

*We are again in the Midst of Trouble: Flooding on the Potomac River and the Struggle for Sustainability of the Chesapeake and Ohio Canal, 1828-1996*

By

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Electronic Research Notes Compendium

The following report was intended to be an electronic notes compendium to *We are again in the Midst of Trouble: Flooding on the Potomac River and the Struggle for Sustainability of the Chesapeake and Ohio Canal, 1828-1996* by Donald R. Shaffer. Research notes from the documentary sources were compiled in electronic form as a word processing files. They consist of primarily of verbatim extracts of original documents from the National Archives, the Washington National Records Center, and other sources. The electronic notes are a chronological, documentary history of flooding and flood damage prevention activities on the C&O Canal from 1828 to 1996. The newspaper clippings and more recent park documents on flooding also were collected in a "C&O Canal Flood File." The clippings and documents in the file are referenced and described, although not transcribed, in the electronic notes.

Subjects can be searched for by performing "word searches." This type of historic material on the flood maintenance for the C&O Canal is important to have when we face similar issues.

Note: see the end of the document for the key to abbreviations.

#### 1828

[190] William W. Boardman, New Haven, Conn., to Governor Tomlinson, Fairfield, Conn., 2 October 1828 (Study-Floods-C&O Canal Company)

This letter discusses flooding on the Farmington Canal in Connecticut. Evidently this canal came through the flood well. Boardman says, "I have no hesitation in saying that the injuries alluded to are attributable to the plan or construction of the canal," although he doesn't specify how. How did this letter get into the C&O Canal Company's files? Evidently, it was a copy of a letter that Tomlinson provided Charles Mercer, the C&O President, in response to Mercer's inquiries about flood damage to the Farmington Canal. See C. Tomlinson, Fairfield, Conn., to Charles F. Mercer, 7 October 1828 in Entry 190.

#### 1829

[CF] [190] Benjamin Wright, Chief Engineer, to C. Fairfax, Engineer, 3rd Residency, 23 May 1829 (Canal Construction-Flood Implications)

"I am much dissatisfied with the line of Canal on Section 32 it appears to me that the wall is pushed into the River at both points much too far. I should even take up part of the wall at lower point and bring in the line at least 15 or 20 feet as I now think, and I should then make back curve to put the indentation between the points thus"

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"All the bottom at A must be filled up and made tight, and I consider that the bend at A in the outside Wall is the best economy [?] and I should rather narrow the Canal at the two points to 45 or 50 feet than to go so far into the River."

[180] "Report of the General Committee," 8 June 1829 (Canal Construction-Flood Prevention)

Evidently one of the earliest strategies of the C&O Company to minimize flood damage was to distance the canal from the river, wherever they could. To wit, the following discussion:

"It appears that in some instances purchases have been made of lands other than those which are required to furnish the line of the canal. . . . it appears that three motives have operated as inducements for these acquisitions. . . . 2nd Where the ground lying between the Canal and the river progressed a guard or barrier which protected the shore and consequently the canal from abrasion by the river during the high stages of water, and it was deemed prudent and necessary to acquire the ownership of the soil, in order to retain an absolute control, in the Company, over such barriers or guards, the removal of which might involve the destruction of their works."

In the same report, the General Committee also expressed the refusal of the C&O Canal, of a request by the state of Virginia, to put the place the eastern terminus of the canal farther down stream, for fear of exposing the canal to damage from tidal floods.

[182] Board of Directors Meeting, 7 August 1829 (Flood-July-August 1829)

"Lewis Sewall, the collector of tolls at Great Falls appeared before the Board and stated, that in consequence of the injury done to the old canal near the little falls, by the late rains and which has destroyed the use of it at that place, persons passing their boats thru the locks at the Great Falls refused to pay any tolls, it was then ordered that the collector be authorized to pass boats at the locks at the Great Falls, free of tolls, until otherwise directed."

[190] Holdsworth and Isherwood, Contractors, Washington, D.C., to the President and Directors, 24 September 1829 (Flood-July-August 1829, Floods-Compensation Claims)

"The late fresh in the Potomac River, having filled two of our Lock pits with water, & having nothing allowed us in our contract for bailing out the same, we would respectfully ask of the board Some reasonable allowance for bailing it out. N.B. Having spoken above in the plural, we would observe, that although one of them is under contract to Loftus, yet as our men intend to commence work first (on Monday next) they will necessarily have to bail out both before they can commence their own (the Guard Lock pit)."

#### 1830

[182] Board of Directors Meeting, 19 February 1830 (Study-Floods-C&O Canal Company, Floods-Compensation Claims)

"The board being informed that doubts are entertained as to the capacity of the culverts at Cabin John, Muddy branch, and Watts branch to carry off the water of these streams in times of great floods; it was ordered, that the Engineer in Chief cause inquiry to be made on the subject, of the people residing near these streams, if the fact be established, as to the capacity of the culverts, that he report to this Board the best means of removing the danger arising therefrom."

[182] Board of Directors Meeting, 26 May 1830 (Maintenance-Dredging)

"Ordered that the Resident Engineer of the 1st residency cause the earth and sand recently washed into the mouth of the lower lock, at the Little Falls to be removed, so as to admit and from the Locks at all times of the tide."

[182] Board of Directors Meeting, 6 June 1830 (Sustainability-Naivete)

In a ploy to raise revenue, the President, C. F. Mercer, suggested, "It may not be unworthy the attention of the stockholders to avail themselves of the same occasion to enable the public, without injury to the canal, to use the towpath, at the discretion of the company, for travelling by other horses than those engaged in tracking the canal boats. A better road cannot well be conceived than a towpath as broad as this furnishes; and a moderate toll."

[180] Second Annual Report, 7 June 1830 (Canal Construction-Minimizing Maintenance)

C. F. Mercer, President, on behalf of himself and the Board of Directors proposed the stockholders:

"Among the causes of immediate, and indeed no inconsiderable expenditure on the Canal, this report has hitherto omitted to notice the construction of those inner slope walls, or pavements, designed to obviate the necessity of future repairs, as well as to extend the use of the canal, to passage boats of quick motion without endangering the abrasion of its banks."

"The New York Commissioners have resorted to this expedient for protecting the banks of their Canal after incurring an annual expenditure, which its early adoption would have saved. It is an expense which, whenever it arises, obviously makes a part of the cost of the construction, rather than of the repairs of a canal. The same motives of economy, however, which have prompted the use of the rock excavated from this canal, for the above purpose, have induced its postponement till the Canal shall be finished, wherever its immediate application would require the transportation of the stone by land, beyond a certain distance."

"The expenditures last mentioned, and the substitution, in all cases of stone for wooden aqueducts, will greatly diminish the future repairs of the Canal, however, the may enhance the primary cost of construction. A resort to such precaution, against future accidents, is enforced by all the experience of that state, to whose example, affording as it does so much to admire and to imitate, and so little to avoid . . ."

[190] P. Aaron Simtz [?], Contractor to Benjamin Wright, Chief Engineer, Georgetown, 18 July 1830 (Canal Construction-Flood Prevention)

"Necessity requires to boald [build?] as strong as possible the corner of the front wall East, near the tumbling dam on piene [?], against the destructive power of the Ice from Potomac River, we are in want at about 50 perches at large stones, at lest from tow; to three, ton's each, they must be wall converted by Iron clamps & lead."

"I understood Mr. Paine will provar [provide?] short stones as mentioned for \$2.00 a perch."

[190] Thomas F. Purcell, Resident Engineer, to the President and Directors, Washington, D.C., 4 August 1830 (Canal Construction-Flood Prevention)

"I would respectfully suggest the propriety of constructing two brick tunnels as sewers under the canal in Geo. Town the one at a creek or run next above Mr. Key's dwelling, and the other in Frederick Street. The wash which comes down at these places it is believed would soon fill the Canal where it is contracted, so as to impede the navigation; besides at one of them the water in heavy rains will come pouring down on the towing path and effectually stop the passage of a horse along it, at the same time would most probably endanger the wall building to support the bank on the upper side of the Canal, as to the other its construction by the corporation of Geo. Town. I am therefore of opinion that it would be prudent to build these sewers."

[190] Benjamin Wright, Chief Engineer, to the President and Directors, 2 October 1830 (Canal Construction-Flood Implications)

"The original plan of the Dams at the Little Falls, and at Seneca, contemplated to have a body of gravel on the the upper side to raise to near the top of the Dam and slope off up stream an angle of descent of about 15 degrees. This has not been done only in part and if it is not attended to very soon the dams are in danger already there appears some stone displaced on the lower side of the Dam where the water passes this in a powerful stream and where the dam has been unfaithfully done"

[194] John P. Ingle, Clerk, Washington, D.C., to Benjamin Wright, Chief Engineer, 9 October 1830 (Canal Construction-Flood Prevention)

"The Board has this day Ordered that the Chief Engineer be instructed to take means to guard effectually the walls of the tide lock from injury by external pressure. They have also Ordered that you provide for the construction of a waste weir upon the most eligible site near or above Mason's Foundry."

[190] Benjamin Wright, Chief Engineer, to President and Directors, 16 October 1830 (Canal Construction-Flood Implications)

"Mr McCan has suggested the putting in some small Brush of Cedar or some thing of the kind with the gravel on the Dam at the Little Falls The Brush to be laid on before the gravel."

"I approve of the plan entirely provided the Brush are very small twigs there should be none larger in the large end than a Mans little finger it they are large they will do more hurt than good. Straw would do fine but fine brush is better it will last longer."

"This is done to prevent the fine parts of the stuff put on from washing thru the dam and be lost."

[194] John P. Ingle, Clerk, Washington, D.C., to Benjamin Wright, Chief Engineer, 23 October 1830 (Canal Construction-Flood Prevention)

"It is ordered by the Board that means be immediately taken to strengthen the wall and embankment on Sec 15, and that the Chief Engineer be instructed to proceed immediately to the Section and examine the same and devise such means as he may deem proper to effect the object."

[190] [211] Thomas F. Purcell, Resident Engineer, First Residency, to C. F. Mercer, President, Washington, D.C., 9 November 1830 (Canal Construction-Flood Implications, Sustainability-Dams)

This letter refers to an opening in the center of Dam No. 1 at Little Falls by a contractor, who left it unfinished. Purcell proposed filling the gap with 400 perches of stone, none less than eight cubic feet each. He said, "This stone if large will not be swept away by the winter freshets."

#### 1831

[190] Daniel Van Slyke, Superintendent, to C. F. Mercer, President, Washington, D.C., 24 February 1831 (Flood-February 1831)

"Presuming that there will be great anxiety in the part of the Board to know the state of the Canal, after the extraordinary freshet, which has not yet abated, I write to say, that where the water has been admitted or retained in the Canal to an elevation as great as that in the river, no damage to the Canal has been Sustained. This has been the case every where, except on the level immediately below the Seneca Guard Lock, on which Col. Gumair is engaged, here a disaster of Some moment has occurred."

"At the culvert next below the feeder, the river having risen about four feet above the level of Canal bottom, forced up the arch wall and puddling of the culvert, through which the water is admitted to an extent, rendering it probable, that the rock excavation in progress there, will have to be abandoned for the present. Moreover, fearing further damage if a similar kind, I have determined to retain the water on that level, to the depth of three feet as this is the greatest height to which it can be raised without wholly inundating Gumair's work. The precise extent of the breach, cannot now be ascertained, but appearances indicate the opening in the arch does not exceed ten feet in length. Of this however, a perfect repair will be requisite, the culvert next below it on the same section in which a breach occurred last fall, and which was calculated to pass the water from the same lands that this is intended the drain, having been closed, and it further use dispensed with, unless a repair shall hereafter be found expedient."

"The breach occurred early this morning. Since which time, the river has become higher by about two feet."

[180] Third Annual Report, 6 June 1831 (Canal Construction-Flood Implications, Canal Construction-Flood Prevention)

C. F. Mercer, President, claimed the company had spent \$22,000 on improvements to the canal since the beginning of navigation, exclusive of the money spent on repairs.

Later in the report, Mercer specifies the nature of these improvements. "They consist of buttresses to support the lofty external walls; of stone transported from the surplus of former excavations, and loosely thrown over these walls, to strengthen their foundation; of earth to raise embankments which have settled since the admission of water; and of inner walls to guard the banks from abrasion by the surge of canal boats."

[194] C. F. Mercer, President, Washington, D.C., to Thomas F. Purcell, Engineer, 17 November 1831 (Canal Construction-Flood Implications, Canal Construction-Flood Prevention)

"The repairs of the dam or rather the effort to secure it by gravelling above it proceeds very slowly and much brush lies on the surface, without a hand near it that I could discover to place or secure it."

"Howards told me he had made the backing of loose stone, narrow opposite the last winter's breaches in Dam 2. I told him to make it in all such places thicker because there I apprehend the greatest danger in the future."

1832

[190] Thomas F. Purcell, Engineer, to C. F. Mercer, President, Washington, D.C., 11 January 1832  
(Flood-January 1832)

"To inform you of the injury done by the ice freshet of to day is an unpleasant duty which devolves on me. Yesterday the ice in its passage carried away the guard gate, this was however repaired, when last night it was again forced open, & at the same time the ice was pushed over the towpath into the Canal at the powder mill on the Falls branch. As soon as intelligence was received this morning Genl Smith, Mr Creager, & myself repaired to the spot & witnessed the removal of the company's bridge at the little falls. the water in the canal was near the top of the bank, & the ice several feet higher, but no other damage was sustained at 1 O'clock & in order to prevent further injury we ordered the towpath to be cut away on Carberry's lands near the waste weir, but before this was accomplished the ice cut a passage near where the Little Falls bridge stood; and it is to be hoped that no further damage will result."

"Such an accumulation of ice is unparalleled it being in places 40 feet higher than tide water"

[190] J. C. Lackland, Superintendent, Canal Line, to C. F. Mercer, President, Washington, D.C., 28 January 1832 (Flood-January 1832)

"Within a few days part I have been able to ascertain with more certainty the extent of damage done to the Dam at the Little falls feeder. There are two breaches. The first on this side of the angle about Midway between the angle and the abutment in this shore, and is about sixty feet wide. The other breach begins at the angle and includes about half of the distance between that and the abutment on the Island"

"The Dam at Seneca has also sustained considerable injury but what extent cannot at this time be correctly ascertained, but there appears to be three different openings which together cannot amount to less than three hundred feet"

[190] J. C. Lackland, Superintendent, Canal Line, to President and Directors, 10 February 1832  
(Flood-February 1832)

"The late ice freshet of the fore part of the present week has passed without doing any additional injury to the Canal of any Moment though at one time from the rapid and sudden rise of the river, and Narrowness of the channel at the head of the Little Falls occasioned by the previous damming of the ice, that part of the Canal below that point was in considerable danger of being overflowed a second time. The water from the river in several places having overrun the Towpath. On Saturday, and Sunday previous I made use of all precautionary means to guard against such an event. Having Closed one of the breaches (the largest) I thought from the very sudden thawing of the river there must be a considerable freshet and that it was most prudent not to close the other breach for a day or so at least, and I think the event fully Justified the Course. Calculating that the greatest danger would occur to the Canal in the neighborhood of the Guard Gate, and after having secured that, I had the protection bank leading from the guard gate to the towpath of the Sec No 1 raised, on Sunday, about two feet above its original height and guarded all of that night, but in despite of all our efforts the water raised to such an height that it broke the bank and poured into the Canal. This was caused by a large Mass of Ice which was lodged by the previous freshet at the head and side of Stewarts Island and which was moved by the Current and shoved in at the foot of the Island so as effectually to stop up the Course between that and the Guard Gate. the Current which came in around by the Magazine having then no vent. To prevent the enlargement of the Breach I had a large quantity of Stone thrown in on each side which effectually stoped its further progress, and the water passed out of the opening in the Towpath without any material enlargement."

"I have so far got the repairs Completed that by Sunday evening or Monday Morning at furthest we shall be enabled to pass boats on the whole line"

[190] J. C. Lackland, Superintendent, Canal Line, to C. F. Mercer, President, Washington, D.C., 10 February 1832 (Flood-February 1832)

"I have made every exertion to get the Canal in order for navigation I am sensible of the importance of having it so but the late rainy and wet weather and consequently the bad roads has unavoidably retarded our progress, having considerable distance to transport the earth, particularly for the breach opposite the Chain Bridge. We shall by Sunday evening or Monday morning be able to pass boats along the whole line. The canal is entirely Clear of ice with the exception of that part along Bear Island where the ice is yet near a foot thickness, and through which I shall have to cause, tomorrow and the next day, a passage to be cut. The present freshet has passed off so far without doing the Canal any material damage though in some measure it has put back the repairs. On Sunday and Sunday night last the river took so sudden a rise, and before we could raise the side puddles of the breach at Muddy branch Culvert Sufficiently high to let in the desired quantity of water on the level, that the little Culvert near the Guard Lock was in consequence somewhat injured by having the Puddle started from the pressure of the water on the side next the river. it will not however stop us from letting in the water."

"The river at this time is very high. it has risen since last night four or five feet and still on the rise . . ."

[190] Georgetown Washington Committee to President and Directors, [c. April 1832] (Flood-April 1832)

Note: this letter could actually be referring to January-February freshets of 1832. The lack of time references in the text and the lack of a date on the letter itself make it impossible to pin down when the freshets it refers to in Rock Creek actually took place.

"We have been appointed a committee by the Levy court of Washington county and by the Corporation of Georgetown, to make known to you the views of our respective corporations, concerning the state of the dam erected by you across Rock Creek near to the Paper Mills & its utter unfitness for travel at this time, and we enclose copies of the resolutions which have been adopted, appointing a committee for this purpose."

"The late freshets in Rock Creek have displaced many of the stones and caused holes [in] the dam which makes it an unsafe crossing for horses and carriages of every description and from the character of the stream and the frequency of freshets in it, we do not believe that any dam can be constructed, which can be made safe and convenient for crossing the creek"

"The remedy for this evil and the only one we believe which will gratify the views & wishes of those we represent is the erection by the Canal Company of a permanent and substantial bridge across the creek at or next to the site of the present dam . . . "

[180] Fourth Annual Report, 6 June 1832 (Sustainability-Naivete)

C. F. Mercer, President, stated in his report, "The net income from this source [tolls] has, in the first two years of the use of the canal, been greatly reduced by deduction for its necessary repairs. It will be proportionably augmented with the diminution of those repairs, as experience on this, and all similar works carefully constructed has invariably shown."

[190] Alfred Cruger, Resident Engineer, Washington, D.C., to the President and Board of Directors, Washington, D.C., 24 August 1832 (Canal Construction-Flood Prevention, Sustainability-Dams, Warnings-Flood Vulnerability-Dams)

Cruger in this letter offers his suggestions for the completion of Dam No. 1 at Little Falls, in part with a mind toward securing it from freshets. He writes, "With regard to that portion between the Island & Maryland Shore, I think it expedient to finish it in the best manner upon the former & present plan. The abutments will require some alteration & Repairs, which I have described to the Superintendent & directed to be done. This work is now progressing & may be finished in 3 weeks. The Character of the work is far better than that executed by McCord With regard to the plan & manner of the Constructing that portion between the Island & the Virginia Shore, I think that too imperfect to last more than one winter. if a dam is necessary now, one will always be necessary; if so why not make a permanent dam; if this, at present is not expedient on account of its cost, then one of the most economical construction should be erected, with the expectation that, the first ice freshet would overthrow it, & with the previous knowledge that it will be necessary to repair it every summer. This will be a small yearly cost, but it does not interfere with the main object of the Co. by subtracting from their means of executing them."

"For a temporary work (which in my opinion the part under consideration is) I think it altogether too costly. I would therefore recommend the Board to finish it as far as it is now commenced upon the plan intended, & then to throw up in a line with the dam, across the River the stones formerly taken there. The objections to this will be that a portion only of the dam being finished, it will be swept off & that the materials of wood (poles) will be lost, to which I would answer that at the point where this portion of the dam will terminate, two large & firm rocks are situated, which will give it security, & that this wood can be cut up in chord wood & sold, for its value."

"The plan I would recommend is to construct a permanent dam of the most approved construction entirely across the Virginia side. The position & form of this dam will depend upon local considerations derived from facts discovered in an examination of the bed of the River. I have thought that a position at the head of the Island, would be the most eligible, as the fall in the bed of the river would cause a dam of less height at that place, than at the first place selected, by which the cost of hazard would be lessened. Under this impression I have directed that the soundings be ascertained, & upon this information, we can institute a comparison of the advantages of two positions, & ascertain whether the one possesses advantages superior, to other, sufficient to compensate for the cost of removing the old site, & the upper one."

[190] J. C. Lackland, Superintendent, Lock 5, to John P. Ingle, Clerk, [c. 1832] (Flood-November 1832)

This letter was in the November 1832 correspondence file, but it is not dated except for a notation made by a clerk later, "1832." It could refer to the flood of January 1832, which was also an ice freshet. In any case, November seems a bit early in the season for an ice freshet in the Mid-Atlantic region, although it is possible.

Lackland writes: "I have just received yours of to day, and in reply I have to state that there has been some damage done to the Canal below the Guard Lock at the Little Falls, but not near as much as might be expected from the tremendous rush of ice. The towpath was yesterday overflowed from the the 5th Lock as far as below the bridge across the Canal in some places six feet deep, the consequence was that the bridge across the Canal was amediately carried away, and two openings

made in the bank one a few feet above the Culvert on Section F. The last named breach is about 50 or 60 feet in breadth the other about 40 feet wide. I have has the water so secured above that there is very little now coming in. The Guard Gate was carried away on Tuesday morning, but I immediately secured it by timbers plank & brush before the rush of ice took place. It yet stands firm. The Canal is so far safe between this and Seneca. But what the else may be it is impossible to tell. The Ice at this time is completely dammed from a short distance above the Dam up as high as the 8th Lock, but I am in hopes it will move off without doing further injury. It seems to be gradually moving off from the lower end. I apprehended on last night serious injury to that part of the Canal between the 6th & 7th Lock the Ice being dammed up as high as the towpath for more than half of the distance & the water in several places on the top of the path and within five or six inches of running into the canal. It has now fallen about three feet. I shall be down on Saturday and in the mean time I shall further examine the Canal to Seneca and report accordingly, but there is I do not believe the least danger to be apprehended above the 7th Lock"

Note: at the back of the folder for Nov. 1832 there is a printed form listing the specifications for contractors building the canal.

### 1833

[190] C. F. Mercer, President, Washington, D.C., to the Directors, 21 January 1833  
(Study-Floods-C&O Canal Company)

"The intelligence we have of the failure of the Pennsylvania dams over rivers of like character with the Potomac and the fact that for part of the new line of navigation we are to rely on a pond formed by one of our dams induce me to propose to the Board to instruct Mr Purcell the Engineer of the 4th Residency on which two dams of 20 feet elevation each to be built to visit the Pennsylvania dams and ascertain the causes of the failures and the remedy therefor so as to guard effectually in the structure of the Potomac dams against the occurrence of like accidents when the effect would be even more pernicious."

[182] Board of Directors Meeting, 29 November 1833 (Sustainability-Embankments)

"A letter was received from Alfred Cruger, representing the present situation of the near to Georgetown, and the expediency of strengthening the Embankment. The letter was read and referred to a Committee consisting of Phineas Tannev, William Gunton and Walter Smith."

[182] Board of Directors Meeting, 6 December 1833 (Improvements-Unspecified)

"The committee to whom was referred on the 29th Ultio. the letter of A Cruger on the subject of the present condition of the Canal near Georgetown, made a report in writing, recommending that certain improvements be made. The report was accepted, and a Committee was appointed, consisting of Walter Smith and William Gunton, with authority to have the recommendation of the report carried into effect."

### 1834

[190] Thomas F. Purcell, Resident Engineer, Williamsport, to John P. Ingle, Clerk, Washington City, 15 January 1834 (Flood-January 1834)

"Yesterday the Potomac rose 16 feet in about 12 hours, the ice broke up bearing off two bridges across the river. I have heard from Dam No 5 this morning, it has not sustained the least injury: we have no positive information from Dam No 4, but it is said to remain uninjured. Mr Hollman lost his boats and some loose timber. The ice was piled yesterday about 30 feet high, & four miles in length, above Hollman Dam. Since writing the above I have learned that Dam No 4 which is now 21 feet, & the top of it only part planked, has not sustained the least damage. It is impossible that the dams can ever again be exposed to so severe a trial, as that to which they were subjected by the ice freshet of yesterday; and they stand uninjured, a striking refutation on the works made by the state of Pennsylvania, that Dams across rivers, to supply canals with water, were insecure & could not be made to stand."

[190] A. B. McFarland, Superintendent of Masonry, Boonsboro, to John P. Ingle, Clerk, Washington D.C., 20 January 1834 (Flood-January 1834)

"There is at this time a great freshet in the river and I apprehend that some the unfinished embankments of the canal will sustain some damage. The arches of the Antietam & Conococheague Aqueduct were completely filled with water yesterday morning, up to the soffits [?] of the keystones. Both buildings however I am happy to say are not likely to sustain any serious injury. The culverts are nearly all immersed in water, so that I am unable to say whether or not they have sustained any damage. The Maryland abutment of Mr Hollman's Dam, and the embankment next to it are said to somewhat damaged, and the Virginia abutment of the upper Dam is also reported to have sustained some damage. This last however if the statement is correct, will favour the temporary Lock at this place. It must be understood however that the water is yet, too high to enable me to speak with certainty of the injury, if any done to any part of the work."

[190] Charles B. Fisk, Superintendent, Harper's Ferry to John P. Ingle, Clerk, Washington, D.C.,



27 January 1834 (Flood-January 1834)

"The canal from Shepherdstown to Seneca has sustained no injury by the late high water."

"The navigation of the river has generally been spoken of as divided into three stages 'High water', 'Low-water' and 'the lowest water'."

"The usual period of High-water' has been from the opening of the river in the spring to about the last of May with occasionally intervals 'Low water'. Sometimes there has been a month of High-water in the fall say November."

"The usual period of 'the lowest water' has been during the 3 months of August, September & October."

"The remainder of the year, may be called the period of 'Low-water' navigation."

[190] James Forman, Berkeley County, Va., to W. Price, Attorney-at-Law, Hagerstown, 28 January 1834 (Flood-January 1834, Warnings-Flood Vulnerability)

Forman is complaining to his attorney that raising the height of Dam No. 4 is destroying his mill and "I think the Late Rise in the potomac will Show that the Dam is too high for safety of the work I have Seen the Potomac at Least Eight feet Higher then the Late Rise . . ."

[182] Board of Directors Meeting, 14 February 1834 (Flood-January 1834)

"A letter was received from C B Fisk stating that he had directed the necessary steps be taken to secure the Bridge on 27th Street from further injury as suggested in the letter of N Frye. The Board approved the proceeding."

[190] Charles B. Fisk, Superintendent, Harper's Ferry, to John P. Ingle, Clerk, Washington, D.C., 1 March 1834 (Flood-January 1834)

Fisk lets Ingle know he has recommenced filling the canal with water that morning and the water had already reached Berlin (now Brunswick).

[190] Charles B. Fisk, Superintendent, Point of Rocks, to John P. Ingle, Clerk, Washington, D.C., 8 March 1834 (Flood-January 1834)

Fisk lets Ingle know that navigation has been completely restored on the canal from Harper's Ferry to Georgetown.

[190] Charles B. Fisk, Engineer, Washington, D.C., to the President and Directors, 18 March 1834 (Flood Damage Prevention-Proposed, Harper's Ferry-Sustainability)

"Several Waste Weirs will be needed on the canal above the head of Harpers Ferry Falls before the water can be safely admitted. It would be advisable therefore that the Board authorize their immediate construction."

[190] Thomas F. Purcell, Engineer's Office, Williamsport, to the President and Directors, 11 April 1834 (Flood-April 1834)

"It ceased to rain last night after a almost uninterrupted continuance for six days, during a great part of which time it rained with exceeding violence."

"The river rose to the height of about 20 [?] feet at this place, and where the river was narrow, it attained a much more considerable elevation. It has done some injury to the body of Hollmans Dam, swept nearly all the material that we have been engaged putting in for sometime past the abutment of said Dam, and opened a breach about 200 feet long on Sect 155 which is next below the Dam. These constitute the principal injuries that I yet know to be sustained by the portion of Canal under my charge; the river being yet 14 or 15 feet above low water it is not possible to discover the real extent of the damage. The freshet was unusually rapid in its rise, and rose to an uncommon height. The effect of all this will be to delay the opening of the canal beyond the time fixed before the accident occurred."

[182] Board of Directors Meeting, 18 April 1834 (Flood-April 1834)

"A letter was received from T F Purcell reporting that the late freshet in the river, had again carried away the Embankment connected with the abutement of Dam No. 4. It was Ordered that said Purcell be directed to report whether these accidents were the consequence of an eroneous location, or of bad construction of the work; at whose cost the damages are to be repaired, and whether any part of such expense of repairs has been expressed in Estimates rendered on the work." The board also authorized him to repair the damage.

[190] J. Y. Young, Superintendent, Canal Line, to "Gen," [probably refers the C&O President Charles F. Mercer, who was sometimes called "General Mercer"] 14 April 1834 (Flood-April 1834, Sustainability-Embankments)

"Their has occured on the eleventh Section in consequence of the last rain, A large Slide from the berm bank of the Canal about 140 feet in length, and about half of the bank in width Also in the towing path side, but being much Smaller, I have removed My hands from the Glass House wharf to this place. To repair it in the Following manner first by removing the fallen earth from the

outer edge of the base and sinking a ditch to the Sallied [?], After which build a wall Sufficient to Sustain the pressure of the high bank above this I believe will effectually Secure it."

[190] Thomas F. Purcell, Engineer's Office, to the President and Directors, 21 April 1834 (Flood-April 1834)

"We have had during the late freshet from 7 to 5 feet depth of water in the canal from dam No 4 to Shepherdstown. The work generally stood very well: no breach made in any part by the water in the Canal. After the river had subsided some of the embankment slipped down on Section 138, in consequence of its being so suddenly & thoroughly saturated with water. It will be necessary for the Board to give me a general power to have the repairs done. I expect to get the water through in two weeks."

[194] John P. Ingle, Washington, D.C., to Thomas F. Purcell, Engineer, 6 May 1834 (Flood-April 1834)

"It has been represented to the Board by Mr. Douglas, in behalf of Mr Henry, that the late freshets in the Potomac River have already produced serious injury to the land below Dam No 4, and that unless some means shall be immediately taken to protect the River Bank, her House (perhaps Mill), will be in danger of being thrown down, the Board directs that you examine the premises, and report the extent of injury done, and the best means of correcting further damage with its probable cost. "

[190] J. Y. Young, Superintendent, Canal Line, to "Gen," 27 June 1834 (Flood-June 1834)

"In consequence of the severe rains on Sunday and Monday last their was a small breach through the berm of the Canal over Culvert 5 Section 5, however the navigation was suspended but for a few hours"

[190] Charles B. Fisk, Point of Rocks, to the President and Directors, 14 July 1834 (Warnings-Flood Vulnerabilty)

"The river bank between the canal and the Maryland abutment of Boteler & Reynolds dam, near Shepherdstown, has sustained serious injury from the high water of the Potomac for several years past. This injury is rapidly increasing with every rise in the river. The cost of securing the bank, in its present state, will be expensive, but it will be much more so if longer deferred."

"The injury to the bank has manifested, been occasioned by the Dam & sluice. The closing of the sluice, however, will not be sufficient to prevent further damage."

"I bring this subject before the Board, as being one that requires immediate attention. If not soon attended to, the towpath itself will be carried away."

[190] Charles B. Fisk, Superintendent, Point of Rocks, to John P. Ingle, Clerk, Washington, 12 August 1834 (Flood-August 1834)

"On Monday night we had a very severe rain that has done some injury to the berm bank over Poplar run Culv on Sec 90. The Culv. itself is slightly injured."

"A large quantity of timber rails &c dam'd up at the upstream end of the Railroad Culv. lately built by the RR Comp. The water rose entirely over their road which is about 17 feet above Canal bot. and carried away from 600 to 1000 yards of the RR emb. The Canal Berm bank in narrowed perpendicularly down on each side for 20 feet in length to about 8 feet. The puddling is also washed out a little below bot. This has delayed about one day perhaps the filling of the Canal as We are compelled to draw down the Canal to make the repairs."

[182] Board of Directors Meeting, 12 November 1834 (Flood Damage Prevention-Ordered)

"A letter was received from J Y Young representing the necessity of forming a stone abutment to support the high wall on Sec. 18 and also of repairing the temporary Lock on Sec D. It ws thereupon Ordered that said Young be directed to construct the abutment on Section 18, and, that Charles B Fisk be directed to report a plan and specification for constructing a Stop gate on or near the Site of the present temporary Lock."

[194] John P. Ingle, Clerk, Washington, D.C., to Charles B. Fisk, Superintendent, 14 November 1834 (Flood Damage Prevention--Ordered)

"Mr John Y Young has reported that the Temporary Lock on Section D is in a very weak state, and under the impression, that it may long be necessary to have a Stop Gate there for the protection of the work below, the Board has requested that you report a plan and estimate of a Gate with Stone Abutments, at or near the site of the present Lock."

[190] Thomas F. Purcell, Washington, D.C., to the President and Directors, 19 December 1834 (Sustainability-Embankments)

"Permit me to draw your attention to that part of the canal lately finished between Hollmans Dam & Guard Lock No 4. The Guard bank designed to keep the water of the river in times of high freshets from entering the canal needs raising & strengthening; the bank from 8 to 10 chains below the Dam should be raised and such other security as may appear to the Superintendent necessary on inspection should be attended to without delay; for the spring freshets overflow

this bank great injury will result."

1835

[190] Charles B. Fisk, Superintendent, Washington, D.C., to the President and Directors, 21 January 1835 (Flood Damage Prevention-Proposed)

"It is important for the safety of the canal that there should be at least three wastes put in between Shepherdstown & Holman's dam this winter. Will the Board order them to be built. A reference to a letter of mine of Dec. last will show I think the importance of their being built."

[190] Charles B. Fisk, Superintendent, Washington, D.C., to the President and Directors, 5 February 1835 (Maintenance-Culverts)

In this rather lengthy letter, Fisk brings up the recurring problem of breaches in the canal over the culverts. He confessed, "The only way to guard against similar breaches hereafter at Culverts . . . is occasionally at a proper season for two or three years . . . to draw out all the water from the Canal and to examine closely the puddling of the Culverts. This the Board will recollect I advised last summer above Seneca, and by their approval the water was drawn out in August, and it is a fact that not a breach has since occurred on the portion of the canal thus examined. I mention this now, merely for the purpose of stating to the Board, that I have not the least doubt that the drawing out of the in August, save in the end, time & money, by the prevention of breaches."

[190] Charles B. Fisk, Superintendent, Harpers Ferry, to the President and Directors, 5 April 1835 (Maintenance-Aqueducts)

"Since my return I have examined the breach at the Catoctin Aqueduct. It is of a more serious nature than any that we have had above Seneca."

"Would it not be best to do at once what at last we shall be compelled to do, and what I would have long since recommended but for the scarcity of money, that is rebuild all of the wings. As they now are the Aqueduct never can be secure with 6 feet of water, it is absolutely impossible that it should be. The wings of an aqueduct ought particularly to have as firm a foundation as the piers and abutments themselves, and if rock can be had the foundations should be upon it.

"The wings ought always to splay out to the full width of the Canal as nearly at right angles to its direction as the nature of the stream will admit of, and connected with these wings there ought to be near their termination masonry with foundations equally good, extending in a direction nearly parallel with the canal & running into the bank. It is also of the greatest importance that the side of the wings next the embankment and the back of the abutments and in fact all of the masonry that joins the filling or the puddling, should batter and should have a face as smooth as masonry can be laid, with out cutting, in order that the weight of the filling shall press it the closer against the masonry. In addition to all this the masonry should be as water tight as it can be made, and in no case should any dry masonry be admitted."

[190] Charles B. Fisk, Superintendent, Washington, D.C., to the President and Directors, 23 April 1835 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"The work at present required upon the finished part of the Canal. The Canal bank above Georgetown is not safe. There is not weight enough in the bank to sustain the pressure. The outer slope is too steep, there is not strength sufficient at the base to prevent the bank from sliding, at a suitable time there ought to be put in a stop gate of masonry near the wooden lock."

"The Board by an order have required of me a report on the expediency of repairing the Tuscarora feeder. Were the Canal perfect, and no danger of breaches occurring, I would say that it is not necessary. But we have had several cases lately in which we would have found it very useful in keeping up the levels between the Point of Rocks & Seneca upon the breaking of the Canal above. By keeping up this we save time in the refilling of the Canal. and in case of a great length of time being required for the repair. We can prevent injury to loaded boats that may be stopd. \$400 would probably put the wooden trunk & embankment in the situation it was before the breach but \$200 more would probably be required to make it safe."

"The gravelling & filling in of Holmans dam particularly at the Maryland abutment is not completed. A very high freshet will endanger the embankment around the abutment unless considerably more filling shall be put in."

"Along the whole line there are several more places that the canal is unsafe for the want of suitable outer protection. Several wastes are needed. Also flumes."

"My opinion is that there ought to be formed a plan for the general improvement of the canal, in order that it may be made as perfect as possible, and that every thing done by the Superintendents should aim towards the carrying into execution this plan. Unless something of this kind is done we shall have merely a four feet canal. There are several levels this side of Seneca as well as above into which it is unsafe to put the full depth of water."

[194] John P. Ingle, Clerk, Washington, D.C., to George Bender, Commissioner, 27 May 1835  
(Flood Damage Prevention-Proposed, Sustainability-Dams)

"Mr. Purcell has furnished the Board with a plan & Specification of the work proposed to be done at the Virginia Abutment of Dam No 5, also with an estimate & proposals for its execution"

"As these appear to embrace extensive walls not anticipated by the Committee when at Williamsport & much increase the contemplated expenditure. I am directed to send the whole of them to you & to request that you will with Mr Fisk examine the ground & if the security of the Dam & Abutment shall appear to require that so much be done, that you contract upon reasonable terms for its immediate execution. It has been stated here that the wall A is necessary to support the of the Abutment heretofore built, if this be a fact, it will be a good reason for erecting it, but the Board desire to be informed on this point."

Note: no diagram is included with the transcription of this letter.

[180] Seventh Annual Report, 1 June 1835 (Improvements-Unspecified)

G. C. Washington, President, on behalf of himself and the Board of Directors commented on the completed portion of the canal (then 110 miles long from Georgetown to Dam No. 5):

"Protection walls, embracing fully thirty miles in extent, have been constructed on the line of the canal, varying from ten to twenty feet in height, and, in some places from forty to sixty feet."

Where did they specifically build these walls?

[CF] [207] W. S. Elgin, Superintendent, Conrads Ferry, to Charles B. Fisk, Resident Engineer, Washington, D.C., 28 June 1835 (Improvements-Unspecified)

"I have this day finished Examining Section No 63 I commenced 450 feet above the Culvert on the upper end of Section No 62, at the point I think the wall should Commence as I think there is sufficient strength to the point for 950 feet Runing up I think we can get sufficient gravel foundation the remaining 450 feet will be in water of about 2 1/2 feet depth which I think will have to be ripraped until we reach the surface of water with the Exception of two points which will run by the line of wall accationed [?] by the sliding of the bank last spring than two points will have to be cut through for the foundation of wall. the two points spoken of are about 50 feet each in length putting 950 + 450 feet = 1400 feet is the length of the wall this briges [?] the upper end within 50 feet of the Culvert on Section 63 above this point I think thar is sufficient strength in the bank by throwing over some stone on the slope."

"I have measured out fifty feet which makes bout 2 1/2 feet slope to the foot rise which takes to the out part of the wall without encrouching on the base of the embankment the foundation for the wall will avage 2 1/2 feet to gravell for the 950 feet . . ."

[Original in Box 1 of #207]

[190] George Bender, Commissioner, Hancock, to the President and Directors, 21 September 1835  
(Sustainability-Dams)

"Mr. Fisk had previously mentioned that reports had reached his ear that part of the body of Dam No. 5 as well as part of the walls of its Virginia abutment rested on Gravel, and further that the walls of that abutment were laid in great part without mortar or sufficient grouting. He had expressed his disbelief of the truth of both these reports, but was then on his way with Mr. Morris to examine more closely as the water was very low, and would afford an unusually good opportunity for examination. He has just now returned. He says that Mr. Morris & himself have discovered that for about 80 feet in length of the lower side of the Dam, not far from the Virginia end, the lower timbers do not rest on the bottom, but that the bed of the river appears to have been washed out below them, and through the aperture this created the stone filling has has also been washed out to the extent of many cubic yards, leaving a cavity into which Mr. Morris & himself entered in pursuing their examination."

"Now the object of this statement is that no time may be lost, but that directions from your Board be sent to Mr. Rodgers [the relevant canal superintendent] to give his immediate attention to these particulars, and that he call on Mr. Fisk for orders and advice as to the best, and most expeditious, mode of securing this Dam, a work which we have been accustomed to think among the best woks on the line, but which it is feared will turn out to be among the worst."

[CF] [190] Unknown to Unknown, "Monday Evening," "Greenwells place" [c. Oct. 1835]  
(Sustainability-Dams)

This document is evidently a fragment from a longer letter. Probably written by a contractor. Contains a cross section drawing for a masonry dam. This drawing could be useful in assessing the ability of the design to withstand floods.

[Original in Box 11 of #190]

[194] John P. Ingle, Clerk, Washington, to J. Y. Young, Superintendent, 11 November 1835 (Flood Damage Prevention-Proposed)

"The Board directs that you make enquiry and report an Estimate of the cost covering the inner side of both banks of the canal between Aqueduct No. 1 and Lock No 25 with stone sprawls, wheresoever it may require it, within that distance."

[190] Ellwood Morris, Camp 7 Mile Bottom, to Charles B. Fisk, Resident Engineer, 16 November 1835 (Flood Damage Prevention-Proposed, Sustainability-Dams)

Morris, a member of canal company's engineering corps writes concerning the construction of a proposed dam near the Paw Paw tunnel. "I would in this situation recommend the Board to build a dam of Masonry; its cost would but little exceed that of a wooden dam of the best construction, while it would have the advantage of permanency & of securing to the canal in the Low, water season the entire flow of the river."

[207] William Brown, Dam No. 5, to Charles B. Fisk, Resident Engineer, Hancock, 29 December 1835 (Flood Damage Prevention-Proposed)

Brown speaks of an embankment "around the head of the abutment [at Dam No. 5] to protect it From ice and freshets of the River . . . "

1836

[190] J. Y. Young, Superintendent, Canal Line, to the President and Directors, 12 April 1836 (Flood Damage Prevention-Ordered)

Young writes, "I have made arrangements to complete the waste ware next above the old Locks [near the Muddy Branch Culvert on Section 30? Young is not clear where he is putting in this waste weir, evidently because this is an old project the president and board are already aware of] which was suspended last fall in consequence of the weather becoming too cold to use cement. All the necessary materials have been placed on the Spot and the work will be resumed this week and completed as soon as practicable."

[190] J. Y. Young, Superintendent, Georgetown, to J. P. Ingle, Clerk,, Washington, D.C., 1 June 1836 (Flood-June 1836, Harper's Ferry-Sustainability)

"I shall start early tomorrow for Senaca The sudden rise in the river Since I saw you induces me to apprehend a same serious damage to the Canal when the back water shall arrive The whole space between Lock 5 & the Virginia Shore is already covered with water. I hear tonight from Senaca that the river is higher at that place than it has been for some years. I am afraid the water will get over the embankment at Senaca. Captain Taylor from Shepherds Town to day informs me that the sudden rise here is from the Shanadoah entirely. As the Potomac above Harper's Ferry has raised but little as yet. Should this be the case and the water already so near the top of the towing path, as represent I, we may apprehend a serious consequence. It is the opinion of Taylor and others that the water by tomorrow while be entirely over the embankment. I only hope it is not so bad. The heavy embankment on Sec 11 has slipped over the outer side. I have ordered the work draw so as to ease the swell. This I think is in no danger."

[190] J. Y. Young, Superintendent, Canal Line to J. P. Ingle, Clerk, Washington, D.C., 2 June 1836, [6 a.m.] (Flood-June 1836)

"Yesterday evening the water raised about three ft. and this moment it passing over the towing path below Lock 5, 7, & 8. And the river yet rising. Since 4 oclock it has raised at the Little Falls three ft Driven the Lock Keeper from his house and raise a three ft on the upper side. I have asked a Mr. Padgett to cut through the embankment on Sec E if he found a waste ware cannot take all the water. I am induced to do this to save the high embankment on Sec B. This will not be done unless necessity requires it. I shall go immediately to the great Fall and use every effort to save the Canal. Mr Padgett will be blow. Ther is no passing down the Canal from this place. All the stone part of Dam No 1 will go I am afraid. The water is entirely over the high abutments and Fish [illegible] Island. The high embankment on Sec 10 & 11 have settled very much, I have had the water drawn from the level every effort shall be made to secure the Canal that I can put in force. This is the largest freshet by far we have had since the completion of the Canal. I hope for the best, but should the river continue to raise I do not believe the damage could be replaced in six months."

[190] J. Y. Young, Superintendent, Canal Line, [near Lock 21] to J. P. Ingle, Clerk, Washington, D.C., 2 June 1836, [4 p.m.] (Flood-June 1836)

"When I wrote you yesterday I gave a rough account of the situation of the 1st nine miles of the canal at that time. And what would probable be the result should the river continue to rise assuming yesterday. After writing the above note I started up the canal. The long levell was in good order except the settling on the 10th & 11 Sec which I spoke of yesterday. When I arrived at Crommelin to my utter astonishment I found a large Breach through the embankment at the head

of the 20th Lock. 100 ft. in length with a full head of water passing through it. I then continued up the canal on the North or berm side. And found the water from the River passing over the Canal Bank and entirely carrying the whole embankment from Lock 21 to Bealls Land at least a mile. From that point towards Lock 20 for the same distance the river was lower than the canal which procured a rapid current from the canal to the river cutting away the embankment at a rapid rate. The current of water passing through the canal moved at a velocity of 12 to 15 miles an hour. From Lock 21 to 22 is precisely in the same situation. And so to Seneca. I did not get as far as Seneca. But have sent a man to the Lock Keeper. The only plan I could adopt with the Geo Town level was to cut away through on Sec E to save the high embankment of Sec B. The level between Lock 7 & 8 has been broken by water entering the canal as with the upper levells. The water at this time passes in the canal and out as rapidly as it did early in the day washing and destroying everything in its course. It is impossible to form an idea of what will be the final results. If it should continue in this way much longer between Great Falls & Seneca. The greater portion of the canal will have to be rebuilt,. All the Island with the embankment opposite in many places here are entirely covered. As if neither Canal or Island ever existed. When and where it will stop God only knows. The river is believed to continue to rise at this place Lock 21. There is no traveling on the towing path. I have left my horse and taking afoot over rocks. You shall hear again tomorrow when I hope the water shall have subsided."

[194] John P. Ingle, Clerk, Washington, D.C., to G. W. Rodgers, Superintendent, 2 June 1836 (Flood-June 1836)

"Apprehensive that the present rise in the river will injure the Canal, I write to request that you will report on the subject to the Prest every day until the extent of damage shall be known"

[190] J. Y. Young, Superintendent, Canal Line, to "Dear Sir," 3 June 1836 (Flood-June 1836)

"Since I saw you this morning, I have had a better chance of ascertaining the damage done As the water has already fallen about three ft and continues to fall my instructions to have the embankment opened at some point above Sec B & C was intended to save the high embankment near Geo. Town where it must be evident of the quantity of water had to pass through must cause a breach the cost of which would be five times the some required to repair one caused by the same quantity of water on Section F. The water when the embankment was opened on Section F was that moment on the top of the towing path. And evidently would have attacked the weakest point of the embankment which you are aware is the exposed part of Sections B & C if not suffered to pass before it reached that place. Next Dam No 1 I am as yet unable to give you any information with regard to the damage that may have been done to this work. I hope it escaped."

"A large breach on Sect 5 near Cabin John Culvert where the water passed which entered the Canal in Section 7 and washed the embankment in the Canal for 400 ft in length. It still continues to power through this place passing down the the Canal and out at Sect 5. This as in all similar cases cannot be stoped untill the river falls. The levell between Crommelin & Lock 21 is nearly the same situation as when I last wrote to Mr Ingle. The Breach at Lock 20 increases. And the embankment above that where the water is passing over the towing path is much torn and washed in holes."

"Between Lock 21 & 22 is nearly the same situation. The current of water passing through the Canal cannot be checked until the water falls."

"Match Branch appears to be safe so far. The next levell between Lock 22 & Seneca has broken near Muddy Branch on the berm of the Canal. And Another opposite Long Acre. These and others between Seneca & the Falls cannot be told what their dimensions untill the River shall have fallen. At present the water is entering the Canal at the upper end of each of these levells & passing out below. And will continue to do so untill the river falls below the bottom of the canal As the opening where the water enters the canal is nearly as great through the embankment. As where it passes out."

[CF] [190] Charles B. Fisk, Resident Engineer, Williamsport, to John P. Ingle, Clerk, Washington, D.C., 3 June 1836 (Flood-June 1836, Flood Damage Prevention-Proposed, Sustainability-Dams)

"The river is running around the Maryland end of Holmans' dam [Dam No. 4]. I do not think that the canal between that point and the next dam below will again [be] navigable short of two months."

"The canal in many places has received serious injury but nothing so far I hve seen or heard to bear comparison with that at Holman's dam."

"At Dam No 5 the river rose so high as to run slightly over the guard gates. No injury has yet been sustained there except that the river has broken into the canal below the dam and broken out again in several places. Many levels have been completely covered by the river. If any one has doubts as to the expediency of guarding a canal against high water he had but to visit the line of canal. . . . I am making conditional arrangements for the repair of Dam 4 We propose a water tight wall of masonry that will connect the abutment with the solid work of the Maryland shore. Thus our wall will run up to where the solid rock rises to the highest point on the berm side of the canal thru this solid wall of masonry will be an opening for the canal with lock gates. I find upon inquiry that before the dam was built the water within the remembrance of the persons living there several times 3 or 4 ft higher than the top of the abutment at A. [Original in box 13 of #190].

[190] James O'Reilly, Georgetown, to John P. Ingle, Clerk, 3 June 1836 (Flood-June 1836,

Harper's Ferry-Sustainability)

"Knowing you are desirous to hear from the damages done to the works in the different parts I have heard nothing as yet that can be relied on. The captain of the packet came down last evening as far Lock 11 - 27 via the towing path those he had to swim his horses across and take the road via Poolsville. He states that the canal near to Harpers Ferry Bridge could not be discovered to suffer very much that it was covered with water towing path and all it was feared that Shenandoah Lock had suffered more or less. . . . There is very little damage done in the neighborhood of George Town. the old coping logs being already rotten the length of the water displaced them and took some of them off. It also washed away about the matter of 30 yds of dirt near the Glass house. The water at present is running in the canal a few hands will be able to repair it in one day."

[CF] Alexandria Gazette, 3 June 1836, 3 (Flood-June 1836)

"Potomac Bridge," "High Tide," and "The Canal." The Gazette reports minimal damage to the canal, despite the recent freshet.

[182] Special Board of Directors Meeting, Saturday, 4 June 1836 (Flood-June 1836)

"A letter received from J Y Young reporting an uncommon rise in the waters of the Potomac, and serious injury to the Canal. It was ordered that the Superintendent be instructed to proceed without any delay to make all repairs which may be called for reason of the late freshet."

"Ordered that two thousand dollars be advanced to J Y Young for repairs if the Canal."

[190] G. W. Rodgers, Superintendent, Dam No. 4, to John P. Ingle, Clerk, Washington, D.C., 4 June 1836 (Flood-June 1836)

"I am under the painful necessity of informing you of the damage done to the canal by the High Water On the 1st day of June the water in the River rose to such a height it flowed over the towing path at the tail of every lock between dam no 5 and the Harpers ferry falls Except lock no 37 the damage down to the canal is as follows there are 3 small breaches in the tow path near Gd lock no 5 one at the stop gate above Williamsport on through the berm bank over the culvert above aqueduct no 5 and some small ones between Williamsport and Lock no 42 a breach through the gard bank above Dam no 4 about 200 ft in length and about 1/4 of a mile of the tow path washed away below dam below dam no 4 the break is all above the old one from about 70 ft above the dam and about 300 ft below the gd bank is still standing as near as I can ascertain at the breach it has not yet washed the earth away below the course of the dam and if the water continues to fall as fast as it has since 12 oclock this day the damage will not be as much as it was supposed to be there are a number of Small Brakes through the Towing Path between dam no 4 and gd lock 3 but none of much note with the exception of the breaks at dam no 4 the canal could been put in a navigable state in about 3 weeks but as the water does not fall fast it is impossible to say What the damage will be at dam no 4 I going an to Refrain it as fast as in my pauses." Rodgers goes on to say that as soon as the water falls he'll be able to state the full extent of the damage.

[190] Charles B. Fisk, Resident Engineer, Hagerstown, to John P. Ingle, Clerk, Washington, D.C., 4 June 1836 (Flood-June 1836, Sustainability-Spillways, Sustainability-Waste Weirs)

"Since writing to you last evening I have met with Mr. Rogers. From convening with him I am encouraged to hope that the injury will not be as great as I was fearful that it would be at Dam No 4. The water is running around the abutment but not in the same place that it did two or three years since. a large body of earth and rock is left between the breach and the masonry of the abutment if this only remains and the rest of water can be confined to its present channel the damage will be comparatively inconsiderable. time only will decide this, two or three days, or until the water shall have considerably fallen. Mr. Rodgers however still thinks from the examinations he has made and his acquaintance with the manner in which the former repairs have been made that he will be able perhaps in ten days to stop the breach. In the mean time he is making every effort to do what is necessary. having in him full confidence I do not think that it will be advisable to make any other arrangements than he has done that is to employ his own force with such addition as finds necessary under his own management. It is possible that my first apprehensions may be realized but I trust not and I may add I think they will not be. In the mean time & until an opinion can be formed with more certainty no time will be lost. The stop lock & gate I still consider important a plan and estimate shall be presented to the Board."

"Mr. Rogers informs me that the injuries to the towpath between Williamsport and Harper's ferry are mostly of the same character as those sustained by the canal above Williamsport, and I mention in my yesterday's letter. that is into many of the levels the river has run over into the canal at the upper end and has broken its way out at different places towards the lower end of the levels. The want of waste weirs and tumbling wastes have added very considerably to this class of injuries."

[190] J. Y. Young, Superintendent, to John P. Ingle, Clerk, 4 June 1836 (Flood-June 1836)

"I passed up the Canal from Geo. Town to Senaca yesterday Many times crossing and recrossing the Canal at every point I could possible make my way over so as to examine the Canal carefully on each side. Their is a large breach on each of the following sections. 2 [or ??], 5, 18, 23, 30 & 32 common earth embankments sections 30 & 32 over culvert muddy branch and culvert next above they are from 100 to 150 ft in length & from 4 to 10ft below bottom at sec G, 7, 22, 29, 34."

Where it passed over at Section G the Bank is not injured the rest of them the top of the embankment has been cut away by the river water passing in the canal from a foot to 5 in depth and a from 200 to 400 yds in length & left in an uneven ragged state the earth removed is deposited in the canal with the exception of some few small walls. the masonry I believe is secure. I have my hands this morning making temporary dams around the breaches to turn the water through the different waste ways. I have dispatched several messengers out in the country for hands & carts to be at the different places as soon as possible. and collecting provisions. It will require at least 20 hands & 12 carts at each point. and to remove the deposits from the canal at least 10 hands at each point. to be able to readmit the water in 15 days. every effort to complete it as speedily as possible shall be made. . . . this is an important matter the selection of proper material for the repair of a breach to secure permanency. I have taken accurate notes of the river at the different points which you shall have ther after with a plan to secure the work from a similar accident. for the future. This can be done at a comparatively small expense should the river rise even higher than it has done in this instance. I shall proceed to repair the damage immediately and keep a separate account of the expense of each Sec."

[194] John P. Ingle, Clerk, Washington, D.C., to G. W. Rodgers, Superintendent, 4 June 1836 (Flood-June 1836)

"The Board met to day and were much disappointed in not having a letter from you on the state of the Canal & Dams after the late extraordinary freshet. Having no intelligence from you we should conclude that your division of the line had sustained no injury but this can hardly be possible."

"I am instructed by the Board to request that for any repairs made necessary by the freshet you will take immediate steps to have them repaired without awaiting any communication from the Board, unless it shall be something of very serious magnitude indeed."

"The canal below Seneca is much injured, but we hope to have the navigation restored in two weeks."

[194] John P. Ingle, Clerk, Washington, D.C., to W. S. Elgin, Superintendent, 4 June 1836 (Flood-June 1836)

"By Mr. Humrickhouse we are much pleased to hear that your division of the Canal has not suffered much by the late freshet. Still the Board were disappointed to day in not having a letter from you in the subject."

"I am directed to request that you will take prompt measures to have any repairs made which are necessary so to restore the canal to use. Below Seneca the damage is considerable, but we hope in two weeks to have it repaired."

[182] Board of Directors Meeting, 6 June 1836 (Flood-June 1836)

"Letters were received from Charles B Fisk, Geo W Rodgers and W S Elgin, reporting damage done to the Canal, by the late great freshet in the river Potomac."

[190] W. S. Elgin, Superintendent, to President and Directors, 6 June 1836 (Flood-June 1836, Harpers's Ferry-Sustainability)

"Reports reflecting the late freshet in the river & respecting the damage done the Ches & Ohio Canal, I am of the opinion that \$200 will pay all damages from Dam No. 3 to Lock No. 26 & from Lock No. 26 to No. 25 have received considerable damages the river was about 3 feet over the banks of the Canal in many places; But I am of opinion that \$1,000 or \$12,000 [\$1,200?] will be sufficient to repair the damages if there is none of the Culverts Injured; which I was not able to Judge when I left I think in the course of ten days I shall be able to have the Canal on my divisions fit for use; I came down the canal as far Sinaca it is broke in three places Beteen Sinaca & Lock No. 25 But I do not Consider them very bad the top of the tow path is very much washed in places and I am fearful that it has deposited in the bottom of the Canal; I have been told by some persons long resident on the river that they never see it as high But others at Harpers Ferry say that in 1810 it was a few inches higher than it was over the shanandoah River Lock & it Embankments from 2 1/2 to 3 feet."

"P.S. I see that there was an order passed for \$1,200. I find it necessary for for me to have \$500 more as it will save me the necessity of coming again."

[190] G. W. Rodgers, Superintendent, Sharpsburg, to G. C. Washington, President, Washington, D.C., 7 June 1836 (Flood-June 1836, Sustainability-Dams)

"I Rote from dam N. 4 on the 4th inst I then stated the amt of Damage done at dam no 4 as near as I could calculate the water has since fallen so that We have been able able to make a dam through the brake in the stone and brush which has stopped the water. the breach is a little over 200 ft in length and the gd bank is washed down about 8 ft below the top which leaves the presant surface whare water rub over Still above the comb of the dam. all the Earth &c which washed out is deposited convenient to Replace into the Breach again thare is less damage done to the tow path than I supposed I find since the water has left the bottom that thare is nearly Earth Enough which was washed into the Bottom to form the Bank again. the damage between gd Lock no 5 and lock no 42 is but little we shall be able to let the trade pass from gd lock no 5 to Williamsport on the 8th We shall also have two feet water in that Part of the canal between Lock no 44 and Lock no 42 on the ninth or tenth of the month which will enable us to Place Scowes in



the Pool of dam no 4 and Repair the gd Bank in a few days the canal between dam no 4 and Harpers ferry falls or about 1/4 of a mile below dam no 4 and H F Falls has Recd but little damage as we ware able to cutt through the Embankment near the lower end of the levels and let the water off."

The following is supplemental note at the bottom of the letter:

"To John P Ingle Esq

We are progressing better with the Repairs than I Supposed we should have been able to have done Men are plenty but teams Scarce I now believe we shall be able to have the Canal navigable in about 4 weeks if the River does not take another Rise Also Fisk has no doubt informed you of the importance of a gd gate at dam no 4"

[194] John P. Ingle, Clerk, Washington, D.C., to George Bender, Commissioner, 7 June 1836 (Flood-June 1836)

"The reports from the Superintendents shew that the injury to the Canal by the late freshet is by no means as great as was anticipated, and they hope to restore the navigation in three weeks."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to G. C. Washington, President, Washington, D.C., 9 June 1836 (Flood-June 1836, Harper's Ferry-Sustainability)

"since I was in washington I have examined all the line on my division. I find it not worse than I reported to you. I believe that none of the masonry on my Division any way Injured as far as I have been able to Judge as the river still Keeps up I can not pass under any of the Culverts to Examine them minutely I have a tolerable force & I am of the opinion that I shall be able to get the water in this week or the 1st of the section my Division as I get mine in condition for the water I will assist Mr Young so as to restore the navigation as soon as possible from Harpers Ferry. I had come to the determination to have the wall & pudling dam around the pier of the viaduct in the towpath at Harpers Ferry But I will have to let it remain to some other time as the river Keeps up so as not let us be able to get a sufficient foundation to start the wall and pudling."

[CF] Alexandria Gazette, 9 June 1836, 3 (Flood-June 1836, Harper's Ferry-Sustainability)

"The late rains . . ." The Gazette reports flood damage in Harper's Ferry, but mentions no damage to the canal.

[190] W. S. Elgin, Superintendent, Edward's Ferry, to G. C. Washington, President, Washington, D.C., 10 June 1836 (Flood-June 1836)

"I have my division ready for the water I moved my force down this day about 12 oclock & I am repairing the Canal between Edwards Ferry and Sineca I think I shall have all the upper Breaches on that level done & ready for the water by sunday next if we have no bad weather there is one breach on that level in Sec No 40 which Mr Young has a sufficient force to insure it be done in time for the lower work or repairs so as soon as I do then that I am at I shall move my force up again to repair the tow path where the water has taken of the top & left it in a rugged condition I have 3 feet water on at this time I intend putting in 4 1/2 feet in day or two which will be sufficient for the present."

[190] W. S. Elgin, Superintendent, Canal Line, to G. C. Washington, President, 10 June 1836 (Flood-June 1836)

"according to your request, I write you, to let you know that I have my Division ready ready for the admittance of water. I Repaired all the breaches & Raised the embankment Enough to admit 4 1/2 feet water I intend to take all my force down in the morning to assist Mr Young with the Breaches Betwen Edwards Ferry and Sineca. I shall do all my power to get the water in again from Harpers Ferry to Geo Town."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to G. C. Washington, President, Washington, D.C., 13 June 1836 (Flood-June 1836, Harper's Ferry-Sustainability)

"I again write you a few lines to let you know how we are getting on with our repairs &c. I have the water in from Dam No 3 & am filling the Canal to sineca there is 28 Gondalas on ther way down they were about to send ther flour on to Baltimore By the rail Road on account of reports in circulation that the Canal would not be fit for use for two or three months. However I contradicted the reports & have told them that they could get to Geo Town by the 1st of next week which is quite satisfactory they say they are willing to wait 10 Days rather than send there flour By the rail Road I shall have to draw off the upper level on my Division for one or two days in order to remove the passels of Earth &c brought in by the levels above breaking & washing in the Embankment from Locks No 35 & 36 which is Deposited in the Feeder Mr Rodger had a force taken out But he has taken them up to dam No 4 as soon as I can get my force up I will Draw off that level & remove the wash from the canal."

[CF] Alexandria Gazette, 13 June 1836, 3 (Flood-June 1836)

"The navigation . . ." Reports navigation on the C&O Canal will be restored in two or three weeks.

[180] Eight Annual Report, 15 June 1836 (Flood-June 1836, Sustainability-General)

G. C. Washington, President, on behalf of himself and the Board of Directors reported:

"Extensive repair and improvements on the line, from Georgetown to dam No. 5, have been made within the last year, and were indispensably necessary for the security of the canal, and the advancement of its trade. Since those repairs were made, no interruption of any consequence, to the navigation has occurred, until the recent freshet, which raised the waters of the Potomac to an unprecedented height, and carried off some of our embankment. Great apprehension was entertained of extensive and serious injury, but we are happy to state that the damage is not so great as feared. Had the board ever doubted the expediency of the location adopted by Mr. Fisk [the Resident Engineer], those doubts would have been wholly dissipated by the results of the recent freshet, as the chief injury sustained by the canal has been at points where it approximated too closely the river line. The new locations have been made with the view of placing the canal above, any rise of the river, and consequently, its entire security. The economy of such locations is evident, both in the permanency of the work, and the assurance of an uninterrupted navigation. We hope in a few days, to re-admit the water. The strength of the masonry, and its admirable construction, were fully tested by the recent freshet; and notwithstanding the immense pressure on the aqueduct and other masonry, none have been injured."

[190] G. W. Rodgers, Superintendent, Sharpsburg, to John P. Ingle, Clerk, 19 June 1836 (Flood-June 1836)

"we are progressing well with the repairs of the canal and will have the water in again by the last of the month. I have been so much engaged since the water has fallen so that we could work at the breach above dam no 4 that I have not had time to make an estimate of the damage done but I will do it as soon as in my power. I hope Mr Fisk has made arrangements for the guard gate at dam no 4"

[182] Board of Directors Meeting, 20 June 1836 (Flood-June 1836)

"A letter received from J Y Young, stating that the navigation of the Canal from Georgetown to Harper's ferry is again restored, asking that \$2.000 be advanced to him for repairs. The advance was ordered to be made."

[190] G. W. Rodgers, Superintendent, Sharpsburg, to John P. Ingle, Clerk, 30 June 1836 (Flood-June 1836)

"The water will be let into the Canal on the 1st day of July the whole line will be navigable by Monday Evening."

[182] Board of Directors Meeting, 6 July 1836 (Flood-June 1836)

"A letter was received from John Y Young reporting a breach in the embankment of Section No. 12. Whereupon it was Ordered, that such Members of the Board as can conveniently meet at Georgetown to morrow morning at 9 o'clock, be appointed a committee with authority to make arrangement for the immediate repair of the Breach. It was further ordered that the several Superintendants be instructed carefully to examine all the foundations of the High Walls and embankments along the margins of the river, and especially such as may have been exposed to injurious action of the recent freshets, and if any injury be discovered to report the same to the Board without delay, with an estimate of the probable expense of the repair thereof. And also to examine and report the state of the Locks, Culverts, and other works of the Company, and to report on the same as early as possible."

[194] John P. Ingle, Clerk, Washington, D.C., to J. Y. Young, Superintendent, 6 July 1836 (Flood-June 1836)

"The Board directs that you proceed as speedily as practicable in repairing the breach on Section No 1, and that such repairs be made at other points as can best be done while the water is drawn off."

"The Board also directs that you examine all the high walls and embankments, on your line, and see whether the late high water has not injuriously effected the foundations of the work."

[CF] [190] W. S. Elgin, Superintendent, Harper's Ferry, to G. C. Washington, President, Washington, D.C., 14 July 1836 (Flood-June 1836, Flood Damage Prevention-Proposed, Sustainability-Embankments)

[Note: this is a long letter suggesting improvements to protect against future flood damage. The letter contains a few informal sketches outlining the proposed improvements. Elgin's proposed strategy was to reinforce the canal embankment against the river. [Original in box 13 of #190]

"In obedience to your order of the 6th Inst I have carefully examined all the Embankments, walling, Culverts, Locks, & Aqueducts on my Division & Report as follows Viz 1st Embankment on Section No. 52 Above the Broad River Culvert has slid in consequence of the late High Freshet in the River in the River on the first of June last which saturated the embankment on the outer slope & it being on spongy foundation, at this place I would recommend a wall at the base of the embankment about 100 feet long 6 feet in its foundation 6 feet high with a bottom of 4 inches to

foot rise on the out side and perpendicular on the inner side as this [refers to small illustration] which would make 120 perch of wall & suppose it to cost \$1.50 per Perch would Amt. to \$180 & filling in the embankment which will have to be done any way for the security of the canal say \$100, and it will be liable to be take a way again unless there is a wall put to protect it against the freshets in the Run & River the next section no. 63 it being just finished before the freshet in the river & the embankment being fresh & the river entirely over it I suppose it will cost to replace the embankment & Dress up the banks a gain \$120. there is also a slite injury done to the wall & embankment on Section 64 which has not as yet been Repaired But I am a bout repairing at this time say \$40. besides what we have done on Section No. 64 in June in repairing the embankment when the river was entirely over it and taken off a considerable [part] of the top & inner slope of the tow path the next place where the water in power acted on the embankment is Section No. 74 in consequence of the location of the Canal being too near the river & the soil being alight eluvial nature & a considerable seaping from the Canal to the river, & the cutting & carrying away of the embankments, has very much weakened them and at this place being all mud embankment & materials very scare & would be very costly to repair the breach, & I do not consider it very safe, I would recommend for the present as the water is from 3 to 4 feet in the river to have it ripraped to surface of low water (say 10 wide) and then commence a wall on this riprap 8 feet in the foundation & 8 feet with a batter 4 inches on the out side next to the river, & perpendicular on the side next to the canal, & fill in between the wall and & the canal with with earth gravel &c; this wall at this time will not be more than 200 feet, But will have to be eventually extended; it would take 700 perch of stone to Riprap & wall what ought to be done immediately on this section which would cost sat \$1.25 per perch when put in the works & say \$300 for Boating & filling in embankment. next is Section No. 76; I would recommend the wall below Tuscarora culvert to be extended 120 feet Lower down as the river is acting very much on the Bank next to the canal & has taken it a way perpendicular nearly to the foot of the base of the Embankment which Renders it very weak & not safe for six feet water in the canal; & also the wall Above the culvert ought be extended 100 feet for the present from the wing of the Culvert. I would recommend a wall as it is recommended on Section No. 74 Except the ripraping as we can get good foundations at this place. it will take 475 perch of walling (say \$1.38 per perch in wall) & Say \$350 for Boating earth & filling in between the wall & Canal; the next is Section No. 95 where the canal is also located too near the river & the soil being of eluvial pourous nature very considerable leakage & the bottom of the canal has the appearance of a honey comb; I would also recommend a wall at this point say 300 f[ee]t long at present & of the dimentions; of the the walls recommended at the other places before & I also would recommend to have the bottom well puddled with suitable clay at 2 feet thick at some suitable season, when the canal can best afford its navigation being interrupted as I am fully of the opinion this place can never be permanent until it is done. the puddling should be well connected with the embankment as I believe the embankment is perfectly tight say 575 perch of wall at \$1.50 per perch when in the wall puddling the Bottom say \$250. say \$375, for Boating cart &c, & filling in between the wall & canal. the next Section No. 99 & opposite Berlin I would also recommend a wall at this place as the river is cutting away at the bank; I did not make any measurements, at this place as I thought it would be time enough as the rest required immediate attention; the next and last of the embankments that Require examining on my division at this time is on Section No. 107. I would recommend at the lower end of the wall on said section that there should be continued for 200 feet Ripraping to protect the Embankment from the action of the river it will take 400 perches which is hndy & ready Quarried nothing to do but boat them to the place & tumble them over as the late freshet taken off considerable embankment at this place it will have to be made again soon as we can get in some hands as most of them have gone a harvesting, I suppose the ripraping & Embankment at this place will cost \$200. the wall on the material from behind it has been acted on very much on the upper end of this section or the Lower end of section No. 108 which has caused the embankment to settle very much & crack on the outer edge next th wall I do not see that I can do very much with this place not do I consider it any way dangerous."

"2nd the walling on my Division is near by all safe I do not consider it very much injured."

"3rd The the Culverts on my division I do not see that they are any way injured except the puddling over the Culvert on Section No. 90 which have failed; & I have some men at this time puddling it."

"4th The Locks in my Division is in good order except the Shanandoah River Lock which is filled up pretty much by the river getting over the embankment. I am now making a coffer dam to clean it out. the river here to fore have kept up so we have not had an opportunity to clean it out."

"5th & Alast I do not see that the late freshet has done any damage to Either of the Aqueducts on my Division."

Elgin estimated the repairs and improvements would cost \$4,058. He added, "I would also recommend some tumbling wastes for the safety of the canal." There is notation dated 18 July 1836 that Elgin's proposal was "Read and laid on the table" by the C&O Board of Directors.

[182] Board of Directors Meeting, 18 July 1836 (Flood-June 1836)

"A letter was received from J Y Young informing the Board that the late Breach on Section No. 13 will be so far repaired by Wednesday next, as to re admit the Trade of the Canal. Also asking for Two thousand Dollars for repairs and improvement of the Canal. The advance of Two Thousand Dollars was ordered to be made."

[190] J. Y. Young, Superintendent, Canal Line, to "Gentlemen," 28 July 1836 (Flood-June 1836)

"The present state of Dam No. 1 from injury sustained by the late freshet requires immediate

repair as so soon as the river Shall have become sufficiently low to procure a fast rock foundation. The damage is confined to that portion built of stone between the Island and the Maryland Shore. The Tumbling wastes between the mouth of the Feeder & Guard Locks has also suffered by the Freshets and will be repaired as soon as the stage of the water in the river will admit of it. I have carefully examined all the high walls and exposed points liable to be injured by the late freshets I have not discovered any defect at any point from that course many of the high walls have bulged from the canal and will require a large quantity of stone in addition to what has already been placed on the river side for their protection on Sections 12, 13, 15, 17, & 18."

"The outer protection required where the late breach occurred I am now forcing as rapidly as possible as it is important to have it completed early for the security of the embankment." Young asked for \$1,500 for the repairs which the board ordered paid. Fascinating: it seems they are interested in immediate repairs, but are deferring on long-term improvements. For confirmation, see the next proposal from J. Y. Young which was also laid on the table.

[194] John P. Ingle, Clerk, Washington, D.C., to G. W. Rodgers, Superintendent, 29 July 1836 (Flood-June 1836, Flood Damage Prevention-Ordered)

"The Board has . . . adopted your suggestion of having the Stop Gate at the Maryland abutment of Dam No. 4, constructed by hands to be employed by you, and such stone as may come out in making the road for Mrs. Henry, suitable for the foundation of the Gate, to be used for that purpose."

[190] J. Y. Young, Superintendent, Canal Line, to the President and Directors, 6 August 1836 (Flood-June 1836, Flood Damage Prevention-Proposed)

"[As you directed] me to examine all the high walls and exposed points, and report the probable cost of securing them by out filling &c"

"1st Their is no point where danger is apprehended between Geo. Town & the 10th Section. here we have a slip on the outer slope of the canal embankment where an additional quantity of stone thrown over and the wall increased 25ft in length & 4 ft in height. This wall is at the foot of the outer slope and found insufficient it will require about 800 perch to be boated from the 12th section and will cost 45 cents per perch \$360. The 12th Sec will require about 1200 perch at 40 cts per perch 480 if the largest size stone are used the cost will be greater greater."

"Section 15 is more exposed than Sec 12 and will require in the whole about 3000 perch in addition to what has been already thrown over Sec 14 will supply the stone say 40 cts 1200 dollars Section 17 & 18 will also require a large quantity not less than Sec 15 --3000 perches the cost of which will be greater in consequence of the increased distance and the passage of 2 locks. Sixty will be the probable cost \$1800. I have carefully examined all the culverts by passing through them and find them in good order that they have sustained no damage from the late freshets Neither have I discovered any further damage to my part of the canal by the late Freshet than I have already given notice of. The embankment above the Great falls are all low which secures them from any danger of falling. The Locks are also in good order." The board tabled Young's proposal on 10 August 1836.

[182] Board of Directors Meeting, 16 August 1836 (Flood-June 1836, Study-Floods-C&O Canal Company)

"The Board proceeded to Harpers ferry examining in the way, the different works as reported to be necessary by John Y Young and William S Elgin Superintendents.

[182] Board of Directors Meeting, 20 August 1836 (Flood-June 1836)

"A report was received from the Commissioner on the application of Michael Tracy attorney for Thomas Barr, asking an allowance for damages sustained by him on Section No 255 by the late Freshet, which application was referred to the Commissioner in the 13th Ultio It was thereupon Resolved, that the Engineer be directed to estimate the work done, or which may be done in order to replace the Embankment washed away from Section No 255, according to the prices of the existing contract, provided it shall not in the whole exceed the sum of Two hundred and twenty Dollars, as estimated in his report. It was further Ordered that the Engineer be directed to estimate the work done or which may be done by John Gorman in replacing the embankment washed away by the late Freshet from Section No 247, according to the prices of the existing contract, provided it shall not in the whole, exceed the sum of Four hundred and Seventy Six Dollars, as estimated in his report received by the Board on the 6th of July last."

[194] John P. Ingle, Clerk, Washington, D.C., to G. W. Rodgers, Superintendent, 27 August 1836 (Flood-June 1836)

"The Board is anxious to get as soon as possible your Estimate . . . for repairing the present line."

[182] Board of Directors Meeting, 31 August 1836 (Flood Damage Prevention-Ordered)

"Ordered, that the protection wall & road upon the land of Mrs. Henry, at the Virginia Abutment of Dam No 4, according to the report of the Superintendent adopted the 29th of July last."

[194] John P. Ingle, Clerk, Washington, D.C., to George Bender, Commissioner, 17 September 1836 (Flood-June 1836)

". . . the Board received your communication, covering the application of Michael Tracy, Atty of Thomas Barry, asking for an allowance for damage sustained by him on Sect No 255 by the late great freshet, being your report thereon."

"It was thereupon Resolved, that the Engineer be directed to estimate the work done, or which may be done to replace the embankment washed away from Sect 255, according to the existing contract prices for such work, provided it shall not in the whole exceed the amount of \$220 as estimated in the report. It was further Ordered that the Engineer be directed to estimate the work done or which may be done by John Gorman to replace the embankment washed away by the late freshet from Sect No 247, according to his existing contract prices, provided it shall not in the whole exceed the sum of \$476, as estimated in his report received by the Board on the 6th of July last."

[207] John G. Stone, Clear Spring, to Charles B. Fisk, Resident Engineer, 29 September 1836 (Flood Damage Prevention-Proposed)

"Mr. Darby requested me to inform you that he thinks it necessary to have a grating at the upper end of the Culvert to prevent the ice from going under the culvert, also that the last fresh[et] was 3 feet higher than the plan for the bridge and that an other such fresh[et] would carry away the bridge."

[190] D. K. Cahoon, Round Hill, to the President and Directors, 12 October 1836 (Flood-June 1836)

"We respectfully ask of the Board of directors to make good in some measure our loss of embankment on sections no 243 & 4 occasioned by the last June fresh. The amt of damage as near as we could calculate on Sec 43 from ten to fourteen hundred cubic yards on Sec 44 from twelve to fifteen hundred cubic yards at twenty two cents per cubic yard, our expenses being great it would be thankfully received this present month."

[182] Board of Directors Meeting, 14 October 1836 (Flood Damage Prevention-Proposed)

"A communication was received from the Clerk of the Alexandria Canal Company, inclosing a Copy of the following resolution adopted by the President and Directors of that Company on the 13th Inst."

The Board of the Alexandria Canal Company complained the C&O Canal Company had taken no steps to construct a northern abutment to Potomac Aqueduct as directed by their stockholders at the July meeting. The C&O Board directed the Clerk to invite proposals to build this abutment, "upon the plan agreed upon by Capt Turnbull, and Charles B Fisk submitted to the Board on the 15th of March last, and now marked A."

[182] Board of Directors Meeting, 15 October 1836 (Flood Damage Prevention-Proposed)

The Board agrees to put off letting out proposals for the northern abutment to the Potomac Aqueduct until the November stockholders meeting.

[182] Board of Directors Meeting, 23 November 1836 (Flood Damage Prevention-Proposed)

The Board refers the matter of building a northern abutment to the Potomac Aqueduct to a committee of five stockholders.

[207] John P. Ingle, Clerk, Frederick, to Charles B. Fisk, Resident Engineer, Washington, D.C., 25 November 1836 (Flood Damage Prevention-Proposed)

". . . the Board directs that you Locate a Stop Lock on the level of the Canal above Monocacy, and present a plan and Estimate for it."

[207] William H. Bryan, Edwards Ferry Outlet Lock, to Charles B. Fisk, Resident Engineer, 30 November 1836 (Flood-November 1836)

"On Monday the 14th the water broke into this work, and during the last high rise of the Potomac it was inundated."

"Some of the masonry laid will have to come up both because it is laid too thick and the mud left by the freshet in it is a quarter of an inch thick."

[190] Charles B. Fisk, Resident Engineer, Clear Spring, to John P. Ingle, Clerk, 20 December 1836 (Flood Damage Prevention-Proposed, Sustainability-Waste Weirs)

Fisk, speaking of various improvements to canal, has some definite opinions on the placement of waste weirs. He says, "I will now speak of what is called for at the upper end of this level as well as of every other level on the canal of any length, a waste weir."

"The place at which waste weirs have hither to usually been put it at the lower end of the level."

"A breach occurs. What is the consequence. All the water of the level from above the breach must pass out through it, unless you have above you a stop gate or waste weir. We cannot have stop gates all over the canal so as to be available for a breach at any point. We can do this, however--we can have a waste weir at the upper end of the level which can be immediately opened, let the breach be where it may, and drain off much of, the water of the level that must otherwise necessarily, pass thru the breach, and in consequence, very materially increase the damage."

"Within my own knowledge a waste weir at the upper end of the level in question would have paid for itself before this in the saving of damage at the various breaches that have occurred."

"If it is true that the outlet locks at the Point of Rocks if built will answer all the purposes of a waste weir. But if they are not to be built I should recommend the putting in of the waste weir at once."

"If merely one of the two is to be built, a stop gate at Noland's Ferry or the waste weir at the Point of Rocks, so far as the safety of the Canal is concerned I would prefer the waste weir."

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[194] John P. Ingle, Clerk, Washington, D.C., to W. S. Elgin, Superintendent, 6 January 1837 (Flood Damage Prevention-Ordered)

"The Board has directed that a Waste Weir be constructed at some suitable point near the foot of Lock No 28, as recommended in your letter of the 10th Ult and subsequently by Mr Fisk"

"The Board directs that you have two full setts of stop planks provided for the entrance of Aqueduct No 2, one set to be placed for the entrance of Aqueduct No 2, and the other sett to be deposited at Lock No 27."

[194] G. C. Washington, President, Washington, D.C., to Thomas W. Veazey, Governor of Maryland, 4 February 1837 (Sustainability-Embankments, Sustainability-Masonry)

Washington speaks of the advantages of masonry in terms of preventing damage to the canal during a flood.

"The fidelity with which the dams and other works have been constructed, was fully tested by the unprecedented freshet of last June; the ice of the river being so great as to pass on many sections over the towpath, but inconsiderable injury was done to the embankment, and none to the masonry."

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Resident Engineer, 9 February 1837 (Flood Damage Prevention-Ordered)

"I am putting in a waste ware at Lock No 28 at this time . . . we have another Breach at Monocacy Aqueduct at the east end which we are also trying to repair before a rise in the river so as to let the water in the canal to protect the Culverts against High water in the river"

[182] Board of Directors Meeting, 15 February 1837 (Flood Damage Prevention-Study)

"Ordered, That Colonel John J. Albert be requested to examine, with the Chief Engineer, the state of the high walls on the lower side of the Canal in Georgetown, and to report the best means of making them secure."

[190] J. Y. Young, Superintendent, Canal Line, to President and Directors, 6 March 1837 (Sustainability-Embankments)

"I shall place immediately above Seneca 15 hands for the purpose of repairing the embankment between Lock 24 & 25 The berm in many place will require an increase width and of better material than the original bank to prevent future washing by rains, and wherever it can be done to give it an outer coating of soil that will produce grass the coming summer."

[182] Board of Directors Meeting, 3 May 1837 (Flood Damage Prevention-Ordered)

"On application by J. Y. Young it was ordered that One thousand and fifty dollars be advanced to him for repairs and improvement of the Canal; and it was further ordered, that the said Young invite proposals for coping the Basin at Rock creek with stone."

[180] Ninth Annual Report, 12 June 1837 (Maintenance-Dredging, Sustainability-Naivete, Sustainability-Embankments)

G. C. Washington, President, on behalf of himself and the Board of Directors reported:

"The Board has carefully inspected the entire line of the canal now in use, from tide water at Georgetown to dam No. 5, as well as the line under contract and progressing to the Great Cacapon, and from that point to Cumberland. Many improvements have been made between the first-named points, essential to their security and permanency; and it gives the Board great pleasure to state that the embankments are acquiring strength and solidity, which secures the canal from the

hazard of future breaches, and the consequent interruption of its trade. Until within the last week, no interruption to navigation has occurred from breaches, or any other cause, during the present year, and then only for three or four days. The inner slope of the tow-path has been covered with broken stone to a considerable extent, and it is deemed advisable to proceed gradually with this improvement on the whole line where it may be necessary. It has been found from experience to answer the purpose of protection better than walling, and at a diminished cost. This work is performed by a few hands in the service of the Company under the direction of the superintendent on each division, at times when they cannot be more profitably employed. The basin at Georgetown has been so much filled by deposits of sand and mud from the freshets of Rock Creek, that the Board found it necessary to adopt measures for their removal, and for that purpose procured a dredging machine, which is in successful operation, and has already made considerable progress in removing the deposits. Between Mason's foundry and the Little Falls, a substantial stop-gate and waste weir have been constructed, adding greatly to the security of that level."

"The high freshets of this spring have passed by without injury to the canal, and we have every reason to believe that the great strength of the dams, superior masonry of the aqueducts, locks, culverts, and wastes, with the increasing solidity of the embankments, afford an ample guarantee against future damage."

"The chief interruptions to the navigation have occurred from the mode of making the embankments and the location of the canal too near to the banks of the river through alluvial bottoms, which could in most instances have been easily avoided. The motives of engineers, in those locations, was to lessen the amount of damages in the acquisition of land. In many instances the increase expense of stopping leaks, repairing breaches, and making protection-walls and rip-raps along the river shore, to prevent the slides common on alluvial banks, had amounted to double the sum saved in condemnation of the land."

"In the more recent locations, and wherever practicable, these faults have been carefully guarded against. Instead of embankments showing slopes at an angle of one and a half to one, they are made at an angle of two to one thus giving greater breadth and strength at the foundation, more security to the walls, and being less liable to abrasion. A puddle-ditch is also carried through the centre of the embankment longitudinally, and is sunk some depth below the natural surface. On this embankment is deposited layers of six inches at a time, over which for the whole extent of the section carts are driven. In consequence of this plan, an embankment, when raised to its proper height will be as firm as on the old plan it would be after having settled for years. The construction of embankments on the old line, as contrasted with new, will we believe fully verify the old adage, 'that the cheapest work is not always in the end the best or most economical.'"

[190] Colonel Albert [?, the handwriting looks like that of Charles B. Fisk, the Chief Engineer], Washington, D.C., to "Dear Sir," [c. August 1837] (Flood Damage Prevention-Ordered, Flood Damage Prevention-Study)

"A letter from Mr. Ingle of July 20th 1837 says

'The Board has requested Col. Albert in conjunction with yourself to examine the high walls on the lower side of the Canal in Georgetown and to Report the best means of making them secure.'

"The examination desired by the Board having been made the following has been prepared by me at your request as impressive of the views entertained by both of us."

"It was understood by us that the wish of the Board was to ascertain whether any strengthening or rebuilding of the high walls referred to was necessary before the full depth of water can with safety be admitted."

"The first point requiring attention as it appeared to us was the wall directly against the Bake house. For the whole length of this building the same strengthening of wall should be continued as along the upper half of it."

"2nd The narrow span between the foundation of the next building and the canal wall should be carefully filled in by stone so placed as not to press by their weight against the foundation wall of the building. they should sustain their own weight And should fit closely against the two walls."

"3rd Were it not the construction of the Alexandria Aqueduct Abutment will correct the defect, it would be advisable to take down & rebuild prove rock foundation the wall next below where there was a failure of the wall within the last year at Capt Turnbull's office."

"4th Above this wall and below the foundry the foot of the outer bank should be protected against the wash of the river. The quantity of stone not large in amt will placed as riprapping will be sufficient."

"5th The foundry Culvert. This ultimately will have to be rebuilt in whole or in part. Time alone can determine which as regards the rebuilding in part, that is of the end of the Culvert, it will not enable us any sooner to put in the full depth of water. Under the circumstances it is not thought advisable for the present to anything to the Culvert."

[190] J. Y. Young, Superintendent, Canal Line, to "Gentlemen," 1 August 1837 (Maintenance-Dams, Sustainability-Dams)

"An opportunity is offered at the present low stage of the water in the River to repair the Dams."

"The Small brush Dam at the great Falls Feeder has been much injured by the last Freshet so as to afford no water to the Canal at this time It can be repaired at a small cosy and in a more permanent manner than the original plan also the Dam and Feeder of Dam No 1 requires some repairs to keep up the Geo Town Levell. I have men engaged at each of these points & shall complete them as early as practicable."

[182] Board of Directors Meeting, 16 August 1837 (Maintenance-Dams, Maintenance-Dredging)

"Walter Smith stated that complaint had been made to him of the want of suitable depth of water in the Canal below Dam No. 4, owing to the imperfect state of that Dam; and also that a Bar has been created near the Guard Gate No. 2. Ordered that G. W. Rodgers be directed to repair the defects in Dam No. 4, and that J. Y. Young be directed to remove the obstruction complained of at Guard Gate No. 2."

[182] Board of Directors Meeting, 30 August 1837 (Flood Damage Prevention-Proposed)

"The committee to which was referred on the 6th ultimo the examination of the high walls on the Canal in Georgetown, made a report which was accepted: And it was ordered that John Y. Young be directed to furnish an estimate of the cost of making the proposed improvement."

[190] J. Y. Young, Superintendent, Canal Line, to President and Directors, 5 September 1837 (Flood Damage Prevention-Proposed)

"Your order directing me to prepare an estimate of the probable cost of certain improvements in Geo Town recommended by a committee of the Board."

"As Follows"

"1st The Buttress near the Bake House 60 ft in length will contain about 270 perches of dry walling at \$1.25 per perch \$337.50"

"2nd The filling near the College run to bottom of Canal will require about 3000 yds of earth or gravel at 25 cts per cubic yd \$750."

"The cost of the inner filling will be diminished in an arrangement can be made with the proprietors of lots to bear a portion of the cost of executing them."

"I understood the committee that the outer slope should be faced with rubble stone at the River surface sufficiently to protect its surface sufficiently from the abrasions of the tides. And not to the same extent. As has been done above the Foundary. I have their force estimated according The slope to be covered 2 ft thick & 12 ft high the whole length that is exposed, extending 3 ft below low tide & 9 ft above The quantity however will depend somewhat upon the character of the foundation."

"The stone can be either brought down the canal from the Virginia Shore, at a cost if about 90 cts per perch. . . . The quantity delivered can be ascertained by perching the Boats & making the depth & requiring the boats to be loaded down to the mark deduct for leakage &c"

"The wall opposite the Bake House will extend about 18 ft beyond the length of the building to a point where the buldge ceases."

[182] Board of Directors Meeting, 6 September 1837 (Flood Damage Prevention-Ordered)

"According to the order of the Board of the 30th of August, John Y. Young reported an estimate of the cost of making the improvements upon the Canal in Georgetown, as recommended by a committee on that day. It was ordered that 'the buttress near the bake-house,' and the 'filling at College-run' be executed immediately."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to the President and Directors, 11 November 1837 (Maintenance-Embankments, Sustainability-Embankments, Flood Damage Prevention-Proposed)

". . . I am fearful of the embankment on Section No 95 & 96 on opening the navigation the next Spring, as the embankment will be very pourous By the first of the winter and I would recommend to guard against heavy Breaches on that level to put in a waste weir Below Lock No 30 which would probably cost \$350, and also Before we readmit the water in the Spring to cut down the inner slope on Section No 95 at its worn places, and get a good puddle ditch to prevent so much leakage and to guard against Breaches to interrupt the navigation."

[190] J. Y. Young, Superintendent, Canal Line, to the President and Directors, 15 November 1837 (Sustainability-Embankments)



"1st Spalling & raising the embankment from Sect 35 to 50 inclusive \$600."

[194] John P. Ingle, Clerk, Washington, D.C., to Charles B. Fisk, Chief Engineer, 30 November 1837 (Flood Damage Prevention-Ordered)

"By the enclosed letter from Joseph Hollman, you will perceive that he proposes for the riprap and covering of the lower end of the Towpath above Dam No 4, at one Dollar and fifty cents per perch."

"Considering the small proportion of the stone that will be required to be broken up for a covering, compared with that required for the riprapping, the Board considers the price very high, as we are getting this work done near Geo Town for 60 cents per perch, but if you consider it indispensable to have the work done immediately and cannot do better the Board authorizes you to accept Mr Hollmans offer so much of it as must now be done."

[207] I. Gore, Principal Assistant Engineer, Clear Spring, to Charles B. Fisk, Chief Engineer, Hancock, 20 December 1837 (Flood-June 1836)

"In the June [1836] freshet, when the river generally about 18 feet above low water [in the upstream vicinity of Dam No. 5] . . ."

#### 1838

[207] John A. Byers, Principal Assistant Engineer, Hancock, to Charles B. Fisk, Chief Engineer, Washington, D.C., 15 March 1838 (Flood-March 1838)

"I should have replied to your letter Sooner but that I momentarily expected the ice to move off the dam [No. 6] and I wished to give you the result. it is now gone over and So far as is visible at present two logs in the top front course are carried off, one in a place and that is I believe all the injury at present done. At Dam 5 Mr MacFarlan told me all was safe."

[182] Board of Directors Meeting, 21 March 1838 (Flood Damage Prevention-Proposed)

"The Chief Engineer made a report under the order of the 19th of July last, in relation to the plan of the Northern Abutments of the Potomac Aqueduct, recommending that no change be made in the plan of that abutment as reported by the Board of the 15th day of March 1836. The report was laid on the table, and in as much as the said plan has been lost, it was ordered that the Chief Engineer do forthwith present a duplicate thereof."

[182] Board of Directors Meeting, 12 April 1838 (Flood Damage Prevention-Proposed, Maintenance-Aqueducts)

"A letter was received from the Chief Engineer accompanied by a plan of the Northern Abutment of the Potomac Aqueduct, and a specification thereof; furnished under the order of the Board of the 21st ultimo. It was ordered that the Clerk send to the Alexandria Canal Company a copy of the said plan and specifications."

"A letter was received from W. S. Elgin relative to the present condition of the abutment of Aqueduct No. 3; when it was ordered that said Elgin be directed to have the repair made in such a manner, as the Chief Engineer."

[182] Board of Directors Meeting, 25 April 1838 (Flood Damage Prevention-Proposed)

"Order that the Clerk cause if copy to be made of the plan of the Northern abutment of the Potomac Aqueduct as presented to the Board by the Chief Engineer on the 12th instant, and that he send the same to the Corporation of Georgetown in lieu of the former plan of that work loaned by the Corporation to the Canal Company."

[182] Board of Directors Meeting, 4 June 1838 (Sustainability-Towpath)

"The Engineer presented a proposal from Joseph Hollman for protecting the tow path above Dam No. 4 by stone as agreed to under the order of the 29th of November last. The proposal was accepted and a Contract was ordered accordingly. An Estimate for stone delivered on this work was also received, passed and ordered to be paid."

[180] Tenth Annual Report, 4 June 1838 (Sustainability-Naivete Study-Floods-C&O Canal Company, Sustainability-Naivete)

G. C. Washington, President, on behalf of himself and the Board of Directors reported:

To begin with, Washington quoted from his letter to the Governor of Maryland, dated 23 December 1837 (in what must have been wishful thinking):

"As no breaches of any consequence have occurred on the line, and as the embankments are becoming more solid every day, we have reason to believe such accidents will be of rare occurrence, and that the cost of repairs will consequently decrease every year. Indeed, it is one the highest recommendations of canals, that, unlike most works of art, their strength increases with their age. The materials of which this canal is constructed are imperishable, with the exception of the lockgates and a few pivot-bridges; and when it is completed, the annual expense of repairs will be inconsiderable, compared with its magnitude and cost, and will abduct but a small amount from its vast receipts."

"Additional security has been given to the works at points where any weakness was indicated."

In the body of the main report to the stockholders, Washington reported:

"But few interruptions to the navigation have occurred during the past year from breaches. The principal occurrence of the kind was at the Catoctin aqueduct, one of the wings of which gave way and occasioned a breach. A temporary trunk was thrown over it, and the repair is in progress."

[190] Charles B. Fisk, Chief Engineer, Hancock, to John P. Ingle, Clerk, 13 June 1838 (Flood Damage Prevention-Payment)

"Mr. Hollman is here, and says that he is desirous of receiving the monthly estimate for riprapping above Dam No. 4 which was sent to Washington about a month since."

[182] Board of Directors Meeting, 3 October 1838 (Floods-Compensation Claims)

"The Committee to whom was referred on the 17th of May 1837, the claim of Lewis Carbery for damages sustained by the heirs of A Cloud by cutting a breach in the embankment of their land during the freshet in the river in the spring of 1836, returned the papers to the Board when it was ordered that the balance of the money claimed, viz: one hundred and fifty dollars, be paid."

[182] Board of Directors Meeting, 13 October 1838 (Flood Damage Prevention-Payment)

"An Estimate on the Protection for the Tow - path above Dam No. 4 was presented in favor of Joseph Hollman, which was passed and ordered to be paid."

[190] Charles B. Fisk, Chief Engineer, Dam No. 6, to the President and Directors, 1 November 1838 (Flood Damage Prevention-Proposed, Improvements-Unspecified)

Speaking of the progress of the construction of Dam No. 6, Fisk states, "Let us now suppose that at this moment we were to be driven from work by a freshet. Would the dam be safe? we think it would be, with some comparatively light damage, with the precautions a few hours work would enable us to take." What precautions? Fisk doesn't specify them.

[190] G. W. Rodgers, Superintendent, Williamsport to "Dear Sir," 15 November 1838 (Flood Damage Prevention-Payment)

"Enclosed you have J. Hollmans Estimate for work done on the riprapping of towing path above dam No. 4 . . ."

#### 1839

[182] Board of Directors Meeting, 23 January 1839 (Flood Damage Prevention-Proposed)

"Phineas Tanny presented to the Board a resolution of the President and Directors of the Alexandria Canal Company of the 15th inst, requesting this Company to proceed with the construction of the Northern Abutment of the Potomac Aqueduct according to the order of the Stockholders of the Chesapeake & Ohio Canal Company of the 24th of April 1837. It was thereupon Ordered, that this Board will now proceed in the execution of the aforesaid order of the Stockholders: and to that end the chief Engineer was directed immediately to revise the specification and estimate heretofore made by him for that work, according to the plan presented by him on the 15th of March 1836."

[182] Board of Directors Meeting, 20 March 1839 (Flood Damage Prevention-Ordered)

"A proposal was received from the Alexandria Canal Company offering the contract for building that part of the Northern Abutment of the Potomac Aqueduct which it is agreed shall be constructed at the expense of the Chesapeake and Ohio Canal Company, at the prices estimated by Charles B Fisk in his report received on the 27th Ultio. The proposal was accepted and a contract was authorized accordingly."

[190] J. Y. Young, Superintendent, Georgetown, to the President and Directors, 22 May 1839 (Flood Damage Prevention-Proposed, Sustainability-Dams)

Young recommends the Georgetown bridges over the canal be covered to help preserve their wooden

elements. He also stated, "Dam No 2 Seneca, also requires some repair or rebuilding in order to supply the Canal with a Sufficiency of water for Navigation from that point to the little falls during the low water of Summer & fall."

"It will be found necessary ultimately to rebuild this Dam upon some permanent plan. And the question arises whether it would not be advisable to rebuild in preference to temporary repairs. So far as cost is concerned Brush cannot be permanently connected with broken Arch of the old Dam. It is constantly liable to be carried away by freshets. Yet I believe it may be repaired at a cost of about \$1000 So as to give a supply And last several years unless carried away by high freshets. This would not be the case if it was a continuous brush Dam from Shore to Shore. As each course is so closely wound into the former course, as to make it almost impossible to him are one piece without carrying off the whole Dam together"

[180] Eleventh Annual Report, 3 June 1839 (Sustainability-Dams Sustainability-Embankments, Sustainability-Masonry)

G. C. Washington, President, on behalf of himself and the Board of Directors reported:

"The entire line of the canal, from the District to dam No. 6, at the mouth of the Great Cacapon 135 miles is now in order for navigation. The breach which occurred in the winter, at one of the high walls below the Great Falls, has been permanently repaired. The works, also, at the Catoctin Aqueduct have been repaired and improved. The embankments on the old line are every year becoming more solid and less liable to breaches; and we have reason to hope that in future there will be but few occurrences of the kind to interrupt the navigation."

In speaking of the newly opened portion of the canal (27 1/2 miles) between Dams No. 5 & 6, Washington said:

"We have great confidence in the strength of this portion of the work, from the improved mode in constructing the embankments, and the solidity of the masonry."

The General Committee (Richard S. Coxe, Chairman) indicated in its report, dated 5 August 1839:

"Dam No 6 is 475 feet in length, and has a fall of nearly 16 feet. It is a crib dam, and on the upper side has the same form and slope as dams Nos 4&5. There is, however, a very material difference in the construction of the lower side. From the highest point or apex of the dam, the slope or inclination is much less than in dams lower down the river. The fall is only 5 feet in a distance of 25 feet, at the end of which the dam assumes its peculiar shape. This form of dam was preferred, as the best calculated to protect it from the reaction of the water, and from receiving injury from heavy bodies thrown over it at the high stages of the river. . . . The line of the dam is not exactly straight. At the distance of 150 feet from either abutment are points that are 5 feet out of (and in the direction up stream) the straight line drawn from the abutment to this point and from point to point are however straight. . . . There is an additional wing of timber midway under the front slope of the dam from the foundation up. There are also additional timbers upon which the slope rest, and this is covered with six inch plank."

"Breaches occasionally occurred [on the finished portion of the canal]; but the committee has learned with much satisfaction, so skillfully have they been repaired, that not a single instance has happened in which a breach has taken place in the spot which had been once injured. Some few places exist which still require vigilance and care."

"In reference, however, to the work above Shepherdstown, there is exhibited a manifest improvement in the whole of its character. The canal has not been so studiously kept on the very edge of the water; and when embankments became necessary in exposed situations, they have been constructed with every necessary regard to strength. The high elevation at which the canal is in general carried, relieves it from the danger occasioned by the rises which have been at times so great and so injurious."

Note: the General Committee report for 1839 contains a detailed description of the canal, both those portions that were finished, and those portions still to be completed. That is, it describes its physical features, construction, the features of the work, etc. It might pay dividends to pour over this material in more detail at a later date, because of the insights it provides on the strategies of flood protection employed by the canal at the end of the 1830s. As I can surmise from reading, they chose in the upper parts of the canal, wherever possible to move the canal away from river, or raise and strengthen embankments where the former was not possible.

[207] Ellwood Morris, Principal Assistant Engineer, Tunnel Residency, to Charles B. Fisk, Chief Engineer, 10 June 1839 (Canal Construction-Flood Prevention)

"The great volume of water drained out of the two main ravines upon this residency vis Green Run (at Lobdells [?] Shantee) & Greenwells Hollow (at McAcAtees [?]) during the late rain, induces me, when I reflect upon the increased quantity they would have to vent in a 6 inch rain, to call your attention to them:"

"Green Run draining according to Mr Pratt 4 1/3 sq miles, was not passable on horse back on Wednesday last:"

"Greenwells Hollow draining by the same authority 3 1/5 sq miles, possessed on Wednesday at a point where there is more fall in the bed of the river, than would be given to the floor of the Culvert, a [illegible] section of 82.5 sq feet:"

"Green Run, far the most formidable drain if not the largest between the South Branch & Hancock has a strong declivity, & lies between Town [?] Hill & Green ridge, both of which slope directly to the bed of the run, so that the 4 1/3 sq miles, may be regarded as chiefly mountain slope:"

"Greenwells Hollow with its extensive branches, embraces the country from Montgomerys Road, on the East, to the top of Town [?] Hill on the North draining its point [?] for A distance of neary 3 miles, & extends southward & westward, so as to drain nearly all the ground, included between the range of town hill, a line perp. to it from the [illegible] of the Tunnel, River Potomac on the south & a line parallel to the River with a 1/2 mile of it on the west:"

"These mountain torrents (for Green Run at least is such) bring down brush & drift timber to considerable extent, enough to choke a Small Culvert. While they are so rapid that if the Culverts of either should become at all obstructed, they would mount [?] over the Canal back in a very short time:"

"Of the Green Run is the most to be feared & here I would respectfully advise you to make the span 16 ft semicircle, with Abutments of 4 ft clear [?] height:"

"At Greenwells Hollow I advise that the span of the Road Culvert be increased to 14 feet semicircle, the Abutments being kept at 6 ft high:"

"In Conclusion, I beg to state that at a rough view, I should judge, the drainage to be more nearly

Green Run = 5 sq miles  
Greenwells Hollows = 4 or 4 1/4 miles"

"[P.S.] The other Culverts on this Residency are in my opinion proportioned suitably to their duty."

[182] Board of Directors Meeting, 10 July 1839 (Floods-Compensation Claims)

"A letter was received from Clement Cox on behalf of the Corporation of Georgetown in relation to the obstruction of Streets in that Town, by construction of the Northern Abutment of the Potomac Aqueduct."

"A final Estimate for Sec No 366 in favor of H Devine was also received asking compensation for Embankment washed away from Sec No 366 by a freshet in the river. The letter was referred to the Chief Engineer with directions to report whether any instructions were given in the case, which entitle the said Devine to an allowance for the embankment washed away, in opposition to the terms of the contract."

[190] John G. Stone, Superintendent, Clear Spring, to John P. Ingle, Clerk, 20 July 1839 (Improvements-Unspecified)

"The banks in some place have settled a little, and a few slides have taken place. the outside of the natural bank which is easily secured by a protection of stone."

[214] Ellwood Morris, Principal Assistant Engineer, to John Gorman, 18 September 1839 (Flood Damage Prevention-Proposed, Sustainability-Bridges)

Concerning rebuilding a bridge at Coxes Island after a high water, it was noted that the new floor of the bridge would have to be raised.

[194] John P. Ingle, Clerk, Washington, D.C., to J. Y. Young, Superintendent, 5 October 1839 (Maintenance-Cutbacks)

"The President and Directors of the Chesapeake and Ohio Canal Company direct that you discharge all the hands employed by you, except enough only to attend to necessary repairs; dispensing, for the present, with all works of mere improvement, so as to reduce your current expenses to the lowest possible point."

[207] John G. Stone, Superintendent, Clear Spring, to Charles B. Fisk, Chief Engineer, 7 October 1839 (Maintenance-Cutbacks)

In response to Ingle's directive of 5 October 1839, Stone responded that he did not think he could reduce his force much because of the problem with leaks and sinks on his division.

[190] J. Y. Young, Superintendent, Canal Line, to the President and Directors, Clerk, 10 October 1839 (Maintenance-Cutbacks, Maintenance-Dams)

"I recd your order of the 5th instant directing me to discharge all persons in my employ excepting such as are required for the necessary repairs of the Canal. I have already reduced my force to about 20 hands, and one manager engaged at different points requiring attention between Geo Town and Edwards ferry. Dispensing with all work that can be suspended for the present, including the repair of Senaca Dam. So long as the Canal can be supplied with a Sufficiency of

water for navigable purposes. So far we have a supply. Should the river get much lower, a repair will be indispensable, in the event of which I will immediately do the necessary work so as to keep the navigation open. I have also engaged in the Geo Town basin from 15 to 20 men removing the deposits with the dredging machine. At present a channel has been opened sufficient to accommodate the trade, until it shall again be filled up by deposits from the creek during a freshet."

[194] John P. Ingle, Clerk, Washington, D.C., to G. W. Rodgers, Superintendent, 26 November 1839 (Maintenance-Cutbacks)

"On the subject of general repairs, of which you speak, I can only say, that such as are indispensable to the navigation next spring, must be done of course; but we have not money for anything which can be delayed. In the case of Mr. Brien's Culvert, the Board has a plan ready to reconstruct it, but they have not the money to do the work."

[190] J. Y. Young, Superintendent, Canal Line, to "Gentlemen," 28 December 1839 (Maintenance-Waste Weirs, Sustainability-Waste Weirs)

"their are upon my division, 12 wastewares of which are built of timber, and now in the most decayed and useless condition. All of which, tho 9 timber wares, Should be rebuilt during the winter. I propose that they Should be reconstructed of timber, with some alteration as to plan &c. I will at your next meeting Submit a plan and estimate for them."

#### 1840

[207] Ellwood Morris, Principal Assistant Engineer, Tunnel Residency, to Charles B. Fisk, Chief Engineer, 13 January 1840 [letter reads "1839" but this appears to be a mistake. Fisk notes the letter as being from 1840.] (Flood-January 1840)

"I enclose you the agreement made by with Wallerchant [?] on the afternoon of the same day in which you authorized it, by which he agreed for \$500 to move Brights Embkt Bridge (Sec 321) and was to begin this day:"

"But on the night of the 12th the Ice broke up and swept away the Bridge: Watkins Bridge has also gone, the cribs filled with stone having been shaved off at the waters edge: All this was anticipated as I believe the ice was moved more or less in Jan every year since 1835; and it is unfortunate that you yielded to the arguments of Mr Bright & countermanded the arrangements I has made for the removal of the Bridge in December."

"The effects as regards the canal company will be as follows:"

"A New Bridge will cost = \$1600:  
Add about 500 yds of Embkt hauled over 1/4 mile by your permission to Mr Bright, which might have been kept under 1/4 mile by moving the Bridge (as arranged in Dec) x 12 1/2 c =  
62.50

1662.50  
Removing Bridge & rebuilding would have cost = 500.00  
Extra cost to the Canal Company = \$1162.50"

[207] Ellwood Morris, Principal Assistant Engineer, Tunnel Residency, to Charles B. Fisk, Chief Engineer, 15 January 1840 (Flood-January 1840)

"I have further to report for your information that McCubbins Bridge as well as the remnant of that opposite Section 297, have also been swept away:"

"And I believe this completes (upon this Division) the list of disasters occasioned by the Ice Freshet of the night of the 12th of January:"

[207] John A. Byers, Principal Assistant Engineer, Hancock, to Charles B. Fisk, Chief Engineer, 25 January 1840 (Flood-January 1840)

"On the 13th of this month the ice from the South branch and the river below came down into the pool of dam No 6 carrying away the Bridges in its Course, and gathering up all the grubbing of the Canal and Railroad until the river for several miles looks like a fallen forest."

"The ice in the pool was broken up just far enough down to destroy Mr Manns bridge of boats and of Course Mr Gormans along Sections 268 & 269 the ice dam'd up and raised the water about 16 feet, and all this was done by a freshet of not more than 4 feet height in the Potomac."

"Very little of the Boats or Bridges can be saved out of the ice, the forepart of this week being moderate I was fearful of another rise, so I engaged Mr Mann to throw a bank across the Canal on the upper end of Section No 263. I had this done in case the ice should form another dam somewhere below this, and throw the water into the Canal above the aqueduct at S.H. [Sliding Hill] Creek as such a current would carry away the Embankment from around the wings. I also got Mr Proctor to place a bank across the canal on the lower end of Section No 259 and to put in the Stop plank at lock No 55. this I believe is all that can be done in the way of precaution about the Dam."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to Francis Thomas, President, 10 February 1840 (Flood-February 1840)

"The river is at this time flowing over the canal Banks. However, there is not much damage done yet the Ice is coming down in large masses and the river on the rise fast."

"I am very fearful that there will be very considerable damages Done the Canal"

[190] Charles B. Fisk, Chief Engineer, Cumberland, to John P. Ingle, Clerk, 10 February 1840 (Flood-February 1840)

"We have had a very severe freshet. I have reason to hope that there has not been a very large amount of damage done this side of Dam No 6. Damage to the amount of about \$2,000 had been done at and within one mile of Cumberland."

[190] Charles B. Fisk, Chief Engineer, Cumberland, to Francis Thomas, President, 10 February 1840 (Flood-February 1840)

"There will probably be exaggerated rumours abroad, of the damage done to the Canal, this side of the 'Capon. I will place you at the earliest period in possession of the correct information upon the subject. about \$2,000 of damage has been done to the Canal in & within one mile of Cumberland."

"From all that I have learned, I have reason to hope that there will not have been a very large amount of damage done between Dam No 6 and Cumberland, excluding the bridges, of which there is not one now remaining"

"I propose going down the line as soon as the water falls sufficiently to admit of it, and shall endeavor to be in Washington in about one week."

[214] Ellwood Morris, Principal Assistant Engineer, to Charles B. Fisk, Chief Engineer, 10 February 1840 (Flood-February 1840, Sustainability-General)

"Upon the 10th of Feb'y there was high freshet in this quarter of the Potomac Valley and the river has since remained up so as to prevent me from reporting its effects upon the works with accuracy."

"This freshet was about 20 feet high along sec 319 & 23 feet high around and below the Paw Paw bend."

"Of course it has swept over or through really all of our works and the damage done to the embankment or several sections had been quite serious."

"Supplying that correct information as to the amount lost would be requisite we are now engaged in measuring the \_\_\_\_ or sections 293 & 317 & 18 and shall present [?] the results on the 7th of March."

"From a \_\_\_\_ view of the works some parts are still immersed I have foreseen a rough estimate of the repairs to permit you some conception of its extent."

"From the facts and evidence that out of the same snow we had 3 freshets of 12, 10 & 7 feet high respectively previous to the last."

"I deem myself justified in drawing the following inferences:

1. That a freshet of 26 ft high (our limit) is quite practicable.
2. That if we have erred either way in arranging the levels in this quarter it has not been in laying them too high.
3. That if the work on this residency had been severally [?] finished upon the plans contemplated no injury would have been received by any if the late freshets and know that it will nowhere be necessary to vary or strengthen the works as planned."

"Finally I have not to reproach myself with any want of care or foresight as every step taken during the last season was upon a matured plan aiming at the ultimate security of the works before spring against ordinary water."

"This freshet however having run through the canal bottom several feet deep on the long levels it was scarcely possible to defend the works against so high a water by any effort short of entire completion."

"The rip rap wherever finished has stood fast without incurring the slightest injury."

"P.S. A prodigious slide is about to take place in the lower tunnel deep cut, berm side."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to Francis Thomas, President, 11 February 1840 (Flood-February 1840, Harper's Ferry-Sustainability)

"The river is on the face to day there is 4 Breaches from Lock No 31 to Dam No 3. I am in hopes they will not be very large. But can not Tell there Extent until the river falls, as the river is still runing in the Canal over the Shenandoah River Lock. I cannot have

any command of the Canal until it does fall below that Point as all the Breaches is from the Top of the Canal. By over flowing, I am in hopes that I shall be able to save a part of the Embankment as soon as the river falls by at once stopping off the water from the Canal the canal from Lock No 31 to Lock No 26 is not Injured as yet. from Lock No 26 to Lock 25 I cannot say how much Injury the canal has sustained; I will inform you as soon as I can ascertain. I shall promptly repair the Breaches as soon as the river will let me, and put the Canal in good order as soon I can do so"

[182] Board of Directors Meeting, 12 February 1840 (Flood-February 1840)

"A letter was received from Phineas Tanney stating that after an attempt to reach Washington to attend the special meeting of the Board called for Monday last, he had been unable to do so in consequence of the freshet in the river Potomac."

"A letter was received from Philip Gormley, Contractor for the repairs of Section No 208, asking compensation for the extra expense of piling up stone upon the Banks of the Canal.

Whereupon it was Ordered that the said Gormley shall be compensated for the additional expense which he may incur in piling up any stone which the Superintendent may require to be piled upon the Banks of the Canal, above that which he would incur by throwing them over the banks of the Canal; such compensation to be adjudged by the Chief Engineer."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to Francis Thomas, President, 12 February 1840 (Flood-February 1840)

"As the water has fallen Between Lock No 25 & 26 I am now able to report the condition of the Canal on that portion the water flooded over the Embankment from Section No 63 to 67. It made four small Breaches, Besides cutting off a considerable portion of the Top of the Embankment. 2 of the Breaches is on Section No 67 one Section 60 near Conrads Ferry and the fourth on Section 51 near Edwards Ferry. The Breaches reported yesterday will not be very large as I succeeded about the midnight of last night Tuesday to get the water stopped off from the Canal and drained off the levells Immediately which saved very considerable of the Embankment. the one near Lock No. 31 is the largest, I have commenced the repairs of that one as it is necessary so as to free some of Lower Levells to prevent the culverts from Bursting up a portion of the Enclosure around the Lock House Lots of Locks 27 & 28 have been taken away By the ice though the damages on my Division has not been as great as I Expected"

[190] G. W. Rodgers, Superintendent, Canal Line, to John P. Ingle, Clerk, 13 February 1840 (Flood-February 1840, Harper's Ferry-Sustainability)

"The water on Tuesday Came over the towing path at Dam 5 and passed out at the Stop Gate above the High Rocks 5 miles above Wms port doing but little damage. it came in again below lock no 43 and passed out above Lock No 42 the damage cannot be ascertained untill the level is drained off. the tow path along the Slack Water is injured and two of the Bridges Carried off the damage I Cannot tell untill the river Shall fall 2 or 3 feet. at Dam 4 we found the Stop gate to answer the perpous intended there is but little damage done. at the Saw mill one mile above Zoocks Landing there is a Breach through the Berm at tow path Bank booth Small Below Lock 40 the water came over the two path and went out about one mile below making a Breach about 30 ft long and four feet deep leaving the bank about 3 feet above bottom at the 76 mile post there is a Small Breach and another at the Head of lock no 36 about 55 feet long and down to Canal bottom from what can be Seen I am induced to believe we Shall be able to have the Canal navigable by the 10th of march as Soon as the levels are drained off So I can make a more minute Estimate of the damage . . . I am making arrangement to commence the repairs of the damage done, and I will be able to commence the work on monday next with about 40 men"

[190] J. Y. Young, Superintendent, to John P. Ingle, Clerk, 13 February 1840 (Flood-February 1840)

"Their has been considerable damage done the Canal between the Great Falls & Seneca occasioned by the water from the river passing over the towing path into the Canal. a full report of which I will give you tomorrow by letter"

[190] J. Y. Young, Superintendent, to Francis Thomas, President, 13 February 1840 (Flood-February 1840)

"During Sunday afternoon the Ice gave way & passed off opposite to my division of the Canal without doing any damage to the Canal or its works. It was followed Monday by high freshets in the river, overflowing the embankments upon each of the levells between the Great Falls & Seneca, passing into the Canal at the lower end of the Locks, and overflowing the towing path below, making large breaches in the embankments, in all numbering nine. No Masonry has Sustained any injury, As yet, And as the water is fast Subsiding I am inclined to think All is safe thus far. The damage is confined to common earth embankments, and with one exception, the Breach next above Seneca Aqueduct, have fortunately occurred where, all the materials necessary are hand, this fact will greatly lessen the time & cost of repair."

"Every precaution was taken to prevent destruction to the works of the Canal by Stationing men at all the exposed points, with the necessary instructions to cut the bank, in the event of the over flowing of the banks, so as to pass the water off where the least damage would be done the Canal. this duty was faithfully performed, & I have no doubt has saved the Canal from greater injury than has been Sustained. I have made a rough estimate of the cost of repairs of the Injury done the Canal under my charge at or about Five thousand dollars. this Estimate of course is but supposition as the water had not subsided Sufficiently to permit of a close examination."

"I have already made the necessary arrangement for a speedy repair of the whole damage done, and in two or three days shall be fairly under way, and should the weather be favourable I believe the whole can be permanently repaired and the water readmitted by the 15th of March. All the hands & carts necessary can be readily employed and the work forced from the beginning, so as to ensure its speedy completion, to which my early and strict attention shall be given. The present height of the water in the river prevents any knowing whether any damage has been done Dams No 1 & 2. Should this be the case you should have any early notice of the fact."

"with reference to that portion of the Canal between Geo town & the Great falls I am pleased to say no damage has been done. Although the water wase to the top of the towing path in a number of places."

[207] John A. Byers, Principal Assistant Engineer, Hancock, to Charles B. Fisk, Chief Engineer, 14 February 1840 (Flood-February 1840)

"I have just received a letter from you by Mr Story, requiring me to report to you the probable amount of damage done by the late freshet on my division. I have examined the Condition of the Canal as far as the present stage of the river will permit and I respectfully Say before you, the following report which not being based upon measurements can only be approximate, before doing so however I will make a few remarks in relation to the manner in which the ice passed off, and the height of the river at several points along the Canal, the ice began to move at 15 Mile Creek about 4 O'clock on last sunday afternoon, forcing itself step by step towards the dam. in this way it kept on untill near sundown, when it started is if determined to be gone, but was again stopped by a Dam formed against the head of P. Pendleton Island, and by another in the bend above 15 Mile Creek. while in this situation the water and ice was about 4 feet higher than the towing path below lock 57, and ran into the Canal for nearly half the length of Section 267. the water also came into the canal over the towing path along the Sections No 274, 275, & 276 these sections being also filled by the water coming in at the upper end of 276. above this section the freshet has done no perceptible injury to the Canal though the water stood about 4 feet deep in 278, 280 & 281. the rise above low water at round hill I believe to have been about 23 feet at Sideling hill creek 16 1/2 above the Comb of the dam, at Lock 57 about 26 ft. and from 25 to 27 feet from thence round to the seven mile bottom When the ice reached the dam it rested for a few minutes against it, untill the ice had crowded up as high or higher than the abutments. Mr Roberts the lock keeper says the ice was for about a minute, very much higher than the abutment, the water ran over the timbres placed on the breast of lock No 55, and there is ice now piled 8 feet high on the top of the Maryland abutment, fortunately the ice dam held but for a few minutes, when the water fell to about 6 feet below the top of the abutments."

"The first damage done by freshet above Hancock is to the protection along sections 243 & 244. the protection is very perceptibly diminished from the cement mill upwards, but only So as to require repairs on that part of 244 above the end of the wall, where it is so much Cut away that I think there will be another slip, though one has not taken place yet the next damage is to the protection on 247 & 248 which has been raked off slightly along both sections in short more or less of the protection has bn taken of all the Sections below the Dam. the water ran into the Canal over the logs of waste No 63 below lock 53 and moved about 100 Yds. of Earth into the canal"

"At the dam the short river wall below the abutment is carried away, and with it about 1/2 of the guard bank for 150 feet in length, this is all the injury at this time visible, say 300 perches as masonry and about 4000 @ yds of Emb. and protection. If you can bring to mind the position of the lock keepers shantee, the Embankment is gone to a line parallel with the Guard lock and 10 ft. in the rear of the shantee. the Circular ends of both abutments where the force of the Current struck them are considerably worn and small pieces are broken out. the wood work of the dam does not appear to have suffered at all, but from the appearance of the water below the dam I would judge that the water fall had quarried out a large amount of Stone. I made inquiry of all who saw the timbre passing over the dam, to know whether there was any reaction [?] upon the Dam, but no one observed any thing of the kind, all concurred in saying that the drift passed directly away. From the dam to Section No 267 the damage is probably about \$200, to replace earth lodged in the bottom of the canal from the slope"

"On Section No 272 about 3000 yards has been swept into the River say worth \$900."

"on Section 273 the inner slope of the towing path is washed down a little and the bank has settled and cracked open for about 300 feet in length, at the upper end of the protection, I cannot at present say what the ultimate damage may be, but I think the slide will not be a serious one The great amount of damage is on sections No 274 & 275 & 276. the water made a very general breach over all, first into the canal and afterwards out of



it, making three breaches through the towing path and washing the inner slope of the towing path into the bottom of the Canal. I should think [page torn] that about 2000 C Yds. are gone, and on Section 275 [page torn] 5000 C. Yds. and on Section 276 about 2500 C. Yds two of the breaches are on sec. 274 one of 30 and one of 60 feet in length. the first is about to bottom and the last about 5 ft. below bottom. the breach on Section 275 is about 200 feet in length, averaging about 2 ft above bottom."

"I should think the damage on 274 would be about \$1500 on Section 275 about \$2500 and on 276 about \$1000 The whole amount of damage exclusive of the dam will not exceed \$6000"

"Wherry's lock bottom (lock 58) has floated off Some few of the timbers are still in the pit and about 50 pieces lying at different points as far as lock 57."

"I presume the most part of the Cement at lock 58 is lost as the water stood 4 ft deep around the building for about 1/2 an hour."

[190] G. W. Rodgers, Superintendent, Williamsport, to John P. Ingle, Clerk, 15 February 1840 (Flood-February 1840)

"The damage done the Canal is much less than I Expected to find it owing to the ice in the levels I am not able to say the quantity of wash above Bottom Canal"

[207] John A. Byers, Principal Assistant Engineer, Hancock, to Charles B. Fisk, Chief Engineer, 17 February 1840 (Flood-February 1840)

"In my last letter I forgot to mention that on Section No 278 there is a slide of about 1/2 the bank for 250 ft. down to about 5 ft. below bottom."

"The injury to the Canal below this place, as far as Seneca is said to be trifling"

[207] Ellwood Morris, Principal Assistant Engineer, Tunnel Residency, to Charles B. Fisk, Chief Engineer, 17 February 1840 (Flood-February 1840, Study-Floods-C&O Canal Company)

"Upon the 10th of Feby there was a high freshet in this quarter of the Potomac valley, and the River has since remained up so as to prevent me from reporting its effect upon the works with accuracy."

"This Freshet was about 20 feet high along section No 319 and 23 ft high around and below the paw-paw bend."

"Of Course it has swept over or through nearly all of our works, and the damage done to the embankments on several sections has been quite serious."

"Supposing that Correct information as to the Amount lost would be requisite we are now engaged in measuring the same on sect 293 & 317, 18, and shall furnish the results on the 7th of March."

"From a mere view of the works (by me above the Tunnel and Mr Dungan below) though some parts are still immersed, I have formed a rough Estimate of the injury, to furnish you some conception of its extent."

"No of Sec:		Embkt Lost:
322	say	500 C Yds
321	'	1000
320	'	2000
319	'	none
318	'	3500
317	'	1500
312	'	1000
297	'	none
296	'	100 or less
294	'	unknown
293	'	4000"

"Say 13600 C Yds 13600 x 30 = \$4080."

"From the facts, and considering that out of the same snow, we had 3 freshets previous to the last of 12, 10 & 7 feet high respectively."

"I deem myself justified in drawing the following inferences."

"1. That a Freshet of 26 feet high (our limit) is quite practicable."

"2. That if we have erred either in arranging the Levels in this quarter it has not been in laying them too high."



'	'	320 = 1200	'
'	'	318 = 3278	by measurement
'	'	321 = <u>1908</u>	ditto
		<u>7786</u>	"

"Embkt lost on Sev 297 = none  
 ' 296 = none  
 ' 294 = 500 C Yds  
 2544 by  
measurement  
3044  
 7786  
3044  
 Total = 10830 C Yds"

[207] Ellwood Morris, Principal Assistant Engineer, Tunnel Residency, to Charles B. Fisk, Chief Engineer, 20 March 1840 (Flood-February 1840)

[Original in Box 6 of #207]

[190] Charles B. Fisk, Chief Engineer, Clear Spring, to Francis Thomas, President, Clerk, 23 March 1840 (Flood Damage Prevention-Proposed)

"The monthly estimates having been paid off I have come down to this place for the purpose of passing over the line of the Canal from here to Cumberland on horseback. The information has just reached here of the failure of the Legislature to make an appropriation. The consequences upon the cost of the work will be disastrous to an extent that will scarcely be believed by any until they have been realized."

"I shall on my way up the line turn my attention to the securing of the Canal as far as practicable against future injury from high water. A small expenditure now may save thousands of dollars. I respectfully suggest to the Board that they authorize the doing such work as may be advisable for the protection of the canal, in the way of throwing up at a few points temporary banks across the canal or, or if the Board should prefer it I will first make out an estimate of what will be the cost of such work upon reaching Cumberland."

[182] Board of Directors Meeting, 28 March 1840 (Flood-February 1840)

"A letter was received from John Aldridge & Co. Sub contractors of Peter Bargy contractor for Section No 275, stating the circumstances under which much of the Embankment had been washed away from the Section during the late rise in the river, and asking an advance of money. The Board thereupon authorized the Commissioner to make such advances out of the money retained on the work already done, as shall be expended in replacing the lost embankment, provided the original Contractor shall assent thereto."

[190] J. Y. Young, Superintendent, Georgetown, to the President and Directors, 12 April 1840 (Flood-February 1840, Sustainability-Dams)

"The late freshet in the Potomac River has damaged the Seneca Dam. So much as to require some attention before the dry season commences, or else we shall have an insufficiency of water for the purposes of the Canal. this Dam was built of stone in the form of a cimicircular arch And for Several years has been in a broken condition. But by repeated temporary repairs a supply of water has been obtained. a similar repair can now be made. But like what had heretofore been done, will be liable to be carried away by the next freshet."

"It is a question whether it would not be cheaper, to construct a permanent Dam at this place than to be required to make an annual expenditure of from five hundred to one thousand dollars. The canal for a distance of 18 miles has to be fed from this Dam, and unless the Dam shall be made secure a scarcity of water will be the consequence."

[182] Board of Directors Meeting, 15 April 1840 (Flood-February 1840)

"Two weekly reports were recd from the Superintendent of the 4th Division of the Canal shewing the force employed by the Contractors for repairing Sections No 208 and 230. A letter was also received from the Superintendent, stating that B F Hollman had refused to sign his Contract for repairing Section 230 &c and that Philip Gormly had permitted the force employed by him on Sec No 208 to be diminished. A letter was also received from the Chief Engineer shewing the little progress making on these works; enclosing a certificate that P Gormley had failed to increase his force after being duly required so to do. The Board thereupon declared the contract made with Philip Gormley for the repair of Sections No 207, 8 & 9 abandoned, so far as it applied to the work below a point 400 feet below the centre line of road Culvert No 140 on Section No 208. The Board also Ordered that the clerk notify B F Hollman, that if he shall fail to increase the force employed by him on Sections No 229 & 230, to the extent required by the Chief Engineer, with five days from

the time he shall receive notice, the Board will then adopt other means to carry on the work."

[194] John P. Ingle, Clerk, Washington, D.C. to Charles B. Fisk, Chief Engineer, 1 May 1840 (Flood-February 1840)

"You are aware that the Board in February last agreed to make an advance to Mr. Shafer on account of the Cement delivered by him into the House at Lock No. 57, provided he would be responsible for the keeping and delivery of the Cement, when required, according to his contract."

"It is stated that the cement put into that house has been destroyed by the late freshet . . ."

[190] G. W. Rodgers, Superintendent, Williamsport, to John P. Ingle, Clerk, 4 May 1840 (Flood-May 1840)

"The high water of last week done considerable damage to Dam No 4 170 feet from the Maryland End all the rib timbers on lower side of dam are carried out to the foundation about 20 feet in length, the comb timbers on the upper side appear to have settled 4 or 5 feet the river is still high though falling rapidly from what I can See at the present hight of water I am induced to believe that no Serious injury will be done to the dam I am prepairing materials to commence the repair as soon as the water shall fall to enable us to get a Scow down to the dam to work from . . . "

[182] Board of Directors Meeting, 7 May 1840 (Flood-February 1840)

"A letter was received from the Chief Engineer, certifying that B F Hollman has failed to employ the necessary number of hands upon Sections No 229 & 230 to complete the repairs therof in a reasonable time. The contract entered into with said Hollman for making the repairs on said Sections was thereupon declared abandoned."

"A letter was received from the Chief Engineer, recommending that the repairs to be made on Sections No 207, 8, 9 and 229, 30 so far as the Contracts for that work may be annuled, be carried on by the Superintendent of the Canal: that a double force of hands be employed so as to work by night and by Day" and that the work be continued on Sundays as on other days of the week. The Board Ordered, that the repairs be made by hands employed by the Superintendent; but postponed the question of employing a double force of hands; and disapproved of the proposal to continue work on the Sabbath days."

"A letter was received from Philip Gormley asking an increase of price for some of the work yet to be done under his contract for repairing Section 208 &c. The Board declined to increase the price."

[190] G. W. Rodgers, Superintendent, Williamsport, to the President and Directors, 18 May 1840 (Flood-February 1840)

"if Convenient I would respectfully ask you to send me two thousand Dollars as the most of my accounts for Labour &c Since Feb 1st is unpaid, for repairs of dam No 4 it is important to have a little money to pay for timber &c"

[182] Board of Directors Meeting, 27 May 1840 (Flood-February 1840)

"A letter was received from Philip Gormley, contractor for the repair of Section No 208 &c, asking that a competent Engineer be authorized to measure the work done by him, and offering to relinquish his entire contract for the work, upon being paid the full contract price for all the work done. A letter was also received from B F Hollman late contractor for the repair of Sections No 229 & 230, the contract for which, was declared abandoned on the [?] proposing to complete the work, and asking that a measurement of the work be done may be made if the abandonment shall be insisted upon by the Board. A letter was also received from the Superintendent of the 4th Division of the Canal, stating that B F Hollman, late Contractor for Sections No 229 & 230 was prepared to enjoin the Company from proceeding with the work unless a measurement was made of that which he had done: stating also what he the Superintendent had done in the matter. It was thereupon Ordered that the offer of P Gormley to surrender his contract be accepted, and that the Chief Engineer be directed to have correct measurements made immediately, upon the work done by P Gormley and B F hollman, and that they be paid according to Estimates to be made from such measurements. It was further Ordered, that the Superintendent be directed to employ hands and to carry on both of the aforesaid works to completion."

[180] Twelfth Annual Report, 1 June 1840 (Flood-February 1840, Sustainability-Dams)

Francis Thomas, President, on behalf of himself and the Board of Directors reported:

"The repairs during the last year on the 134 miles of the Canal which is completed, were very small [not surprising given the fact the Canal was serious financial trouble that year]. But little of that sum was expended on the 27 1/2 miles between dams No 5 and

No 6. Which is evidence that, that division of the Canal is constructed, in superior style. Although it was filled with water for the first time in April 1839, there was not one day's interruption to the navigation, from breaches or other causes during the last year."

"On this division in improvement is now in progress, that must arrest the trade on the Canal west of dam No 5, until it can be completed. It was anticipated when the water was let into this portion of the Canal, that this improvement would be necessary to guard against the effect of lime sinks near Panther's neck, and to secure a weak point in the Canal four miles below Hancock."

The General Committee (Clement Cox, Chairman) reported, dated 20 July 1840:

"The line of the Canal to dam No 5 is in excellent order, and evidences the vigilance and attention of those in whose charge it is. The expence of the repairs for the past year has been very inconsiderable, falling short of \$100 per mile, including the damage done by the extraordinary freshets of the last winter. A considerable breach has lately been made in dam No 4 which, however, was happily arrested by the prompt attention and skill of the superintendent and is now in the course of thorough repair. The only other point at which any trouble has ben experienced is on section 137 passing over a limestone region, where there have been frequent breaks resulting the lime sinks incident to that formation of country and defying ordinary repairs. This point has, during the past winter received a thorough and expensive repair, by the formatin, for the bed of the canal, of a complete trough of water tight material, which has proved entirely effectual and the Chief Enginner thinks will permanently answer its object."

Evidently contracts for some repairs were not carried out as effectually as they could have been, accordindng to the report of the General Committee, because of the tardiness of the Board of Directors on acting on the recommendations of the Board of Directors and executing contracts for the repairs.

[182] Board of Directors Meeting, 10 June 1840 (Flood-February 1840)

"A letter was received from Thomas M McCubbin, claiming among other things, allowance for earth washed away from the Embankment of Section No 293 during the high water of the last Spring. This letter together with any others now on the Table, making claim for similar allowance were refered to the Chief Engineer."

[190] Charles B. Fisk, Chief Engineer, Cumberland, to Francis Thomas, President, 26 June 1840 (Maintenance-General)

"It just occurs to me that in reading over the proof sheet of your annual Report I saw a remark to the effect that there had been no expenditure for repairs on the 27 1/2 miles during the last year. This I presume is an error of the printer as the intention I believe was to say that but a very small amount had been thus expended on the 27 1/2 miles within the year on work chargeable to repairs."

[207] G. W. Rodgers, Superintendent, Williamsport, to Charles B. Fisk, Chief Engineer, 30 June 1840 (Sustainability-Dams)

"I have the coffer dam in [at Dam No. 4] and two rows of Sheet piling across the Breach and one row around the Ends the water is nearly all stoped after Sheet piling the frame the water in the pool rose one foot and now runs over the dam about 10 inches in depth I find the damage done to the timber work more than I Expected I therefore wish you to See it before I commence putting down the foundation timbers . . ."

[182] Board of Directors Meeting, 7 July 1840 (Sustainability-Dams)

"A letter was received from the Chief Engineer representing the necessity of making immediate repairs to Dams No 4 & 5. It was Ordered, that the Superintendent of the 3d Division of the Canal be directed to have the repairs made as proposed, and that he make agreements to pay for the same in the Scrip about to be issued by the Company."

"A letter was received from the Chief Engineer inclosing a proposal from A B Proctor for protecting Culvert No 201 The proposal was accepted provided payment be accepted in Scrip."

[190] Charles B. Fisk, Chief Engineer, Washington, D.C., to President and Directors, 7 July 1840 (Flood-February 1840, Sustainability-Dams)

"The injuries that have been sustained from the high water of last winter, and heretofore, by Dams No 4 and 5, are of such character and extent as to render necessary a very considerable expenditure of money this season to make them secure."

"I do not think that less than \$10,000 will be required for the purpose."

"I respectfully call the attention of the Board to the subject, as the Superintendent may not feel justified in undertaking so extensive a repair without their order."

"The whole lower slope of the two dams should be covered with six inch sheeting in place of three inches, so far as the sheeting has not already been doubled, or so far as

planking has not already been provided for the two courses of double planking."

[182] Board of Directors Meeting, 8 July 1840 (Flood-February 1840)

"A final Estimate for work done on Sec No 207, 8, 9 by Philip Gormley, was passed, and payment ordered in Canal Scrip."

"A final Estimate was presented by B F Hollman for work done on Sec No 229 & 230 accompanied by a letter from the Chief Engineer in relation to this and the work done by P Gormley. B F Hollman being present, claimed a further allowance for constructing roads, Bridges & bailing water. It was Ordered that the Estimate be passed and paid with the addition of Four hundred Dollars which shall cover all claims for extra work in making roads & Bridges and for bailing water. It was further Ordered, that Two thousand and Sixty two 20/100 Dollars be now paid by Requisition, and the balance in Scrip."

[190] Edward Colston, Contractor, Honeywood Mills, to Francis Thomas, President, 24 July 1840 (Sustainability-Dams)

Colston complains in this letter about Dam No. 5. He writes, "It has never been filled in behind with gravel and the consequence is that in a low stage of water, it leaks so dreadfully as to let the whole river pass through." He goes on to indicate that the Dam barely kept the canal filled sufficiently to run half-loads on the level below it or for periods it was necessary to suspend navigation entirely because of insufficient water."

[190] Charles B. Fisk, Chief Engineer, Washington, D.C., to the President and Directors, 7 July 1840 (Sustainability-Dams)

"Mr Grove tells me that it is for want of the materials that he has not yet been able to commence work in the breach of Dam No 4."

"A letter will arrive at Washington I presume at the same time this does, from Mr. Grove stating, the amount of money he wishes at present."

"I must urge upon the Board that it is all important that there should be no obstacle in the way of Mr Grove's proceeding with the repairs particularly on Dam No 4, occasioned by want of means, as a failure to repair the breach in a proper manner and at the proper time may prove highly disastrous to the Company."

[194] Thomas Turner, Clerk, Washington, D.C., to John D. Grove, Superintendent, 13 August 1840 (Sustainability-Dams)

"A letter from Edwd Colston Eng [Esq?] . . . having been submitted to the Board, I have been directed to call your attention to the state of Dam No 5 & to instruct you to take steps for its immediate repair."

[194] Thomas Turner, Clerk, Washington, D.C., to John D. Grove, Superintendent, Sharpsburg, 17 August 1840 (Sustainability-Dams)

"From what we have learned of the situation of Dams No 4 & 5 no delay should be permitted in the their repair. I would advise therefore your coming down, as early as possible."

[207] Joseph Hollman, Superintendent, Dam No. 6, to Charles B. Fisk, Chief Engineer, 9 September 1840 (Sustainability-Dams)

"yours of the 31 was received yesterday Evening on my way up to this place when I wrote to you last concerning the Brake below Williams port I for got a very Im portant matter that is the watters giving a Way at dam no 5 and the navigation stopt as soon as I discovered that we had not sufficant head of watter in this dam to fill the level draulin of and to dam was sinking I apprised W Grove of the fact and waited from Friday till monday to see what his a rangments was getting no answer and the Traiding comunity be came much disatisfide I put Every thing I have in reconition on monday morning at graveling and stopping the dam and shall continue to do so untill other wise directed I did not to enter upon an other man devition without first seeing him [illegible] I am not transcending my authority I am clare of the opinion that Bruch mixt with the gravle would give grite security to the fill be hind the dam with long splings from 50 to 60 feet and upwards with ceder brush put a bout and a gainst the upstream frunt will filed with gravle as it progress it would collect cedement and increase in quantity insted of washing a way I believe that after the dam is will fild with gravle and brush it would be a good plan to put a lager of tolerable sesed [?] rubble stone over the top to press it down tight and keep it to its place . . . Col Colston wishes to fill the ballance of his contracts With pine and that of a very inferior quality and says W Grove a greed to take pine I do not no how it is he [illegible] them I refused to let awney more go on the dam as he had a plenty of good white oake Logges to saw and he can furnish good sheeting if he will we all no from Experance that pine will get soft in the watter and can not stand the reaction of the flud [illegible] and hevey Ice for one single freshet it is only spending money and time for nothing I shall conclude to refuse pine sheeting unless other wise ordered by your self"

[182] Board of Directors Meeting, 16 September 1840 (Sustainability-Dams)

On application of J. Y. Young, Superintendent, of 1st Div. for an advance of 1200\$ for the

repair of Seneca Dam, it was ordered that that sum be advanced him in Scrip of the Company."

[190] J. Y. Young, Superintendent, Canal Line, to President and Directors, 16 September 1840 (Sustainability-Dams)

"Since I commenced the repairs of Dam No 2 (Seneca) Instead of a temporary repair as was contemplated I have done the work permanently with reference to a continuation from Shore to Shore at some future time. And as the water in the river is very low I think it advisable to do as much of this work as the Season will permit. If it is the pleasure of the Board that this shall be done. I respectfully ask the Sum of Twelve hundred dollars"

[182] Board of Directors Meeting, 19 November 1840 (Sustainability-Towpath)

"A letter from the Chief Engineer recommending that the Tow path, for a distance of one mile next below lock No 57 on Section No 267, be raised to protect the Canal from damage from freshets was read. Whereupon sundry propositions were considered, & the bid of Patrick Mechan being considered the lowest & most favorable it was ordered that a contract be made with him for said work, provided he would accept in payment scrip of this Company payable nine months after date with interest."

1841

[190] J. Y. Young, Superintendent, Georgetown, to Thomas Turner, Clerk, Frederick, 10 January 1841 [note the letter is dated "1840," but this is obviously a mistake on Young's part] (Flood-January 1841)

". . . we have been threatened with a freshet in the River, which you know is so often destructive to the Canal & its works upon my division as to require my presence and utmost vigilance upon all Such occasions. . . . I am happy to state that so far the Canal has sustained no material damage, although the worst is yet to be dreaded from the back water from the Mountains"

"Rock Creek was swollen to a greater height than I have ever seen it before passing over the mole, and carrying away, a portion of the Bridge over the Tide Lock & washing a few small breaches in the mole and embankments in the City Canal."

[190] J. Y. Young, Superintendent, Georgetown, to Thomas Turner, Clerk, Frederick, 2 April 1841 (Maintenance-Cutbacks)

"I received your letter this morning, containing an order from the President directing me to lessen the depth of water upon each levell throughout my division to three feet nine inches measuring from the lower mitre sill, and in answer beg leave to explain the effect its execution will have upon the navigation of this portion of the Canal."

"It may not be known to the Board that their is a Serious defect in the arrangement of the culverts upon this Division, owing to the crown of many of the arches approaching very near the bottom of the Canal so as to require a thickness of puddling from 12 to 15 inches above bottom of canal to render them secure. This gives us in fact but a five feet canal, where the water has been raised to its intended height without any means whatever to remedy the evil. hence I gave the Chief Engineer 5 feet as the average depth of my division."

"All the largest Class of Boats draw when laden from 4 to 4 1/2 feet, and in order to prevent them from injuring the Canal, by making holes through the puddling, with their socketts, they should move without scraping the bottom. Indeed my own opinion is they Should occupy but 2/3 of the depth of the Canal whenever it is practicable. As I am satisfied many breaches have occurred from this cause a lone. The muskrats are also more destructive when the water is low, they burrow low into the embankment, and whenever the water is raised it passes out often making breaches not so when the water is high."

[194] Thomas Turner, Clerk, Frederick, to J. Y. Young, Superintendent, 9 April 1841 (Maintenance-Cutbacks)

"The order alluded to [in Young's letter of 2 April] was passed at the instace [insistence?] of Wm Morris, & was intended to guard against breaches in the present embarassed state of the Company, whilst, at the same time, it was expected, & intended to keep up the navigation of the Canal, so that the Company might continue in the receipt of Toll."

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, Frederick, 21 July 1841 (Maintenance-Cutbacks)

"My Division is in Bad condition as respecting the condition of the Locks, Gates & wasts & flumes as the Timber in Each are very much decayed and given out, and the worst is I have no Timber preparrd to renew them; also some the Culverts have had a portion of their foundations taken out by Heavy rains which must be replaced, immediately, or endanger the canal very considerable . . ."

[180] Addendum to the Thirteenth Annual Report, 2 August 1841 (Maintenance-Cutbacks)

The C&O company was in a great deal of hot water at this point, virtually broke and hopelessly in debt. The former president and board of directors had been thrown out. The new president, M. C. Sprigg, reported:

"Some provision seems also necessary for the contingency of breaches in the line of the canal which in the present depressed credit of the Company, cannot probably be otherwise repaired unless by a measure of a additional discredit to the Company's scrip. . ."

Sprigg recognized the predicament the company's finances has created for the maintenance of the canal, particularly if some flood hit the canal.

#### 1842

[182] Board of Directors Meeting, 3 June 1842 (Flood Damage Prevention-Abandoned)  
"Ordered, That the Contract entered into with the Alexandria Canal Company, on the 3rd day of April 1839 for the construction of a part of the Northern Abutment of the Potomac Aqueduct, near Section B of the Chesapeake & Ohio Canal, in the District of Columbia &c, & the same is hereby declared abandoned. And that the clerk forthwith transmit a copy of this order to the President of the Alexandria Canal Company to apprise him of the determination of the President & Directors of the Chesapeake & Ohio Canal Company, in this behalf."

[180] Fourteenth Annual Report, 6 June 1842 (Maintenance-Cutbacks)

The C&O Canal president, M. C. Sprigg, rather optimistically commented:

"The past year has furnished additional evidence of the strength of the canal, and of the care with which it has been constructed. No breach of any consequence has occurred during that time, nor has there been any material interruption to its navigation from Dam No. 6 to Georgetown."

In an appendix to the Fourteenth Annual Report, dated 6 June 1842, the Chief Engineer, Charles B. Fisk reported, ". . . for the last four years, owing to the embarrassments of the Company there has much work been omitted to be done in the repairs not absolutely required for the present limited trade, but which, undone, would materially embarrass an active trade, and ought no longer be deferred than until the opening of the navigation to Cumberland."

Fisk thought that if only the absolutely necessary repairs were done they would still cost the company \$40,000 a year, or about \$300 per mile for the 134 1/2 miles of the canal in navigation.

[190] Charles B. Fisk, Chief Engineer, Lock No. 33, Opposite Harper's Ferry, to M. C. Sprigg, President, 27 August 1842 (Flood-August 1842) Note: this letter is misfiled with the November 1842 correspondence

"There are five breaches between this place and Georgetown, viz. two on the Georgetown level above the stop lock, one about 7 miles this side of Georgetown, And two about three miles below the Monocacy. At the breach nearest the Monocacy three fourths of the arch of a road Culvert is almost entirely gone. A temporary wood trunk will take the place of this Culvert, the timber for which is already on its way down the Canal from this place. The Navigation will be resumed by Saturday night. The storm was a very severe one, greater than has been known since the completion of the Canal. Between this and Dam No. 6 I do not think any damage has been sustained. It is all important that Mr. Elgin shall have \$500, by the close of next week, and Mr. Young will need more, say double. These sums, however, will not meet the entire expense of the repairs."

"I shall remain on this part of the Canal until the navigation shall have been resumed. The damages done Amounts to fully \$5,000. Upwards of \$2,000 of this sum, however, will not be needed until the rebuilding of the Road Culvert shall be taken in hand, say next Spring."

[190] Charles B. Fisk, Chief Engineer, Lock No. 26, Thomas Turner, Clerk, 29 August 1842 (Flood-August 1842) Note: this letter is misfiled with the November 1842 correspondence

"Five breaches have occurred on the canal viz two on the Georgetown level this side of the stop lock, one at a Culvert 7 miles this side of Georgetown, and two near this lock (No 26) at the Culvt. below and the Road culvt. above. Of the latter culvert, about one half of the arch is almost entirely gone. a temporary trunk of wood will be thrown over the breach and the Culverts can be rebuilt with the water in the canal. The navigation will be resumed on Saturday perhaps on Friday next. I have written (day before yesterday) to Mr. Sprigg saying that it is all important that Mr. Elgin, who is attending to the two breaches near this lock, shall have by the close of this week \$500, and Mr Young twice as much. These sums, however, will not meet the entire expenses of the breach."

"The damage done is fully equal to \$5000, but upwards of \$2000 of this will not be required until the renewal of the masonry shall be taken in hand."

[194] Thomas Turner, Clerk, Frederick, to J. Y. Young, Superintendent, 29 August 1842 (Flood-August 1842)



"I have just received a letter from Mr Fisk giving intelligence of the breaches on your division & the extent thereof. In his letter he states that it will be necessary, that 1500\$ should be placed in your hands before the latter part of this week. 1000\$ to be used by you on the lower part of the Division & 500\$ by Mr Elgin who has charge of the two upper breaches."

"The 500\$ you will transmit to Mr Elgin by some safe opportunity."

[207] Thomas Turner, Clerk, Frederick, to Charles B. Fisk, Point of Rocks, 29 August 1842 (Flood-August 1842)

"I hope you will be enabled to render the canal navigable by Saturday as you anticipate . . ."

[190] Charles B. Fisk, Chief Engineer, Point of Rocks, Thomas Turner, Clerk, 31 August 1842 (Flood-August 1842) Note: this letter is misfiled with the November 1842 correspondence

"Two days since a small breach occurred near Berlin. Of itself, it would not interrupt the navigation more than a day, but finding some suspicious places on the same and the next level we have concluded to give them a thorough examination. I have just left the two breaches at Fitch's lock. one will be nearly if not quite ready for the water this evening."

[190] J. Y. Young, Superintendent, Georgetown, to President and Directors, 10 September 1842 (Flood-August 1842)

"A sudden and heavy rain fell here on the 24th of Aug, raising the Branches higher than they have been since the first admission of the water into the Canal. On the Geo Town levell there are a number of Streams emptying into the Canal. In addition to which Rock Run Branch (where this [?] is a large culvert) the water passed over the [?] into the Canal, raising over the embankment for the greatest part of two miles, making two breaches in the embankment, between the Stop Lock and the Little falls Bridge, each about 50 ft wide and from 12 to 15 ft below bottom of Canal. All the waste were raised and other precautionary steps taken to prevent the damage. In addition large bodies of Sand were deposited in the Canal, at the Mouth of the different branches. I took immediate steps to repair the damage and with a large force completed it so as to readmit the water on the 3d instant. The water also passed into the Canal from Cabbin John branch, making a small breach over a culvert, and depositing the sand as below. This work was speedily repaired so as to pass the loaded Boats to Lock No 5 from thence a portion of the flour &c was hauled to Town. The probable cost of repairing the damage upon this portion of the canal will be about 1600 dollars a detailed statement of which will be furnished. From Lock No 7, Seven miles from Town to Lock No 25, 31 miles sustained but little damage. from Lock 25 to 27, the culverts have Suffered Severely. the large Road culvert next above Lock 26, the arch of which had been carried away for nearly two thirds [of] its whole length. over this a temporary trunk has been erected under the direction of Mr Fisk, who will explain the particulars of this, as well as the other portions of the Division. arrangements are in progress to secure As well the work already done and its permanent repair"

"The small culvert next below Lock 26 has also been carried away about half of its length this will also be attended to. a number of the small culverts upon this levell have been undermined. Some of them in a dangerous condition. preparations are being made to have then Secured immediately. The cost of repairing this portion of the Canal only temporarily So as to readmit the water I am unable to give accurately. But I should think it will not exceed 1400 hundred dollars. A plan and estimate of the cost of its permanent repair will hereafter be furnished by Mr Fisk."

[194] Thomas Turner, Clerk, Frederick, to John Cox, Mayor of Georgetown, 9 November 1842 (Maintenance-Cutbacks)

"Your letter received some short time since relative to the reconstruction of the bridge on the West Side of the Market House in George Town was presented to the consideration of the Board at its recent meeting."

"Their present resources are not sufficient to preserve the portion of the Canal now navigable in as good condition as would be agreeable to the Board, & as the interest of all concerned in its navigation would demand."

"It is hoped therefore that, deeply interested as are the citizens of Georgetown in the preservation of the canal from ruin & devastation, they at least will interpose no obstacle to the continued navigation of the Canal, but on the contrary will do all within their power to sustain the Board in their efforts to preserve it in such condition as will permit the transportation upon it of such produce as is presented, at the several points to which it now reaches."

"To preserve it in that condition the Board have already been compelled to encounter heavy liabilities, & to anticipate their revenues to such an extent as to render it out [of]

their power to say at what time those liabilities will be met & their needy creditors relieved."

"With this statement of facts it is hoped that the Corporate authorities of George Town will freeze pressing any further a demand, which it [is?] beyond the power of the Canal Company to comply with until their Condition is materially changed."

[190] Charles B. Fisk, Chief Engineer, Frederick, to the President and Directors, 1 December 1842 (Flood-August 1842, Maintenance-Cutbacks, Renovation-1849-51)

"The Board, by its order of September 13th 1842, extended my duties so as to embrace a general superintendence of the finished canal. A few remarks therefore, in reference to that portion of the line, may not be out of place. For several years, the Superintendents of Repairs, for want of means, have been unable to do all that was necessary to keeping the finished canal, in a good and improving condition, and in consequence, a greater expenditure, than otherwise have been necessary, is now required to put the canal in proper order and keep the navigation uninterrupted. Notwithstanding its present condition however, an expenditure comparatively not large, would put the canal in such order, that its annual repairs ordinary, and extraordinary, and to the extent called for by sound economy, would not thereafter exceed those of the least expensive public improvements of a similar character in this country. I have no doubt they would fall considerably short. In support of this belief, I may state that the 27 1/2 miles of canal last finished, between Dams no. 5 and 6, into which the water was for the first time admitted in the Spring of 1839, has not since then had its navigation suspended a single day by a breach, and as the same care was given to the construction of the 50 miles of unfinished line (so far as the work is done) as was to that of the 27 1/2 miles, there is certainly good ground for the conclusion that the upper 77 1/2 miles of the canal when completed to Cumberland will cost very little for repairs. These remarks in reference to the upper portion of the line, seem to me not altogether uncalled for in another view than that for which they were introduced. It has been complained of, that unnecessary expense has been gone to, in the construction of the work above Dam No. 5. I have always contended, that time would prove the contrary. The fact I stated in reference to the 27 1/2 miles of canal above dam no. 5, viz, that its navigation has been free from interruption from breaches, ever since its completion, taken in connection with the numerous interruption during the same period on other and older portions of the canal, is some evidence, I think, of the correctness of the course heretofore advocated by me."

"I already intimated, there is much work, which ought to be done, below dam no. 5, to put the canal in good order for navigation, and what is equally important, to protect it against extraordinary damages, such, for instance, as were entertained on the night of the 24th of August last. At that time, from a rain as heavy and violent as has been known there, for many years, the lower portion of the canal was damaged to the amount of \$10,000. A previous expenditure of \$5,000, would have prevented not only nine-tenths of that damage but the recurrence also of similar injury to the canal, at the same points, at any future time; Whereas now, fully three fifths of the precautionary work will be required, in addition to the \$10,000. That this previous expenditure was not made, is to be attributed to the Superintendents of Repairs, not having the means, wherewith to do the requisite work. These Superintendents are now and for a long time have been nearly \$40,000, in debt, and are receiving from the Company less than will meet their necessary current expenses for ordinary repairs and the pay of lock keepers."

"With so large a debt hanging over them, and that, in the increase, the Superintendents labor under the further disadvantage of not being able to carry on the repairs at cash prices."

"Under these circumstances, I cannot forbear urging on the Board not to lose sight of the repairs on the finished portion of the canal, when seeking aid for the completion of the entire line to Cumberland. If an amount should be set apart, when providing for this completion sufficient to pay off the existing debts of the Superintendents these Repairs could thereafter be carried on at less cost, in as much as, 1st, Those of an extraordinary character, like those alluded to, of August last, could then be on a great measure guarded against, and 2nd, The work would be done at cash prices."

"With the debts due by the Superintendents of Repairs paid off, the tolls received altogether in current money, would be ample to keep the canal, in good order, and the navigation uninterrupted, and would leave a surplus for other purposes. That the tolls have not done this, for two years past, is to be attributed mainly to scrip having been received in part payment of them."

#### 1843

[190] J. Y. Young, Superintendent, to the President and Directors, , Frederick, 8 April 1843 (Flood Damage Prevention-Accomplished)

In this letter, written just before the 1843, Young discusses the conditions and improvements made on the canal. He writes, "I took occasion during the winter to put the Locks culverts wastewares all in order also a new guard gate at the little falls let upon such a plan as insure a greater supply of water into the Geo Town levell for the future. The culvert next below Lock No 26 had been rebuilt with the exception of a few feet upon the tow path side."

"This can be finished during the Summer also the large culvert next above. Arrangements for which I am now making, and until it shall be completed the canal cannot said to be safe at this point."

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, 15 April 1843, 7:30 a.m. (Flood-April 1843, Harper's Ferry-Sustainability)

"We are entirely innundated the Waters in the River is afew inches Higher at this place; than it was, in June 36, on my arrival at Home yesterday Evening I found the river Rapidly rising. I went to work to secure the canal at this place as well as I could. I have been up all night & just return,d from down the canal geting the wastes raised to secure as much as possible, the damage thus far is not much at this point But the river is runing over in the canal from the B&O R R Bridge to the Lower End of Our Carpenter Shop and in spite of all I can do I am affraid will make serious Breaches. I have not been up the Canal as yet owing to being engaged on this portion. But had given previous order to Renner & Jordan, what to do in case of High Water and I feel confident all will be done to save the canal that can be done on that portion I am Just ready to start for that portion of canal and will rite to you from time to time as I ascertain the damages. I feel confident the navigation will be suspended for some time and perhaps for the summer unless there is means at once provided to do the work which will be heavy"

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, 15 April 1843, 12 noon (Flood-April 1843, Harper's Ferry-Sustainability)

"We are entirely inundated the River still rising I undertook to go up But had to retreat the Canal & River is to geather above Lock No. 33 & Sweeping Every thing Below it is runing around Lock no 32, over the Embankment at Sandy hook Runing out near millers narrows and I do not Know how much more one thing certain there will be no more Tolls received soon unless there is money rais,d from some Quarter; I will Let you Know the damage as soon as I can ascertain them"

[190] John G. Stone, Superintendent, to Thomas Turner, Clerk, Frederick, 16 April 1843 (Flood-April 1843)

"The high water has done some injury to the Canal, but not as much as was apprehended from the water being so much so very much higher than it has been since the construction of the Canal. It is impossible to say what amount of damage has been done or how long the navigation will be interrupted. There are 5 or 6 places where the Towpath has been washed away to bottom of Canal, some 20 feet in length, and one (at Shafer's Mill above Hancock) 100 ft of the Towpath gone, and I am fearful as the water falls the bottom of the canal will be carried away. As well as I have been able to ascertain I think it will require \$5000, to this Division. I will write you again in a few days and give you an account of the repairs that will have to be done. The water has fallen 7 or 8 feet since last night."

[190] Charles B. Fisk, Chief Engineer, Hancock, to William Gibbs McNeill, President, Allegany County, Md., 17 April 1843 (Flood-April 1843)

"I have been along the line from this the upper termination of the canal navigation (Dam No. 6) and am satisfied that in ten days, certainly not exceeding two weeks, the navigation will be restored from Dam No. 6 (along the 27 1/2 miles) to Dam #5 and from all the information I have received, I do not think exceeding one week will be required for the repairs from Dam #5 to Georgetown. The damage, I think, on the finished portion of the canal may be rapidly put at not exceeding \$5,000. Immediately at Dam No. 6 the damage is trifling and would not prevent the putting of five feet of water in the canal at once, but at several points along the eight miles below the dam the bank has been broken through."

"The freshet here, as I am informed has been higher than has been known for twenty years. a comparatively small expenditure would render this part of the canal entirely safe against a recurrence of damage from a similar freshet.. When we consider the damage done in Pennsylvania and elsewhere from extraordinary freshets like the present I think we have room to congratulate ourselves on the comparative security agt. extraordinary damages."

"Where a freshet like the present is owing mainly to the snow of the Allegany the principal damage done must of course be on the upper portions of the line, as the height of the water on the lower parts must be comparatively less than on the upper."

[190] I. G. Cobbs, Harper's Ferry, 17 April 1843, to Charles B. Fisk, Chief Engineer, Cumberland, 17 April 1843 (Flood-April 1843)

"the reports that have just reached hear is that there is no large Breaches between this place and George Town. Mr. Tho G. Harris is now hear and he says there is no Breaches of any note between this and Dam No 4."

[194] Thomas Turner, Clerk, Frederick, to William Gibbs McNeill, President, 17 April 1843 (Flood-April 1843)

"You have no doubt, on this, noticed the accounts of the destructive freshet in the

Potomac. I fear it has proved especially so to our canal. Letters have already been received from our Several Superintendents giving information of Much damage along the line, the extent of which cannot be ascertained until the waters have subsided, but they express the apprehension that they exceed anything in the past history of our canal."

"I have seen Col. Coale, & he suggests the propriety & necessity of a special meeting of the Board being called for the purpose of adopting measures for the repair & It is truly unfortunate, that, in the present condition of our Company, such a disaster should have occurred."

"My object in writing now, is to procure from you, instructions & of getting from you the appointment of such day, as you may deem best for the meeting."

[194] Thomas Turner, Clerk, Frederick, to John P. Ingle, 17 April 1843 (Flood-April 1843)

"We have great apprehension, that the recent freshet in the Potomac, has proved the most destructive to our canal. Letters have been already received from our Several Superintendents giving information of injury on their respective divisions, but the extent can only be ascertained after the water shall have subsided. In the present condition of our Company, such a disaster is lamented, & where we shall procure the means of repair? is a question hard to solve."

"I can see no hope, for unless our District friends who are mainly interested in keeping the canal navigable, come to the rescue. It occurs to me, that the Banks in the District might in some way assist us, having the tolls, as they accrue, & are received, when the canal is again in navigable order, pledged & paid in weekly. From what we have heard, I have no doubt, But 10,000\$ will, at least be required. Not all at once but as the work progresses, & that amount would be returned in 2 or 3 months after the navigation again opens. I have just written Genl McNeill suggesting the propriety of a Special meeting of the Board being called immediately."

"My object in writing you is to make the suggestion above, & that you may, so far as you can, properly do so, ascertain its practicality before the Board does meet. Virginia funds you know would answer the purpose & District banks need not issue their own paper. Those interested above might also lend some assistance being given the obligations of the company to be received for toll, so soon as the canal is again open."

"Unless Something of the kind Suggested can be done I cannot see how the repairs are to be made."

"Mr Fisk set out yesterday for Cumberland, upon hearing of the flood & will no doubt, as rapidly as he can, visit the whole line of Canal."

[190] Charles B. Fisk, Chief Engineer, Harper's Ferry, to Thomas Turner, Clerk, Frederick, 18 April 1843 (Flood-April 1843)

"I have been as high up as Dam No. 6 (by railroad from here to Hancock and back). Dam No. 6 and the works connected with it are entirely safe and uninjured. About 600 feet below the dam the river broke thru the Guard bank, doing at this point but little damage. For six or seven miles below this, in several places damage has been done requiring from ten days to two weeks to restore the nav. From the cement mill above Hancock to Dam No 5 no injury was sustained. On Mr Elgins and Mr Stone's div ns at least \$10,000 will be reqd to put the canal in as good order as before the freshet. On Mr Young's divz. report says the canal is much broken." Fisk indicates he thinks it will cost \$5,000 to repair the damage (in Young's division?) and the money for repairs there can be borrowed from Georgetown merchants.

[190] Charles B. Fisk, Chief Engineer, Harper's Ferry, to William Gibbs McNeill, President, Cumberland, 18 April 1843 (Flood-April 1843)

"I have returned to this place last evening and regret to find that the favorable information recd have on my way up in regard to the lower part of the canal has proved to be incorrect. The damage below this is much greater than was anticipated and also from here to Williamsport, fully \$10,000 of damage has been done from this point upwards. Between this and the monocacy, none, of any account. I have not yet learned fully the particulars in regard to the line below the Monocacy. I shall leave immediately for Georgetown and will write you from there. I fear from the places at which breaches are reported to have taken place that they are serious ones."

"The Superintendent of this divz. (extending from Dam No. 4 to the Monocacy) promised to have his division in navigable order in two weeks, & that there is little doubt that the navigation will be restored by that time from Dam No. 6 down to the Monocacy. as regards that I cannot from my present information speak with any confidence."

[207] Charles B. Fisk, Chief Engineer, Harper's Ferry, to John G. Stone, Superintendent, Hancock, 18 April 1843 (Flood-April 1843)

"The favorable account recd here on my way in regard to the lower part of the line (below

Monocacy) has proven incorrect. I must therefore leave immediately for Georgetown. You shall receive from me there more particular information. Mr. Elgin will have his divn in readiness on ten days to two weeks. Pray there fore use every effort to have yours ready at the same time. Immediately on receipt of this write me at Washington how the lower part of your division is, and whether much, and what damage has been done. In Georgetown, our arrangements will be made, I have little doubt, to plan you in funds in the course of a few days. I hope to find Mr. Young's divn can be ready within the time above mentioned"

[CF] Daily National Intelligencer, 18 April 1843, 3 (Flood-April 1843)

"The Flood in the Potomac." Reports flood damage on the canal.

[190] J. Y. Young, Superintendent, to Thomas Turner, Frederick, 19 April 1843 (18 April 1843?--"Sunday Morning") (Flood-April 1843)

"I have only time to say we have the highest and most destructive freshet the Canal has ever experienced. The water commenced raising here on Friday evening. And from 12 oclock yesterday to the present time the water has been over all the low levels upon my division causing one or more breeches on each of them. And continuing to pass into the canal at the high or upper end of the levels and out by the breeches below. how long this is to last I cannot say, as there is no abatement of the water as yet. Every precaution has been taken by cutting the embankment at points where at least damage may be done. This far exceeds the great Freshet of June 1836."

[190] Charles B. Fisk, Chief Engineer, Georgetown, to William Gibbs McNeill, President, Cumberland, 20 April 1843 (Flood-April 1843)

"As I had some reason to fear when I last wrote you (on the 18th) the damages done on the lower part of the line by the recent freshet is greater than was anticipated when we were in company at Harpers Ferry. My present estimate of the cost of placing the canal below Dam No 6 in the order it was before the freshet is \$20,000. . . . The Georgetown level, and all that part of the line above Edwards ferry (which is 30 miles above this) can be ready for water in not exceeding two weeks from this time, and the intermediate distances from Edwards ferry to the Little Falls in three weeks. . . . [postscript] The continuance of high water has at some places prevented the commencement as yet of the repairs."

[190] Charles B. Fisk, Chief Engineer, Georgetown, to Thomas Turner, Clerk, Frederick, 20 April 1843 (Flood-April 1843)

"Mr. Young's divn [the lowest on the canal] has been damaged more than the rest of the line, and will require three weeks to repair."

[207] John G. Stone, Superintendent, to Charles B. Fisk, Washington, D.C., 20 April 1843 (Flood-April 1843)

"I believe the damage done upon this division, by the late freshet, will require \$4000, to put the Canal in about the same condition that it was before the high water. I think that it will require \$2500, to enable us to pass boats in about 3 feet water, we can then boat material to finish the banks and replace what will be taken from the Towpath for present use."

"There is a breach near mile post no. 90, in Dellinger's bottom, the Berm & Towpath are carried away, there was a breach in the same place some time ago. The Level between Boyd and Chrisman is not injured in any other way except that a great deal of the top of the Towpath is washed in the canal and formed bars in different places. They must be removed before the water can be let in. The level from Chrisman's to Hollmans is not much injured, the top of the bank is mashed down and the berm side of a Culvert carried away to bottom of Canal, 4 miles below Town. Also the embankment at the Culvert next to Chrisman's Lock is gone, but not very bad. The level below Dam No. 5 has 3 breaches in it, but none below bottom, and at the bend, about 3 miles from the Dam, there is 2 feet of sand in the Canal for 200 feet in length. The towpath just below the Dam is injured some for 2 miles in length, but just at the Dam it is only washed away to within 2 ft. of bottom, about 200 ft. in length. The water was six inches over the abutment of Dam No. 5, from appearances there was not more than 4 feet difference in the water surface above & below the Dam. I have been compelled to put in the Stop plank at McCoy's Ferry so as to draw off the water in the neck, we have a sink close to the waste, the hole is about 3 feet in diameter. You know all about the line above Hancock and therefore I need not say anything about it. We shall have every thing ready so as to let in the water by the last of next week. we shall in a few days have near 100 men at work. I sent to Baltimore for shovels which of course has caused some delay, they could not be purchased in this county."

[207] Charles B. Fisk, Chief Engineer, Georgetown, to Thomas Turner, Clerk, 20 April 1843 (Flood-April 1843)

"Mr Young's divn has been damaged more the rest of the line and will require three weeks for its repair."

"My present estimate of the cost of placing the canal below Dam No. 6 in the order it was

before the freshet is \$20,000. And in plan of \$5,000 as stated in last \$10,000 will be reqd to restore the navn From enquiries made by Mr Ingle & myself I am satisfied that this amt can be raised here, on a pledge to be repd out of two thirds of the earliest tolls."

[190] Charles B. Fisk, Chief Engineer, Georgetown, to James Smith, Attorney-at-Law, Cumberland, and Walter Blackwell, Collector, Hancock, 22 April 1843 (Flood-April 1843)

"As I feared, when I wrote you from Harper's Ferry the damage at this end of the line is greater than was at first anticipated. On the Georgetown level the water will be readmitted by the 27th inst. Above that level, as far up as Edward's ferry (30 miles from here) by the 11th of May." Fisk adds in a letter to William Price of Cumberland, Md., that the water would readmitted from "above Edward's ferry up to Dam No 6 by the 4th of May." There are several letters of new breaches appearing after water was readmitted to the canal in May.

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, Washington, D.C., 22 April 1843 (Flood-April 1843)

"I am doing all I can to Let the water in on my Division. I have about 100 hands at work, and 20 carts & Horses. I have concluded not to use the cars at all as it would require so much handling the earth. I have thrown Bridges across the flume & Lock; I think I shall be to pass the water by Thursday next and shall have the water in from Dam No 4, by tomorrow evening. I shall need funds, as soon as they can be obtained, as I have promised the cash on the finishing of the work & If I am not able to fulfill my promise in this respect I will have to Leave the Country. I shall do all in my power to get the water in to aid Mr. Terry in the repairs of the Breach above Seneca."

[190] Charles B. Fisk, Chief Engineer, "at Fitch's," to John Y. Young, Superintendent, 27 April 1843 (Flood-April 1843)

"The upper end of the Culvt. below this has fallen down. I do not think much of the arch [that] has given way. I have directed Walter to clear away the upper end, and have said to him that I would immediately write to you that you may cause to be done what shall be necessary before the admission of water."

"If the wings had been put in I do not think any damage would have been done. A straight parapet unsupported by wings never will stand, unless made immensely heavy--of this we have had so frequent evidence on this line that I hope never again to see the experiment tried."

[207] Charles B. Fisk, Chief Engineer, Georgetown, to Philip Coons, Harper's Ferry, and Thomas Crompton, Berlin, 30 April 1843 (Flood-April 1843)

"The gondolas which left Harpers ferry a few days since are now within ten miles of this place, and will arrive here to morrow morning. By Tuesday morning the regular depth will be in from this to Seneca (at present only boats of light [illegible] draught can be able to come down from Dam No. 6 to Edwards ferry, there enter the river through the outlet lock and reenter the canal at Seneca. The level from Edwards ferry to Seneca will be ready by to morrow week (Monday)."

[207] Charles B. Fisk, Chief Engineer, Georgetown, to Walter Blackwell, Collector, Hancock, and Elie Stake, Collector, Williamsport, 30 April 1843 (Flood-April 1843)

"By Thursday morning boats will be able to pass along the entire distance from Dam No 6 to Georgetown, by entering the river through the outlet lock at Edwards ferry and reentering the canal at Seneca."

"The level between Edwards ferry and Seneca will not be ready until to morrow week (the 8th) but in the mean time boats can pass along the river as above explained, and which is sufficiently high."

[182] Board of Directors Meeting, 2 May 1843 (Flood-April 1843, Flood Damage-Financing)

"The President presented two letters, received by himself from the Ch. Engineer dated 17 & 18th ult. giving information of the injury sustained by the canal, from the late freshet, & stated that in reply he had directed the Ch. Engineer to ascertain upon what terms money could be had from District Banks, for the immediate repair of the damage & authorized him to pledge the faith of the Company & the tolls for the repayment of the loan to the extent of \$10,000, feeling assured that such course would receive the sanction of the board."

"A third letter from the Ch. Engineer reporting the extent of the damage & the amount necessary for the restoration of the navigation was also presented, & also a letter from J. P. Ingle Esq, stating that he had negotiated with the Farmers & Mechanic's Bank of George Town, for a loan of \$5,000 With the Bank of Metropolis & Bank of Washington, each each for the loan of 2,500\$, to be applied to the immediate repair of the Canal, the repayment of which loans, if made, to be secured by a pledge of two thirds of the tolls & water rents, which shall hereafter received, by the Company, until said loans be paid."

"The Board approved what Mr Ingle had done as above stated, & agreed to accept the loans upon the terms proposed. And Bonds were ordered to be executed accordingly."

"It was therefore resolved by the Board, That two thirds of all the Tolls & Water rents thereafter received by the Company be & the same are hereby irrevocably pledged & set apart for the repayment of the said loans."

[207] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, Washington, D.C., 7 May 1843 (Flood-April 1843)

"We are now repairing the Breach at the 90 Mile Post, it was repaired by Mr. Stake and the water was in the level, but owing to the waters being too high, the bank was carried away again. Mr. Stake says he directed Mr. Chrisman to raise the level to a certain height . . . We shall have the water in tomorrow so that the Boats that are now landing at Williamsport can pass over as soon as they are ready."

[190] J. Y. Young, Superintendent, Georgetown, to Thomas Turner, Clerk, Frederick, 19 May 1843 (Flood-April 1843)

Young reports that he readmitted the water to the 1st Division on May 7, and a breach occurred on May 10, three miles above Edwards Ferry, which had since repaired, but that a further breach had occurred at the Horse Pen culvert.

[207] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, 4 June 1843 (Flood-April 1843)

"The damage done by the Freshet will amount to near \$4500, of which work to the amount of \$2935 has already been done, I think \$1500, will be sufficient to finish the repairs."

[180] Fifteenth Annual Report, 5 June 1843 (Flood-April 1843)

The C&O Canal president, M. C. Sprigg, stated:

"The navigation, which was open at the period of the last Annual meeting, continued throughout the year, with the exception of short intervals--in all not more than six weeks: nor has it been closed during any one month of the winter, even."

"The condition is what might be expected from the Pains & expense bestowed upon its construction."

"In April last occurred a very serious freshet; more remarkable than has been noticed for many years. The damage done by it was principally on the lower portion of the Canal. For the distance of 100 miles finished below Dam No 6 & the remaining 50 miles above Said Dam, the injuries have been comparatively trifling. Measures were immediately taken for prompt repair; & funds necessary for the purpose, which were not then in the Treasury of the Company were procured on loan from three Banks in the District of Columbia. The amount already so procured (\$10,000) will it is supposed, cover one half of the necessary repairs."

[190] Charles B. Fisk, Chief Engineer, Frederick, to William Gibbs McNeill, President, 5 June 1843 (Flood-April 1843, Flood Damage Prevention-Proposed, Renovation-1849-51)

"On the 15th of April of this year a higher freshet than any since 1816 occurred, which occasioned damage to the canal, to the amount of \$20,000. It required three weeks to restore the navigation. One half of this damage was sustained on the forty miles of finished canal nearest Georgetown. The remaining ninety four of the finished, and the fifty miles of unfinished canal suffered comparatively little. Had the works along the unfinished line been completed, that portion of the canal would have been uninjured, as at no point did the river rise to the level of the towpath. Even in its present state the damage done to it, did not exceed \$5,000. As regards the finished canal, those parts of it which sustained the greatest damage can be made entirely secure against freshets several feet higher than the recent one, by an expenditure not exceeding the cost of the late repairs at those points."

"The small amount required to make the canal safe against a recurrence of like damage, and the comparatively small extent of injury to the canal, even in its present state, occasioned by so unusual a freshet, is conclusive evidence of the stability and permanency of the entire work, especially when viewed in connection with the effects of similar works in this country from freshets of an unusual rise." Fisk finishes by urging the canal company to find the funds to allow the Superintendents to pay off their debts for past repairs, and protect the canal against future floods.

[182] Board of Directors Meeting, 6 June 1843 (Flood-April 1843, Flood Damage

Prevention-Proposed, Renovation-1849-51)

"Resolved that that the Chief Engineer be directed to report as early as practicable, what amount will be required to place the present navigable portion of the canal in a condition secure from damage by accident or breeches."

[190] Charles B. Fisk, Chief Engineer, Frederick, to William Gibbs McNeill, President, 16 June 1843 (Flood-April 1843)

"With a view to the removal of obstructions to the navigation, caused by the forming of bars at various points along the Canal by the April freshet, and that the usual (yearly) examination may be made of the bottom of the Canal at a season of the year when such repairs as may be found necessary can be properly made, and with the least interference with the trade, I respectfully advise that the water be drawn off from the Canal on the 10th of July . . ." for three or four weeks.

[182] Board of Directors Meeting, 27 June 1843 (Flood-April 1843)

"The Chief Engineer having suggested the necessity of making repairs upon the finished portion of the Canal, & of drawing off from the Canal the water for that purpose it was on motion."

"Ordered That the Chief Engineer be directed to have said repairs made, &, for that purpose to cause the water to be let off, on the 10th day of July next, taking care to have the water restored to the various levels of the Canal, as early as practicable."

[207] Charles B. Fisk, Chief Engineer, Harper's Ferry, to Walter Blackwell, Collector, Hancock, Elie Stake, Collector, Williamsport, and John G. Stone, Superintendent, Clear Spring, 1 August 1843 (Flood-April 1843)

"In consequence of the canal below Dam No. 4 being in a worse state than was supposed boats will not be able pass from that to this place before the 9th inst. inclusive. On that day the entire navigation to Georgetown will be restored, and boats enabled to pass without interruption any point."

[190] Charles B. Fisk, Chief Engineer, Georgetown, to William M. Stuart, Attorney, Georgetown, 11 August 1843 (Flood Damage Prevention-Proposed)

Fisk is trying to ascertain the views of owners of land near where the canal company planned to build waste weir; "viz, immediately below the fourth mile stone for one of about 500 feet overfall, and at the upper outlet that the water at present has from the feeder, at 'High Island' for the other"

[190] William M. Stuart, Attorney, Georgetown, to Charles B. Fisk, Chief Engineer, 14 August 1843 (Flood Damage Prevention-Proposed, Sustainability-Waste Weirs)

Stuart gives a much better description about where the canal company planned to build waste weirs.

"The first waste to commence at a given point to be established on the line of the canal above the culvert six hundred and sixty feet below or East of the 4th miles stone, and extending upwards, a wall four feet high to be constructed simultaneously from the canal to the river . . ."

"The second waste to be constructed in the manner preferred by you and agreed upon by us . . ."

[207] J. Y. Young, Superintendent, Georgetown, to Charles B. Fisk, Chief Engineer, 20 August 1843 (Flood-August 1843)

"I am Sorry to have to inform you, That the Cobbin Branch Culvert next below Edwards Ferry, was entirely carried away last night, by the great rise in the Stream, from one end to the other, this culvert is 6 feet span, And heretofore considered safe and from what I can learn the Streams have been higher in this neighborhood, than they have been for Many years, the small culvert next above Wheeler road is also injured but not seriously, the rain throughout the line from here to Fitches has been little Short of the fall we had last Summer. But not quite so destructive. I propose immediately to repair the damage above Edwards Ferry, throw a dam below the out let Locks, And pass the trade down the river to Seneca [?] And as Soon As I can examine the lower culvert, will write you again, unless you come down which I should greatly prefer."

"From what I can learn the levels were kept at their proper heights Neither did the water get over the berm the Arch was either forced up or undermined by the Stream. All the



levels below Seneca remains Safe although I was very apprehensive of this level untill about 11 oclock when the water Subsided."

[207] Thomas G. Harris, Mercerville, to Charles B. Fisk, Chief Engineer, Frederick, 21 August 1843 (Flood-August 1843)

"I am sorry to be compelled to inform you that the Navigation in Part of the Canal is as bad as it was before the water was let off and if money has been expended there it was for no account. on the 9 Mile Level and 8 Mile Level which is below Fitches & Odds, I have been informed the Bars are as bad as they ware at any time this season. the 'S. Harris' drawing 3 [feet] 9 Ins water fastened on both those levels, and the distance being so great from the Feeder, entirely to much time is lost before a Sufficiency of Water Can be had to get boats off."

[207] J. Y. Young, Superintendent, Edwards Ferry, to Charles B. Fisk, Chief Engineer, Frederick, 30 August 1843 (Flood-August 1843)

"When I last wrote you relative to this unfortunate occurence, the water was so high over the culvert to prevent my determining the extent of the damage done to Abrams Branch culvert. I found to my great mortification that one half the Arch from the crown down reaching from the lower wing walls to a line with the inner edge of berm, And Several feet below the foundation on the upstream (canal) side was entirely gone. I at first endeavoured to find a foundation and rebuild it. But after going down about 12 feet below the Crown I found the bottom So Soft As to be able to pass a 6 feet crow bar down with ease And although dam appeared to be tight the water boiled up from the bottom in Such quantities As to require 10 or 12 men constantly bailing, in addition to two large pumps. under these circumstances as I concluded to fill it up, and accordingly procured as good foundation as could be had, and closed it up but little of which can be cultivated, and completed it yesterday And passed the Boats last night, with a full river from this to Seneca, with a prospect of continuing so for some days to come."

"Cobbin Branch is a clean sweep from end to end and must be trunked for which purpose I have procured the necessary material, And am busily engaged constructing it. 50 feet in length and Shall I think be able to complete it by this day week. I am placing Large timbers 25 feet long 12 inches square below the original foundation two feet from centre to centre and at right angles to the Stream, And upon which 2 inch oak plank at least under the abutments. And if I have lumber to spare the whole shall be floored In addition to which the lower and upper timbers will be Sheet piled [?], upon this foundation the abutments will be placed with reference to rebuilding the culvert hereafter. The walls will be 40 feet in length in the base stepping off to 30 at to top 5 feet thick at bottom 3 1/2 at top, with good stone and well laid in cement. I shall not however delay the navigation one moment for these walls. As the whole Structure will rest upon good and Substantial trussells. Although these walls will be Carried up to the height of the trussells yet they be so leveled off at the top of the culvert. Abutments. As to be readily taken down to that point, whenever the culvert Shall be rebuilt."

[207] J. Y. Young, Superintendent, Edwards Ferry, to Charles B. Fisk, Chief Engineer, Washington, D.C. [6] September 1843 (Flood-September 1843)

"I wrote to you last Thursday to Frederick, relating to our troubles here and in my next, I flattered myself, that you would hear of the entire completion and resumption of the navigation."

"The Boats had been passing down to Seneca And I had So far progressed with the trunk over Cobbin Branch As to ensure its completion on Sunday next. But on Wednesday night [September 4] we had a large flood of rain than that which caused the breaches overflowing the level above this making two breaches one where We mending over Abrams branch. And A Small one above Conrads. The water in the branches raised So fast and high as to be impossible to Save the embankment. And had I have cut the Bank, I know no place I would have Solicited Sooner than where the breach was at Abram Branch, plenty of earth and Cannot be very large. they can be done in 3 ord. days. if the river does not get into the Canal at Fitches it is now 6 feet over our work at Cobbin Branch And still raising, the drainage I hope is not Serious, although the filling appears to be nearly all gone."

"The water from the branches nearly all passed over the berm from this to Fitches throwing into the Canal large quantities of water. When this breach took place the Branches was said to be higher than they have been for 12 or 15 years And this flood is even higher And more destructive. As Soon As the river falls I proceed with All diligence to complete the work."

"The Bridge over goose creek from Geo Town to Lees burg Came down this morning on its way to D C Should the river fall I Shall be able to pass the Boats to Seneca by Tuesday Morning"

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, Washington, D.C., 8 September 1843 (Flood-September 1843)

"I have no doubt you feel some anxiety to Hear from the Canal since the Late Heavy rains;

I feel rejoiced to inform you that my division have not sustained any damages from them. I am this moment arrived from the first [J. Y. Young's] Division. There is two main Breaches Between Lock No. 25 & 26. the Embankment put in a few days since at the Culvert, above Broad run is Entirely washed out say 60 feet at Top 5 or 6 feet Below Bottom the Other near Conrads Ferry over the Culvert near the 36 mile post say 20 feet to Bottom on Berm side; the river is very Hight for this season of the year. The Trunk over the Cabin Branch Culvert is not finished there is about one days Carpenters work But the water from the river is four feet in that Level in consequence we can not do any thing. It could have been finished Easy before this If I had not been delay,d in consequence of the Timber the Trunk is 50 feet by 20 in this Clear [?] I think those two Breaches may be repair,d between Lock 25 & 26 by Monday Evening next, and that will delay the Embankment until Thursday at the Trunk if the River falls sufficient the Carpenter work will be finished to morrow"

[190] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, Frederick, 9 September 1843 (Flood-September 1843)

"The late rain has caused damage to the Canal to the amount of about \$150. The only place that is injured is near Lock No 51. Yates bottom land was entirely under water, and the Aqueduct bring stopped by drift &c. the water was forced over the Canal into the river, and of course injured the banks. The Berm, Bank, opposite Barnett's house has a breach in it about 3 feet below bottom. The damage will be repaired in a few days time. Mr. Bowles Mill and the Turnpike Bridge were both carried away."

[207] W. S. Elgin, Superintendent, Mercerville, to Charles B. Fisk, Chief Engineer, Frederick, 15 September 1843 (Flood-September 1843)

"I hasten to write you a few lines to give what information I can the water at this moment is at this place as high as it was in April Last The damages I cannot say what it will be to the Canal as the River is Entirely over the Embankments; But I hoped by care as soon as I can have the controll of the Canal to save it from very serious damage I shall remain her until I can Judge what the damages are, the river is still rising as soon as I can form any Estimate of the damages you shall hear from [me]."

[190] B. F. Mackall, Collector's Office, Georgetown, to James M. Coale, President, Frederick, 16 September 1843 (Flood-September 1843)

"The most awful calalmity has befallen the Canal. The rain of the night before last, has caused more destruction than I have words to describe, the river in the memory of the oldest citizen of the town was never know so high. two breaches are already made within 3 miles of the town. I have been as far on the canal as I could get and never have seen such a body of water. Mr Young returned this way from Senaca. he reports the River and Canal composing one entire sheet of Water, breaches innumerable, (before the water became so high) as to extinguish all appearance of the Canal. the water has been rising the entire day. Mr Turner and Mr. Barnard can form some conception of the extent of the blast of water. Where they know at sun down this way [?] it was within a few feet of the New Bridge at the Little Falls of the Potomac and great apprehensions are entertained for the safety of the Bridge."

[190] J. Y. Young, Superintendent, Canal Line, to James M. Coale, President, Frederick, 16 September 1843 (Flood-September 1843)

"I have only time to say to you we have at this time the highest and I am a fraid will be the most destructive freshet we have ever had since the construction of the Canal. I left above Edwards Ferry last night and made the best way I could down the line cutting the bank at the most advantageous points where least damage will be done and where materials can be most easily had."

"it is at this time impossible to say what will be the extent of the damage--as the water is over a greater part of the Canal from Eds Ferry to Geo Town, and higher from 3 to 6 feet than it has been before Since commencement of the Canal I have Seen all the freshets the Canal has experienced here and I am satisfied that this is double the quantity covered to any former freshet."

"The water is still upon the the rise here (little falls) and will prevent my given you a more detailed account untill it subsides . . ."

[190] J. G. Cobb, Harper's Ferry, to James M. Coale, President, 16 September 1843 (Flood-September 1843, Harper's Ferry-Sustainability)

"The Shanandoah Locks are gone the river higher than ever known, the bank of the Canal here under water. . . . Elgin left here 14th at 12 Oclk for dam 4. news heard from him the water up to the Bridge over the river, River rising"

[194] James M. Coale, President, Frederick, to J. Y. Young, Superintendent, 16 September 1843 (Flood-September 1843, Maintenance-Lack of Diligence)

"I am sorry to inform you, that complaints still continue to be made against your superintendency. At the last meeting of the Board a petition was presented signed by several of the most important traders on the canal charging you with want of attention & proper management of your division, & in consequence thereof the Board of Directors have

requested me to bring the subject to your consideration in the hopes the evil complained of may be remedied. The main ground of objection appears to be, that you do not take precautionary measures, that should be adopted to prevent breaches, and that you do not give enough of your attention to the upper part of your division. I have heard it stated, that you have not been on the upper part thereof more than four or five times during the past year. The Board of Directors have specifically enjoined upon me the duty of saying a neglect or inattention to those matters cannot be tolerated, and that the numerous complaints, that have been made, leave room to doubt, but that there has been great neglect somewhere"

"Upon inquiry of the Treasurer I also find that you are now in arrear for your monthly statement since the 31st of March last"

"I hope it will not again be necessary to write to you on the matters contained in this communication."

"It may be sufficient once for all to say that a strict compliance with orders, & a rigid performance of duty will hereafter be required of all persons in the service of this Company, as the indispensable condition of office."

[207] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, Frederick, 16 September 1843 (Flood-September 1843)

"I am sorry to have to inform you that we have had an other freshet that has caused, I fear, much damage to the Canal [on the 3rd Division, below Dam No. 6]. The Towpath is yet so much covered with water that it is impossible to tell the amount of injury to the Canal. The water was near the height of the April freshet and of course must do as much damage, if not more than was done at that time."

[190] W. Price, Cumberland, to James M. Coale, President, Frederick, 17 September 1843 (Flood-September 1843, Harper's Ferry-Sustainability)

"We have rumors here about the canal, which frighten me. The passengers by the cars this evening say that the tow path side below Harper's Ferry is washed away for miles. This is no doubt exaggerated, but still there may be some truth at the bottom of it."

[190] Charles B. Fisk, Chief Engineer, Canal Line opposite Harper's Ferry, to James M. Coale, President, Frederick, 17 September 1843 (Flood-September 1843, Harper's Ferry-Sustainability)

"I have heard from the line for twenty miles above this, and ten miles below. So far as ascertained, the damage is at least double what it was in April last, and at least a month will be required for the repairs. I cannot yet speak with certainty respecting Dam No. 4 but have reason to think that the water has not yet got around the abutment. The water here was from two to three feet higher than in April. Twenty miles above this, it was 28 inches higher, but at dam no. 5 (which is 27 1/2 miles below dam No. 6) and from thence upward to Cumberland the height was not as great as in April. This latter information I get from the fireman of the locomotive that came down yesterday and who passed along, after the river had commenced falling. He says that in April the Railroad between Dams 5 and 6 was in places three feet under water. at this freshet it did not exceed a foot. It will be recollected that the great rise in April was occasioned by the snow in the mountains which would have the same effect as a very heavy rain at the head of the river. The present great rise, on the contrary, is owing to a rain distributed a long length of the river. The consequence would of necessity be that at this time the lower parts of the canal would suffer most."

"In April we estimated the damage at \$20,000. The whole of which amount, however was never expended, as many places had not yet been raised to their full height and completed. Had they been, the damage now would have been so much the greater. My present opinion is that not less than \$30,000 in addition to the unemployed part of the \$20,000, will be required to place the canal in the order it was before the April freshet. and then, with a like rise of the river, we should again suffer the same damages, unless certain precautionary work hereafter spoken, can be done, that shall keep the river out at points of greatest damage." Postscript near address info: "I have omitted to say within, that the river has fallen here, from 6 to 8 feet."

[207] W. S. Elgin, Superintendent, Mercerville, to Charles B. Fisk, Chief Engineer, Harper's Ferry, 17 September 1843 (Flood-September 1843)

"I can very nearly ascertain the damages from Dam No. 4 to the Ferry to Begin with and I fear the most serious place is a Breach around the A Butment at Dam 4 which place must be attended to immediately and completed as the whole navigation depends upon this point west of Harpers Ferry . . . I can have my division in order in 3 weeks, If this place at the dam does not be more Troublesome than I Expect in the mean time I am desirous to Know as soon as possible, as the necessary arrangements may be made to push the repairs."

"I will give you the number of Breaches & there size one Below Dam No. 4 30 feet so say Mr. Hams as it was dark when I was at it I could not see how much Below Bottom, the filling from Breach at Dam 4 deposited in the Canal below and above the Stop Lock, some other place at or Near Avery Spring [?] such as was thar before 2d one at the Big Spring, Below Harris 30 [?] feet wide a Little below Bottom."

"3d a place we Cut Above Lock No. 40, real Bad [?] 4th a place near & the 76 mile post say 30 feet and a Little Below Bottom 5th at Guyuns [?] Lick [illegible] which I did not see none in the short Levell 6th at Shepherdstown considerable Embankment Washed in Between the river Lock & Lock No 38 7th near Millers Saw mill a heavy san bar say 4 feet deep for 150 feet in Length Besides the Tow Path very much wash,d for some distance 8th a small Breach in Berm near Sharpless. 9th a Breach at the Head of Lock No. 37 say 50 feet Long about Bottom, some small Breaches near Polly John's lock [?] & Culvert to about water Surface at Conns [?] where it was cut at Dam No 3 the the feeder & Canals to be cleaned out from the deposit made By the Breach in in of the Guard Bank near that place the one at Crowleys [?] about 30 feet & to Bottom when I saw it."

[207] James M. Coale, President, Frederick, to Charles B. Fisk, Chief Engineer, Harper's Ferry, 17 September 1843 (Flood-September 1843, Flood Damage-Financing)

Coale summarizes the damage to the canal from the flood as he as heard about it thus far, then near the end of the letter proposes, "It is my purpose to adopt hereafter a system to meet these emergencies & set apart each month a sum for that purpose." This is a very realistic proposal, but one the resources of the company ultimately did not permit.

[190] John P. Ingle, Washington, to James M. Coale, President, Frederick, Md., 18 September 1843 (Flood-September 1843)

"I have been twice to Georgetown to learn the extent of damage sustained by the Canal. The river has fallen so slowly that we are as yet without information from the line of the Canal above the Little falls to that point from Georgetown I hope the navigation can be restored for \$1,500 to \$2,000. . . .I have a letter from Mr. Fisk at Harpers ferry from which I have hopes that the damage may be less than I had feared."

[CF] Daily National Intelligencer, 18 September 1843, 3 (Flood-September 1843)

"Great Flood." General description of the September 1843 flood, with some mention of the damage to the canal.

[190] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, 19 September 1843 (Flood-September 1843)

"I have examined the line near the late freshet and have to report that the injury to this division is about the same as it was in the April freshet. There are two breaks between Hancock & Dam No. 6, one at the Cement Mill the other at the Rock work in Gorman's section. The breaks below Dam No 5 are not very serious in any one place, at no place have we a break below bottom of canal, most of the damage is the Towpath being washed either into the Canal or river in the former case forming bars that must be removed. We have commenced doing what we can toward repairing the canal with our usual force. . . . The protection of Rock, that was done this summer, just below Dam no 6 was the means of saving the Towpath at that place and greater injury the canal below, had all the April breaks been protected in like manner the damage would have been triffling in comparison to what they now are. After they are again repaired they should be protected with stone on the outside, or they will all [have] to be repaired again whenever we have an other freshet."

[190] J. Y. Young, Superintendent, Lock 26, to James M. Coale, President, 19 September 1843 (Flood-September 1843, Sustainability-Culverts)

"When I wrote you from the little falls, the water was yet rising and consequently I could not give you a correct account of the damage done the canal upon this division. Since that time I have seen the whole division, on my way up to this place. The Geo Town level has two large breaches breaches one near Pointes [?] the other opposite Alaxandria Aqueduct Quarry here the water where I left was too high to determine their extent. They will cost not less than 2500, from this to the Dam. the Banks have been washed considerable above the Magazine their is a breach at the upper end of this level the Bank is also much washed. above Lock 7 their are two breaches below Lock 8 the bank is much injured where the river passed over. the damage on the levels between Lock 6, 7, & 8 are similar to former cases but much more extensive the river came over into the long level below the Great Falls. I cut the bank and saved the heavy embankment at the high wall on the 15th where the water passed over & above but little damage. above Lock 20 their is a breach, and the Bank washed above near 21 two breaches. and Similar wash at the upper end of the level between 22 & 23 two breaches at long acre [?] and nearly the whole bank carried away for 300 yds in length at the point of Rocks next below Lock 23. And where meterial will be difficult to procure. this level has suffered more than any other below this excepting the Geo Town. From Guard Lock 2 sinaca to Great Falls, the whole canal has been covered with water 2 to 6 feet deep. the marks of which are now visible. permanent marks of which I have directed to be made along the whole line. Beaver Dam Culvert was carried away with 150 feet of embankment on each side of the canal, making a heavy breach.

I cut the embankment on this level in the first place in order to Save this work. But Such was the height of the River at Edwards Ferry nothing could be done to save it. The new trunk I do not think that much was injured. their is three breaches between Lock 25 & 26 not very extensive. In addition to the places named. the Bank in many places is torn by the water passing over the towing path. No Masonry has been injured excepting Beaver

dam. I had a dangerous & laborious tramp to the lower end of of my line and back hoveing to walk and after wade to my neck crossing the streams. where the water had back from the river. Which will account for your not hearing from me more in detail before this time. I had not time neither was the water low enough in many places to enable me to make any like an accurate estimate of the entire cost. But as something approximating it, I would say it will cost 4000 dollars from Geo Town to Lock 8 from this place to Sinaca 3000. the Beaver Dam Culvert will depend upon the plan of its repair. It cannot be rebuilt before the low water in the river. Mr Fisk will be able to explain this and terms I have used in this report. 7 or 8 hundred dollars will pay all between Lock 25 & 26. this estimate does not include the raising tow path, where it is washed off at a point above high water in canal."

[CF] The Herald of Freedom (Hagerstown), 20 September 1843, 2 (Flood-September 1843)

The Herald of Freedom contains a letter from the paper's correspondent in Williamsport, reporting driftwood piled up against the Conococheague Aqueduct, and a small break in the canal towpath half a mile above the town.

[182] Special Board of Directors Meeting, 21 September 1843 (Flood-September 1843, Flood Damage-Financing)

"The President laid before the Board sundry letters addressed to him from the Chief Engineer, the several Superintendents, & others relative to damage sustained by the canal from the late freshet on the Potomac." He also indicated he applied to banks in Frederick, MD for loans to repair the damage to the amount of \$10,500, using toll receipts not already pledged to District banks as collateral. The C&O President also reported an offer of a \$3,000 loan from Georgetown millers to repair damage to the canal between Georgetown and Dam No. 1. The Board accepted the offer.

[190] J. Y. Young, Superintendent, Georgetown, to James M. Coale, President, 21 September 1843 (Flood-September 1843, Widewater-Sustainability)

"When I last wrote you I was upon the upper end of my division, having been down to this place, and returned. The water had then receded several feet but not sufficiently to enable me to give you an accurate report of the damage. I returned immediately in order to turn off the water, and save from the washing wherever it could be done. The damage between Lock 25 & 26 is as I stated in my last. the old trunk not injured. although the water was entirely over it. our new trunk has raised about 18 in on the lower side. as down stream of canal and I am afraid will be difficult to get in its place. without removing the planking here the water covered it also 4 or 5 feet this is the only damage it sustained. The beaver Dam culvert has 2/3 of its length carried away with about 200 feet of embankment on each side of canal. and very [?] deep on the tow path side. the ballance of the masonry appears to be as good as when last repaired. The only point on this level where the Bank could be cut. was the connection of the berm to the fast [?] land opposite the aqueduct. where I had it opened and passed the water off freely. and by this means hoped to save this culvert. Indeed the damage would have been little and confined to the top of the bank. had it not been that the whole Sugar land bottoms were completely inundated all of which had to pass this culvert upon the fall of the river. . . . The embankment below Seneca & All other places, Although dangerous to leave too low may on this occasion be only raised above water mark, in order to resume the navigation. . . . I see no reason to change any part of my my former report relative to the portion of canal between this and Geo Town, excepting the damage done on the 18th section high wall where the the water although not over the bank was up to the top and washed out the filling. their is also a considerable slide on the inner side of the tow path at the log wall of this I apprehend no serious damage."

[194] James M. Coale, President, Frederick, to Louis McLane, President, B&O Railroad, 21 September 1843 (Flood-September 1843)

"The recent damage done to the Canal by the heavy freshet of last week will probably cause a suspension of navigation until about the middle of next month. By that time it is presumed all things will be in readiness to commence the contemplated trade."

[190] W. S. Elgin, Superintendent, Dam No. 4, to James M. Coale, President, Frederick, 26 September 1843 (Flood-September 1843)

"I have men Engaged on my Division 144 men & 34 Horsecarts; I have them engaged at various points. Between this [Dam No. 4] & Harpers Ferry; If the weather is any way Favourable I shall be able to readmit the water by the 15th of next month. I have more work to do than I first thought, since the water has got off. I find there is considerable sand Bar Left remaining in the canal which will be to remove; before the navigation can be restored;"

[190] W. S. Elgin, Superintendent, Dam No. 4, to Charles B. Fisk, Chief Engineer, 26 September 1843 (Flood-September 1843, Harper's Ferry-Sustainability)

"I have been down as Low as Harpers Ferry on my Division. Every thing appears to be now moving on so as to Enshure the navigation in the time Spoken off; I have about 60 men at this place and 17 horses and carts; this is as many as can be accommodated at this point

I have made a commencement at Shepherdstown, and shall be able to put on a Sufficient Force at that place in a short time Jordan will get down to Dam 3 by Saturday next & then he will attack the Large Sand Bar near the 71 mile Post with Formidable Force. Maloy as soon as he gets through the Breach & sand Bars near Crowleys he will attack the San Bar & Feeder at Dam No. 3. in the mean time I shall have a Force Engaged with the sand Bar & Breaches Below Dam No. 4 The Large Breach at the Ferry is in a fair way If we should not get another High water & wash out before we get it out of Danger. . . . If it was not for the sand Bars the Breaches is not much but the Sand Bars is very much more than I first thought them, and will cost very much to remove them Especially Below Dam No. 4, and in the neighborhood of Sheperdstown. . . . do urge the making secure, this place & that at Harpers Ferry If it is not done the same thing will be to do over the first rise."

[190] Charles B. Fisk, Chief Engineer, Point of Rocks, to W. S. Elgin, Superintendent, Harper's Ferry, 29 September 1843 (Flood-September 1843, Flood Damage Prevention-Study)

"the calculation, now, is to have the entire line navigable by the 15th of October except between Seneca and Edwards ferry which will take until the 20th. . . . be careful to have the marks of high water preserved at numerous points along your whole division especially opposite each lock, and wherever the high water fell below the top level of the towpath, and also below five feet above canal bottom--and along the entire distance where guard banks may be required and can reasonably with propriety be constructed."

"I have been informed by a person residing in the neighborhood of the Monocacy, that the Little Monocacy Culvert is (as he expressed it) in a bad way. I have not yet had an opportunity of examining it. By all means if you find it unsafe, lose no time in securing it."

[207] Charles B. Fisk, Chief Engineer, Point of Rocks, to John G. Stone, Superintendent, Clear Spring, 29 September 1843 (Flood-September 1843, Study-Floods-C&O Canal Company)

First Fisk informs Stone he can count on receiving approximately \$1500 for repairs on his division from the flood.

"Mr. Elgin will have his division navigable by the 15th of October, by which time yours also can easily be ready. Mr. Young's divn. below Seneca And above Edward's Ferry will also be navigable by the same time, but between Seneca and Edward's Ferry, not until the 20th of October. This will in all probability enable the ascending boats now at Seneca to leave there by the 15th by the way of the River to Edward's ferry. . . . Be particular in regard both removal of all sand bars that will interfere with the full loading of boats."

"I ommitted in my last to direct that the marks of the recent high water be carefully preserved along your whole division. These, as well as the marks of the April freshet, will prove highly useful hereafter. I desire them along the line from Lock No. 51 to Dam No. 5, as well as elsewhere, though more frequent marks should be made along the levels covered by the freshet than those that were not. Above all, marks should be carefully taken and preserved opposite each lock and wherever the water fell below the top level of towpath and also below five feet above bottom of Canal, and along the entire distance where Guard bank may be required, and can reasonably and with propriety be reconstructed."

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, 1 October 1843 (Flood-September 1843)

". . . the amt. that would Likely fall to my division for repairs I fear it will fall short of what I need as the sand Bars are very much more than I first thought them to be . . . I am doing all in my power to restore the navigation by the 15th If it was not for the very heavy deposits of sand, I could do Easy with a much Less force than I now have"

[207] W. S. Elgin, Superintendent, Dam No. 4, to Charles B. Fisk, Chief Engineer, Washington, D.C., 3 October 1843 (Flood-September 1843)

"I shall after this day Leave the Dam with all my force for the Canal and Let it remain where I have it until I get in the Waters. It, However, is not safe for such a rise in the River as we Lately had. the cross Bank is nearly as high as it formily was and I have some of the Lower places in the Guard Bank above the dam rais,d so as to prevent an Ordinary rise from coming in and If it should get in or Likely to do so we must only depend on the stop plank. I shall in the morning the 4th put my whole force Engaged at this point at clearing out & mending the Breaches Downward . . . I shall not be able to clean out all the sand Bars, & repair the Breaches with the amt. allotted to me as I shall have to dismiss part of my Force as means will run out before I get through. I shall clean them out as far as I can, But I can assure you I had no idea of the amt. of deposits in the Canal, as the water was on part of the Levells when I passed up. I believe the sand from Millers Basin to Shepherdstown will average 2 feet. Considerable on the short Levell above Shepherdstown, considerable from the 75 mile post to the 76 mile post considerable below the 78 mile post considerable on the 82d mile & 84th mile I shall have my hand full to get the water in by the 15th. But I will try to accomplish it If it was not for the Bars the Breaches is nothing after that at Dam No. 4"

[190] W. S. Elgin, Superintendent, Harper's Ferry, to James M. Coale, President, Frederick, 7 October 1843 (Flood-September 1843, Harper's Ferry-Sustainability)

"I have the largest Breaches repaired the most important and the worst work on my

division is the sand bars. . . . There will be much work to be done on my division after the water is admitted. Especially at Dam 4 & Harpers Ferry as these two points ought by all means be made secure at as an Early day as possible."

[190] Charles B. Fisk, Chief Engineer, near Seneca, to James M. Coale, President, Frederick, 10 October 1843 (Flood-September 1843)

Fisk makes a progress report on repairs and the disbursement of repair funds. He notes at the beginning of his report, "I have been at this point (Beaver dam Culvert) night and day for nearly a week. The foundation of the culvert, we found, so miserably bad that I was fearful we should be unable to pass the water at this point within the time which had been named." However, he had cleared up that problem and he was confident the canal would be put back in operation on schedule.

[207] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, Washington, D.C., 10 October 1843 (Flood-September 1843)

"We will be ready tomorrow to admit the water at Dam No. 5, that is about 3 feet so as to enable us to boat material to the different breaks. By the last of the week we shall do the same at Dam No. 6."

"If the water should fall enough I intend to replace the Sheeting that was taken off of Dam No. 5."

"I will continue with a strong force to put the canal banks in the same condition they were before the freshet, so as to try and be prepared for the next high water."

[194] James M. Coale, President, Frederick, to Charles B. Fisk, Chief Engineer, 12 October 1843 (Flood-September 1843)

"I recd yours of the 10th Inst this day, and am sorry to hear, that sickness has deprived you of the aid of Mr Young. I have no doubt that your labours have been arduous, but I must caution you against too great expense of your health, least you also should have a relapse. Your service could not well be spared for a few months to come from out door matters along the line."

"In conformity with your letter received several days ago I transmitted on the 10 Inst to Mr Young, Mr Ingle, \$2454 being the whole of the balance coming to him from the loan as divided according to your recommendation. On the same day I sent by Col Tilghman to Mr Elgin 2453\$ & to Mr Stone 1000\$, which are likewise in full of their shares."

Elgin & Stone will let in the water on the 15th & Mr Young should not need the whole amount sent for opening the navigation the balance can be expended in perfecting such parts of his work as may require further labor to make it proof against damages in future."

[207] W. S. Elgin, Superintendent, Sharpsburg Landing, to Charles B. Fisk, Chief Engineer, 12 October 1843 (Flood-September 1843, Harper's Ferry-Sustainability)

"I should like to know what is to be done respecting the Funds for the Future work at Dam No 4. unless that work is done this fall it will be [illegible] to give us considerable Trouble again in the Spring or the first rise in the river . . . If nothing more Happens than I know of at this time to readmit the water at Dams 3 & 4 on Saturday night next . . . I am taking out all the sand Bars that will interfere with the navigation . . . I fear the Canal from Dam 3 to 4 will be very Troublesome until the necessary repairs can be made."

[190] John G. Stone, Superintendent, to Thomas Turner, Clerk, Frederick, 13 October 1843 (Flood-September 1843)

"The water was admitted in the canal at Dam No 5 yesterday. We will not be ready with the upper part of the division before Sunday or Monday."

[190] Charles B. Fisk, Chief Engineer, Seneca, to James M. Coale, President, Frederick, 14 October 1843 (Flood-September 1843, Flood Damage Prevention-Financing)

Fisk writes that he thinks activities to prevent breaches on the Georgetown level of the Canal can be funded by the Georgetown millers who rent water from the canal.

[207] Charles B. Fisk, Chief Engineer, Beaver Dam Culvert, to George Shafer, Funkstown, 14 October 1843 (Flood-September 1843)

"The Beaver dam Culvert, sufficiently for a reduced width of Canal, will be rebuilt, (on solid rock) by the 20th. In the meantime the embankt. is progressing as rapidly as the masonry will allow. A short time will then suffice to pass the water over. The water has been admitted on the Georgetown level; on Monday we shall commence filling from Seneca down on Monday at midday. From my last information I presume the filling is now going on upon all the line above, except between Edward's Ferry and Seneca."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to Thomas Turner, Clerk, Frederick, 19 October 1843 (Flood-September 1843)

Reports the resumption of navigation in his division. He writes, "I shall need more means at the 1st of next month as I shall have to Keep an Extra Force until that time to strengthen the weak points and ought to Keep them longer to Guard against the High Water at many points; where such caution would at small Expence Keep the River in its proper channels."

[190] Charles B. Fisk, Chief Engineer, Washington, D.C., to John G. Stone, Superintendent, Clear Spring, 21 October 1843 (Flood-September 1843)

"I find that the river between Edwards Ferry and Seneca will not at its present stage pass boats drawing more then two feet." Presumably because of the sand bars still in the canal and weakness of the canal walls and their inability to hold a full load of water.

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 23 October 1843 (Flood-September 1843)

Reports that he readmitted water at Dam No. 6 on Oct. 21, and the whole division was now watered. He finished, "We are now at work repairing the sheeting on Dam, No 5, and hope to get it protected against an other rise in the river."

[207] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, Washington, D.C., 23 October 1843 (Flood-September 1843)

"We have had so much sickness to contend with that we could not get the water in at Dam No. 6 before Saturday last. We are repairing the sheeting on Dam No. 5, not much has been taken off, but I am afraid an Ice freshet might do considerable injury to the timbers if they were not protected."

[190] W. S. Elgin, Superintendent, Harper's Ferry to James M. Coale, President, Frederick, 25 October 1843 (Flood-September 1843)

Elgin asks Coale for more money as the amount sent him "will fall short at Least \$1000 to pay the hands Bills &c Contracted by me." He also wanted the men to be able to work an additional month on further repairs of the canal.

[190] John P. Ingle, Washington, to Col. James M. Coale, President, Frederick, 28 October 1843 (Improvements-Unspecified)

Ingle writes concerning his efforts to obtain funding for improvements to prevent flooding on the Georgetown level.

Ingle is rather non-specific about what the weak spots on the Georgetown level are, but he writes, "A good many Boats have come down from Seneca, but the fear of a Breach at the high wall spoken of has made it necessary to suspend navigation for a day or two."

[190] J. Y. Young, Superintendent, Edwards Ferry, to James M. Coale, President, Frederick, "Friday morning" [?] October 1843 (Flood-September 1843)

This is a confusing letter. I am unsure whether Young is refering to damage from the September flood or some subsequent freshet. The latter is probably the case, because he refers the "cabbin [cobbin branch] work which very heavy. a large trunk 50 feet long and 20 wide. I had nearly completed it and would have passed he water on Sunday. But the water had been and still is, entirely over all work 6 or 7 feet. damaged it considerably. It came over the embankment, making two small breaches in the Bank which can be finished in 3 or 4 days should the river fall today. Should it continue to rise I cannot say what other damage may be done to the Canal Line. It is nearly high as I have ever seen it at this place and yet rising."

The canal had real problems getting the superintendents sufficient cash to pay their laborers to finish the repairs absolutely needed.

[182] Board of Directors Meeting, 1 November 1843 (Flood-September 1843, Flood Damage-Financing, Flood Damage Prevention-Financing)

John P. Ingle, in letter the President presents to the board further details of the transactions with the Georgetown millers. "Collected \$2,500 for canal repairs between Georgetown and Little Falls. Made disbursements of \$200 & \$150 to J. Y. Young, Superintendent of the First Division. He expects to raise \$4,000 to 5,000 more from the Corporation of Georgetown on the pledge of water rents "to be applied to making the Georgetown level of the canal secure against further breaches."

[194] James M. Coale, President, Frederick, to Louis McLane, President, B&O Railroad, 9 November 1843 (Flood-September 1843)

"The navigation has been resumed along the entire line of the Canal from Dam No 6 to George Town, & the coal dealers of Allegany are anxious to commence their trade under the



recent arrangement."

[180] Special Report of James M. Coale, President, 16 November 1843 (Flood-September 1843, Flood Damage Prevention-Proposed)

"In consequence of a continued rain of several days' duration, the waters of the Potomac rose on 15th of September last, upwards of two feet higher than they were ever before known by any living witness. The loss and destruction of property along the course of the river were consequently very great, and in common with other works of internal improvement located in the vicinity, the canal sustained considerable injury. A very general impression prevailed at the time, among persons not connected with the Company, that the breaches could not be mended so as to let in the water again this season. We are, however, happy to inform you that the navigation along the whole line, from Dam No 6 to George Town, has already been resumed, and that the canal is at present doing an unusually active business. As soon as the breaches occurred, upon the application of the President, the several Banks of Frederick promptly agreed to advance the funds that might be necessary to restore the navigation, and the most efficient measures were immediately taken to accomplish that object. A subsequent arrangement was also made with the proprietor of certain manufacturing establishments in George Town, whose machinery is operated by Water from the canal, for an advance on their water rents to an amount sufficient to repair the damages on the level leading to that place. During the progress of the work, the Superintendent of the first and third Division, were, unfortunately, disqualified by sickness, for a portion of the time, from giving that attention to the repairs which the exigency required; but the loss of their services during their brief confinement was ably supplied by the personal supervision of the Chief Engineer, whose exertions on the second division also deserve especial notice. On this division the water was admitted on the 14th of October, and boats of light burden were enabled to pass down the whole line, by turning out upon the river at Edward's Ferry and returning to the canal at Seneca, by the 20th of that Month. The serious damage Sustained by the Beaver Dam Culvert which is situated 24 miles above Georgetown and the frequent interruptions of the Navigation which have occurred by reason of breaches at that point rendered it advisable, in the opinion of the Chief Engineer, to tear down nearly the whole structure at once, and build it up anew; which was accordingly done in a manner that will, it is hoped, render it proof against future freshets. This prevented the admission of the water on that level, which is about eight miles in length, until the eighth [sixth?] of the present month, at which time the entire line of the canal was opened to boats of the heaviest burden. A further outlay will, however, be required to strengthen the repairs; and when means are obtained to complete the unfinished portion of the canal, a due regard to economy will dictate the expediency of granting permission to appropriate a portion of the means that may be authorized to be raised, to the purpose, as we have before intimated of constructing waste weirs on some long levels fortifying the exposed points and putting the entire line in proper condition. All this can be done at a cost of about \$60,000."

[190] J. Y. Young, Superintendent, Georgetown, to the President and Directors, Frederick, 12 December 1843 (Flood-September 1843)

"Since the readmission of the water into the Canal, I have been occupied settling up my accounts and doing such work as was absolutely necessary upon the following levels No 4, 16, 20, 21, 24, & 25, with the smallest possible force and upon cheapest terms."

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[190] Charles B. Fisk, Chief Engineer, Annapolis, to James M. Coale, President, 17 February 1844 (Flood Damage Prevention-Proposed) [Note: this letter is unsigned, but the handwriting is that of Fisk]

Fisk once again advocates paying off the repair debt, and making improvements on the canal to prevent future flood damage.

"There are some points, comparatively few, however, and in reference to the extent of damage done, principally on the lower part of the line, where in times of heavy rains and high freshets that the canal sustains great injury for want of sufficiently high guard banks to keep out the river, and the requisite waste weirs, to dispense of any excess of water that may from any cause get into the canal. The poverty of the company alone, hitherto, has prevented the doing of this precautionary work, as is well known, to all acquainted with its past history. To illustrate what is here said, I may refer to one single case. The five-mile level just above Georgetown, within the last two years, has sustained damage and caused an expense to the company entailing \$8,000 owing to the causes stated. An expenditure, not exceeding this sum, would have prevented altogether the damage done within the last two years, and would have rendered that level secure in all time to come against such damage. Whereas, now, it remains as much exposed to damage as was without having been rendered the slightest degree more secure by the expenditure in the repairs referred to."

[207] J. H. Williams, Engineer, Georgetown, to Charles B. Fisk, Chief Engineer, Washington, D.C., 6 April 1844 (Study-Floods-C&O Canal Company)

The Company hired Williams to ascertain the high water marks from the 1843 floods.

For Georgetown, he reported, "My Levels of high water are taken in reference to Level No 4, they are as follows."

"On the Gable end of Smith's Ware House, nearly opposite Market Street, 21.34 [feet?]"

"On the Stair steps of F & A. H. Dodge's warehouse 22.22 [feet?]"

"On the Door of Davidsons ware House, next door below F & A. H. Dodge's 22.02 [feet?]"

[182] Board of Directors Meeting, 18 April 1844 (Flood Damage Prevention-Proposed)

"The report of the Chief Engineer relative to the improvement, & cost thereof, of the George Town level submitted yesterday, was again taken up, & on motion laid on the table . . ."

[190] Charles B. Fisk, Chief Engineer, Frederick, to the President and Directors, 23 May 1844 (Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed)

"I have had interviews with individual members of the Corporation of Georgetown, & am assured by them, that there is a majority of each Board, who will agree to advance, say \$10,000, for the purpose of securing the Georgetown level and rebuilding the bridge near the market house in that city, upon a pledge of water rents derived from the mills fed from that level . . . The widening of the feeder they think ought to be provided for by the Corporation of Alexandria, or the Alexandria Canal Co."

[182] Board of Directors Meeting, 24 May 1844 (Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed)

"Resolved, That the improvement, as recommended by the Engineer as plan No 2, be adopted excepting the widening of the feeder, & that the same be made accordingly. Provided the Corporation of George Town, will loan to the canal Company, on Interest, the sum of 10,000\$ upon a pledge of the water rents in the District of Columbia."

"The President presented a letter from the Ch. Engineer stating 'that he is informed that the corporation of George Town is willing to loan to the Canal Company on a pledge of the water rents in the District of Columbia, the sum of Ten thousand dollars, to be applied to the improvement & security of the George Town level of the Canal. It was therefore,"

"Ordered, that the President of the Company be authorized to negotiate with said Corporation for the said loan, to be applied to the Improvement of the said portion of the Canal as proposed to be made under the order of the Board of this day."

"The [President?] presented a letter from the Chief Engineer dated 23rd Instant suggesting that authority be given to the Superintendents to draw off the water from the canal on the 1st day of July next, & to continue the same let off for two weeks, for the purpose of examining the canal & making such repairs as may be found necessary."

[180] Sixteenth Annual Report, 3 June 1844 (Flood-April 1843, Flood-September 1843, Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed)

The C&O Canal president, James M. Coale, reported:

"The attention of the Board has recently been particularly directed to the portion of the Canal within the District of Columbia commonly known as the George Town level. The numerous & heavy breaches that for several years have been occurring on that part of the canal plainly indicated that some improvement were essentially necessary there, & we accordingly directed the Chief Engineer to make a particular examination of the work on that part of the first division, & to report, what in his opinion, was required to guard against future occurrences of the like nature. In pursuance of this order, the survey was made & an estimate submitted of the cost of such work as was required for the security of the canal against the frequent & costly breaches to which it is now liable & to ensure an adequate supply of water. From that report it appeared that the length of the level, including that part of the feeder from the Potomac lying below the guard gates which is connected with it is 4 2/3 miles. Of this distance, three fifths of a mile below the guard gates is usually overflowed by heavy freshets. This occurred twice last year viz: in April and September [1843]. At the last mentioned freshet, the water ran over the tow-path in places to the depth of four feet. Whenever such an inundation from the river takes place, breaches must inevitably occur lower down, by which the surplus water which has entered the canal returns to its natural channel. Such breaches, owing to the great height of the canal upon that part of it, above the level of the river, are generally very heavy. As a protection against these river freshets it will be necessary, as soon as adequate means (for which we are now negotiating) can be obtained, to raise the part of the tow-path liable to overflow, & also the feeder bank below the guard gates, at least one foot above the highest water mark hitherto known in the Potomac; or in other words, about one foot higher than the rise of the last September freshet. This, with a tumbling waste 500 feet long on the tow-path side of the canal, near the fourth mile stone & some few other repairs of minor importance, it is thought would offer an effectual barrier against the in roads of the river at all times hereafter, & would amply compensate the Company for the cost of the outlay, in the saving from breaches on this level, in the course of three or four years. The repairs of the breaches on this level in 1842 was \$2,242, & in 1843 \$4,053. The proposed improvements, if they had been constructed in time, would have saved all this expense. The entire cost of making them is estimated by the Chief Engineer at about \$9,000, including the reconstruction of the bridge over the

canal in George Town, which is imperatively called for. There are also other parts of the line where improvements are required, all of which will be attended to in due season."

"From the past experience of the canal, Since it was finished to Dam No 6 the expense of repairs, ordinary, and extraordinary, is estimated by the Chief Engineer at about \$200 per mile per annum, which would make the average cost for repairs amount annually to the sum of \$26,900. In 1842, the actual cost was \$26,750. During the year ending in the 31st of December 1843, they amounted to \$61,173.12. The last year, however, was altogether without a parallel for the number & power of its freshets. From the beginning of Spring to the middle of autumn, they followed each other in such rapid succession that the breaches of one could scarcely be closed before they were opened by another. In consequence of this disastrous state of things, the continuous navigation along the lower or first division was interrupted for 103 days, & on the other two divisions for about 51 days. In addition to this navigation was suspended by a drawing off of the water for ordinary repairs in January, 1843, & also for 22 days in July of the same year. On the last named occasion it was taken off to remove the sand bars in the canal which were produced by the April freshet. And as the causes of the Suspensions produced an increase in the expenses of the Company, the Suspensions themselves caused a material diminution of the annual revenues."

[180] Charles B. Fisk, Chief Engineer, Frederick, to the President and Directors, 3 June 1844 in the Appendix to the Sixteenth Annual Report (Flood-August 1843, Flood Damage Prevention-Proposed)

In his report Fisk states that in addition to the major floods of April and September 1843, "There were likewise in August, of the same year, extraordinary heavy rains along certain parts of the line, viz: at the Big-Tonoloway, (near Hancock) & below the Monocacy, which caused the streams passing under the canal at those points to rise to a height unprecedented within the memory a man, & occasion great damage."

"The Board is aware that a comparatively small expenditure in the way of precaution would render the almost entirely immune against heavy damages from extraordinary causes. As, however, the whole amount required for that purpose will not probably be at the command of the company, in the present state of its affairs, for some time to come, though portions of it may be from time to time, I would urgently advise, that whenever the limited means of the Company are sufficient for any part of the work, one or more of the most exposed places along the line should be taken in hand, & made at once secure; and, that, when further means are obtained, other points should in like manner be made safe, and so on, rather than that the same amount of means should be applied over the whole line, with out making any one point entirely safe & secure, and in consequence leaving the whole line liable to heavy damage from high freshets as ever. By adopting this Course, the canal will be gradually getting into a good condition throughout, and in the mean time the cost of its repairs will annually be lessening."

"My report to the Board on the George Town level, dated the 13th of April, 1844, shows the importance of selecting that as one of the first points to which attention should be directed; as, for want of the precautionary work spoken of, & which will cost not exceeding \$7,812, the Company paid, in 1842 & 1843, \$6,295 for the repairs of breaches on that level, & without rendering it at this time more secure than before."

[194] James M. Coale, President, Frederick, to the Mayor, Aldermen, and Common Council of Georgetown, 10 June 1844 (Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed)

"At a meeting of the President & Directors of this Company held on the 24 of May, the President was authorized to negotiate with the Corporation of George Town for the loan of such sum, not exceeding ten thousand dollars, as may be necessary to make certain Improvements on the George town level of the canal, which have taken place on that portion of the line during the few last years, & to pledge the water rents in the District of Columbia for the repayment of the same."

"In fulfillment of the duty thus assigned to me I have the honor now to address to you an application to that effect."

"The Chief Engineer has made an accurate examination of the portion of the Canal indicated for the proposed improvement, & in conformity with his report the Board have determined upon the following"

"1st Raising the guard bank at the upper end of the George town level, & along the feeder to the guard gates, & thence across to the tow path & up to lock No 6."

"2nd Raising the towpath of the George town level below the proposed guard bank, wherever the same is now too low."

"3rd The construction of a tumbling waste near the 4th mile stone, & of the work rendered necessary thereby."

"4th Securing the waste weir near & above the old locks, & doing such work at the same as may be necessary."

"5th Extending the waste at Mason's Foundry & lowering the present overfall."

"6th The construction of a Bridge over the canal near the market house in George town."

"The cost of the above work is estimated at about 9000\$."

[190] Charles B. Fisk, Chief Engineer, Frederick, to the James M. Coale, President, 19 June 1844 (Easements-Flood Implications)

"By your directions, I have been at Weverton for the purpose of ascertaining whether a dam, and if one, of what height, could be constructed by Mr. Wever across the Potomac nearly opposite lock No 31, without rendering the works of the canal Company more liable to damage from high water than they now are."

"Assuming that the freshet of last September was as high as any likely ever to occur, hereafter, I am of opinion that the 3 1/2 foot dam might be constructed . . . with safety to the canal provided the company which Mr. Wever represents raises the towpath and guard bank along the upper part of level No. 31, for a distance of about 1 1/4 miles, say not exceeding two feet at any one point; this addition to the towpath and guard bank to be put on after they shall have been restored by the Canal Co to their original height and width as left when that portion of the Canal was completed, and provided also, that that company, do as such other work as may be required to prevent injury to the Culvert between Miller's Narrows & Lock No 32, from the increased height of water occasioned by the dam and also certain other work contemplated by Mr. Wever in connection with the proposed improvements which would prevent the river in high freshets from getting into the Level below No. 31."

"A higher dam than 3 1/2 feet I do not think could be constructed with safety to the canal."

[190] Thomas I. Davis, Georgetown, to the James M. Coale, President, Frederick, 13 July 1844 (Flood Damage Prevention-Proposed)

Davis suggests some flood control improvements to the canal in Georgetown.

"you are aware of the critical & much exposed condition of this end of your canal, & the importance of securing it by raising the embankments & erecting waste weirs as a security against heavy rains & freshets in the river, The money expended in repairing the numerous breaches which have occurred on this level since my location here would have been sufficient to have placed this level (which is by far the most exposed of any other in the line of the Canal) beyond the reach of danger from freshets. The canal was temporarily repaired last fall & so it still remains. I would recommend to your consideration, cutting off the tops of all the present waste gates level with the surface of the water required in the canal & also making openings in the Alexa aqueduct on both sides from end, to end, so as to admit of the water passing off, whenever it rises above its usual height in the canal, as being some security against breaches until time will admit of your having it more permanently done,"

[190] Thomas I. Davis, Georgetown, to the James M. Coale, President, Frederick, 16 July 1844 (Flood Damage Prevention-Financing)

Davis indicates that the Corporation of Georgetown has become disinclined from loaning money to the canal company for the purpose of repair and improvement to the canal in Georgetown.

[190] J. Y. Young, Superintendent, Canal Line, to James M. Coale, President, Frederick, 3 August 1844 (Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed)

Young informs Coale that "The Corporation of Georgetown passed an ordinance last Evening Authorizing the issue of Said Corporation Stock not exceeding Ten Thousand dollars, to be loaned to the Ches & Ohio Canal Company upon the terms proposed by the Prest of Said company. For the purpose of making certain repairs & Improvements within the Corporation & vicinity upon the Canal, to prevent damage to the Canal from Freshetts in the River & Branches." One condition imposed was that the Canal Company widen the bridge over the canal on Potomac street east of the Market House. Young further reports he has been engaged on work at the feeder of Dam No. 1 and he had restored a sufficient supply of water the levels below it, and that he was confident that the flood control improvements to the canal could be completed before the arrival of another freshet.

[190] J. Y. Young, Superintendent, Rushville, to the President and Directors, Frederick, 3 September 1844 (Flood-September 1843, Flood Damage Prevention-Accomplished)

"I have succeeded at a cost of little rising Six hundred dollars in supplying the Geo Town level with a Sufficiency of water is as low as I have ever known, it to be at this point in the river. Five hundred dollars of which is permanent repair to the Feeder. The ballance is but temporary, and will be carried away by the first Ice Freshett, only Stone loose thrown up a cross the broken portions of the Dam . . ."

"I have vigorously prosecuted the repairs of damages done by the Freshett of Sept 1843 and in all cases raising the embankment with reference to a similar occurrence."

[182] Board of Directors Meeting, 5 September 1844 (Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed)

"On motion the resolutions of the corporation of George Town in reference to the town for improvement of the George Town level of the canal &c and the Mortgage presented by them to be executed by this company to name to the same was again taken up & considered"

"Whereupon it was Resolved, That this Company decline executing said Mortgage & that the President be directed to communicate to said corporation through its recorder the action of this Board in this behalf, together with the grounds upon which this Board have acted. See letter Book page 186."

"On motion it was further ordered,  
"That the President be authorized & requested to cause by contract or otherwise as he may deem most expedient a tumbling waste & such other improvements to be made on the George town level of the canal as in his opinion & in the opinion of the Chief Engineer may be necessary to secure the said portion of the canal from damage by the usual river freshets, & over flow from the Falls Branch, and such portion of such work as it may be found desirable to have done by contract that he be authorized & empowered to execute a contract or contracts in the name of the Company & to issue requisitions from time to time for the sums of money that me be required to pay the cost thereof, & all such improvements as may be made on said level under this resolution."

[190] Peter E. Henderson, New York, to the President and Directors, 9 September 1844 (Renovation-1849-51) Note: this letter is misfiled with the May 1844 correspondence.

Henderson appears to be an outside engineer or consultant. He examined the canal with Charles B. Fisk, the Chief Engineer.

He writes:

"Georgetown to Dam No. 6"

"This portion of the Canal requires overhauling. its Banks in many places heightening and strengthening, immediately over the limestone stratas the Canal requires puddling. The Dams require repair (except Dam No. 6 which Dam is well constructed & these repairs may be made at a moderate cost during the progress of the works on the upper Section after which there will be nothing to fear either from freshets or other casualties. I therefore recommend that this portion of the Canal be stopped for the purpose of being repaired during the progress of the works on the Upper Section."

[190] Charles B. Fisk, Chief Engineer, Georgetown, to James M. Coale, President, Frederick, 26 September 1844 (Flood Damage Prevention-Proposed)

This letter contains Fisk's estimate of materials needed and request to start bidding on construction of a waste weir in Georgetown. This is no doubt the waste weir referred to in the annual report of June 1844.

[190] Charles B. Fisk, Chief Engineer, Georgetown, to James M. Coale, President, Frederick, 1 October 1844 (Flood Damage Prevention-Proposed)

Fisk lets Coale know the he had received nine bids on the Georgetown waste weir, of which Mr. Byrne's was the lowest. It seems stone was used in its construction, as Fisk mentions the Canal Company has a quarry near the construction site of the waste weir.

[190] Charles B. Fisk, Chief Engineer, Georgetown, to James M. Coale, President, Frederick, 19 October 1844 (Flood Damage Prevention-Ordered)

Byrne having refused the contract for the Georgetown waste weir, Fisk concluded an agreement with the next lowest bidder, Roberts and Cleaveland.

[190] J. Y. Young, Superintendent, Canal Line, to James M. Coale, President, 7 November 1844 (Flood Damage Prevention-Accomplished)

"My attention has been directed particularly to repair of the embankment, where damage was done by last years freshets. In order to secure all the exposed points before the coming Spring, by raising the embankment above high water, and this Save the Canal from a Similar occurances."

[190] Charles B. Fisk, Chief Engineer, Frederick, to W. S. Elgin, Superintendent, 21 December 1844 (Flood Damage Prevention-Accomplished)

Fisk instructs Elgin to report on his ordinary maintenance activities, so that Fisk may include that information in his report to the C&O President. He requests, "State also of your line as regards security against breaches and river freshets, at the close, as compared with the commencement of the year 1844, and at what points during the year, you have, or nearly so, made the canal perfectly safe agt. freshets like those of 1843, and the saving to the Company there will be in consequence, (when the work at these points is completed,) on a recurrence of such freshets, in view of the damage done at those points in 1843."

[180] Charles Ellet, Jr., Civil Engineer, Philadelphia, to James M. Coale, President, 26 December 1844 in the Appendix to the Seventeenth Annual Report (Sustainability-Embankments)

Commenting on his tour of English canals, Ellet comments, "The washing of the slopes is adequately guarded against by a well cultivated sod . . ."

#### 1845

[207] W. S. Elgin, Superintendent, to Charles B. Fisk, Chief Engineer, Washington, D.C., 1 January 1845 (Flood Damage Prevention-Accomplished)

Elgin reports he has had workers remove sand bars washed into the canal by the floods of 1843, and had the banks of the canal, weakened by the freshet, strengthened. [Note: Stone on the upper part of the canal below Dam No. 6 made a similar report.]

[207] J. Y. Young, Superintendent, Canal Line, to Charles B. Fisk, Chief Engineer, Washington, D.C., 1 January 1845 (I)

"At the commencement of last year the entire division had only been so far repaired from damage done by freshets in the Potomac River & Streams flooded by incessant rains, as to admit only a sufficiency of water for ordinary navigation leaving the embankments in most places only a few inches above high water mark in Canal, rendering the Canal again liable to a similar damage should a freshet have occurred either during the winter or spring following. But fortunately for the Canal and the finances of the Company, there was less Snow in the Mountains than usual & consequently but a slight rise in the river at the close of the winter. Should such an event have happened destruction to the Canal would have been the consequence. Having escaped so great disaster, I immediately in connexion with the ordinary repairs commenced securing the canal against further damage from this cause, by raising the embankments above high water in the river (having noted such points) as rapidly as the means of the company would admit of. Commencing at the most exposed points where liability to damage was greatest from high water in the River and working in reverse order. In this manner I have been able to secure Levels 22, 21, & 20, against any ordinary freshet, & partially Levels 23 & 24. Levels 4 & 5 will be in a few days also be fully secured, By raising the embankments above high water in Sept. 1843 for a distance of one mile. In addition to this improvement will be added a tumbling waste 300 feet in length on Level 4 which I am sure will be sufficient to secure this dangerous point from further damage."

[207] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, Annapolis, 11 January 1845 (Flood Damage Prevention-Accomplished)

Stone reports, "The Towpath is raised and well protected at the Cement Mill, it now out of all danger"

[207] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, Annapolis, 19 March 1845 (Flood-March 1845)

"The towpath at the Big Pool is very much washed, in some places the bank is not more than 4 feet wide. The Bank, you know, was left 1 1/2 feet lower than the proper height so that the material might be Boated. This work ought to be down now or the water in the long level must be kept lower than the proper height. It will require an appropriation of about \$500, so as to enable us to put on an extra force and finish it at once."

[180] Seventeenth Annual Report, 2 June 1845 (Flood Damage Prevention-Accomplished)

The C&O Canal president, James M. Coale, reported:

"Since the first of January, the operations of the canal have continued to improve; no breaches of any moment have occurred; and during the winter the navigation was only Suspended at brief intervals by ice on the lower division embracing in all not more than 24 days. The improvements, including the tumbling waste near Georgetown . . . have all been completed, and the entire line of the finished portion of the Canal is now in excellent condition."

And more wishful thinking . . .

[180] Report of the Committee on the Seventeenth Annual Report, 3 June 1845 (Sustainability-Naivete)

"The excellent condition of the canal in reference to repairs affords the best proof of the gratifying fact that in progress of time and in consequence of the necessary repairs the work had become more perfect and substantial and less liable to accident or injury; and proves conclusively, that in future there will be a diminution of Expenses for repairs instead of an increase as in the case of works of a different character."

1846

[190] Charles B. Fisk, Chief Engineer, Frederick, to W. S. Elgin, Superintendent, Harper's Ferry, 12 March 1846 (Flood-March 1846)

"If there should be a heavy rain this month or early in April, we have reason to fear that there would be a very high freshet in the Potomac, in consequence of the large quantity of snow still remaining on the mountains. The unusually high freshet in April 1843, You will recollect, was in part owing to the snow, even that late, on the Mountains beyond Cumberland. To render the damages to the Canal as light as possible, in the event of Such a freshet, the attention of each lockkeeper And person in the employ of the Company, who is in a place of any responsibility, should at once, if it has not already been done, be called to the Subject, and the necessary instructions given to each as to the course they are to pursue in case of a heavy rain, and especially at such points on the Canal as are liable to overflow. If you think that by having more hands in employ until the danger is passed, to be ready for Any emergency, the Canal would be more secure against damages, they ought to be employed at once. I have spoken with Mr. Coale on the subject. He desires that you will take such course in relation to the matter as your judgment may dictate. The current expenses now in arrear, he says shall be provided for at the earliest Moment practicable . . ."

[207] W. S. Elgin, Superintendent, Crommelin Hotel, to Charles B. Fisk, Chief Engineer, Frederick, 16 March 1846 (Flood-March 1846)

"I have reached thus far on my way down the line; There is nothing amiss from Seneca to Geo Town; I shall return this evening to Seneca & with the hands to repair the Damage above that point which is one Breach above Lock 24 near where the wast weir formerly stood it is about 70 feet in Length say from 5 to 6 feet Below Bottom; There is also 4 Small ones 3 on the Berm on the 26th mile & 1 above Doct Whites Lower farm none more than 20 feet and in about 3 feet above Botton Canal, on the Levell above Lock 25 3 Small Breaches no to bottom 1 at the Waste weir Near the Marble Quarry 1 at the Culvert on Berm near the uper end of the 39th mile & the 3d on the Berm [?] of Culvert Below Lock No 26. Besides several washes where the Towpath has been cut down into the Canal on the 66th section, & 39th mile; I am in hopes to be able to pass the Boats on Saturday next [Note: this letter was written on a Monday].

[190] Charles B. Fisk, Chief Engineer, Georgetown, to James M. Coale, President, Frederick, 17 March 1846 (Flood-March 1846)

"Mr. Elgin has not yet come down, but is expected this evening. I learn from Mr. Hogmire and others that the canal has sustained no injury this side of Seneca & with the exception of a small break in the level above Seneca none this side of Shepherdstown. Boats are in fact now running between this and Seneca."

[194] James M. Coale, President, Frederick, to W. S. Elgin, Superintendent, 17 March 1846 (Flood-March 1846)

" I recd your letter of the 15th & am sorry to learn that the canal has again suffered breaches from the recent freshet but as I am given to understand that they are not serious I hope they will soon be mended & the navigation resumed"

"I send you this day a requisition on the collector at Georgetown for \$1200 which I hope you will use judiciously. The first object is the repair of the breaches, after which I hope we will soon receive funds enough to meet your expenses in arrear since 1 Jany."

"As soon as you can ascertain the extent of the damages inform me of it, as also of the sum that will be required to repair them over & above the amount now sent you, & when it will be wanted."

"It is desirable that the breaches should be mended as early as practicable as every day loss of navigation at this [illegible] is of importance."

[194] Thomas Turner, Clerk, Frederick, to John G. Stone, Superintendent, 18 March 1846 (Flood-March 1846)

Turner sends Stone a \$300 check for repairs drawn on the Washington County Bank, but warns him make sure the enough funds are there before trying to withdraw it. If there was not enough money at the bank, then Stone was to call on Elie Stake, the toll collector for the Company at Williamsport, and get what money he had.

"So soon as the navigation is open & tolls accrue Col. C [Coale] desires me to say that funds shall be sent you to meet claims against you. We hope such will be the case in a few days."

[210] Charles B. Fisk, Chief Engineer, Washington, D.C., to James M. Coale, President, 19

March 1846 (Flood-March 1846, Sustainability-General)

"I have just seen Mr. Elgin. The navigation, he thinks, will be restored from Georgetown to Harpers Ferry by Saturday the 21st inst and on the whole of his division by Monday or Tuesday next, these repairs he says \$800 (in addition to the \$1,200 Requisition he has just rec'd) will be wanted by Monday or Tuesday next, and that \$2,000 more will be needed by the close of the month, in order to put the canal in safe order. This makes the amount of damage by the freshet on his division \$4,000."

"The work done since 1843, in raising the banks he has no doubt saved many thousand dollars"

[194] James M. Coale, President, Frederick, to John G. Stone, Superintendent, 20 March 1846 (Flood-March 1846)

"According to your request I a few days ago drew a requisition in your favor for \$300 which was checked for on the Bank at Williamsport to be paid as moneys were there deposited by the collector at that point. I will endeavor at an early day to furnish you with \$500 more which will be sufficient to meet the cost of recent breaches on your division. After that it will be my endeavour to afford you the means of paying off the expenses in arrear for this year as early as practicable. As soon as the navigation is restored I have reason to believe that our resources will speedily supply sufficient funds to pay arrears & keep up current payments. Repair the breaches as soon as possible & then dismiss all unnecessary hands."

[207] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, Washington, D.C., 21 March 1846 (Flood-March 1846, Flood Damage Prevention-Proposed)

"The damage done on the 3d division is not as great as I at first feared it was."

"the 4 Mile level between Lock No. 42 & 43 was overflowed as far as the rock work extends, about 1 3/4 miles, the tumbling wastes that was made above Lock No. 42 passed off the water sufficiently to prevent its running over the berm or towpath. The water carried off nearly all the material that had been put on the towpath after the freshets of 1843, and as then, deposited it in the bottom of the Canal, which had to be removed before the water could be admitted."

"The level between Lock No. 43 & 44 was overflowed for a short distance from Lock No. 44 down, and the water having a ready outlet at the tumbling waste, passed off without doing much injury. The level between Lock No. 44 and Dam No. 5, was overflowed in like manner, but was saved by three tumbling wastes on the level, except some slight injury done to the berm bank at Middlecauff's Culvert. This Culvert is not of sufficient span to pass the water of an ordinary rain, and the water consequently must run into the Canal. I intend to raise the bank so high that the water will be forced into the fields before it gets in the canal, which will prevent its doing much injury."

"Dam No. 5 has about 50 or 60 feet in length of the sheeting broken off, which cannot be repaired until low water in the Summer."

"From Dam No. 5 up, there was no injury done, except in two small places, where Muskrats had made some holes in the banks, and when the water raised and softened the earth, it settled and a little water passed over the bank, both places were however stopped by Monday."

"The water in the river was within 4 feet as high as it was at the freshets of 1843. Had it been one foot higher, all the towpath that was made last year below Dam No. 5, would have been carried away, and the damage must have been very great, this part of the towpath should be raised and protected with stone before an other freshet. I do not see how it can be done without filling up the present road that goes from the abutment of the Dam to the fording, and making the road on the towpath for about 400 feet, in which case the course material that the road would be made of, would be the protection to the towing path. A new sett of Gates will soon have to be at this point, and they should be made at least 3 feet higher than the present ones, and the coping of the lock raised, which will effectually keep out the water of the highest freshet. I have raised the Abutment of the Dam 3 feet."

"I think the cost of of putting the canal in the same condition that it was before the freshet, will not exceed about \$600. The water was admitted this day on all the levels of this division and the canal will be navigable the 23d"

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, Washington, D.C., 22 March 1846 (Flood-March 1846)

"I am happy to in form you that I now have the navigation of the Canal again restor,d in the 1st & 2d Division, and Boats are again moving in Both directions, as the Breaches have Built up in such manner as to restore the navigation in the shortest possible time I shall



continue a part of the additional Force for the purpose of Building up the Breaches & Strengthening the points made weak by the recent Freshet."

[194] James M. Coale, President, Frederick, to Frisby Tilghman, 23 March 1846  
(Flood-March 1846)

"I am happy to learn that much flour is ready to go down the canal as soon as the navigation is opened, which will be tomorrow, & hope our trade will be brisk, for we are now much in arrear to the Superintendents since the first of January. . . . the cost of repairs from the recent freshet will be about 5000\$. It is lucky that it is no worse."

[194] James M. Coale, President, Frederick, to William Price, 23 March 1846 (Flood-March 1846)

"I expect the breaches on the canal will be repaired by Tuesday next. The cost of repairs will be about 5000\$ & we are now sorely pressed for means."

[182] Board of Directors Meeting, 14 April 1846 (Flood-March 1846)

"The President stated to the Board that by the Freshet of the 14th of March several breaches had been made in the Canal by which the navigation was suspended except on a small part of the lower division until the 22nd Inst. when the through navigation was resumed. That the funds of the Company being exhausted in the long suspension during the winter he had on his individual note payable in forty days with T. Turner as security borrowed of the Farmers & Mechanics Bank of Frederick County \$1,000 on the 23rd March to meet the urgent demands of the superintendents . . . and applied to the payment of the laborers employed in the repair of the said breaches." The board ordered the company treasurer to pay the note.

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 2 May 1846  
(Flood-May 1846)

"The late rains have raised the river to within 5 feet of the last freshet. The water did not get into the Canal at any point on my Division [the 3rd] and of course no damage has been done to the Canal. The navigation has been stoped at Dam No. 5, which is owing to the river being too high to pass boats through the Guard Lock, by this morning I think the water will be low enough to pass them."

[207] William H. Bryan, Commissioner, Little Orleans, to Charles B. Fisk, Chief Engineer, Washington, D.C., 12 May 1846 (Flood-May 1846)

"On Saturday night we had a rain as hard as that of Augt '43, and the water rose as rapidly, but I am glad to say that I have not seen or heard of any damage to the Canal."

"We had a freshet nearly as high as that in which went off this spring."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to James M. Coale, President, Frederick, 18 May 1846 (Flood-May 1846)

"We have another high water, I am Just from Dam No. 4 The River is in the two first Levells, Below that Dam. The Damages I am not able to ascertain as yet. However I do not think the navigation will be interrupted more than one week Judging from what I can see on this portion of the canal; I shall leave to day for the Lower Portion, and will write you from Geo. Town, and Let you Know the full extent of Damages."

"N.B. the Upper Guard Gates at Dam No. 4 have given out which will Take 4 days to renew"

[190] W. S. Elgin, Superintendent, Lock No. 26, to James M. Coale, President, Frederick, 18 May 1846 (Flood-May 1846)

"since writing to [you] yesterday [?: this letter has the same date as the previous letter to which he refers] I have ascertained the Damages on this portion is not very Great some two or three small Breaches on the Levell above Seneca; where we cut through the Embankment at Points to save the high Embankments; where If there was a Breach would cost much to repair; I hope to have the navigation restored this week; much or all the Expences on Levell Between Goose Creek & Seneca might, If there was an Expenditure of a bout \$500, to raise the head of the out Let Locks and Guard Bank at Edwards Ferry; so as to have stop plank to Keep the River out at this point; and I Respectfully recommend the improvement as it would have paid for it self this Season; had it have been done"

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 19 May 1846  
(Flood-May 1846)

"The rise in the river has not done much injury to the 3d division of the Canal. The water from the river has washed the towpath and deposited most of the material in the bottom of the Canal, on the 4 mile level between Locks No. 42 & 43. It will take us this week to remove the stuff, so that by Monday at farthest boats will be able to pass with full loads. The Navigation between Williamsport and Dam No. 6 continues as usual, the freshet having done no injury above Williamsport, except braking some sheeting of Dam No. 5, which cannot be repaired until low water this summer."

[190] W. S. Elgin, Superintendent, Georgetown, to James M. Coale, President, Frederick, 21 May 1846 (Flood-May 1846, Flood Damage-Lack of Diligence)

"Yours of the 17th Inst with one from Capt Easley of the 13th Inst have been received. I have this day examined into the matter and Beg Leave; to state the reasons of the water not being on the City Canal, as you are aware for the Last 3 weeks we have had constant Heavy rains, which have fill'd up the Rivr [?] Lock in Geo Town as fast as it could be Taken out not permitting Boats to pass through and out into the river to enable us to Clean this Lock out, we have to Keep the basin drawn down Therefore the water has to be Kept off the City Canal and Capt Easley is well aware of this fact that every thing has been done that could to get this portion of Canal fill'd all though he complains so very Loud; he also States to you in that Letter 1/2 days work would have saved the Company hundreds of Dollars; I now have a Bid from Mr. Collins of Washington to replace all the damages done to this portion of the canal for \$30.00. I have given the facts to the chief Engineer in regard to these damages. I am sorry that Capt E. could for get himself so far as to make such statements; I shall remain here until I put things proper on this portion of the canal. I find I shall have to take the water off many of the Levells for the purpose of removing the sand Bars Brought in by the recent very heavy rains The portion of the Canal from Senica down, has suffered in no other respect; I now have the navigation restored from Harpers Ferry to this place . . ."

[190] W. S. Elgin, Superintendent, Dam No. 4, to James M. Coale, President, Frederick, 23 May 1846 (Flood-May 1846, Sustainability-Dams)

"we have the Canal from this place to Geo Town navigable, with Exception of the gates at Guard No. 4 which we will have ready by to Morrow night or Wednesday morning The repairs have been done quite Temporary and will require close attention to Keep the navigation up we have passed the Boats at Guard Lock No 4 by means of stop planks so as not to hinder them they will not suffer by the Guard Gates not being in I am very sory to inform you that there is a breach in Dam No 4 of about 40 feet in Length, about the center of the Dam. I am fearful it will stop the Navigation when the water falls, and If the river should take another rise such as we have had the Last month it will be a serious affair. I shall take such steps to repair it, as the nature of the case will admit I wish the advice of the Chief Engineer as soon as he may get to Frederick as regards the Plan of repair &c There can nothing be done until the river falls; except the getting of the Timber &c for it; I wish the Chief Engineer to give me a plan for the coffer dam . . . There is many Sand bars in the Canal, which will have to be removed before the navigation; can be considered good, which I would respectfully, recommend the Canal be drawn Off during the month of July . . . [to remove them]"

[207] W. S. Elgin, Superintendent, Dam No. 4, to Charles B. Fisk, Chief Engineer, Frederick, 24 May 1846 (Flood-May 1846, Sustainability-Dams)

"I am sorry to inform you that there has Been a Breach made in dam No 4 about 40 feet in Lenth it is near the center of the Dam and must suspend the navigation of this Portion of Canal west of Harpers Ferry; as soon as the river falls. The canal is again navigable from this to Geo Town, with the Exception of the Guard Gates of Dam No 4, which I hope to get in to day or to morrow; The damages have been Greater the Last Freshett on this end of the Canal than it was in March But the river was not as high by 1 foot. The Lower portion Suffered Less with the Exception of sand Bars which there is a goodly number brought in. I shall remove the worst of them; and the remainder must remain until such time as the Canal is drawn off for the purpose of Examination, & there removal . . ."

[207] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, Frederick, 25 May 1846 (Flood Damage Prevention-Accomplished, Sustainability-Waste Weirs)

"Wastes have in part been made on the level below Lock No. 43, below lock No. 44 and below Dam No. 5, they are not yet sufficently protected with Stone but they prevent injury to the banks by high water."

"I think the banks are getting better every year, in proof of which I will mention that we have had no breach since June 1844, about 2 years. What interruption there has been to the trade has been caused principally by the high water overflowing the low levels, and leaving a deposite in the canal, this could be in a great measure prevented by raising the banks in some places, and protecting them in others."

[182] Board of Directors Meeting, 1 June 1846 (Maintenance-General)

"Ordered, That the chief Engineer be authorized to cause the Water to be drawn from the canal to make the necessary repairs & clear out the canal at such period & for Such length of time as he may deem expedient provided it shall not be kept out from than three weeks."

[180] Eighteenth Annual Report, 2 June 1846 (Flood-March 1846, Flood Damage Prevention-Accomplished, Flood Damage Prevention-Payment, Sustainability-General)

The C&O Canal president, James M. Coale, reported:

"The inconsiderable sum paid for construction during the past was expended in the completion of certain improvements on the line of the finished portion of the Canal, the most of which we have described in our former reports. The benefits resulting from these improvements have been very clearly demonstrated, particularly on the occasion of the

heavy freshet of March last. The repair of the damage caused to the Chesapeake and Ohio Canal by that freshet did not exceed in cost four thousand dollars, and the navigation in consequence thereof, was only interrupted for eight days . . . This affords gratifying evidence, not only of the propriety of the improvements to which our exemption from serious injury was many attributable, but also of the superior construction and durability of our work, which is yearly becoming less liable to breaches. The navigation has been but little interrupted during the last year, except from the severity of the winter . . ."

[182] Board of Directors Meeting, 2 June 1846 (Flood-March 1846, Sustainability-Dams)

"On motion it was Ordered, That William S. Elgin, Superintendent, was directed to provide the materials necessary for the repair of Dam No 4, by contract, or otherwise, and to make all needful repairs of the Said Dam, and in like manner to provide the materials and make all needful repairs that may be required at other points, on the 1st and 2nd divisions of the canal, which the Chief Engineer may think necessary;"

[190] Charles B. Fisk, Chief Engineer, Frederick, to the President and Directors, 29 June 1846 (Flood Damage Prevention-Proposed)

"In consequence of the giving way of the Maryland abutment of Boteler and Reynold's dam in the Potomac near Shepherdstown the outer part of the towpath of the canal adjoining has been wasted away. If the abutment is not soon rebuilt and the part of the dam connecting with it put in repair, the canal will sustain serious injury."

"I call the attention of the attention of the Board to the above, as I am under the impression that under the arrangement with the Potowmac Company when the dam was built, its owners are under obligation to keep it in such condition that it shall not occasion injury to the canal, and that they may be required to pay for the repairs to the canal that any failure or imperfection in the dam may render necessary."

[182] Board of Directors Meeting, 30 June 1846 (Flood Damage Prevention-Ordered)

"The President presented a communication from the Chief Engineer relative to the present condition of Boteler & Reynolds Dam, & suggesting the necessity of Said persons or their representatives being called upon to make the necessary repairs."

"On motion the same was referred to the Counsel of the Company to require the said parties [make] the necessary repair of the Dam."

"On motion, the chief Engineer was also directed to require the necessary repairs to be made."

[190] W. S. Elgin, Superintendent, Lock No. 11, to James M. Coale, President, Frederick, 1 July 1846 (Flood-July 1846)

"From the excessive & heavy rains that fell yesterday and last night, I am sorry to have to report that the canal have sustained this far up some damage (i.e.) at the Basin in Geo. Town at South West corner it has made a Breach of about 100 feet in length through the mould into the river; The Geo Town Level did not sustain much damage; only by having sand Bar Brought into it although the water ran over the embankment at one place for a short time; and had it not been for the large tumbling waste on this level the damages on this level must have been very great there is a Breach of about 50 feet in length on the level between Locks 7&8 near Cabin John Culvert The Culverts on this levell not being able to pass the water the stream flowed into the canal, and also the Falls Branch Flowed into the Canal on the Geo Town levell;" Elgin indicated he thought it would cost \$1000 to repair the damage on his division. Note: Stone also reported the freshet on the same day from Division 3, but said it was too early to calculate damage.

[207] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, Washington, D.C., 1 July 1846 (Flood-July 1846)

"The late rain has raised the river very much, it is now higher than it was in 1843, and is still rising, it is over the towpath below lock no. 47, but cannot do any injury at this point. So soon as I can ascertain the amount of Damage I will write to you again. As the river falls, I will draw off the water and go to work repairing as fast as possible."

[190] W. S. Elgin, Superintendent, Conrads Ferry, to James M. Coale, President, Frederick, 2 July 1846 (Flood-July 1846)

"I written you yesterday from Lock No. 11 Giving you Bad news, I now write you from Conrads Ferry; giving you more Bad news, i.e. the Heavy rains and high water have done Considerable damage on the Levell Betwen Lock No 25 & 26 1st the Broad Run Culvert of 2 arches [illegible] 16 feet span each have been from appearances entirely sweep out . . . There are 2 other Culverts damaged on this Levell to what extent I cannot not Tell until the water falls. . . . The Broad Run Culvert will have to be Trunked it will Take 100

feet in length."

[190] W. S. Elgin, Superintendent, Conrads Ferry, to James M. Coale, President, Frederick, 3 July 1846 (Flood-July 1846, Harper's Ferry-Sustainability)

"There are some 4 or 5 Breaches from this to Dam No. 4 as the Water is still up and so as not to be able to form a current." Elgin told Coal he did not have an accurate idea of the extent of the damages, as it was still raining and the Shenandoah river (which flows into the Potomac) was now rising, but he thought the damage would amount to \$6,000 to \$10,000. Elgin reported to Coale on July 5th the river was still rising.

[207] Thomas G. Harris, Mercerville, to Charles B. Fisk, Chief Engineer, Washington, D.C., 3 July 1846 (Flood-July 1846)

"The River at this point was not as high by 13 1/2 Inches as in Sept 1843 it wanted about 1 1/2 In of being in my Ware House Flour all safe, I sent up to McGregor this morning so as to report to you the situation of Dam No 4. No account Can be given yet to the extent of the breach in the Dam, the water being too high, owing to the stop plank not being put in at the Stop Lock, (which I mentioned to you I feared would not be attended to) 3 breaches have occurred in the Guard bank which is reported to average about 50 ft. Each, the depth Cannot now be ascertained as the water sill running out. 2 Small breaches in Tow Path below the Dam, water still passing out. balance of this level all safe."

"Harpers Ferry . . . As far as I have understood all the damage is from Dam No 4 to this place Can be repaired in 2 days Mr. Elgin is still below report says all safe, from here to Fitches on the 9 mile level 2 Culverts gone. the River here wanted about 4 ft of the September freshet"

[CF] The Herald of Freedom (Hagerstown), 3 July 1846, 2 (Flood-July 1846)

"High Waters." The Herald of Freedom reports that the canal has been submerged by the river in the vicinity of Williamsport.

[207] H. M. Dungan, Paw Paw Post Office, Morgan County, Va., to Charles B. Fisk, Chief Engineer, Washington, D.C., 4 July 1846 (Flood-July 1846)

"I am sorry to have to announce we have again been visited by a freshet as great almost as that of April 1843. I find it just one foot lower at this place fortunately no injury has been sustained by the unfinished portions of the Canal on this Division nor between this fifteen mile check, the Berm bank is half cut away at Town creek for some thirty feet being an exception."

[190] Charles B. Fisk, Chief Engineer, Harper's Ferry, to James M. Coale, President, Frederick, 6 July 1846 (Flood-July 1846, Sustainability-Waste Weirs)

"The Broad run Culvert of two arches, 16 feet span each is entirely carried away. It is possible that some portions of the abutments may be left, but it is doubtful The arches are wholly gone. The towpath and berm and the whole width of the canal for about 70 feet at the culvert is entirely washed away. a wooden trunk must be put in, which may be done I think on three weeks after the river falls. With the exception of this Culvert and the breach in the Rock Creek basin, the damage between this and Georgetown is not great. In fact for 20 miles below this place the canal is uninjured on the other 40 miles (went above Georgetown), the breaches about 10 in number are, except the one at the Broad run Culvert at places where material is convenient for the repairs."

"The breach in the Rock Creek basin is at a point where a narrow bank can soon be put in so as to readmit the water."

"The waste weirs in the Georgetown level saved it and and several other levels of the canal are uninjured that were greatly damaged in 1843. The raising of them since that time having kept the river out."

"At Dam No. 5, the river was higher than in 1843. Below Seneca it was 3 1/2 feet lower. It was lower here and at Dam No. 4."

[194] James M. Coale, President, Frederick, to John G. Stone, Superintendent, 6 July 1846 (Flood-July 1846)

"Your letters respecting the effects of the freshet on your Division was duly received & in compliance with the request contained in your last of the 4th Inst. which has just been received I herewith send to you a requisition for \$500 to enable you to provide at cash prices all the requisite means to repair the damages. You state you will not need the amount to pay the laborers before the 20th or until after you shall have completed the repairs. This will suit very well under the circumstances & I wish you to give me a few days notice before the time when the money will be wanted, as also the amount will be necessarily required in order that I may make all proper arrangements for the purpose."

"I am happy to learn that you will be able to restore the navigation in three weeks. Let the work of repairs proceed with all becoming energy and economy."

[194] James M. Coale, President, Frederick, to John G. Stone, Superintendent, 6 July 1846

(Flood-July 1846)

"Your letters of the 1st, 2nd, & 4th Inst reporting the effects of the recent freshet came duly to hand, & in compliance with your request I cause a requisition for \$1000 to be transmitted to you by the same mail that carries this to enable you to commence & proceed with due energy to the repairs of the breaches & the dismissal of Supernumerary hands as fast as they can be dispensed with. When further hands are required let me know several days before hand in order to that I may have time to make all due arrangements."

"As soon as you have ascertained the full extent of damage let me hear from you together with your estimate of the probable cost of restoring the navigation & the time required to do so."

"I have received reports from Mr Stone. He has not suffered so much as your Division. He writes that he can restore the navigation in about three weeks. I have notified Mr Fisk who is in Washington to be with you on the line of repairs."

[190] Charles B. Fisk, Chief Engineer, Hancock, to James M. Coale, President, Frederick, 8 July 1846 (Flood-July 1846, Sustainability-Dams)

"Above Harpers Ferry the damage to the canal is less than I feared," although Fisk admitted the river had not fallen sufficiently for him to assess the full extent of the damage. He reported, "The breach the dam [no. 4] appears to be a little but not much enlarged. Upon the whole the canal has suffered less than we had a right to expect. From near Williamsport to Dam no 6 the river was higher than in 1843." Fisk thought repairs would cost at least \$10,000 and navigation could be restored by August 1.

[190] W. S. Elgin, Superintendent, Point of Rocks, to James M. Coale, President, Frederick, 8 July 1846 (Flood-July 1846, Flood Damage-Lack of Diligence, Sustainability-Embankments, Harper's Ferry-Sustainability)

"I have examined the full extent of the Damages caused to the 1st & 2d Divisions of canal; and am of opinion the navigation can be restored by the 1st of Augst including the removal of sand Bars and other work intended to be done during this month had not the freshet occurred; this freshet above Harpers Ferry was within 14 inches of the Freshet of Sept 1843. But did not do any thing like the damages of that freshet not 1/4; the improvement done at the Shenandoah inlet Lock has saved the canal at this point and there is no damage for 20 miles Below this point; Below Seneca or to within 8 miles of George Town; the canal has sustain but Little damages, owing to the embankments having been raised in many places, where it has been in the habit of Breaking into the canal at Less Freshet, than the late one. The Breach in Dam No. 4; has not much increased by the Late Freshet; But Guard Bank at this dam has suffered probably to the amount of \$1,000; owing to it not being high Enough to Keep the river out; and neglect or incapacity of the Boss in charge of this portion of the canal; the stop plank was not put in time to prevent the damages; or in other words the damages would have been much lessened had they been got in time."

[210] Charles B. Fisk, Chief Engineer, Hancock, to C. Hogmire, Collector, Georgetown, 8 July 1846 (Flood-July 1846)

"The navigation may be restored by the first week in August. And but for the Broad Run Culvert having been carried away, it might be by the time we had named for the readmission of the water, after taking it out as we had intended, on the 5th of July, for repairs And examination. A wooden trunk will be constructed in place of the Culvert. From here to Williamsport to dam No. 6 the water was higher than it was in 1843. From Shepherdstown to dam No. 4 from the 13 to 14 inches lower."

"The Canal from Fitch's lock, (39 1/2 miles) to the Government dam (62 miles above Georgetown,) sustained no injury. The breaches, generally, except that at Broad Run, are Greatly less than they were in 1843."

[207] Thomas L. Patterson, Assistant Engineer, Cumberland, to [190] Charles B. Fisk, Chief Engineer, Frederick, 13 July 1846 (Flood-July 1846)

"The freshet in Wills Creek has been higher than any I believe since 1810. If there had been a corresponding one in the river the damage to the town would have been very great The river at Cumberland to judge by the eye, for I have taken no levels was at least four feet lower than in 1843. At Evitts Creek at that time the water which was bracked [?] from the river was up to the keystone of the Aquedt at the last freshet two feet lower. At Patterson Creek which rose up on the floor of the R.R. bridge, the River was more than two higher the last freshet at Shepherd Mill, Old Town, about three feet higher than in 1843."

[190] Charles B. Fisk, Chief Engineer, Frederick, to the President and Directors, 14 July 1846 (Study-Floods-C&O Canal Company, Sustainability-Culverts)

"I would suggest that Mr. Bryan with one person to cut as Rodman be employed to ascertain the levels along the finished canal of the highest freshets that have occurred of late

years with a view to ascertaining what amount of work, and at what points, will be required to secure the canal so far as practical against damage from similar freshets in future. An estimate can then be made of the amount that ought to be expended on each level, and by comparing this with the cost of the repair of breaches from freshets on the same for several years past we can readily determine in what manner the limited means of the company can be most advantageously expended for improvements. In connection with this estimate should be one, based upon a thorough examination of the foundation of every culvert of what is required to make them secure against failure."

"Several culverts have already given way in consequence of a failure in their foundations. This should not be as culverts rarely fail from the effects of any one rain but only after repeated heavy rains."

[210] Charles B. Fisk, Chief Engineer, Frederick, to Joseph McMurran and William Butler, 15 July 1846 (Easements-Flood Implications)

"The Chesapeake and Ohio Canal has been considerably damaged by reason of the failure of the Maryland end and abutment of 'Boteler and Reynolds' dam.' A part of the outer slope of the towpath and much of the river bank between the canal and the river, below the dam, have been washed away. Every rise in the river, with the dam in its present state, must cause more or less injury to the canal."

"I am directed by the Board of President and Directors of the Canal Company, to notify the owner or owners of the dam that they must forthwith repair it, and in a manner that will prevent further injury to the canal from the cause referred to, understanding that the mill and dam are now in your hands as trustees for the owner or owners. I have thought it proper to give you the notice directed by the Board, and to require you to have made such repairs of the dam as are necessary to protect the canal from damage with as little delay as practicable."

[182] Board of Directors Meeting, 16 July 1846 (Flood-July 1846, Flood Damage-Financing, Renovation-1849-51, Study-Floods-C&O Canal Company)

The board authorized the C&O President to borrow up to \$5,000 for repairs of damage caused by the July 1846 freshet. "The President presented & read a communication from the Chief Engineer dated the 14th instant with reference to the employment of the Corps of Engineers on the unfinished portion of the line of the canal & the [illegible] necessary for the continuance of their service and suggesting the propriety of employing W Bryan to ascertain the levels along the finished portion of the canal of the highest freshets that have recently occurred, with the view of ascertaining what work will be necessary to guard the canal against similar freshets &c."

[180] Report of the Committee on the Eighteenth Annual Report, 16 July 1846 (Flood Damage Prevention-Proposed, Renovation-1849-51)

"The freshets of the past spring [March and May 1846], & again of the interval since since the Report of the President & Directors have permitted the opportunity for a favorable comparison in this respect with other similar works [referring to canals in Pennsylvania which sustained greater flood damage in the Spring of 1846], of public improvement, under like in [illegible], which have generally exhibited a far inferior capacity of resistance. But whilst the general condition of the work is comparatively excellent, the official communications presented to the committee show that, although not immediately indispensable, yet so just as the resources of the Company shall admit of it, a considerable sum of money may be very advantageously expended in repairing, strengthening, & protecting them."

[190] W. S. Elgin, Superintendent, Georgetown, to James M. Coale, President, Frederick, 18 July 1846 (Flood-July 1846)

"I am getting on slowly with my Repairs owing to the scarcity of Hands, which I never have known so hard to obtain."

[190] John G. Stone, Superintendent, to Thomas Turner, Clerk, Frederick, 21 July 1846 (Flood-July 1846)

"We will have the water in on this division in the course of a few days."

[190] W. S. Elgin, Superintendent, Georgetown, to James M. Coale, President, Frederick, 27 July 1846 (Flood-July 1846)

"I have been put Back with my repairs at the Culvert By back water from the river, thowing [?] the force Idle. Since the past week I hope now we will be able to push though [?] without any further hinderance the water from Seneca to this place will be readmitted on to morrow."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to James M. Coale, President, Frederick, 5 August 1846 (Flood-July 1846)

Elgin is requesting money for repairs and reports, "I shall in this Evening commence filling the canal at Dam No 3 and Tomorrow Evening at Dam No 4." Elgin complains has been unable to attend to office work and will not be able to until he has the coffer dam framed

around Dam No. 4.

[190] W. S. Elgin, Superintendent, Dam No. 4, to James M. Coale, President, Frederick, 18 August 1846 (Flood-July 1846)

"I need which I had written to you some days since \$1500 more to pay the Expences of the Late Freshet, which Bills I have created and promised the cash; such as Timber & Lumber &c for the construction of the Trunk over Broad Run; which alone have cost about \$2,000; you speak of my returns being much in arrear; my Excuse is that the continued high Waters; of the Present season; have not given me time; from the line; where the interests of the Company; mostly required my attention; as the High waters caused Frequent Breaches &c which required my attention in person; I now have the Coffe dam under Framing; which I hope to get done and in the next week; after which time If we get no more high water; I shall have some time to devote to my accounts; which I regret as much as any person possibly do nor should it be the case If in my Power, for them to be other wise for I can assure you; I have not Trifled away any time this season; not even a sabath since Last March; nor have I been at Home for more than one day at the time for the last 2 months; I hope under those circumstances you will Excuse my accounts; being in arrears . . ."

"N.B. The water on the Feeder of Dam No. 4 is quite low at this time, The breach in the dam is 60 feet, and very much rack'd [?] in other places."

[190] W. S. Elgin, Superintendent, Dam No. 4, to James M. Coale, President, Frederick, 26 August 1846 (Flood-July 1846)

"I have the Coffe Dam Framed and ready to put around the Breach which I hope to get properly scoured this week; we have managed to pass all the Trade though [?] the Feeder levell that have presented itself. By means of lighter through the levels. If there should get a high water in the river during the time of the repairs of this Breach in the dam; There will be risk of having the Coffe Dam Taken off which would give the same Trouble and Expince to renew; Therefor the repairs to be push'd from time or from the time we get the coffe Dam in; and to do this will require means"

[190] W. S. Elgin, Superintendent, Harper's Ferry, to Thomas Turner, Clerk, Frederick, 5 September 1846 (Flood-July 1846)

"I have have this moment learned that the Trunk put in Below Edwards Ferry in 1843 have given a way." Indicates that he thinks the repairs to divisions one and two (both of which he superintends) will cost \$3,000

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 10 September 1846 (Flood-July 1846)

"This division of the canal has the usual depth of water in the different levels, and there has been no interruption to the navigation since the water was admitted the last of July."

"We are still at work repairing the banks that were injured by the freshet in July, and replacing the sheeting on Dam No. 5, that was broken off. I think it will require about 20,000 feet of sheeting & 1 1/2 Tons of iron for spikes. There is not as much of the filling washed out as I expected. I think we can have the dam repaired this month, although we have from 4 to 6 inches of water on the comb of the dam to contend with."

[182] Board of Directors Meeting, 1 October 1846 (Flood-July 1846)

"The President stated to the Board that in consequence of the considerable additional expenses which have accrued for the repairs of Dam No 4, which are now nearly advanced to Completion the receipts & means of the Company are too limited for the payment of the current expenses, at present, and the payment of the loan of \$2000 obtained from the Washington County Bank now due, & suggested the expediency of obtaining a renewal, or extension of the said note, if the Bank will consent thereto."

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 5 October 1846 (Maintenance-Dredging)

"This division is all in good order except the feeder level at Dam No. 5, which cannot be cleared out without a Mud Machine. Mr. Elgin has an old Machine which I will send for and repair. The mud to be removed was deposited by the late freshets."

[182] Board of Directors Meeting, 11 October 1846 (Flood-July 1846)

The board authorized the president to borrow such money as would be necessary to repair the canal because of the recent freshet, and pledge toll revenues as security except those that had already been pledged for previous loans.

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 3 November 1846 (Flood-November 1846)

"I am sorry to have to report that the River is now up very high and is over the Canal in different places. The water is within 6 inches as high as it was in 1843, and 2 feet of the July last freshet. The river is still rising but all the damage is done that can be."

It will be impossible to tell the amount of injury the Canal has sustained until the water falls." If Coale has no money to send Stone for repairs, Stone asks for the authority to borrow it on his own.

[190] W. S. Elgin, Superintendent, Harper's Ferry, to James M. Coale, President, Frederick, 4 November 1846 (Flood-November 1846)

". . . the water in the River is subsiding. it was yesterday over all the Levels from Dam No. 4 to Shepherdstown the extent of Damages done on this portion can not be ascertained until the water falls it was also in the Level Below Shepherdstown. The Damage from this to Monocacy I believe will be light; from that to the Great Falls will be heavy."

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 5 November 1846 (Flood-November 1846)

"The damage done by the freshet can repaired so as to pass the Boats by the 20th of this month. The injury upon this Division is not as great as it was in July. The cost above Dam No. 5, will not exceed \$300. With \$1,000 I can have the water in the Canal."

[190] W. S. Elgin, Superintendent, Georgetown, to James M. Coale, President, Frederick, 6 November 1846 (Flood-November 1846)

". . . the Damages has Been heavy from from Monocacy to Geo. Town; there is a good many breaches, But none very serious, as none of the culverts or other costly work is injured; I am in hopes Build up the Breaches and restore the navigation by the 13th Present month. I shall need \$4,000 for the purpose. there is also considerable damage done from H. Ferry to Dam No 4; & I fear Dam No. 4 has suffered again; as I fear the coffer dam is gone from the Breach in the Dam and if that is the case; the damage will be severe there is a great deal of Deposits made in the canal; which I fear cannot be removed sufficient for more than 500 Boat [?] Loads this fall, as it would consume the remainder of the season. . . . The Geo Town Level sustained but Little damages the River Broke though [?] Guard Bank near the Junction of the Feeder. But the waste & waste weir saved the Level the Level Between Lock 7&8 has 3 Breaches on it the Largest about 4 feet in length Some 3 feet Below Bottom the other 2 next to Bottom; on the level Above the falls the Largest about 50 feet the other 40 feet one Below Sineca & Edwards Ferry two Between Edwards Ferry & Monocacy are small Above Harpers Ferry I have not been over since the water has fallen. But have a letter from Mr. Jordan who states the Damages is not heavier on this portion than it was in July."

[194] James M. Coale, President, Cumberland, to John Van Lear, Cashier, [Washington County Bank, Williamsport], 6 November 1846 (Flood-November 1846)

"I was down to the Canal on yesterday & am glad to find that the damage from the recent freshet so far as yet ascertained has not been so heavy as I apprehended. Mr. Elgin Supt. started down the line yesterday morning and I shall receive an accurate account of injuries in a few days. Above Harpers Ferry there has been some damage. Under those circumstances we shall again need money for immediate use & I write to say that if it meets your approval I will forward you a requisition for 500\$ of the fund now in your Bank belonging to the Company in part payment of the Company's note in Bank & give the Superintendent a requisition for the residue to meet immediate wants. This will reduce the Company's debt to you to \$1000 payable the last of the month and I think their can be no doubt but that by that time we shall be easily able to pay it without keeping locked up the funds in your Bank for the purpose particularly in the present exigencies. The balance of \$1000 would be paid from any funds at command whether in your Bank or not. If you agree to this please write me immediately and let me know the sum now in deposit to the credit of the Company in your Bank. You need not take the trouble to furnish to me an amt current but merely the Company's balance liable to be drawn for."

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 7 November 1846 (Flood-November 1846)

"The damage done by the late freshet can be repaired in the course of 2 weeks so as to make the canal navigable. The cost for this month will not much exceed \$1500. The injury between Dam No. 5 and Dam No. 6 can be repaired for about \$300. As [illegible] the greatest damage is below Dam No. 5 I do not think Dam No. 5 has sustained much injury, perhaps some of the sheeting may be knocked off . . ."

[194] James M. Coale, President, Cumberland, to John G. Stone, Superintendent, 9 November 1846 (Flood-November 1846)

"Mr Elgin thinks he will have his part of the Canal ready for navigation by the 15th Inst. He has however not yet given a personal inspection above Harpers Ferry. If we get the navigation restored between the 15th & 20th it will be doing well."

[190] W. S. Elgin, Superintendent, Point of Rocks, to James M. Coale, President, Frederick, 11 November 1846 (Flood-November 1846)

"The rain of Friday, Saturday, & Saturday night made another rise in the River and got over several of the levells & washed out some embankments which we had put in and causing some further damage to the Canal by increasing the Breaches more by the previous freshet. But it has subsided again . . ."



[190] W. S. Elgin, Superintendent, Dam No. 4, to James M. Coale, President, Frederick, 13 November 1846 (Flood-November 1846, Sustainability-Dams)

"I do not believe that the Breach in the Dam has been any increased. Although, as I feared would be the case the coffer dam, and a portion of the new work recently put in has been taken away; also some Timber we had for this repair about 20 pieces has been taken which was fastened to the Guard Bank above the dam, the river rising above the Guard Bank and inundating the whole from the stop Lock to the Guard Lock; which rendered it impossible to get the Timber to save it; There has some two or three Breaches made in the guard Bank by the Last freshet; causing heavy deposits of sand & Gravel to be made between these two Locks, distance of upwards of a mile in many places filled 2 feet in depth it is so situated that we can not do any thing with it only by the mud machine which is Tedious as the embankment is high and the deposits wet and thin, makes it out of the Question to remove it with Barrows or carts; I would respectfully recommend to the consideration of the Board the raising of this Guard Bank at least 3 feet higher which would cost about \$2,000, and make it safe; This is the second time this year that this Guard Bank has been inundated; and caused a heavy deposit of sand and mud to be made in the feeder between the two Locks which is situated as can not be moved unless by the machine, which is tedious and costly; The Boat men become impatient and complain a great deal about this place." Elgin goes on to complain about the lack of funding for repairs which is making it difficult to hire laborers as they fear they will not be paid for their work by the canal company.

[190] W. S. Elgin, Superintendent, Dam No. 4, to James M. Coale, President, Frederick, 23 November 1846 (Flood-November 1846)

"I had the navigation restored from Dam No. 3 to Geo. Town on the 18th Inst. since, however there has been one small Breach at the west End of the Seneca Aqueduct which has been promptly repaired by working day & night on the 20th. I am happy to inform you that this portion is in order to pass the Heaviest Laden Boats from Dam No. 3 to 4 the water has not as yet Been admitted, although All the Breaches on this, was repaired By the 15th, I found the sand Bars on this portion so very bad and Especially on the feeder of Dam No. 4, that it would be useless to attempt navigation; which they remained, so I have since the 15th." Elgin hoped to have water admitted to the portion by the next day.

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 24 November 1846 (Flood-November 1846)

Stone reports boats are operating on his division and asks for funds to pay off his workers in order to maintain their faith so he can call on them on future occasions. He evinces frustration at his failure to pay workers promptly.

[207] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, Petersburg, Va., 1 December 1846 (Flood-March 1846, Flood-May 1846, Flood-July 1846, Flood-November 1846, Sustainability-Dams)

"The navigation on this Division opened on the 10th March and the boats had just commenced running when on the 12th a freshet occurred that stopped the trade until the 20th, after which time the navigation was uninterrupted until the 10th of May, when an other freshet caused a loss of 2 days below Dam No. 5."

"On the 17th of May we had an other freshet which caused a loss of 7 days to the trade below Dam No. 5, but no interruption above that point."

"On the first of July an other freshet occurred in the river which stopped all navigation until the first day of August, from which time the Canal continued in good order until the freshet of Nov. 2d again stopped the trade until the 23d., when the breaches were all repaired and the Canal again put in as good order as it was possible under the repeated injuries it had received from the different freshets."

"It may appear that our expenses have been heavy, but I have always thought it better to spend money to prevent than to repair damages."

"It will be necessary to protect the bank of Dam No. 6 by continuing the crib lower down and finishing the stone protection than was commenced some time ago. This work should be done before an other freshet or the injury to that part of the Canal Will be very serious."

[190] W. S. Elgin, Superintendent, Harpers Ferry, to James M. Coale, President, Frederick, 6 December 1846 (Flood-November 1846)

Elgin reports the condition of the canal not ideal for navigation, because of the sand and mud still in the canal (especially at the Dam No. 4 feeder) but with boats backed up and the close of navigation for the year near, he thought it best to admit the water and get the boats through from Hancock. He indicates that it will be necessary in the spring to remove the remaining debris from the canal.

[190] W. S. Elgin, Superintendent, Harpers Ferry, to James M. Coale, President, Frederick, 6 December 1846 (Flood-March 1846, Flood-May 1846, Flood-July 1846, Flood-November 1846)

This letter is a summary by Elgin of the very rough year for navigation on the 1st and 2nd division of the C&O Canal. Elgin reports freshets in March, May, July, and November. He indicates the July and November floods were by far the worst, and that most severe damage occurred at the Broad run culvert and Dam No. 4. He complained that repairing all the flood damage prevented him from taking such steps that would prevent more damage in the future.

[182] Board of Directors Meeting, 9 December 1846 (Flood Damage-Financing, Flood Damage-Lack of Diligence)

"Resolved, that the President be authorized and requested to borrow on behalf of this Company such sum, or sums of money as may in his judgment be necessary to pay for the repairs of the Canal made necessary by the late freshet not exceeding 5000\$ in the whole, and that he be authorized to execute bonds under the seal of the Company for any such loans, and also to renew the said Bonds if may become necessary."

"Resolved, that the Superintendent of the 2d Division of the Canal be directed to report to the Board the cause of the late breaches in the embankment near Big Spring, if the same is known to him, and especially to report whether any person in the employ of the Company has been unfaithful in the performance of duty in connection with said breach."

[194] Thomas Turner, Clerk, Cumberland, to W. S. Elgin, Superintendent, Cumberland, 9 December 1846 (Sustainability-Dams)

"P.S. I am also especially directed to call your attention to the coffer Dam from Dam No. 4 which has been floated down the river some distance & to suggest its being separated & secured Such as is supposed to require your earliest attention."

[194] James M. Coale, President, Cumberland, to the President and Directors of the Cumberland Bank of Allegany, 9 December 1846 (Flood Damage-Financing)

Coale applies for a loan of \$2,000 to pay for extraordinary repairs of the canal from the damage caused by the floods of 1846.

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, Petersburg, Va., 13 December 1846 (Flood-March 1846, Flood-May 1846, Flood-July 1846, Flood-November 1846, Flood Damage-Lack of Diligence)

"The Present season have been one very disastrous to the canal, as Thare have been Six Freshets this Season; innundating a portion of the 1st and 2d Divisions Besides Many heavy rains, causing the over flow of the Levells; and causing Breaches, thereby & also racking & undermining the foundations of Several of the Culverts; forming deposits of sand Bars at All places where ravines are let into the canal, and the Basin in Geo Town. The feeder of Dam 3 & 4. The former I Kept the mud machine Employ,d from the March Freshet until After the July freshet, and as fast as we could get the deposit removed The frequent Freshet in the river, form new ones This Also was the case with the Tide lock & Basin in Geo Town. The Guard Bank at Dam No 4 from the stop lock Lock up have been inundated Three times. The present season, The First of the July freshet, which owing to not having the stop plank, put in season, caused considerable damage, to the Guard Bank, and making the deposit in the feeder, which owing to its steep Banks, & not being able to get the water off makes it very tedious and costly to remove, The Second was the 1st of Nov. doing very little damage as the stop plank was got in season; and the Third, on the 5th of the same month the stop plank remaining in from the first. The Lock Keeper refusing to fill the pool. Between the Two Lock unless writen orders Suffering, the Pool to be fill,d Through breaches made through the guard Banks, forming very Heavy bars in the Feeder the second time; This Lock Keeper is not a fit person at this lock the Company would have saved at least \$1,000 dollars this year at this Feeder I have complained of it; Several times, & He was Dismissed at one time But restor,d again by Petition or the interference of Mr Vanlear of Wms. Port; The Guard Lock should have men of Judgmt appoint,d to them as the river caused the Feed to be changed often; Buchanan, the Present Lock Keeper I do not complain of his inattention But lack of Judgmt;"

"March 15th Freshet; navigation restor,d Mar 27th May Two Freshets not doing much damages, navigation interrupted; 4 or 5 days, July 1. Heavy Freshets and doing considerable damages, the navigation restor'd at Dam No 2 & 4 on the first of Augt from 2 to 3 on the 8th Augt Nov 2 Heavy Freshet within above Harpers Ferry of the Sept. Freshets of 1843. Below that point within 18 inches, 5th of Nov a second rise, navigation restor,d from Dams

No. 2 on the 17th from Dam No 3 on the 15th from Dam No 4 on the 24th"

[190] Charles Embry, Berlin, to John Van Lear, [Cashier, Washington County Bank] Williamsport, 17 December 1846 (Flood Damage-Lack of Diligence)

An interesting letter from Embry, who is evidently not an employee of the canal company, writing to Van Lear, the cashier of the Washington County Bank in Williamsport. He calls the canal company to task for not sufficiently safeguarding the canal, by building embankments higher or making other improvements to prevent damage that stops navigation.

[190] W. S. Elgin, Superintendent, Harper's Ferry, to the President and Directors, Frederick, 19 December 1846 (I)

In a letter evidently in a response to a request for an explanation of why there was a breach in the canal. Elgin indicated that he believed the cause of the breach was bad construction. That the original builders of the canal had failed to detect a stream that crossed paths with the canal and build an appropriate culvert, and that the stress of the 1846's freshets and earlier ones had undermined that portion of the canal sufficiently to cause a breach.

#### 1847

[190] John Lambie, Superintendent, Georgetown, to James M. Coale, President, Frederick, 21 February 1847 (Maintenance-Floods)

This letter speaks well to the difficulties that floods caused in terms of getting preventive maintenance done.

"We have A breach in the Canal this morning at Rock Run Culvert nine miles from here which will cause A suspension of the navigation for nearly A week. Part of the Culvert wall has been giving for years I have been told, and Mr. Elgin informed me that he had intended to secure it last Summer but the damage done by high water prevented him from doing it. I had intended to go to work at it as soon as the weather would permit."

[190] John Lambie, Superintendent, Georgetown, to James M. Coale, President, Frederick, 1 March 1847 (Maintenance-Floods, Sustainability-Waste Weirs)

"I find that there are six Bridges that will have to be rebuilt this Season, that there are only three levels on the division that have Waste Weirs and only one that has A Waste that can be said to be of any use. Some of the Culverts and Lock Gates wants repairing. It will require considerable time to repair the damage done by high water last season, and some of the Banks ought to be made higher to prevent the like in future."

"There is a good deal of complaint here about the River Lock. It seems that every high water levees A quantity of Mud in the Lock and above the upper Gates, thereby preventing the use of it untill it is cleansed out, which requires considerable labor. It has not been used since last October the weather being to cold for men to work at it."

[190] John G. Stone, Superintendent, to W. S. Ringgold, Clerk, Cumberland, 22 March 1847 (Flood-March 1847)

"The late freshet has caused some damage to the Canal which will require about a week to repair."

"I shall be compelled to use the money last sent me to put the line in navigable order, therefore it will not be in my power to close up the account for January until I receive more money."

[207] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, Hancock, 23 March 1847 (Flood-March 1847)

"I think that by Monday next we can have the Canal navigable again. The damage will not be great, from three to five hundred dollars."

"The water was over the Towpath at Dam No. 5. but had not done any damage except left deposits in the Canal. It was also over the two levels below Williamsport, but did no damage between Locks 43 & 44, almost all the injury was in the 4 mile level."

"I could not hear from Dam No 4."

"We will be compelled to draw off the water and then I think a few days work will put things to rights again."

[207] John Lambie, Superintendent, Georgetown, to Charles B. Fisk, Chief Engineer, Cumberland, 26 March 1847 (Flood-March 1847)

"I am happy to inform you that there is no damage done on this division, the water came within one foot of getting over the Banks below Seneca."

[190] W. S. Elgin, Superintendent, to James M. Coale, President, Frederick, 27 March 1847  
(Flood-March 1847)

"I on the First of the week wrote you the River was fast rising and I was fearful for the safty of the Canal. But it has receded, and Very Little damages has been sustained on this division although slitley over some two or three Levels The navigation has not been interrupted There has been considerable damages done the Embankments of the Canal at Reynolds Dam Below Shepherdstown during the last season, caused by cutting around the North Abutment of this dam; the River is still passing around this abutment and cutting into the Embankment of the Canal; I have it from some source that the Proprietors of that Mill were Liable, for all the damages the Canal Company might sustain in consequence of the construction of this dam. If so, they ought to at once make good these repairs; If not They ought to be forced to Build the abutment, as until that is done, All work or repairs done at this place is Liable to be taken off"

[190] Charles B. Fisk, Chief Engineer, Cumberland, to the President and Directors, 29 March 1847 (Flood Damage Prevention-Proposed, Renovation-1849-51, Sustainability-Dams)

"The condition of the canal between the Guard and stop lock at Dam No. 4, for some year or more past, and at the present time, has been, and is such, that more serious interruption to the navigation occurs at that point, than at any other on the whole line of the Canal. The expenditures for repairs on this portion of the canal, and for clearing out the deposits thrown in by breaches through the Guard bank and from the adjacent fields, have been, especially within the last year, very heavy."

"I would urgently advise, as the only effectual remedy for these evils, that the raising of the Guard bank, Guard and Stop locks, and abutment of the dam, entirely above the highest freshets, be immediately taken in hand. The earth for raising the Guard bank may be obtained from along the berm side of the canal, so as to enlarge the water way which is now too small, and to form a berm or offset at the level of water surface, to receive the deposits from the adjacent fields."

"measurements have not been made to ascertain the amount and probable cost of this work, but upon the supposition that it may be necessary to raise the Guard bank &c four feet, the cost may be \$6,000."

"The work should be commenced at the Guard lock, and carried in regularly, step by step, towards the dam. In this way, if from any cause, it should be suspended, when partially done, some good will have been accomplished."

"The Board is aware that Dam No 4 is in so dangerous and exposed a condition, that no time should be lost in putting it in thorough repair, at the earliest moment practicable."

"Two of the three wooden trunks that have been substituted for culverts, which had failed, -viz the one near Lock No. 26, and that at Cabin Branch, near Edwards Ferry, will not stand much longer. The renewal of Culverts as masonry, at these points ought not be deferred longer."

"There is much other extra work, along the line, that ought to be done this year, if the means of the Co. would permit, but the above is that most urgent in its character."

"On the 16th of July last, the Board, on my suggestion, authorized the employment of a party for the purpose of ascertaining the levels, along the finished portion of the canal, of the highest freshets, with the view of ascertaining what work ought to be done to protect the canal against damage from similar freshets in future, and what would be its probable cost, and of thoroughly examining the foundations of the Culverts, &c, and estimating what sum would secure them, where defective, against failure. Shortly after, when about to commence the survey, I was informed by the President of the Co, that the Board had informally come to conclusion that it must be postponed for the want of funds. I call attention to this, at this time, as there is not, that I am aware of, any thing in record to show why the survey suggested by me, and authorized by the Board, as above, has never been made."

"For the want of such a survey, examination and estimate, and the adoption of some systematic plan of repairs and improvements, the limited means of the Company are not always applied to the best advantage, at the most exposed and dangerous points, and these that would sustain the greatest damage, in case of a failure, are not always taken in hand first. Of this, the failure of several culverts within the last few years, is an evidence."

[190] Charles B. Fisk, Chief Engineer, Cumberland, to the President and Directors, 29 March 1847 (Easements-Flood Implications)

Fisk asks the Board to determine if the Potowmac Company planned to repair the Boteler and Reynolds dam near Sheperdstown, pursuant to their agreement with the C&O Canal Company. Fisk felt this dam was in a vulnerable state and could possibly cause much damage to the canal company.

[190] Charles B. Fisk, Chief Engineer, Cumberland, to the President and Directors, 6 April 1847 (Easements-Flood Implications)

Fisk returns to the subject of a proposed dam to be built on the Potomac River by C. W. Wever, at Weverton, Maryland. Fisk approved the project, on the following conditions, which give some insight into the subject of flood damage prevention. In order to secure the works of the canal against the proposed dam, Fisk would require:

"1st That Mr. Wever, or his representations, shall, at such points as the Chief Engineer of the Canal Co. shall designate, raise the towpath and guard bank, between locks No. 31 and 32, as much and with such top width and side slopes, and outer protection of wall and riprap, as said Engineer shall consider necessary and requisite, to make the canal as secure as it now is, and shall, in a like manner, raise and protect the berm bank of the canal, over Israel's creek culvert and the canal culvert next above Millers' Narrows, and above and below those culverts to the high grounds adjacent; but with the understanding, that the said Engineer shall not require more embankment to be made, and extra protection, put on, as aforesaid, than by his measurements and calculations would be required, to raise two feet in height, and protect, in like manner as aforesaid, the guard bank and towpath, for a continuous distance of 1 1/4 miles, next below lock No. 32."

"2nd That Mr. Wever, or his representatives, shall permit an overfall or waste to be constructed by the Co., and have an outlet to the river, over his or their land, of such length as the Company may determine on, between lock no. 31 and Israel's creek culvert."

"3rd That Mr. Wever, or his representatives, shall construct, and keep in repair, at his or their cost, a bank from from lock No. 32 to the Maryland abutment of the dam, of the height and dimensions, and constructed in a manner, that the Chief Engineer of the Company shall consider ample and sufficient to exclude the highest freshets of the river."

"4th That Mr. Wever, or his representatives, shall construct, and keep in repair, at his or their cost, a bank of proper dimensions from the said Maryland abutment of the dam to the low factory or mill that may, at any time, be erected on his or their property, raised to a height two feet above the level of the guard bank and two path below lock No. 31; determining the said height of the said bank, at each point in its whole length, by the height of the guard bank and towpath directly opposite; which said bank shall have the width and slopes, and be constructed in a manner, that the Chief Engineer of the Co. shall consider ample and sufficient, to secure it against failure from the freshets of the river."

[182] Board of Directors Meeting, 8 April 1847 (Flood Damage Prevention-Ordered, Renovation-1849-51, Flood Damage Prevention-Financing, Sustainability-Dams)

"A letter from Chas B. Fisk Chief Engineer dates 29 March relative to the condition of Dam No 4 was read, where, upon on motion it was, Resolved, That the Chief Engineer be directed to cause such repairs to be made to Dam No 4 and the guard bank &c at that point, as he may deem expedient and proper for the security of the Canal, and also to cause all necessary repairs to the culvert near & above Lock No 26 and the culvert at Cabin branch near Edwards ferry, the costs of all the said repairs to be from time to time provided for and paid through the Superintendent and included under the term current expenses."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to James M. Coale, President, Frederick, 24 May 1847 (Flood Damage Prevention-Accomplished)

Elgin indicates that he is ready to begin the repairs on Dam No. 4. He has, "The coffer Dam Framed, Timber Ties, & Lumber on the spot. Also the stone quarried and deliver'd to the margin of the Dam." He would have had the repairs done by June 1, but a 5 to 6 foot rise in the river delayed the start of work, and forced him to dismiss the men he had gathered. He had since assembled another force, and unless delayed again, would complete the repairs as soon as possible on the dam and the rebuild the destroyed culverts.

[182] Board of Directors Meeting, 26 May 1847 (Flood Damage Prevention-Financing)

"The President communicated to the Board sundry letters from Wm S. Elgin Supt. of the 2d. division on the subject of the repairs now making at Dam No 4 and two culverts, under a resolution passed at the last meeting of the Board, and stated that with a view of availing of the most favorable season for making the repairs as early as practicable, and meeting the other necessary demands upon the Company; it would be desirable & necessary to anticipate the revenues of the Company by a temporary loan on a pledge of the toll, which are now subject only to a former pledge of 1000\$ borrowed of the Washington County Bank, which loan had been recently extended on said Bank for 60 days longer, whereupon on motion it was, Resolved, That the President be authorized & requested to borrow on behalf of this Company such sum or sums of money as may in his judgment be necessary to meet the current demands on the Company in aid of the revenues; provided said loans shall not exceed 5000\$ in the whole; and that he be authorized to execute Bonds under the seal of the Company for any such loans, and also to renew the said bonds, and pay the discount thereon, whenever it may become necessary. Resolved, That the revenues & tolls hereafter to accrue to this Company from the Canal & its works, be and they are hereby invariably pledged to the payment of the loans, that may be made under the foregoing resolution, subject only to the payment of 1000\$ borrowed of the Washington County Bank under a previous pledge of said revenues & tolls and yet

remaining unpaid until the same shall be discharged, and that the President be authorized to issue requisitions for the payment of the said loans that may be made under these resolutions, and for the interest there from time to time until the same shall be fully discharged.

Resolved, That the money so borrowed shall pass into the Treasury and be drawn for by requisition from time to time, in the discretion of the President, according to the present practice."

[194] James M. Coale, President, Frederick, to W. S. Elgin, Superintendent, 30 April 1847 (Flood Damage Prevention-Financing)

"I have recd your letter informing me of the amount required for current expenses and the repairs of Dam No. 4. The sum is unexpectedly large as I did not anticipate that the whole amount for the repairs of the Dam would be wanted so early. The completion of that work is however all important and the opportunity afforded by the low water must be availed of. I will make every exertion to meet the necessities of the case."

[180] Nineteenth Annual Report, 7 June 1847 (Flood-March 1846, Flood-November 1846, Sustainability-Dams)

The C&O Canal president, James M. Coale, reported:

"During the last year the Canal suffered considerably from the numerous heavy freshets which occurred in the Potomac. The breaches however were not generally of a serious character, and were repaired, after the waters had sufficiently subsided to enable the laborers to work upon them. The damages sustained from the freshets of March and November [1846] were nearly as high as the extraordinary flood of September 1843 were by far the most important, inasmuch as the swollen current of the Potomac, in the first of those freshets carried away about eighty feet of Dam No. 4, and in the second, swept off the repairs of the breach which had cost many months of hard labour and had nearly progressed to completion. Ten days more work would have rendered the Dam safe from the force of the waters. Immediate steps were taken to renew the repairs and they are so far advanced at present that the superintendent expects to be able to finish them by the end of this month. But little interruption to the navigation was produced by this breach in as much as it could only materially affect the water in the Canal during a period of long protracted drought, and there was none such last year. There are several other parts of the Canal and its works, particularly some of the locks on the lower division which suffered from the high waters, and require renovation or considerable repairs. They will be duly attended to from time to time as the means of the Company will permit. It is a subject of regret that the resources of the Company will not once enable us to make all repairs and improvements which are called for, our ability in this respect being circumscribed, we can only apply the means at command to such immediate repairs and improvements, as are required to keep the Canal in good navigable order. This, with the interruption unavoidably incident to all works of this character, we have so far successfully accomplished."

"The past year however has been one of peculiar trial to the Company and of labour and anxiety to the subordinate officers on the several divisions of the line. In no former year in the recollection of any one connected with the Company have so many freshets occurred and of such general magnitude." As such, the Board went ahead and hired a third superintendent, John Lambie. This superintendent took over the 1st Division, relieving the superintendent of the 2nd division, W. S. Elgin, who had been overseeing it as well as his own division for some time.

[180] Report of the Committee on the Nineteenth Annual Report, 23 June 1847 (Flood Damage Prevention-Management)

The committee indicated its approval of proposal to "place the Supervision of the entire finished portion of the Canal in the immediate Superintendence and charge of the Chief Engineer of the Company: subject however to such restrictions as the Board might deem necessary to impose." One intention of this change was to have someone who respond quickly to the need for maintenance and repair work. "And when it is recollected the injury to which the eastern division of the Canal has of late been subjected by freshets in the Potomac, the damage to dams & frequent giving way of Culverts Causing interruptions to navigation loss of revenue & large expenditures for repair it is of the utmost importance that there should be an officer of Character skill & experience detailed to Supervise, & watch the condition of the work and manage it police. A timely application of labour & money will most generally arrest injuries which if suffered to progress will require thousands to repair, for it is well known to all persons at all acquainted with canals that breaches seldom occur without first giving warning of their approach."

[182] Board of Directors Meeting, 21 September 1847 (Flood Damage Prevention-Financing)

"The President stated to the Board, that under a resolution of the Board of the 26th May last, authorizing him to borrow a sum not exceeding 5000\$ on a pledge and in anticipation of tolls of the Company, he had on the 12th day of Augt, borrowed of the Farmers & Mechanics Bank of Frederick County, the sum of 2000\$ on the Company's note at 60 ds."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to James M. Coale, President, Frederick, 8 October 1847 (Flood-October 1847)

"The river is near the height of the highest freshet of 1846, and from appearance it will be the highest water ever known in this River." Elgin indicated he had taken what steps he could to prevent damage, but that he was not optimistic and he would keep the company informed of developments.

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 8 October 1847 (Flood-October 1847)

Like Elgin, Stone reports a rising river. He says, "The river is at this time--12 O'clock--still rising and will be at least 2 feet higher. It is now 20 inches higher than it ever has been since I have been on the canal." He indicated he would let the company know about the damage as soon as the water fell and said that he would need money to effect repairs. He added on a more optimistic note, "We got the new gates in at the Guard Lock of Dam No. 5 only 10 days before this rise, which turned out to be very fortunate, the old Gates could never have stood this Freshet."

[182] Board of Directors Meeting, 9 October 1847 (Flood-October 1847)

"The Board having adjourned on the 2d Inst. to meet on Friday the 8th were prevented from assembling in consequence of the interruption to travel caused by obstructions on the roads from the recent heavy freshets convened on this day."

"The damages caused by the recent heavy freshet was then spoken of and the State Agent present, concurred with the Board as to the expediency of the Board holding a meeting immediately in Washington City for the purpose of ascertaining at once as far as practicable from the line, the extent of damages, and of adopting the requisite measures for borrowing money to pay for the repairs."

[190] John Lambie, Superintendent, Georgetown, to James M. Coale, President, Frederick, 9 October 1847 (Flood-October 1847)

Unlike Elgin and Stone, Lambie already has damage to report. He indicates the freshet, "When I left Lock No. 10 at 9 o'clock this morning it was 12 or 15 inches higher than the great freshet of Sept 43 and still rising. . . . A very large breach took place this morning at the high wall between 12 & 13 miles from here. At 7 O'clock upwards of 200 feet of the wall had gone. another took place on Thursday evening above Lock No 7 there is some damage done to the Georgetown level, and I think there are breaches on all the the levels above the Great Falls."

[207] William H. Bryan, Collector, Washington, D.C., to Charles B. Fisk, Chief Engineer, Georgetown, 9 October 1847, 1:00 p.m. (Flood-October 1847)

"The Potomac is higher by 2 feet than any persons in Geo. Town recollect to have seen it for 40 years. The Geo. Town level is safe up to the Stop Gate, & to the bridge so far. at the upper side of the bridge there is a breach about 100 feet long. The water is on the Tow path from that to the [illegible] rushing in & out. It has broken around the berm at De les [?] lock & comes into the Geo. Town level. The Gd bank is supposed to be gone about to feeder. I fear the Island, between the abutments of the Dam is gone. I could not see any thing of it or the dam either today."

"The injury done already appears to be inconsiderable. the [illegible] is to come when the water falls. There seems to have been no change in its height since sunrise, 6 long hours & the highest water!!"

"I suppose the navigation will be suspended for some weeks or months."

[207] William H. Bryan, Collector, Washington, D.C., to Charles B. Fisk, Chief Engineer, Georgetown, 9 October 1847, 3:45 p.m. (Flood-October 1847, Widewater-Sustainability)

"Mr Lambie was down today & I am told, & reports that there is already 150 or 200 feet of the high embankment below the log wall gone. Also, that there is a very heavy breach at Cabin John's run, but it is not known whether the Culvert is gone or not. It is impossible at present, to tell anything of the depth of breaches & pretty hard to make out their length. Any thing in the 15th Section, however or at Cabin Johns, must be very bad."

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 10 October 1847 (Flood-October 1847)

"The water is yet over the lower levels of my Division and therefore I cannot yet say what the damage to the Canal will be, but from what I have seen, I think it cannot fall much short of 7000 dollars. There is nothing very serious in any one place but every level is injured to some extent."

"I think we can have the water in again by the 10th of next month. I have employed additional men and will commence tomorrow morning to repair the breaches."

[190] W. S. Elgin, Superintendent, Dam No. 4, to James M. Coale, President, Frederick, 10 October 1847 (Flood-October 1847, Sustainability-Dams)

"I find the Damage Great much heavier than in 1843. The whole of the Cross Guard Bank between the Stop Lock & the abutment of the Dam have been carried a way. The river is running around the abutment of the Dam also considerable damage done the Guard Bank. I do not believe \$5,000 will place this place alone in the condition it was The River has been 3 feet higher than ever Known. It also cut around the Guard Lock No 4; there will have to be land obtained at this points for the repairs. there is a heavy Breach about 1/2 miles Below the dam; when the water which is running around the abutment of the Dam is again thrown into the river there is some 8 or 10 Breaches from this place to the Point of Rocks, some of them large ones; from what I have seen I do not believe the water can be admitted under one month and at a cost of less than \$10,000. I am doing all in my power to stop the water from Runing a round the abutment of Dam; which threaten the most damage at this moments;"

[182] Board of Directors Meeting, 11 October 1847 (Flood-October 1847, Flood Damage-Financing)

"The President stated to the Board that there was great apprehension that very considerable injury had been sustained by the recent heavy freshet, on the Canal, and that the Company being without money, it would be necessary to provide means for the immediate repair thereof, as far as practicable, whereupon or motion it was, Resolved, That the President be authorized and requested to borrow on behalf of this Company such sum or sums of money in his judgment be necessary to pay for the repairs of the breaches caused by the recent heavy freshets, and that he be authorized to execute Bonds under the Seal of the Company for any such loans, and also to renew the said bonds, and pay the discount thereon, whenever it may be necessary. Resolved, That the revenues and tolls hereafter to accrue to this Company from the Canal & its works, be and they hereby irrevocably pledged to the payment of the loans, that may be made under the foregoing resolution, subject only to the payment of 2000\$ borrowed of the Farmers & Mechanics Bank of Frederick County under a previous pledge of said revenues and tolls, and yet remaining unpaid, until the same shall be discharged, and that the President be authorized to issue requisitions for the payment of the said loans that may be made under these resolutions, and for the interest thereon from time to time, until the same shall be fully discharged." Resolved, That the money so borrowed shall pass into the Treasury and be drawn for by requisition of the President, according to the present practice."

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 12 October 1847 (Flood-October 1847)

"No very serious damage has been done to this Division of the canal at any one place. the injury is on every level. the towpath of course is very much washed and has a great many small breaches in it. we have the Berm end of one Culvert taken away and about 30 perches of the Abutment of Dam No 5, which is all the damage done to the masonry. The Culvert must be repaired before the water can be put in the canal, but the abutment can [be] done afterwards. Some of the old Lock Gates are broken, but I think I can mend them so as to make answer this fall. The river was 3 1/2 feet higher than any Freshet since the canal has been made. "

"I think it will require nearly \$4,000 to put this division in navigable order, and then it will take till next spring to put the banks up again so as to be ready for the spring trade. The Boatmen will have to be contented this fall, with from 3 to 3 1/2 feet water in the Canal."

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, Frederick, 12 October 1847 (Flood-October 1847)

"I have Examined the Canal since the Late Freshet from Dam No 4 to the Point of Rocks; I find the Canal considerable Damaged thus far I have heard from the remander of my Division; and would have Examined the whole myself; But as the Guard Bank at Dam No 4 have been taken a way and the River is Runing around the Abutment of this dam as it was in 43 when you was tharce only considerable worse. The Damages on this portion is greater than it was in 43 the whole of the cross Guard Bank Between the stop Lock & the abutment have been Taken a way, making a Heavy Breach near the 84th mile post; But If I can be furnish,d with means I think I can restore the navigation in 30 days. I hope I will not be dealt by as I was in 43, as I am employing all the force I can get; I have no money in hand. Part of the current Expenses of Augt & All of Sept in arrear; I have not as yet heard from the President, I am rather at a Loss to Know how proceed . . ."

[207] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, Harper's Ferry, 14 October 1847 (Flood-October 1847)

"The damage upon this Division is greater than at any one Freshet. The water was higher and overflowed all the Levels. I should like very much to see you up here. There is no very bad brake at any place but there are so many of them that it will take until the middle of next month before navigation will be restored upon this Division. We have lost no masonry except about 30 perches of the Va. Abutment of No. 5 and the Berm end of a Culvert between Williamsport & Dam No. 5."



"I think it will take near \$7000 to repair the injury done & \$3500 may restore the navigation"

[190] W. S. Elgin, Superintendent, Harper's Ferry, to James M. Coale, President, Frederick, 20 October 1847 (Flood-October 1847)

Elgin asks Coale to send him \$2,500 a week until the 15th or 20th of the November to pay for canal repairs.

[194] James M. Coale, President, Frederick, to the President and Directors of the Farmers and Merchants Bank of Georgetown, 14 October 1847 (Flood-October 1847, Flood Damage-Financing)

Coale solicits loans for the repair of the canal.

[194] James M. Coale, President, Frederick, to W. Maury, President of the Bank of the Metropolis, 14 October 1847 (Flood-October 1847, Flood Damage-Financing)

Coale solicits loans for the repair of the canal.

[194] James M. Coale, President, Frederick, to John Van Lear, [Cashier, Washington County Bank, Williamsport], 14 October 1847 (Flood-October 1847, Flood Damage-Financing)

Coale informs Lear he thinks navigation can be resumed on the canal in about a month and that the repairs of damage caused by the October 1847 freshet will cost from \$20,000 to \$25,000.

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 20 October 1847 (Flood-October 1847)

Stone informs Coale of his financial requirements to finish repairs. He adds, "much of the embankment over the different breaches must be raised and strengthened before the canal will be safe. the first heavy rains may cause a breach unless it is so protected." He reminds Coale the sums he needs for repairs, "are exclusive of the pay to the Superintendent, collector & Lock Keepers."

[190] William H. Bryan, Collector, Section No. 15, to W. S. Ringgold, Clerk, Frederick, 21 October 1847 (Flood-October 1847)

Bryan describes in the letter the logistical difficulty of making repairs on the lowest division of the canal: the lack of tools and funds, the need provide board for the workers, etc. He does note, "The water was yesterday put upon the Geo. Town level."

[190] John Lambie, Superintendent, Georgetown, to W. S. Ringgold, Clerk, Frederick, 22 October 1847 (Flood-October 1847)

Lambie complains, "I am afraid that the work will be retarded for the want of funds. My expenses is more than three times the amount sent. I cannot get men to work on any other terms. I will require at least \$4000 next week."

[190] W. S. Elgin, Superintendent, Harpers Ferry, to W. S. Ringgold, Clerk, Frederick, 23 October 1847 (Flood-October 1847)

Elgin reports repairs progressing and that if he continues to receive repair funds commensurate to his needs (\$400 per day), "I shall not be long before I shall be ready for the water."

[182] Board of Directors Meeting, 26 October 1847 (Flood-October 1847, Flood Damage-Financing)

"The President stated to the Board that under and by virtue of the authority vested in him by the resolution adopted on the 11th Inst. he had negotiated the following loans on the Bonds of the Company for the purpose of repairing the breaches in the Canal caused by the late freshet viz

Farmers and Mechs. Bank of Mo. Co. at 3 ms	\$3000	
Washington County Bank at 6		3000
Bank of the Metropolis at 3		5000
Farmers and Mechs. Bank of Geotown at 6		5000"

"He stated also that assurances had been given that the two Banks of Alexandria would loan the Company to the amount of 5000\$ and that said loans would be negotiated as early as practicable."

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 30 October 1847 (Flood-October 1847)

Stone writes, "By the 10th of November I shall want \$1000 at which time I hope to be able to get the water in the Canal so as to pass boats. The Banks will on many places be but little above the water in the canal and it will therefore be necessary to keep a pretty strong force at work for some time to rain them so as to prevent a breach." Stone again indicates his work force expects to paid at the conclusion of the work and in cash,

because these are the only terms on which they would work. He adds, "If you think there is any doubt about your being able to supply the money to pay off at the end of November, it will be much better to tell the men so at once, otherwise they might do some damage to the canal."

[190] John Lambie, Superintendent, Georgetown, to James M. Coale, President, Frederick, 1 November 1847 (Flood-October 1847)

Lambie complains about the lack of tools or other supplies to deal with the freshet. He has had to pay high prices to obtain them and thinks that some of the tools are being stolen by the workers. Lambie still hopes to have the canal reopened to navigation by Nov. 15. He has thus far spent \$7,500 and expects to spend the same amount or more before the work is done.

[190] W. S. Elgin, Superintendent, Harper's Ferry, to James M. Coale, President, Frederick, 1 November 1847 (Flood-October 1847)

Elgin requests funds to pay off his workers. To get their labor, he promised to pay them every Saturday night and he fears that if he does not keep this promise that workers, horses, and carts will leave and navigation on the canal will not be restored.

[190] John Lambie, Superintendent, Georgetown, to James M. Coale, President, Frederick, 5 November 1847 (Flood-October 1847)

Lambie's letter is similar to Elgin's letter. He writes, "In consequence of laborers and others not being paid after the high water of Sept 43, most of the men have said that the[y] would not work more than one week without there money. Not having it to pay them tomorrow night, it may be that the work may be partly or altogether stoped untill I get it."

[190] W. S. Elgin, Superintendent, Seneca, to James M. Coale, President, Frederick, 5 November 1847 (Flood-October 1847)

Elgin indicates he hopes to have water back on his section of the canal by the night of November 13, if the weather holds. He requests additional funds and indicates he efficiently used all the funds previously allocated to him."

[190] John Lambie, Superintendent, Georgetown, to James M. Coale, President, Frederick, 8 November 1847 (Flood-October 1847, Widewater-Sustainability)

Lambie makes the usual complaints about not enough money and not enough men to make the repairs. He indicates he will need \$2000, above his initial \$15,000 estimate. Lambie states, "if the men employed knew that I have not the money to pay them, the work would stop at once. If I do not pay a man when ever he ask for it, the reply is, [']you are going to put us off to the last, and treat us, as the[y] did in 43[']."

He adds, ". . . the breach at the Logwall . . . is the largest breach that has ever been on this Canal." He further adds, "I ought to have some men employed at Cabin John Culvert if there is money to repair it."

[190] W. S. Elgin, Superintendent, Seneca, to James M. Coale, President, Frederick, 18 November 1847 (Flood-October 1847)

Elgin indicates that he is ready to admit water to his division of the canal, but dare not dismiss his work force until he can pay them and that for each day he keeps them the amount due the men increases.

[194] James M. Coale, President, Frederick, to William H. Bryan, Collector, Georgetown, 18 November 1847 (Flood-October 1847)

Coale indicates that John Lambie, the Superintendent at Georgetown, will finish his repairs the following day.

[190] W. S. Elgin, Superintendent, Dam No. 4, to James M. Coale, President, Frederick, 25 November 1847 (Flood-November 1847)

"We are again in the midst of Trouble, Everything we have been doing the Last 6 weeks have been swept a way; and we may as well & Better have burn, the money we have expended on this portion of the Canal; The whole canal is now under water; This is discouraging; I am discouraged after night & day for the Last 6 weeks to restore the navigation; and Just as it was Ready for the Trade, to entirely be swept away . . ." Elgin was uncertain what the damage in the end would be, but he seemed certain there would be no further navigation on the canal that season.

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 26 November 1847 (Flood-November 1847)

Stone reports about the freshet. He does not seem certain of the damage yet, but he thinks navigation will be stopped for two to three weeks at least. Requests funds to begin repairs.

[207] Sam Grasseley, Georgetown, to Charles B. Fisk, Chief Engineer, Cumberland, 26 November 1847 (Flood-November 1847)

"I take the liberty of dropping you a Few lines to inform you of the Situation of our Canall the present Freshet have done considerable damage, I have just learned that a Breach have takin place at the Tinald [?] aqueduct a considerable one the water is over the Banks between theare & the Falls at several the damage don Thare not her as it came over at Wibourns came in agan below Wilbourns & broke out above the Magazene the presise same place ware broken at the former Fresh & repurdly at the erron the gurd Bank at the Feeder not being replaced it came in to the Geo Town level & they cut the Bank opeisite O'Neals Quarry. we have a glomy prospect for Boating this Fall . . ."s

[190] John Lambie, Superintendent, Lock No. 10, to James M. Coale, President, Frederick, 27 November 1847 (Flood-November 1847)

Lambie, like Elgin, reports a new freshet on the river, which he reported "was a high as the freshet of April 43. It overflowed six levels on this division, and made twelve breaches, but none of them large, besides washing the bank considerably."

"It will require eight or ten days to get ready for the water and about three thousand five Hundred dollars in addition to what I have. Had it not been for the rain and high water this week, the water would have been let in by this time."

"I hope you will see the necessity of appropriating money for raising the banks of the Canal at some places, making wastes, wasteweirs, and for repairing Culverts."

Lambie added, "Had the sum necessary to repair the damage say \$30000, been expended in improvements the damage by the two freshets would likely have been repaired 12 or 15 hundred with A suspension of the navigation of eight or ten days. untill the improvement are made the Canal will allways be subject to the same."

[190] William H. Bryan, Section No. 15, to James M. Coale, President, Frederick, 27 November 1847 (Flood-November 1847, Sustainability-Waste Weirs)

"The breaches at (or just above) Locks No 21 & 20 have both gone out again. the necessary consequence of not having wastes. The injury to the banks in the latter level (Fishers) is rather worse than the freshet of Oct. Otherwise the work about the Falls & down to Barnetts Lock is safe. On this level the one below, (Williams) the damage is as great as before & in the same places. there being no wastes or wastes weirs to vent the water."

"On the George Town level there is one breach and a good deal of tow path cut down."

[194] James M. Coale, President, Frederick, to W. S. Elgin, Superintendent, Harper's Ferry, 27 November 1847 (Flood-November 1847)

"Your letter of the 25th only reached me this evening. I had a strong foreboding of damages to the Canal from the freshet of Wednesday morning but scarcely anticipated so serious a result as your letter indicates. I wish you after a proper examination, to let me know what sum of money it will be necessary to receive to restore the navigation on your division & in what length of time it may be done with an extra force. Also give me your views as to whether, in view of the near approach of winter you consider it advisable to employ an extra force for the repairs and whether they may not be done with the ordinary force & if so in what time. Answer me as soon as you are able."

[194] James M. Coale, President, Frederick, to John Lambie, Superintendent, Georgetown, 27 November 1847 (Flood-November 1847)

"The freshet of Wednesday morning has done Much damage to the Canal on the 2d & 3d Division. I hope it has not affected your division. If it has let me know to what extent or what sum of money will be required to make the repairs & in what time they could be finished. Also let me know what amount of money you now have in hand unexpended. An early answer is desired."

[190] W. S. Elgin, Superintendent, Point of Rocks, to James M. Coale, President, Frederick, 29 November 1847 (Flood-November 1847)

". . . it will take some 20 days to restore the navigation, & at a cost of about \$6,000. The Damage from Dam No. 3 to 4 is much Heavier than the Oct. Freshet from Dam 2 to 3 They will not be over one fourth or fifth as much as they were in Oct. and that is one the Level between Locks No 24 & 25 The Damages at Dam 4 is a fourth greater than in Oct. This is and has been a Troublesom Portion portion of Canal.; and must continue to be so unless there can [be] something done to guard against it."

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 29 November 1847 (Flood-November 1847)

Stone reports it will cost \$2,000 to restore navigation and he should be able to do so by January if he is given the authority to proceed. He thinks that it should be done before the spring, because spring flooding in his opinion does more damage than at any other time of the year. Stone thinks he can raise the repair money by pledging tolls at Hancock and

Williamsport.

[194] James M. Coale, President, Frederick, to John H. Alexander, Baltimore, 29 November 1847 (Flood-November 1847)

"I regret to inform you that in consequence of two heavy freshets in the Potomac, the Canal has Sustained such serious injury as will probably suspend the navigation for 3 or 4 months, and deprive us of any revenue, and that we have been obliged to make considerable loans to repair the damages;"

[207] William H. Bryan, Collector, Georgetown, to Charles B. Fisk, Chief Engineer, Frederick, 29 November 1847 (Flood-November 1847)

"On Mondy last I went up to the 15th Section & was there thro' the rain & the freshet that followed I was very fearful it would break into the Pond again & destroy the work already done. The new outer gates of the waste were put in after nights on Wednesday, (as the water was raising), & in an unfinished state. If the old gates had been replaced we should have had a large breach thro' our new work, as the river was high enough & high long enough to overrun the pool & new work below. But from Baretts Lock up to No 29 (Collins upper Lock) all is safe as before the rain."

"Mr Lambie was at Seneca on Saturday but could not then tell if any injury had been done to the work lately repaired . . . The river first came in above it & ran out over it. The bank at Field's was in the mean time raised (& [illegible]) the waste near there, in part made, being cut to take off the water."

"The breach at Fishers is worse than before. As well as the one above Collins. The damage below Fishers is quite as bad, if not worse than before."

"Below Baretts I think it is not quite as bad, tho' at the point where your horse fell with you (below the Culvert) there is a small breach. Here it should have been Cut. The damage above Wilburns is a good deal worse than before. That below him, about the same."

"The breach below Wilburns, & above the Magazine over the little Culvert, is worse than before, it being cut out nearly square & plump at both ends. 2 feet below B. & 50 ft. long = 500 yds"

"The South Abut' of the bridge at Mutts is gone & the damage at & above the bridge is about the same as before, tho' just below it it is not as bad."

"The new repair at the Chain Bridge escaped, Atchinson having cut the Bank above it, opposite the quarries where there has been a large quantity of surplus material thrown over. This surplus bank will be used in the repair, until it gets high enough to boat earth."

"I do not see any reason why the water should not be in throughout the 1st division on Monday next -- 6 Decr."

"The Exchange Bank of Alexandria have declined to discount the Company's note as promised to you. It is a picayune affair make the best of it."

"The breach at the 15th Section will be finished with the rest. Without the freshet it would not have been ready by or on the 1 Dec."

[207] John Lambie, Superintendent, Georgetown, to Charles B. Fisk, Chief Engineer, Cumberland, 29 November 1847 (Flood-November 1847, Widewater-Sustainability)

"The freshet has done considerable damage on this division. A breach on the Georgetown level near ONeals Clark Smiths Shop. The Abutment on the towpath side at Mutts gone and the breach there worse than it was before. The One that was repaired above Dellziles gone out, the towpath below Wilburns washed, the one above Wilburns worse than it was before and the puddling gone off the Culvert. A small one below Cabin John Culvert, and two below Barrett. The breach above the falls worse then before and much worse below Fishers the level between Fishers and Fields about the same."

"When I left Seneca the Water was over that level but I think there is not much damage done there. We could have been through at the logwall by this time, but I had to draw off part of the force to other places"

"We will be ready for the water in eight or ten days. The expenses of the two freshets will reach \$20000."

[194] W. S. Ringgold, Clerk, Frederick, to John G. Stone, Superintendent, Clear Spring, 30 November 1847 (Flood-November 1847)

"The President requests me to say that efforts are making to procure money to repair the damages from the recent freshet, and desires that you will proceed with the repairs. The Supts of the 1 & 2d divisions expect to restore the navigation in about a fortnight."

[190] W. S. Elgin, Superintendent, Point of Rocks, to James M. Coale, President, Frederick, 1 December 1847 (Flood-November 1847)

"from Dam No 2 to 3, I think will be ready by the 11th or 12th . . . above Dam 3 I do not I can get ready before the 20th with good weather which we [k]now not to Expect at this season.

[194] James M. Coale, President, Frederick, to Thomas G. Pratt, Governor of Maryland, 1 December 1847 (Flood-November 1847)

". . . I regret to say that the Canal has suffered severely from the high waters of the present season. The repair of the damages caused by the heavy flood of the 7th October had scarcely been Completed when we were visited by the freshet of the 24th Inst. which again caused much injury. In the straightened circumstances of the Company and the very limited and uncertain character of its resources Calamities of this nature always bring with them care and anxiety to those who have charge of the work and they will continue to do so until the canal is finished."

[190] John Lambie, Superintendent, Lock No. 10, to James M. Coale, President, Frederick, 2 December 1847 (Flood-November 1847, Sustainability-Dams)

Lambie is writing to report that it will cost more than he initially hoped to repair his portion of the canal. He writes, "I hope that the Canal will be navigable by the last of next week, but the wet weather is keeping us back very much. it rained all last night and is raining to day, with every appearance of the Canal being overflowed again."

"The guard bank at the little falls feeder was nearly all washed with the first freshet it will be necessary to repair it as soon as the water is in. so as to protect the Georgetown level. The banks ought to be raised below the great Falls so as to prevent the River getting in there again (the damage done by it getting in there, has cost more then on all the rest of the division) likewise the feeder level at Seneca the damage there has been upwards of \$3,000 the bank ought to be raised. also at the large breach, there ought to be A large quantity of Rock taken out this winter for pretection."

[182] Board of Directors Meeting, 8 December 1847 (Flood Damage-Financing)

"The President stated to the Board, that since the meeting of the Board on the 27th Oct, he had borrowed on behalf of the Company under the resolutions of the 11 Oct., the following sums for repairs of breaches, in addition to the amount of \$16,000 then reported, viz from the

Bank of the Metropolis at 3 mos	\$1000
Fredericktown Branch Bank " 6 "	5000
Farmers & Mechs bank of Georgetown " 6 "	1000
Farmers & Mechs bank of Alex. " 6 "	4000
Exchange Branch Bank " 6 "	2000

making the aggregate amount borrowed under said resolutions of the 11th of October \$29,000 but that at the time when the repairs were nearly completed. another heavy freshet occurred, & further breaches were made requiring as is estimated by the Chief Engineer a further sum of \$10,000 to restore the navigation, whereupon on motion of the following preamble & resolution were adopted."

"Whereas the sum of \$29,000 has been borrowed by the Company under the resolutions of the 11th of October last and applied to the repairs of the damage caused by the Canal by the freshet of October, and Whereas, before the completion of said repairs, some of the breaches that had been in a great degree repaired, have been reopened by the freshet of the latter part of November, and additional loans to the amount of about \$10,000 will be necessary to make and complete said repairs, so as to restore the navigation and it is just & proper that such additional loans shall be place on a footing of equality with the previous loans already made under the resolutions of the 11th of october aforesaid."

"Resolved, That the authority conferred on the President to borrow money by the resolutions of the 11th of October last be and the same is hereby enlarged and extended, so as to authorize and empower him, and he is hereby authorized and empowered, to borrow under said resolutions on behalf of the Company, an additional sum, not exceeding \$10,000 for the purpose of the Canal, & restoring the navigation thereof, and that the [illegible] amount borrowed, be applied to said purpose by requisition to the several Superintendents as the President may deem expedient."

[190] W. S. Elgin, Superintendent, Point of Rocks, to James M. Coale, President, Frederick, 8 December 1847 (Flood-November 1847)

"I have arranged as I informed you I should as so as to have this portion from Dam No 3 to Seneca ready to restore the navigation by the close of the present week; the Portion from Dam 3 to 4; I am doing all I can with the Present forces to get it ready, the Last wek was such that we could do little or nothing; in consequence of the weather this has been a fine week so far & we are getting on pretty well; with the Exception of Dam No 4; whereas the damages is much worse than have ever seen there; It will take a Large force of at Least \$300 per day to get the watter in at this point before the 25th of the Present month; all with the Exception of this point will be ready this week or nearly so. . . .

Dam No 4; I would respectfully recommend you, If there is any possible way in which you can obtain means to have that guard bank be put out of reach of High Water; If this was done the Expences on this portion of the canal would not be one fourth from the highest freshets we have had; and unless this is done we may Expect to incur the same in the spring from a high rise as the whole of the repair will be green and not sufficient to resist a freshet in the river."

[190] John Lambie, Superintendent, Georgetown, to James M. Coale, President, Frederick, 10 December 1847 (Flood-November 1847)

"The repairs are so far done, that I am having the water let in. Boats will get here about monday evening." Lambie asks for money to pay off his men.

[190] John G. Stone, Superintendent, to L. J. Brengle, Treasurer, Frederick, 19 December 1847 (Flood-November 1847)

Trying get the treasurer to give him money to pay his men before Christmas. He also indicates, "I will let the water in at Dam No. 5 tomorrow and will have the rest of the division ready in a week or 10 days. I think we can pass [a] few boats this winter between Hancock and Williamsport."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to James M. Coale, President, Frederick, 23 December 1847 (Flood-November 1847)

Elgin's letter is basically a desperate request for money, as much of Elgin's workers have left him because of inclement weather, the upcoming Christmas holiday, and, most importantly, non-payment of wages. There is navigation taking place he reports between Dam No. 3 and Georgetown. Note: Elgin wrote again on Christmas Day, indicating he had received the money he asked for, but that the men had already left.

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, 23 December 1847 (Flood-November 1847)

"The Last rise have done much damages at this point and I fear much more before it can be stoped; instead of the Broad Run Culvert having failed as I informed you, it was the Culvert opposite Mrs. Wheelers farm near the 33 mile post about 1/3 [?] taking out, it has been Temporarily repaired and the Boats have done on Last Friday, so the Canal from Geo Town to Dam No 3 may be said navigable on that day . . ."

[190] John G. Stone, Superintendent, to W. S. Ringgold, Clerk, Frederick, 27 December 1847 (Flood-November 1847)

Stone writes to say that he did not get enough money to pay off his men and that he needed \$600 more to do so.

[194] James M. Coale, President, Frederick, to Samuel P. Smith, Cumberland, 27 December 1847 (Flood-November 1847)

"The slow progress of the repairs at Dam No 4 has been caused by the unusually wet & snowy weather. Elgin writes that for the first fortnight of this month or indeed until a few days before the holidays it was impossible to work at the breach with Carts & horses. The arrival of freezing weather renders the suspension not so important but still I wish the repairs to be Completed as soon as possible also the guard Bank raised to keep out the Spring freshets."

[194] James M. Coale, President, Frederick, to W. S. Elgin, Superintendent, Harper's Ferry, 30 December 1847 (Flood-November 1847)

"The present thaw & prospects of moderate weather render it important to have the repairs Completed on your division as early as practical, so as to afford dealers on the upper part of the line an opportunity to take down their flour & other produce."

"Sent you some funds last week & you will be provided with more so soon as arrangements which are now maturing are completed."

"Write & let me know how soon the water can be admitted to your division. Also inform me if the navigation is now open from Harpers ferry down. Believe it was interrupted by ice on Monday last."

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[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 4 January 1848 (Flood-November 1847)

Stone reports he will commence putting water into the canal at Dam No. 5 that evening and on Jan. 6 at Dam No. 6.

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 4 January 1848 (Flood-November 1847)

Stone reports that he will not be able to fill the canal at Dam No. 5 as he hoped because of leaks in the canal. He also indicates further labor problems because he was not able to pay off his men in full, and he will need their help to fix the leaks. Stone asks Coale for more money.

[190] John Lambie, Superintendent, Lock No. 10, to James M. Coale, President, Frederick, 10 January 1848 (Sustainability-Embankments)

Lambie reports the need for funds to hire extra men to help to fully restore the condition of the canal, especially to raise the banks to prevent overflows from the canal and the river.

[182] Board of Directors Meeting, 12 January 1848 (Flood Damage-Financing)

"The President stated to the Board that in pursuance of the resolution passed on the 8th of Dec. last he had borrowed on behalf of the Company for the further repairs of Breaches on the Canal the following additional sums viz from the

Farms & Mechs Bank of Mo. Co. at 3 Mo	\$2000
Farms Bank of [illegible] at Alex. ' 6 '	1000
Bank of the Metropolis Washington ' 3 '	1500
Hagerstown Bank ' 6 '	3000
Farms & Mechs Bank of Georgetown ' 6 '	1000

Making with the sum of \$29,000 heretofore reported the sum of \$37,500, which had been applied to the repairs, and that from Harpers Ferry down to the third division also, the navigation had again been restored."

[207] John Lambie, Superintendent, Lock No. 10, to Charles B. Fisk, Chief Engineer, Cumberland, 17 January 1848 (Flood Damage Prevention-Proposed, Sustainability-Towpath, Sustainability-Waste Weirs, Widewater-Sustainability)

Lambie reports that waste weirs are "badly wanted" on his division. He continues, "You know how the guard bank at Smiths is. The towpath between Wilburns and the Culvert wants raising. The front of the Towpath want spalling at the Logwall, also protection at the back. The level between Brewers and Houser is to low."

[194] James M. Coale, President, Frederick, to Samuel Sprigg, Governor of Maryland, Annapolis, 24 January 1848 (Renovation-1849-51)

"You enquire, 'what sum wd be necessary to make the weak parts of the finished Canal safe & permanent, & place them beyond the power of future freshets.'"

"The sum that wd be required to place the Canal 'beyond the power of future freshets' it is impossible to indicate. We thought the freshet of Sept 1843 the highest that could occur but the last Oct freshet was in this region two feet higher than that. It swept away millions of property along the Ohio [illegible] more injury to the Pennsylvania improvement than to ours. To guard entirely against injury from such a flood and in view of the location of our Canal be an unattainable hope. But by making certain repairs & improvements on the line the Canal could be made safe against ordinary freshets & wou be comparatively safe from such heavy floods as have been mentioned. In Nov 1845 an interrogatory was put to the Chief Engr as to the cost of putting the finished portion of the Canal between Dam No 6 & Georgetown in thorough repair including raising the towpath above freshets repairing lock gates &c &c"

"His estimate which contemplated the putting of the Canal in complete order for six feet water was briefly as follows

Dam No 1, 2, 3, 4, 5 & 6 estimated to require repair & improvement amt.		
	\$27,000	
To raise 15 miles of towpath above freshets	30,000	
Protecting 21 " [miles?] of do [towpath] against freshets, the great cost of raising same above forbedding [?]	25,000	
Rebuilding & repairing culverts		6000
Guarding against loss of water at Limestone sinks to secure 6 feet of water at all times, repairing some Culvert foundations & repairing Tyber [?] lock		73,000
Waste weirs new & repairs		5000
Flumes at some of the locks		5000
Cast Iron for wooden frames at some of the Lockgates	3000	
Renewal of Lock gates		2000
Channel of Rock Creek at the Basin		15000
Renewal of certain bridges	<u>3000</u>	
		\$194,000"

"The estimate for repairs & improvements was in view of the Completion of the Canal, the introduction of six feet of water in the Channel & a full trade & contemplated various changes in the original construction of works particularly the slopes of some the dams &c. It does not contemplate an outlay of the whole sum at once. The Chief Engr thought about \$75,000 might be judiciously expended without interruption to the navigation before the Canal was completed, & the residue afterwards when the revenues wd be adequate to supply the necessary means further required. We have made some few of the repairs & improvements

indicated in this estimate, expending all the money we could from time to time apply to those purposes from our limited means & resources, but the damage done by the late freshets will certainly not lower the amt demanded to accomplish the object embraced in the design of said estimate."

"I do not however understand your enquiry as having this extent & altho it wd. be difficult to say with accuracy without a measurement by the Engr what sum wd now be required to raise the banks to a sufficient height &c yet I wd venture to ascertain that with present aid to the amt. of \$100,000 or perhaps 75,000\$ we could make the Canal safe for the regular trade with the usual depth of water & Gvn further aid that Such sum at this time wd greatly conduce the interest of the Company & all concerned in the navigation of the Canal."

"I have for some time past been meditating an appeal to the Legislature for the means to put the Canal in complete order in view of the early completion of the work to Cumbd & to secure it for ordinary trade from the frequent & much regretted interruption to the navigation occasioned by breaches from the river freshets, but of this you instrumentaly it can be obtained, & I think the application might well be put & enforced by the State Agnts you wd render the Service an immense benefit & we shd be relieved of a world of anxiety."

"In case it be impractiable to obtain of that amt. in raising & strengthening the banks, making waste weirs, repairing locks & culverts & executing similar repairs w [?] are most required wd be of incalculable service at this time. During the past year from 1 Jy to 8 October when the heavy freshet occurred we took in nearly as much toll as the whole of any former year & had it not been for the disastrous floods of Oct. Nov & Dec. our revenue would probably have exceeded former years by the sum of \$20,000. A large portion of the produce however which wd have contributed that excess either has since or must still pass down the Canal but the interruption & delay occasioned by the breaches has doubtless caused much discontent in the past of the traders who scarcely pause to reflect that the Comp. has no control over the power of the water & that probably no repair that could be previously made even if we had had the means to do all that we wanted, would have secured the Canal from some damages by the floods of the past season. Every where the [illegible] over & trod down the work of man & the Penn. or Juanita Canal is not yet repaired & will not be opened for navigation in consequence of the damage done to it, before the month of April probably."

"The managers of that improvement also have means without limit at command. We to obtain them had to exert the utmost efforts. When the water in Oct were up I understand the Traders on the line actually were tempted [?] to give up in despair & think that the whole Canal was swept away & irredeemably injured knowing as they did how difficult wd be the task of obtaining the means to repair it. We however succeeded & the aid of the Banks to raise money enough to enable us to restore the navigation but still much remains to be done to secure the Canal from the probable Spring freshets & as further loans from Banks can hardly be repaid, the Legislature ought under the circumstances to afford the necessary aid & I hope they will do so. It is a matter of great importance & wd be an immense help if the Legislature wd advance or loan to the Compy. the sum necessary to put the Canal in complete order. Breaches then wd seldom occur, our trade wd be regular, our revenues augmented, & general sastisfaction would prevail among those who carry their produce to market by way of the Canal."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to James M. Coale, President, Frederick, 28 January 1848 (Flood-November 1847)

"The repairs of the Breach at Seneca have been completed one week, to day, therefore the navigation from Dam No 3 to Geo Town, have been restored; and Boats running between these two points; The work at Dam No 4 is progressing as rapidly as the cirmcumstance will admit . . . If I can maintain the Present forces at Dam #4 & the weather holds favourable; I am of the opinion I shall have it ready for water by the middle of the first week of Feby." He asks for money to pay his laborers and keep their services.

[182] Board of Directors Meeting, 2 February 1848 (Flood-October 1847, Flood-November 1847, Flood Damage-Financing)

"The President stated to the Board that the repairs on the Canal rendered necessary from the heavy floods of Oct & Nov. [1847] had so far progressed that the Supt. expected the navigation to be restored on the entire length of the Canal in the ensuing week but that to avoid as far as practicable further breaches, and to put the Canal in good navigable condition, it was desirable to obtain further pecuniary aid."

"Whereupon, On motion it was, Resolved, That application be made to the Banks at Williamsport & Hagerstown and also the Banks at Georgetown & Alexandria for further loans for the purpose of raising the embankments and strengthening & securing the Canal as far as practicable, and that the tolls & revenue of the Company be and they are hereby pledged for the payment of such loans & the interest to accrue thereon, subject only to the pledges of the same heretofore made for loans obtained under the resolutions of the Board, passed on the 11th of Octo & 8th of Dec. 1847."

[194] James M. Coale, President, Frederick, to John Van Lear, Cashier, [Washington County Bank], Williamsport, 11 February 1848 (Flood Damage-Financing)



Coale asks Van Lear for a loan of \$2500 to \$3000 for the purpose raising the embankments "at Dam No 4 & at some other low points on the line before the season of the Spring freshets . . ."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to James M. Coale, President, Frederick, 7 February 1848 (Flood-November 1847)

Elgin reports the embankment on Dam No. 4 has been completed, but it will be necessary to "get all the mud and sand out of the Feeder" which would take a few more days to complete and he still had to get started on the guard bank. Delays were being caused by bad weather and the usual problems keeping his labor force, which was three months behind in being paid.

[190] W. S. Elgin, Superintendent, Harper's Ferry, to James M. Coale, President, Frederick, 17 February 1848 (Flood-November 1847)

Elgin reports the restoration of navigation on his portion of the canal and requests funds to pay off his workers.

[190] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, Frederick, 1 March 1848 (Maintenance-General, Maintenance-Dredging)

"This Division [the third] of the Canal is all in such bad condition, that it is difficult to say which part should be repaired first. it will require a strong force to be kept at work on each of the 3 subdivisions to keep the Canal navigable."

"I suppose an expenditure of about \$2000 per month through the summer will restore the Banks to what they were before the late Freshets, stop leaks and protect the wastes as they should be protected."

"We are now able to pass loaded boats, but have some bars that must be taken out as soon as the weather gets mild enough to work with the mud machine. There is one point, on the 4 mile level below Williamsport that I expect will cause some trouble, the water leaks through the old bank and there is no way to stop the leaks but to draw off the water and remove the towpath or change the location. it is at the 90 mile point where the Company have already expended more for repairs of breaches than it would cost to make a new Canal, and yet the change of location must be made before this level will bear a full head of water. We have put new Gates in Locks No. 41, 42, 43, 44 and Guard Lock No. 5, next week we will have new ones in Lock 46, Locks No. 51 & 52 must have new Gates as soon as possible, the ones cannot be depended upon to last a week."

[190] John Lambie, Superintendent, Georgetown, to James M. Coale, President, Frederick, 2 March 1848 (Flood-October 1847, Sustainability-Lockhouses)

"The Lock House at Lock No. 6 was considerably injured by the high water last Oct. The same building was repaired at considerable expense after the high water of Sept. 43. I believe it will be better to build one on the berm side of the Lock, then to repair the old one, as it will be in danger from every high water. Something ought to be done to it soon as

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, Frederick, 7 March 1848 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Yours of the 3rd Inst. I find on my return Last Evening; asking my opinion as to the cost of putting the Guard Bank &c out of danger of high water &c at Dam No 4. I have not had the time to form any Estimate of the work; necessary to be done to make this portion of the canal safe against the Highest Freshet; But at a rough Guess I think it will require about \$7,000, to raise the Embankment, Guard Lock & abutment of the Dam, which it will require about 6 feet the whole way to put it 2 feet above the Freshet of Oct. Last I am now preparing to commence the raising of this Guard Bank; we have not yet repaired the Damages done at this place by the last freshet although I have had a Large force Employed the whole winter on these repairs. I have at this time at Dam No. 4, 52 Horses & Carts at work; this work by all means ought to be done and had it be done sooner, would have saved by this time probable double its cost, you ask, d me to give you my opinion respecting the repairs at Edwards Ferry; to prevent the heavy damages on that Levell, from similar freshets. I have not particularly exam'd this or made any measurements so as to form any thing like an Estimate, there is much to be done on the line to prevent Heavy damages, from similar Freshets many of the culverts must have immediate attention"

[190] John Lambie, Superintendent, Georgetown, to W. S. Ringgold, Clerk, President, Frederick, 16 March 1848 (Sustainability-Dams)

"As respects to the Basin here. I had been waiting for some time for low tide so that I could examine the Dam [No. 1 presumably], and had the water off for that purpose when I recd your letter of the 13th. We have repaired it A little, which I am in hopes will do some good, but to do it right will require nearly a new Dam."

[194] James M. Coale, President, Frederick, to George Schley, Hagerstown Bank, Hagerstown, 28 March 1848 (Sustainability-Dams, Flood Damage Prevention-Financing)

Coale, having failed to secure the loan to finance raising the embankment at Dam No. 4, made application to Schley in Hagerstown. He indicates he has already tried to raise the money in Washington and Alexandria, besides his efforts with Van Lear in Williamsport. He warns, "If we do not obtain loans and that immediately the further prosecution of the work of raising the embankment &c at Dam No. 4 will have to be suspended at once. This is a matter in which all the people of Washington County have an interest in common with this Company & I hope the Bank in your place will aid. Any amount over 2500 or 3000 would help and the larger its (within reasonable limit) the more effectually will it serve us."

[207] William H. Bryan, Collector, Georgetown, to John Lambie, Superintendent, 3 April 1848 (Flood Damage Prevention-Proposed)

"From the best information I can get, I make the heights of the Oct' 47 freshet (taking the Coping of Mitz Lock at 7) as follows.

At Mitz' Lock	8 1/2 feet	or 16 1/2	for Lower Level
Feeder	9 1/2 '	' 17 1/2	
Detzells	17.7	'	' "

"For making the Guard Bank to protect the Feeder Level (including that above Metz) I estimate two or three plans viz"

"1s Guard bank from Detzells to a point on the Towpath (mark A) at the ends of the old cross bank to Guard Gate, thence to Gd Gate, & then down to Feeder bridge."

"2d As above down to (A), thence down 175 feet to (B) a point selected by Mr Fisk for the commencement of a new Bank from the Towpth to Guard gate, &c"

"3d Dispensing with guard bank from Detzells to point (B). Make the Bank from GdGate to (B) thence to Metz, & thence to the hill."

"Each of the above, requires the enlargement of the Guard Bank from Gd gate to Feeder bridge."

"4th Removing the Gd. Gate from its present site to one opposite Metz Lock, then dispense with all Guard Bank above it, raise Level of Metz (as in No 3) & Bank to the hill. This latter would reduce the banks necessary to protection into a smaller space."

"5th Raising of the Towpath below the feeder bridge; this last is common to all the plans proposed."

[182] Board of Directors Meeting, 11 April 1848 (Flood Damage Prevention-Financing)

"The President stated to the Board that application for additional loans to put the Canal in good order in a secure condition against future freshets, had been made in conformity with the resolutions of the 2nd Feby. last, but without success."

[180] Twentieth Annual Report, 5 June 1848 (Flood-October 1847, Flood-November 1847, Flood-December 1847, Flood Damage Prevention-Financing, Renovation-1849-51)

The C&O President, J. M. Coale, reported that the company had hoped to increase their toll revenues for 1847-48, but "we were however disappointed in consequence of the extraordinary floods of the last quarter beginning on the 8th of October and repeated in Nov. and December with intervals barely affording time sufficient to restore the navigation interrupted by the breaches which they produced. . . . [The floods] were of such magnitude and extent that the works of internal improvements of every description, Railroad as well as Canals, in this state and in the states of Pennsylvania Virginia & Ohio all in a great or less degree sustained injury and though the Chesapeake & Ohio Canal probably suffered as little in proportion to its length and sooner resumed operations than the other great canals which were effected by the inundation, the damage done to it at two or three points was considerable."

"With the aid of temporary loans obtained from the banks vigorous measures were immediately adopted to repair the breaches and by the middle of December the Canal was sufficiently open for Boats to pass down from Harpers ferry. On the 15th of February the navigation was restored, throughout the entire line and has continued without interruption to the present time. . . . The Board having on several former occasions adverted to the improvements required on the finished portion of the canal, and the stockholders being fully aware of their continued importance and the caused of their postponement, we deem it unnecessary to dwell again on the subject in this place. . . . As the completion of the Canal to Cumberland is now, we believe, generally understood to be reduced to a certainty, renewed efforts will be made to obtain the necessary funds to make some other improvements, which though not of such indispensable obligation are if possible of more importance in view of the security of the Canal and the maintenance of the navigation."

"In Conformity with the recommendations of the last annual meeting of the Stockholders, the Board on the first day of July last passed an order placing the entire finished portion of the Canal under the immediate Superintendence of the Chief Engineer with such powers and authority as in their opinion were under existing circumstances best calculated to insure an exact discharge of duty on the part of subordinates. The very limited and precarious resources of the Company however under existing circumstances afford but little scope for the exercise of the most important functions with which he was invested. After the Canal is finished and the requisite means to carry it into full effect the system of management thus adopted with modifications may prove highly salutary in all respects."

[180] Memorial of Citizens of Washington, Georgetown, and Alexandria, 17 June 1848, Appendix to the Report of the Committee on the Twentieth Annual Report, dated 2 August 1848 (Flood Damage Prevention-Proposed, Renovation-1849-51)

The memorial expresses the concern with poor condition of the existing portion of the canal between Georgetown and Dam No. 6 and the low water level (3 1/2 feet) that has made passage on the canal difficult. The memorial requested "that a special Committee of you the Stockholders be appointed as early as possible for the purpose of personally inquiring into the present dangerous condition of the work below Dam No 6 and we are of the opinion that if such a Committee is appointed & enters at once upon its duties with spirit, energy & determination proportionate to the interest there is at stake, & proper measures are adopted without delay, the necessary means, may be raised among ourselves & other interested parties to forthwith place the Canal between Georgetown & Dam No 6, in a permanently substantial & profitable condition."

Instead of accepting the memorial's recommendation for a special committee of stockholders to assess the condition of the canal, the stockholders instead accepted an amendment. The heart of the amendment stated, "Resolved, That the memorial be referred to the President, Director, with instructions to proceed forthwith to borrow a sufficient amount to place the finished portion of the Canal in complete repair, from the Signers to this memorial and any other person or persons, and to report the result of the negotiations to the Stockholders in the 10th day of October next." Note: there was no report on the 10th of October because there were not enough stockholders present to form a quorum.

[194] James M. Coale, President, Frederick, to John Van Lear, Cashier, Washington County Bank, Williamsport, 11 July 1848 (Flood Damage Prevention-Financing, Renovation-1849-51, Sustainability-Dams)

"Although much has been done to improve & strengthen the Canal at Dam No 4 yet the importance of raising the embankment as far as the guard lock is duly appreciated & it is a source of regret, that the Company was for want of means arrested in its efforts to complete this design."

"Having been unable in consequence of the tightness of the Banks, to obtain further loans in the Spring, the hands we had at the work left. The work however is now stronger than it was previous to the last fall freshet, & we must endeavour [illegible] to put a force upon it to do whatever work [?] may be required to render it as safe as human foresight & all the means we can command will enable us."

"The matter of most pressing importance at present is the cleaning out the Canal to guard against a drought to maintain the navigation for the heavy fall trade that is expected."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to James M. Coale, President, Frederick, 24 July 1848 (Flood Damage Prevention-Financing, Renovation-1849-51, Sustainability-Dams)

"I shall turn in a small force at the abutment of Dam No 4, to have it put up to the intended height, also the cross Guard Bank so If there should be freshet in the River this work done If the means at your Disposal will Enable the remainder of this work to be done. I should like to make this Point entirely safe against Damage from the Freshets of the river; this may be done in three or four months; by a Division of the cost; But there cannot any thing be done at this place without cash as the most of amts due and in arrear on this Division are to persons in this neighborhood; There is also some culverts on this Division, which must be repaired; Therefore I will put a force at each of them, to repair them, and hope it will meet with your approbation, and If in your Power to furnish me with some means to do these repairs, you will do so, as demands for Labor is great at this time, and commands the cash & I cannot expect to command it unless I am able also to pay cash;"

[190] John Lambie, Superintendent, Georgetown, to James M. Coale, President, Frederick, 24 July 1848 (Flood Damage Prevention-Proposed, Maintenance-General, Widewater-Sustainability)

"I answer to that part of your letter of the 11th Inst by which you require me as soon as I readmit the water, to let you know the state of my division."

"I have to state that the part of the Canal and Basin in Washington is nearly half filled up. The Dam is also nearly gone, and will have to be renewed soon. There has been less destruction to the navigation there this season than last but boats drawing more than 3 feet water cannot get through it. There is no bridge over the canal at the street below the basin, the one at Capt. Easley is good, the one over Lock B will have to be renewed soon. some of the Locks here will require new gates before long, and the Bridge by the Markethouse ought to have a new floor this fall. the rest of the Bridges in Town are all good. The level above Town requires the bank at the upper end to be raised to keep the river out, also A new Dam, the feeder widened and A few bars removed before there can be 6 feet water put in. At Lock No. 6 there will have to be one pair of new gates put in this fall, and A Lockhouse built, the foundation of which was put in since the water was drawn off. The level between there and No. 7 will require some bars removed before that 6 feet water can be had. there ought also to be A long water on this level and the banks raised from the waste to the lower end of it. the level above Lock No. 7 will require the same as the one below it with the addition of A waste weir. Cabin John Culvert will have to be repaired. I was prevented from doing so when the water was [illegible] by the river getting to high. the gates of the 7 Locks will all do for some time with the exception of No 14. there will have to be one pair of new ones put there this fall. Rock run Culvert wants repairing which ought to be done this season. The level between No. 14 and the great falls will require some clearing out, and the banks raised at some points before A depth of 6 feet water can be had. At the Logwall where the big breach was last fall the Towpath was made farther from the river. it requires some rock to be taken out for protection, and to give the Canal the proper width. The road Culvert near the 10 mile stone is giving way and will have to be repaired soon. The banks at the upper end of the level ought to be raised so as to prevent the river ever getting in again. there ought also to be one or two wastes made on it. The embankment that was washed from Lock No 15 & 16 last fall has not all been replaced. the other Locks at the falls will do for some time, with some slight repairs to the wood work. The level above the falls will require some bars removed before 6 feet water can be had. There ought also to be A long waste made on it. Lock No. 21 will require one pair of new gates this season. The level above it will require the same as the one below it, and the towpath raised from the waste down to the Lock. The feeder level will require the same as the others, and ought also to have the banks at the upper end raised high enough to keep the river out. The Guard lock will require one pair of new gates this season, and the Dam has several breaches in it. Muddy branch and some of the other Culverts wants some slight repairs. Several of the Lockhouses wants repairing badly, particularly the one at Rushville [?] it will be necessary to do something to them soon to prevent them from rotting down. Most of the valves in the flues at the upper end of the Locks are nearly worn out, and are continually wanting repairs. it has long been contemplated to replace them with new ones and A cast frame. I have had a few cast and had them put in since the water has been off. Before the Canal is finished to Cumberland it will be necessary to make flumes at some of the Locks where the water has to be passed through the Locks now to supply the Canal below I think that it is of the utmost importance to the safety of the Canal to make long wastes near the lower end of 5 of the levels on this division, and to raise the banks from the waste down to the Locks. if that were done breaches from high water would be intirely prevents on all the levels exept 3 (viz) the Geo Town. the one below greatfalls and the feeder level at Seneca, the banks ought to be raised so as to keep the river out of them. . . . You will have seen by the foregoing that this division is in bad order, but on the whole I do not know that it any worse than it was eighteen months ago. in what I have wrote I have had in view making it safe from high water, and to having 6 feet water in the Canal."

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 29 July 1848 (Flood Damage Prevention-Proposed)

"This Division of the Canal is now navigable again, the banks are all in good order except when they were injured by the freshets of last year."

"it is very desirable that the banks should be protected before an other freshet, if not the damage must be as it has always been. I will not, with our present force, be able to do anything but attend to the leaks and keep the canal in its present condition."

"Until we do have an other freshet, I think we will be able to keep the Canal in as good navigable order as it ever has been."

[182] Board of Directors Meeting, 3 August 1848 (Flood Damage Prevention-Proposed, Renovation-1849-51)

"The Clerk with other proceedings, communicated to the Board, a Memorial numerously

signed. which had been presented to the Stockholders meeting in regard to the present condition of the finished portion of the Canal & the necessity of repairs and improvement thereon, with a view to its Security & the introduction of a greater depth of water, and expressing a willingness on the part of the signers thereto to constitute with other parties interested 'the necessary means to place the Canal between Georgetown & Dam No 6 in a permanently substantial & profitable condition'; also a resolution of the Stockholders referring said memorial to the Board & President & Directors with instructions to make application to the signers thereto &c."

"The said memorial & resolution having been considered on motion it was, Resolved, That application be made to the signers to the memorial presented to the stockholders in adjourned general meeting assembled in the City of Baltimore on the 2d day of August (Inst.) and by said meeting referred to this Board, with a view of ascertaining from them the sum or sums of money they will respectively loan and advance to this Company for the purpose of putting 'the Canal between Georgetown and Dam No 6 in a permanently substantial and profitable condition'"

[190] John Lambie, Superintendent, Georgetown, to James M. Coale, President, Frederick, 28 August 1848 (Maintenance-Dams)

"I had the water drawn off the part of the Canal that is in Washington last night, to do some repairs to the Dam at the Basin in Rock creek. I find that it has given way very much since I had the water off for the same purpose only a few weeks ago, so much that I have to plank up the opening of the waste, thereby preventing water being drawn in case of high water in the Creek, it is the only means that I have of keeping the water high enough in the level."

"It is necessary that something should be done, as the Dam cannot stand long, and it would be A serious obstruction if it was to wash out, as nearly all the building stone used in Washington passes through [that] part of the Canal. The Basin seems to have been badly placed at first, and unless there is A change made in the location the Dam will have to be rebuilt."

[182] Board of Directors Meeting, 14 September 1848 (Flood Damage Prevention-Proposed, Renovation-1849-51)

"The President stated to the Board that soon after the adjournment of the last meeting, to wit: on the 8th of August & again on the 26th of the month he had addressed a letter to the Chief Engineer requesting an estimate of the amount of money that would be required to put the Canal in thorough repair, in order that immediate steps might be taken to carry in effect the resolution of the Stockholders in regard to raising of means for that purpose, but that owing to unavoidable difficulties the Chief Eng. had been unable to receive those letters until the 30th of the month and consequently had not yet had time to provide the information desired, on motion it was, Resolved, That the Canal and the works connected therewith, be carefully examined under the directions of the Chief Engineer from Dam No 6 to the Eastern terminus, and that a report be made to the Board of the cost of necessary repairs and of clearing out and excavating the Canal to a requisite depth."

[182] Board of Directors Meeting, 21 November 1848 (Study-Floods-C&O Canal Company)

"The President & two Directors above mentioned [William A. Bradley and Samuel P. Smith], together with the Chief Engineer, Treasurer & Superintendents of the 1st & 2d Divisions, after a part of them had passed on foot along the Canal from Lock B in Washington to the Market house Bridge in Georgetown, entered the boat prepared for the purpose at that point, and proceeded up the Canal on their tour of examination. On the first day they went as far as the Rushville House a distance of 24 miles which being the end of the first Division the further attendance of the Superintendent of said Division was there dispensed with."

[182] Board of Directors Meeting, 8 December 1848 (Study-Floods-C&O Canal Company, Flood Damage Prevention-Financing, Renovation-1849-51)

"The President stated that in the recent tour of examination up the line, the Canal had been found in good navigable order & condition for the present trade, but that many improvements would be needed for the introductory maintenance of a full depth of water and a regularity of navigation adapted to the coal and other trade that is expected to result from the completion of the Canal to Cumberland. that to effect this object a loan of money was necessary & intimations had been received that there was a probability of obtaining this from Virginia if due application be made. He then presented & read to the Board a memorial to the Legislature of Virginia asking a loan from said State for the purpose of improving and putting in complete repair the finished portion of the Canal from Georgetown to Dam No 6 and after consideration, on motion it was, Ordered, That said memorial be adopted signed by the President & Directors, and placed in charge of the Chief Engineer to be presented to the Legislature of Virginia. Ordered, that any necessary expenses connected with the presentation of said memorial be paid from the Contingent fund."

"The President stated to the Board that he is informed by the Chief Engineer that for the purpose of enabling him to make a survey and estimate of the amount required for the repair of the Canal from Georgetown to Dam No 6 a party under his direction will be required, and that he requests that W. H. Bryan Coll. at Georgetown should be allowed to act as his assistant on said service. On motion it was, Resolved, That the Chief Engr be authorized to avail himself of the assistance of Wm H Bryan, & employ such party as may be required for said service, and that the expenses of such party be paid from time to time by reqs. issued by the Chief Engineer, to be accounted for by him with payment of the same."

1849

[190] Charles B. Fisk, Chief Engineer, Cumberland, to C. J. Faulkner, 18 January 1849 (Flood Damage Prevention-Financing, Renovation-1849-51)

Faulkner was evidently a Virginia legislator or government official.

"For several year past, the Canal Company, with a revenue barely sufficient for ordinary repairs, has done little more than keep the canal in a condition to accommodate the existing trade, which is, comparatively, small, and of a character not indispensably requiring the same depth of water in the Canal that is necessary to a large and successful coal business. We have, in consequence, at present, only a 60 or 70 ton instead of a 100 ton navigation. The depth of water necessary to the latter, would subject certain levels of the canal to a greater pressure, than in their present condition, they could safely bear."

"To add to the difficulties with which the Company has had to contend, during this period, there have been (with the last four years), an unusual number of extremely high freshets, that occasioned great and serious injury to some of the works of the canal."

"To strengthen the weak levels referred to, to put in good condition those parts of the canal that have been injured by freshets, and to guard and protect the canal in all time to come against the floods of the Potomac, are the objects now sought to be accomplished. That they can be accomplished at a comparatively small cost, I have no doubt. The trial has been made, and with entire success, to protect the canal against the Potomac, at a few bad points, where great damage was done in 1845 [1843 or 1846?]. These points wholly escaped injury from the freshet of 1847, which was the highest flood we have ever known. The cost of effecting this exemption from damage, at the places referred to, was less than the cost of the repairs at the same places in 1845 [?], and it has been ascertained that the part of the canal, less than one fourth of a mile in length, at which, in 1847, from 1/5 to 1/4 of the entire amount of damage on the whole canal was done, can be made perfectly secure against freshets several feet higher than the one of that year, for a sum less than one fourth the amount of the damage to the part of the Canal and in the year referred to, and I am confident that the money paid for the repair of damages from freshets in the last four years judiciously expended in advance, would have saved the Company at least \$80,000, and reduced the amount of damage done by these freshets to an inconsiderable sum."

"But it must be inferred from what I have said, that our entire canal is in a weak and unsafe condition. On the contrary we have the satisfaction to know that no freshet has yet risen to within several feet of the top level of our banks on the 50 miles of new work now going on to completion above Dam No. 6. That the 27 1/2 miles of old canal, next below Dam No. 6, is but for a short distance ever overflowed, and that usually one half, if not more, of the entire damage done to the canal by floods is confined to a distance of only about 20 miles on the lower part of the line, and the larger portion of this half to but a very few points on these 20 miles, and we have equal satisfaction in finding that in the year of our severest trial from floods, the average cost of keeping the canal per mile per annum does not exceed the average upon some of the northern canals in their years of least expenditure. But although by far the larger portion of the canal sustains little injury from high water, and much the greater part is of sufficient strength to bear the full depth of water, yet so long as small portions are permitted to remain weak and insecure, nearly all the inconvenience are felt by the navigation, that would be if the whole line were in the same imperfect state."

"The work to be done, it will be observed is of two classes. First, that required to enable the canal to bear safely, throughout its entire length, the full depth of six feet of water. Second, that necessary to protect the canal at all points, against the river. The reasons why both, or as much as can be of both these classes of work, should be done before the navigation is extended to Cumberland, are it seems to me, obvious."

"1st Much of the first class of work, strengthening those levels of the canal that will not now bear safely the full depth of water, can only be done during a suspension of the navigation, and with the water out of the canal. A suspension of the navigation will certainly occasion greatly less inconvenience and loss to the business of the canal, and diminution of the revenues of the Company, before than after the canal reaches Cumberland, and the transportation of coal commences."

"2nd The earlier the second class of work protecting the canal against the river, is done, the sooner will the Company be relieved from having occasionally to pay large sums of money out of revenues to repair damages done by high water, and the sooner will there

be an end to the heavy losses always sustained by the Company in the falling off of its revenues, while those repairs are making. True it is, that very high freshets usually occur but seldom and at long intervals, but the experience of the last four years affords evidence that there may be several within a very short period of time."

Fisk also argued that repairing the finished section of the canal would allow the Canal Company eventually to lower tolls, because of the savings in ordinary and extraordinary repair costs. He also pointed out that a newly refurbished canal would allow the company to pass more traffic, collect more tolls, and more easily pay off its bond holders. He estimated that restoring the existing portion of the canal and protecting it against future freshets would cost \$200,000 and take two years (assuming the work was not interrupted by new flooding).

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, Cumberland, 20 January 1849 (Flood-January 1849)

"I have Just return,d this day from Dam No 4 &c The recent rise in the River got over the Towpath Below the Dam & Lock No 40 the Damage probably 200 to 300\$ As the Raising of the Head of Guard Lock No. 4; will take about 112 perch of masonry;"

[182] Board of Directors Meeting, 18 April 1849 (Flood Damage-Financing, Flood Damage Prevention-Financing, Renovation-1849-51)

"The President read to the Board a copy of a circular addressed by him to the several Banks from whom loans has been obtained for repairs of the Canal from the breaches of Oct. & Nov. 1847, asking the assent of said Banks to an arrangement for the payment of said loans within a period of five years; also the several replies of said Banks thereto, and it appearing that the Washington County Bank required (as a condition of the assent to the arrangement) that the funds to be expended in the repairs of the Canal between Dam No 4 & Dam No 6 should be deposited in said Bank, the President was requested to address a letter to said Bank asking that said condition be rescinded as it could not be complied with, without loss & probable embarassment to the Company in carrying the law into effect."

"The Board then took up for consideration the recent act passed by the Legislature of Virginia and the matters relating thereto and after deliberation, on motion the following preamble and resolution were adopted."

"Whereas by the Act passed by the general assembly of Maryland at its December session 1844 [illegible] 281 entitled 'an act to provide for completion of the Chesapeake & Ohio Canal to Cumberland and for other purposes' it is among other things provided 'that the President & Directors of said Company shall from time to time and at all times hereafter have the privilege & authority to use and apply such portion of the revenues and tolls as in their opinion may be necessary to put and keep the said Canal in good condition and repair for transportation, provide the requisite supply of water, and pay the salaries of officers & agents and the current expenses of said Company.'"

"And whereas the present unsafe condition of the Canal below Dam No 6, the want of elevation & strength of its embankments in many places to sustain the requisite depth of water, the accumulation of deposits in its channel, and its great liability to breaches from the river floods, which in past years have proved so an heavy an expense to the Company and so much interrupted the navigation , all combine to render it a matter of the highest importance to the interests of the Company that the said finished portion of the Canal be repaired & put in good condition as early as practicable, particularly in view of the early prospect of completion to Cumberland, when the expected Coal trade will demand the utmost regularity and facility of transportation."

"And whereas the Company being without present means to accomplish the important object, the Legislature of Virginia, for the purpose of enabling it to obtain the same, passed an Act on the 15th day of March 1849, authorizing and directing (on certain conditions in said act specified) the Treasurer of said State to underwrite or endorse the guaranty of said State to Bonds to be issued by this Company to an amount not exceeding \$200,000 the proceeds whereof to be applied only to the repair and improvement of the Canal below Dam No 6, therefore,"

"1st Resolved, That so soon as the Treasurer of Virginia is prepared to underwrite or endorse the guaranty of the state thereon, Bonds be issued by this Company with coupons for half yearly interest attached, to such amount from time to time as may be necessary to put the Canal below Dam No 6 in good condition and repair, not exceeding in the aggregate \$200,000, the said Bonds to be in sums not less than \$100 each, payable on a day or days not later than 1st of January 1870, and bearing interest at the rate of six percent per annum, payable semi-annually, both principal & interest to be payable in the City of Baltimore, and said Bonds shall be dispersed of under the future order of this Board, and the proceeds thereof applied only to the repairs & improvement of the Canal below Dam No 6, pursuant to the provisions of the act passed by the general assembly of Virginia on the 15th day of March 1849."

The 2nd Resolve provides for the procedure of executing the bonds.

The 3rd Resolve provides for the procedure of getting the State of Virginia to endorse the

bonds.

"4th Resolved, That subject to existing priorities, the revenues of the Company are hereby pledged to the payment of the principal and interest of the Bonds that may be issued under the aforegoing resolutions."

"5th Resolved, That the Chief Engineer's statement of the particular repairs to be done below Dam No 6 with his estimate of the cost thereof be submitted to the Board of Public Works for their approval, that a statement of the said repairs and improvements, and the application of the proceeds of said Bonds shall hereafter be made to the said Board of Public Works from time to time whenever, and so often as they shall desire it."

"6th Resolved, That this Company agrees and binds itself to construct an outlet Lock at such point on the Potomac river as may be designated by Commissioners appointed by the County of Loudon under the provisions of the Virginia Act of 20 Feby 1833 and 9 April 1839, by the first day of April 1850 if the Company shall have then the power to apply the requisite amount of its resources to said purpose, and if not, to construct said Lock under the requisition of the Board of Public Works of Virginia, as soon as the Company shall have the requisite means legally applicable to said purpose."

"7th Resolved, That this Board being of opinion that the facilities afforded for the passage of boats into and out of the Canal both at the guard Lock above Dam No 4 and the guard Lock at Dam No 5, with the slackwater navigation leading to each of these points, are sufficient for the accomodation of the trade of Berkeley County the Board of Public Works of Virginia are respectfully requested to release this Company from obligation to construct a Lock opposite to said County of Berkeley as mentioned in said act of Virginia passed on the 15th of March 1849."

The 8th resolve provided for forwarding copies of relevant paper work regarding the company's efforts to repair and improve the canal to the Virginia Department of Public Works.

"The President stated to the Board that for the purpose of making the contemplated repairs on the Canal in case the aid intended by the Virginia act be realized, it would be necessary to have the water withdrawn & the navigation suspended for some time during the current year, whereupon on motion it was, Resolved, That the President & Chief Engr. be authorized to have the water withdrawn from the Canal for the purpose of making the requisite repairs, at such period, & for such duration as may be deemed necessary."

[180] Twenty-First Annual Report, 13 June 1849 (Flood Damage Prevention-Financing, Maintenance-General, Renovation-1849-51)

The C&O Canal president, James M. Coale, reported:

"During the last year the Canal has very fortunately been exempt from those casualties from high water, or river overflow, which in former years, have caused so much injury to its bed and embankments, and entailed upon the Company the heavy extra expenses which with present condition it has been so illy able to provide for. Although there have been high & destructive floods to the North, and the West of us, there has been no rise in the Potomac of sufficient magnitude to produce serious damage to the Canal. The rains, though frequent, have generally been gentle and diffusive, & the winter snows melted so gradually, as to pass away, with natural channel of the river. Only one breach of any consequence occurred during the year, and this, having been on the upper part of the line, did not cause any interruption to the navigation below Dam No 5, nor Sensibly effect out trade."

"The relief from such expenses [for flood damage repair] during the year has enabled the Company to make Several important repairs, which have long been needed, and has also permitted the Superintendents to give more than usual attention to the strengthening of the embankment, and the maintainance of the navigation. Much has been done in Securing the foundations, & materially repairing the following Culverts viz: the Cabin John and Rock Run Culverts below Seneca, a Culvert of 12 feet span on the 29 mile which has been nearly three quarters rebuilt, one of 4 feet span upon the 34th mile. Only [?] 10 feet span on the 51st Mile and only [?] 16 feet span (the Little Catoctin [?]) on the 53rd Mile. in finishing the repairs of the breaches, which occurred in 1847, in renewing Lock gates, making temporary wastes, and in commencing the work necessary to be done when adequate means are obtained to make the Canal Secure at Dam No 4. The most extensive repair however made during the year has been that of the Dam & Waste Weirs at the mouth of Rock Creek which were in a very insecure state at the beginning of the year."

"In November last, the President & Several of the Directors, accompanied by the Chief Engineer & other officers, made a tour of examination up the line of the Canal, carefully inspecting the works, from Georgetown to Hancock. They found the Canal in good navigable condition for the present trade, and were gratified at the repairs made during the year, with the limited means at command apart of which were then in progress. But the principal object they had in view was information by personal observation, in regard to the extent of repairs & improvements that would be required to make the embankments secure against the innundation of the river & to put the finished portion of the Canal in suitable condition for the accommodation of the Coal trade upon the opening of navigation to Cumberland."



Coale indicated that the subject had long been of concern to himself and the Directors of the company. The extent of the repairs necessary to the canal was such that Coale and the Directors had determined that the funds could not be raised from private sources: the Chief Engineer determined \$200,000 would be needed to complete the contemplated repairs and improvements. So instead, the President and Directors decided to petition the state of Virginia for a loan. Instead of loaning them the money, Virginia indicated it would serve as a guarantor of bonds issued by the company, but insisted on the C&O Canal Company agree to a number of conditions before it would do so. Coale grumbled over the conditions in his report, but the most vexing in his opinion was the insistence of the Virginia legislature that the company build an outlet lock opposite Berkeley County by 1852 (see Act of 15 March 1849) to allow river boats access to the canal. Coale and the Directors objected to that condition because the construction of the lock would cost \$30,000-36,000, and further more was unnecessary because there was already sufficient access to the Canal by the citizens of Berkeley County. It planned apply to Virginia Commission of Public Works for a waiver of the condition it build a new lock opposite Berkeley County, as soon as Berkeley County presented its plan to the commission for locating the canal.

[190] John Lambie, Superintendent, Canal Line, to James M. Coale, President, 15 June 1849 (Flood-October 1847)

"We had a bad leak yesterday afternoon at the high wall between Locks No. 16 & 17 (the place where the river overflowed the Canal in Oct 47 that caused so much damage below the Great falls) the bank is all rent for 60 feet in length and extending nearly half way across the Canal. if the weather is favourable Boats will pass on Sunday evening, but it is raining now and likely to continue for some time."

[190] Charles B. Fisk, Chief Engineer, Cumberland, to President and Directors, 2 August 1849 (Flood Damage Prevention-Proposed, Renovation-1849-51, Widewater-Sustainability)

"I respectfully submit the following statement and estimate of the work that ought, in my opinion, to be done, on the Chesapeake and Ohio Canal below Dam No. 6, with the \$200,000 of bonds prepared to be issued for the purpose of putting the same in good condition and repair, viz"

"1st Securing the foundation of certain Culverts and remedying defective work in about them" Estimated Cost \$14,000

"2nd Removing the present temporary wooden trunk at Broad Run, and substituting a permanent culvert in its place. Completing the rebuilding of the Cabin Branch Culvert, and securing the abutments and walls of Rock run and Cabin John culverts" Estimated Cost \$9,000

"3rd Tightening aqueducts No. 2, 3, 5, and 7, and securing the aqueducts, generally" Estimated Cost \$2,500

"4th Repairing lift, guard, and outlet locks and their dry walls and paving and constructing feeding flumes at some of the locks and guard locks" Estimated Cost \$12,000

"5th Enlarging the Little Falls feeder, rebuilding parts and repairing other parts of Dams No 1 and 2. Repairing & gravelling Dams No 4, 5 and 6, and raising the guard banks at and adjacent to the above mentioned dams" Estimated Cost \$50,000

"6th Securing the Bear Island level and the level next below Edwards Ferry against overflow from the river, and repairing the waste on the former level" Estimated Cost \$6,000

"7th Constructing overfalls on the levels from which high water of the river can be excluded, and waste weirs on certain levels. Also constructing overfalls on those levels liable to overflow and not admitting of being raised, so as entirely to exclude the river in high floods, but which by the proposed overfalls can be put in such condition as sustain comparatively little injury." Estimated Cost \$20,000

"8th Raising the towpath where now too low, from having been partially washed down by freshets or worn down by use and securing the limestone and other portions of the canal against leakage, and removing deposits from the canal and Rock creek basin, and securing the latter against future deposits" Estimated Cost \$80,000

"9th Purchasing boats and tools to commence the repairs and not chargeable to any particular work" Estimated Cost \$6,500

[182] Board of Directors Meeting, 14 August 1849 (Flood Damage Prevention-Financing, Renovation-1849-51)

"A letter from Chs B. Fisk Chief Engr. dated the 10th Inst. was read, enclosing sundry communications made by him to the Board of Public Works of Virginia, an estimate of the cost of repairs on the canal from Dam No 6 to Georgetown &c&c, also a letter from G. Bronup Esq Secy of the Board of Public Works of Va, enclosing the resolutions of said Board in relation to the Virginia Guaranty Law of the 15th of March 1849, by which the act is made operative and effectual, whereupon on motion the following resolutions were

adopted."

The 1st Resolve authorizes the President to have as much as \$200,000 of repair bonds printed, endorsed by the State of Virginia, and sold.

The 2nd Resolve authorizes the President to deposit the proceeds of the repair bonds, and the division superintendents to draw upon the funds by requisition for repair and improvement activities, in harmony with the estimate made by the Chief Engineer and the March 1849 act of the State of Virginia.

The 3rd Resolve authorizes the Chief Engineer to contract out repair and improvement work, where and when he feels it will be advantageous.

The 4th Resolve directs the Treasurer to keep a register of the bonds issued, and separate accounts of the expenditure of the proceeds of the bonds.

The 5th Resolve directs the President, in order to expedite repairs, to obtain a short-term loan of \$10,000 to be repaid by the sale of the bonds.

The 6th Resolve directs the proceeds of the short-term loan, be made available by requisition by the division superintendents for repairs.

The 7th Resolve authorizes the President to obtain short-term loans against bond proceeds whenever he deems it advisable.

The 8th Resolve authorizes payment of any incidental expenses in carrying out the aforementioned resolutions be made out of the contingent fund.

[182] Board of Directors Meeting, 24 August 1849 (Flood Damage Prevention-Financing)

"The President stated to the Board that in compliance with the resolution of the Board of the 14th Inst. he had borrowed on behalf of the Company from the Farmers Bank of Virginia at Alexandria \$10,000 at 30 days on the bond of the Company, in anticipation of the Bonds to be issued under the guaranty law of Virginia on the 15th of March 1849, to be repaid from the proceeds of the first issue of said Bonds. . . . The Clerk presented an abstract from the Requisition book, showing that since the last meeting of the Board, requisitions . . . amounting to \$5548 had been drawn upon the Treasurer, \$5500 which was repairs to be done under the Virginia Act of guaranty and paid out as the money borrowed in anticipation of that purpose."

[190] John Lambie, Superintendent, Canal Line, to James M. Coale, President, Frederick, 29 August 1849 (Renovation-1849-51)

Lambie reports he is at work repairing Dam No. 1 at Little Falls, and he hears W. S. Elgin is working on Dam No. 4. Lambie proudly states that he has raised the water in pool behind Dam No. 1, 11 1/4 inches.

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 6 September 1849 (Renovation-1849-51)

Indicates he is at work preparing to start the repair and improvement activities on the Dams (No. 5 & 6) on his division.

[190] John Lambie, Superintendent, Canal Line, to James M. Coale, President, Frederick, 11 September 1849 (Renovation-1849-51)

His report indicates he has been working on repairing Dams No. 1 (Little Falls) and No. 2 (Seneca).

[190] John G. Stone, Superintendent, to James M. Coale, President, Frederick, 29 September 1849 (Renovation-1849-51)

Stone reports and his crews are working at Dam No. 5.

[CF] [190] William H. Bryan, Collector, Georgetown, to Charles B. Fisk, Chief Engineer, Cumberland, 25 October 1849 (Study-Floods-C&O Canal Company)

This letter contains figures on high water levels on the all the levels of the canal below Dam No. 6 for the floods of 1843 and 1847. [Original in Box 38 of #190]

[190] Charles B. Fisk, Chief Engineer, Cumberland, to H. Addison, Mayor, Georgetown, 29 October 1849 (Improvements-Unspecified)

In this long letter, Fisk describes proposed improvements on the canal in Georgetown, aimed at preparing it for the coming coal traffic once the canal reaches Cumberland (not at flood prevention per se).

[182] Board of Directors Meeting, 5 December 1849 (Flood Damage Prevention-Financing, Renovation-1849-51)

". . . a statement showing that Bonds Nos. 1-100 inclusive amtg to \$50,000 had been issued for the repairs of the Canal below Dam No 6 guaranteed by the State of Virginia pursuant to the Act of the 15th of March 1849, of which \$39,500 had been sold, realizing the sum of \$39,547.75."

1850

[190] John G. Stone, Superintendent, to James M. Coale, President, 24 January 1850 (Renovation-1849-51)

"It will require About \$3000, for this month to pay for repairs as coming under the Virginia Law."

"The weather has not been very favorable for carrying on the work. The water is yet in the bottom of the Canal, caused by the rains and Snow, which prevents our doing much towards removing the bars. The principal part of the work done has been at Dams No. 5 & 6, in raising the Guard Banks so as to keep out the water in time of Freshets."

[182] Board of Directors Meeting, 28 January 1850 (Flood Damage Prevention-Financing, Renovation-1849-51)

". . . a statement showing that Bonds No 101-150 inclusive amounting to \$50,000 had been issued for the repairs of the Canal below Dam No 6, guaranteed by the State of Virginia, pursuant to the Act of the 15th of March 1849, and that since the report to the Board on the 5th of Dec. \$12,000 of said bonds had been sold, realizing the sum of \$12,044.58."

[190] John Lambie, Superintendent, to W. S. Ringgold, Clerk, 21 February 1850 (Renovation-1849-51, Widewater-Sustainability)

Lambie mentions that Burgess Willet [canal employee or contractor?] is working on "a bank across the head of Bear Island to prevent the river from getting into the level below the Great Falls."

[182] Board of Directors Meeting, 1 March 1850 (Flood Damage Prevention-Financing, Renovation-1849-51)

". . . a statement showing that since said meeting, Bonds for the repair of the Canal below Dam No 6 guaranteed by State of Virginia had been sold to amount of \$10,505.50."

[182] Board of Directors Meeting, 20 March 1850 (Flood Damage Prevention-Financing, Renovation-1849-51)

". . . a statement showing that Bonds for the repair of the Canal below Dam No 6 guaranteed by the State of Virginia, had been sold to amount of \$9000 realizing the sum \$9007."

[182] Board of Directors Meeting, 17 April 1850 (Flood Damage Prevention-Financing, Renovation-1849-51)

". . . a statement showing that since the last meeting, Bonds for the repair of the Canal below Dam No 6 guaranteed by the State of Virginia, had been sold to amount of \$4000 at par."

"On motion it was,  
Resolved, That the Chief Engineer be authorized to have the water withdrawn from the Canal below Dam No 6 for the purpose of continuing the repairs on said portion of the Canal, on the 18th of May next, and that the same be readmitted upon the completion of the Canal to Cumberland or earlier if found expedient."

[194] James M. Coale, President, Frederick, to J. Brown Jr., 2nd Auditor and Secretary, Board of Public Works, Richmond, Va., 22 April 1850 (Flood Damage Prevention-Financing, Renovation-1849-51)

In this letter, Coale protests an additional restriction made by the Virginia Board of Public Works, against funds from the repair bonds, guaranteed by the state, being used for repairs of the canal below its intersection with the Alexandria Canal. Coale stated that such a restriction was unfair, because it had not been part of the legislation passed by the Virginia legislature, authorizing the bond guarantee.

He was also bothered that some residents of Alexandria had attempted to impound \$80,000 of the canal renovation funds, part of which was to be used for the desilting of the Rock Creek basin. Coale indicated that no money had yet been spent for repair and improvement activities below canal's the intersection with the Alexandria Canal, and the company only contemplated spending \$15,000 below that point. Evidently, Alexandria merchants feared that if the Rock Creek basin was made more navigable, it would discourage canal boats from crossing the aqueduct over the Potomac to Alexandria.

[190] Charles B. Fisk, Chief Engineer, Cumberland, to the President and Directors, 25

April 1850 (Renovation-1849-51, Harper's Ferry-Sustainability, Widewater-Sustainability)

"The following is a statement of the expenditures up to the 1st of March 1850, on 'the repairs and improvements of the Canal below Dam No. 6,' made with the proceeds of the bonds guaranteed by the State of Virginia under the act of 15th of March 1849."

"The classification of these expenditures conforms to that adopted in the statement furnished to the Board of Public Works of Virginia by the Ches. and Ohio Canal Company, 'of the particular repairs to be done' and estimates of the cost thereof,' and which were approved of by that Board."

"The statement is made out from reports to me by John Lambie, William S. Elgin, and John G. Stone, Superintendents, respectively of the first, second, and third divisions, into the Canal below Dam No. 6 is divided."

"1st 'Securing the foundations of certain Culverts and remedying defective work in and about them.' (The estimated cost of this work was \$14,000.)"

"There has been expended for the above purposes."

By Mr. Lambie, in the repairs of the		
Powder mill branch Culvert	\$97.12	
Culvert on the 6th level		411.29
do on the 8th level		9.13
do on the 14th level (Road culvert)	323.82	
do on 20th level		181.35
	[Total \$1,022.71]	
By Mr. Elgin, in the repairs of several culverts, on		
his division	[Total \$2,522.04]	
and By Mr. Stone in the repairs of a culvert on		
the 53rd level"	[Total \$234.12]	
	[Grand Total \$3,778.87]	

"2nd, 'Removing the present temporary wooden trunk at the Broad Run and substituting a permanent culvert in its place, completing the rebuilding of the Cabin Branch culvert, and securing the abutments and walls of Rock Run and Cabin John culverts.' (All of which was estimated at \$9,000.)"

"Cabin John Culvert	\$282.64
And of Rock Run Culvert	607.34"
	[Grand Total \$889.98]

"N.B. Part of the cost of repairs of Culverts by Mr. Elgin, viz that of the repairs of Cabin Branch culvert, should be included in this class expenditures, but as he has not stated the cost of the repairs of each of his culverts, separately, I have been compelled to let the whole amount reported by him as expended upon culverts remain in the 1st class. A correction of this will be made in my next report."

"3rd 'Tightening Aqueducts No. 2, 3, 5 and 7, and securing the aqueducts generally' The estimate for this was \$2,500, and this has been expended by Mr. Elgin on Aqueduct No. 4" [Grand Total \$25.75]

"4th 'Repairing lift, guard and outlet locks, and their dry walls and paving, and constructing feeding flumes at some of the locks and guard locks.' The estimate was \$12,000, and there has been expended by Mr. Lambie upon the

"Flume at Lock No. 5	\$82.62
'                  6	183.42
'                  7	74.57
'                  8	165.81
'                  9 and dry wall & paving	468.83
'                 10 and do do	266.17
'                 11	178.79
'                 12	83.47
'                 13	246.71
'                 14	582.80
'                 15	60.20
'                 17	72.97
'                 18	313.75
'                 19	64.12
'                 20	605.18
'                 21	95.87
'                 22	67.85
	[Total \$3,613.13]
By Mr. Elgin, on the locks, lock gates and flumes on	
his division	[Total \$1,270.96]
And by Mr. Stone, upon the flume at the guard	
lock of Dam No. 6"	[Total 66.50]
	[Grand Total \$4,950.59]

"5th Enlarging the Little Falls feeder, rebuilding parts and repairing other parts of Dam No. 4, 5, and 6, and raising the guard banks at and adjacent to the above mentioned dams." All of which was estimated at \$50,000.

The expenditures have been by Mr. Lambie upon the repairs of Dam No. 1 and preparation therefor \$317.71  
upon the Guard bank below Dam No. 2 and preparation therefor 5,661.54 [Total \$5,979.25]

By Mr. Elgin, upon the gravelling and repairs of Dam No. 4, and raising the guard bank, guard lock and stop lock adjacent thereto, viz \$  
Upon the gravelling &c 1,255.75  
raising the guard lock 842.84  
raising the stop lock 222.04  
raising the guard bank 8,581.57  
for land to furnish embankment 458.00  
in quarrying stone for walling below the dam 979.37

[Total \$12,339.57]

And by Mr. Stone upon gravelling Dam No. 5 \$2,637.45  
raising the guard bank adjacent to that dam 4,461.97  
[Subtotal \$7,099.42]  
and upon gravelling Dam No. 6 185.00  
and raising the guard bank 6,303.24"

[Subtotal \$6,488.24]

[Total \$13,587.66]

[Grand Total \$31,906.48]

"6th 'Securing the Bear Island level and the level next below Edwards Ferry against overflow from the river, and repairing the waste of the former level.' The estimate for this work was \$6,000. And there has been expended by Mr. Lambie.

for a guard bank \$1,506.53  
for a stop lock 733.17  
and for a shanty for the use of this work 198.78"

[Grand Total \$2,438.48]

"7th 'Constructing overfalls on the levels from which high water of the river can be excluded, and waste weirs on certain levels. Also constructing overfalls on those levels liable to overflow and not admitting of being raised so as entirely to exclude the river in high floods, but which by the proposed overfalls can be put in such condition as to sustain comparatively little injury.' The estimate for this work was \$20,000. And there has been expended by Mr. Stone upon wastes on the 52nd level \$100.00

and upon wastes on the 53rd level 215.00"

[Grand Total \$315.00]

"8th 'Raising the towpath where now too low from having been partially washed down by freshets or worn by use, and securing the limestone and the outer portions of the canal against leakage, and removing deposits from the Canal and Rock creek basin and securing the later against future deposits.' All of which was estimated at \$80,000. The expenditures of this class have amounted as follows, viz

By Mr. Lambie, in  
removing deposits and bars on the 5th level \$31.20  
raising the tow path on the 10th level 480.55  
and raising do on the 11th level 59.04

[Subtotal \$570.79]

By Mr. Elgin, in  
clearing out the feeder level below Dam No. 3 \$517.25  
clearing out do below Dam No. 4 500.00  
clearing out the 36th level 280.00  
raising lift lock No. 38, rendered necessary by raising the towpath below that Lock 434.95  
and in cleaning out and overhauling the bottom of the Canal at various points on his division 8,912.53

[Subtotal \$10,644.73]

[Total \$11,215.52]

and by Mr. Stone, in \$  
cleaning out bars on the 42nd level 200.00  
cleaning out do on the 44th level 210.00  
cleaning out do on the 52nd level 50.00  
cleaning out do on the 53rd level 25.00  
cleaning out the outlet to lock No. 41 35.00  
cleaning out the inlet to Gd. lock No. 5 169.00  
cleaning out do to Gd. lock No. 5 65.00"

[Total \$754.00]

[Grand Total \$11,969.52]

"9th Purchasing boats and tools to commence the repairs and not chargeable to any particular work." The estimate for these purposes was \$6,500. The expenditures I cannot accurately state, as the Superintendents in their returns have included some that are evidently chargeable to the ordinary repairs. They may, however, be assumed to have been as follows, viz.

By Mr. Lambie	\$1,400	
By Mr. Elgin		1,600
By Mr. Stone		1,000

A corrected statement of these expenditures must be deferred until my next report."

Fisk then provides a summary of the expenditures on each class of repairs, by each superintendent, as of March 1, 1850, and the remaining amount to expended on each class of repairs. As as this date \$60,274.67 of the \$200,000 bond issue had been spent, and \$139,725.33 remained to be spent.

Fisk ended by saying, "To the amount expended may be probably added and from that to be expended, deducted, about \$3,000, for material on hand and that will be used in the repairs yet to be made, and estimate which I may have improperly rejected, but which from the reports to me by the Superintendents I could not properly include as chargeable to the repairs and improvements contemplated by the Virginia law. Mr. Lambie's reports are very full and satisfactory, and have enabled me with great accuracy to classify his expenditures, those of Mr. Elgin and Mr. Stone will in future no doubt equally so."

[190] John Lambie, Superintendent, to Charles B. Fisk, Chief Engineer, Cumberland, 29 April 1850 (Renovation-1849-51)

Lambie reports removing deposits to the bottom of the canal on the Georgetown level and that the Cabin John culvert is leaking, which he will have to deal with the next time the water is taken off that level.

[CF] [190] W. S. Elgin, Superintendent, Harper's Ferry, to James M. Coale, President, 2 May 1850 (Renovation-1849-51)

This document contains a month by month summary of the money expended for various repairs and improvements by Elgin on the 2nd Division of the canal. It covers August 1849 to March 1850. He had spent in total, \$36,694.05 in that period. [Original in Box 40 of #190]

[CF] [190] Charles B. Fisk, Chief Engineer, Cumberland, to the President and Directors, 6 May 1850 (Renovation-1849-51)

This document is another itemized accounting of expenditures for repairs and improvements funded by the repair bonds guaranteed by the state of Virginia on the canal as April 1, 1850 (the report of 25 April 1850 only went up to March 1, 1850). In this report, \$70,765.53 had been expended and \$125,234.47 remained. [Original in Box 40 of #190]

[182] Board of Directors Meeting, 13 May 1850 (Flood Damage Prevention-Financing, Renovation-1849-51)

". . . a statement showing that since the last meeting, Bonds for the repairs of the Canal Nos 151-200 inclusive each of \$1000 had been issued and guaranteed by the State of Virginia, and that repair bonds had been sold since the last report to the amount of \$19,000 realizing \$19,219 with the interest accrued thereon."

"A report from Chs B. Fisk Chief Engr. dated the 6 Inst. was presented, of the expenditures for repairs & improvements of the Canal below Dam No 6 from the proceeds of the bonds guaranteed by the State of Virginia to the 1st of April last, and on motion it was Ordered, That a copy of said report be transmitted to the Board of Public Works of Virginia."

"The President stated to the Board that he had addressed a communication to the Board of Public Works of Virginia asking them to recind their resolution of the 5th of March last, postponing and imposing restrictions on the repairs to be made below the intersection of the Alexandria Canal, but no definite action had yet been taken on the subject, and that for the present, an assurance had been given that no portion of the proceeds of the bonds now guaranteed, would be applied to that object, without the assent of the Board of Public Works."

"On motion it was, Resolved, That the resolution of the Board of the 17th of April, authorizing the Chief Engr. to have the water withdrawn from the Canal on the 18th Inst., be so modified, as in the direction of the Chief Engr., that the water remain in the Canal from Dam No 3 to period not later than the 1st of June next."

[194] James M. Coale, President, Frederick, to J. Brown Jr., 2nd Auditor and Secretary, Board of Public Works, Richmond, Va., 16 May 1850 (Flood Damage Prevention-Financing,

Renovation-1849-51)

Coale informs Brown, that the Company will honor the restriction against funds from the Virginia guaranteed repair bonds being used for any repair or improvement work below the canal's intersection with Alexandria Canal, by not charging any work made below that point to the accounts of the funds raised through bond sales.

[180] Twenty-Second Annual Report, 3 June 1850 (Flood Damage Prevention-Financing, Renovation-1849-51)

The C&O Canal president, James M. Coale, reported that the state of Virginia had dropped as a condition of guaranteeing the repair bonds of the C&O Canal, that the company build a new outlet lock into the Potomac opposite Berkeley County, Virginia. Even after being relieved of that burden, the Virginia legislature imposed a new condition: that repairs above the Alexandria Aqueduct had to be completed before work below it could be commenced.

The Company was forced to battle to overturn the decision of the legislature. Coale indicated that as of the date of the meeting about \$125,000 of the repair bonds had been sold and the work commenced on the repairs and improvements on the canal below Dam No. 6.

While the sale of the bonds at par (or even above) was gratifying, "It is a subject of regret that in consequence of the difficulties interposed, the Company was deprived of the most favorable portion of the last year for the prosecution of the repairs. Since their commencement, however, they have been pressed forward as rapidly as the weather and other circumstances would permit. On the 9th of January the water was withdrawn from the Canal to facilitate the operations, but in consequence of the numerous appeals made to the Company by persons who desired to forward their flour and produce to market, which had been accumulating during the winter in the warehouses on the line, and from a desire to secure to the Company the revenue that would result from the transportation of the same, the navigation was restored on the 10th of March and before the repairs in the bottom of the Canal had been completed. The water was again drawn off from Harpers Ferry upwards to the 18th Ultio. and along the residue of the line to Georgetown on the 1st Inst., and will probably be kept out until about the middle of July, by which time it is hoped that the new portion of the line above Dam No 6 will have been finished between Georgetown and Cumberland. Very decided and marked advantages have resulted from the repairs that have already been made."

"We have been visited with no breaches of any consequence since your last annual meeting. The capacity of the Canal for the transportation of tonnage has been sensibly increased. . ."

[182] Board of Directors Meeting, 3 June 1850 (Flood Damage Prevention-Financing, Renovation-1849-51)

". . . a statement showing that since the last report, Bonds for the repairs of the Canal had been sold to amount of \$31,000 realizing \$31,071.82 with the interest accrued thereon."

"Resolved, That the President be authorized and directed to issue requisitions from time to time in such amounts as may be necessary for the payment of the coupons of interest to become due on the Bonds for repairs, guaranteed by the State of Virginia under the Act passed by said State on the 15th day of March 1849, the sum to be deposited in some suitable Bank in Baltimore for said purpose."

[182] Board of Directors Meeting, 12 September 1850 (Flood Damage Prevention-Financing, Renovation-1849-51)

"The Committee on accounts report to the Board that they have examined and counted . . . Coupons on the the Repair Bonds of the Company issued under the Act of Virginia of the 15th of March 1849 and guaranteed by said State, which have been paid in July 1850, amounting to \$3084 and recommended that said Coupons be destroyed by burning."

[182] Board of Directors Meeting, 26 November 1850 (Flood Damage Prevention-Financing, Renovation-1849-51)

". . . a statement showing that since said meeting, Bonds for the repairs of the Canal Nos. 201-225 inclusive, amtg to \$25,000 had been issued & guaranteed by the State of Virginia of which \$6000 had been sold realizing the sum of \$6040."

#### Abbreviations for Documents at the National Archives at College Park

[180]: Proceedings of the Stockholders, 1828-90, Chesapeake and Ohio Canal Company, Entry 180, Record Group 79, Records of the National Park Service

[182]: Proceedings of the President and Directors, 1828-90, Chesapeake and Ohio Canal Company, Entry 182, Record Group 79, Records of the National Park Service

[190]: Letters Received by the Office of the President and Directors, Chesapeake and Ohio Canal Company, Entry 190, Record Group 79, Records of the National Park Service

[191]: Letters Received, by President and Directors, 1873-80, Chesapeake and Ohio Canal Company, Entry 190, Record Group 79, Records of the National Park Service

[194]: Letters Sent, by the Office of the President & Directors, 1828-70, Chesapeake and Ohio Canal Company, Entry 194, Record Group 79, Records of the National Park Service

[196]: Letters Sent, by President & Directors, 1879-81, Chesapeake and Ohio Canal Company, Entry 196, Record Group 79, Records of the National Park Service

[202]: Correspondence of Office of Trustees, 1913-38, Chesapeake and Ohio Canal Company, Entry 202, Record Group 79, Records of the National Park Service

[207]: Letters Received By The Chief Engineer, 1834-52, Chesapeake and Ohio Canal Company, Entry 207, Record Group 79, Records of the National Park Service

[210]: Drafts of Letters Sent By the Chief Engineer, 1836-38, 1846-52, Chesapeake and Ohio Canal Company, Entry 210, Record Group 79, Records of the National Park Service

[211]: Letter Book of the Resident Engineer of the 1st Residency of the 1st Division, 1828-31, Chesapeake and Ohio Canal Company, Entry 211, Record Group 79, Records of the National Park Service

[214]: Records of Ellwood Morris, Principal Assistant Engineer, 1838-40 Chesapeake and Ohio Canal Company, Entry 214, Record Group 79, Records of the National Park Service

[320]: Printed Materials, 1816-1907, Chesapeake and Ohio Canal Company, Entry 320, Record Group 79, Records of the National Park Service.

[650-03]: National Park Service, Central Classified File, 1933-49, National Capital Parks, 650-03, Record Group 79, Records of the National Park Service.

#### Other Abbreviations

[1460-C&O-5] Administration, Protection and Maintenance File 1460/C&O-5, National Capital Parks, National Park Service, Washington National Records Center, Suitland, Md.

[68A-3048] Administrative Correspondence, 68A-3048, National Capital Region, National Park Service, Washington National Records Center, Suitland, Md.

[Brown] Brown et al. Trustees v. Chesapeake and Ohio Canal Company, Nos. 4191 and 4198 Equity, Circuit Court of Washington County, Hagerstown, Md.

[CF] Clipping File

[LIB-PHP] Library, Park Headquarters

[RF-PHP] Restoration File, Park Headquarters Papers

[UMCP] The Chesapeake and Ohio Canal Company Collection, Archives and Manuscripts Department, McKeldin Library, University of Maryland, College Park.



Note: see the end of the document for the key to abbreviations.

#### 1851

[182] Board of Directors Meeting, 8 January 1851 (Flood Damage Prevention-Financing, Renovation-1849-51)

". . . a statement showing that since said meeting [27 Nov. 1850], Bonds for repairs of the Canal guaranteed by the State of Virginia had been sold to amount of \$8000 realizing the sum of \$8080."

[190] Charles B. Fisk, Chief Engineer, Washington, D.C., to James M. Coale, President, 19 January 1851 (Renovation-1849-51)

Fisk indicates he has been detained in Washington, D.C. "getting through all that is necessary to be done by me in relation to the cleaning out of the Canal between the Rock Creek and Tyber tide locks."

[182] Board of Directors Meeting, 27 February 1851 (Flood Damage Prevention-Financing, Renovation-1849-51)

". . . a statement showing that since said meeting [8 January 1851] Bonds for repairs of the Canal guaranteed by the State of Virginia, had been sold to amount of \$6000 realizing the sum of \$6075.75."

"A letter from G Bronup 2d Auditor of Virginia dated the 29th of January was read, enclosing a resolution the Board of Public Works of Virginia modifying their former resolution so as to limit the resolution of the expenditures of moneys arising from bonds for repairs guaranteed by the State of Virginia, to the first Lock below the Alexandria Aqueduct."

[190] John G. Stone, Superintendent, Williamsport, to W. S. Ringgold, Clerk, Frederick, 25 March 1851 (Renovation-1849-51)

"Mr. Fisk told me when I saw him last in Frederick, that he wished to raise the different levels 6 inches higher than they were last fall, to do so, it is necessary to employ a large force at different points of my division. The Towpath must be raised and at some points must be protected. The work at Dam No. 5 must be finished. The Abutment is yet to be done."

[210] Charles B. Fisk, Chief Engineer, Frederick, to John Lambie, Superintendent, 26 March 1851 (Study-Floods-C&O Canal Company)

"I wish you upon receipt of this to inform me of the depth of water, (above canal bottom,) kept at this time, in each of the level upon your division, also of the depth of water, that a boat may draw at this time upon each level, without being stopped or retarded by sand bars or other obstructions above canal bottom."

"It is extremely important that the expenditures during the present year upon the entire line of the canal shall be as small as practicable. It will not be, until the revenue from the coal trade is materially larger than I am fearful it will be the present year that any work can be undertaken or improvements made not necessary to allow boats to draw 4 feet 3 inches of water, or imperatively called for to guard against heavy damages from high water or from breaches or to secure the structures of masonry or other works of the canal against giving way."

[182] Board of Directors Meeting, 1 May 1851 (Flood Damage Prevention-Financing, Renovation-1849-51)

". . . a statement showing that since said meeting, Bonds for repairs of the Canal Nos 226-260 inclusive, amounting to \$25,000 had been issued & guaranteed by the State of Virginia, under the Act of the 15th of March 1849. constituting with former issues the aggregate amount of \$200,000 authorized to be issued under said Act, and a statement showing that Bonds for repairs to the amount of \$4,000 had been sold, realizing with the interest accrued thereon \$4026.83."

[182] Board of Directors Meeting, 2 June 1851 (Study-Floods-C&O Canal Company)

"Resolved, That the Board will on the 23rd Inst. proceed on an excursion on the Canal from Georgetown to Cumberland, for the purpose of examining and inspecting the line of the Canal &c &c, and that the President be requested to invite a limited number of guests for the occasion."

[180] Twenty-Third Annual Report, 2 June 1851 (Flood Damage Prevention-Financing, Renovation-1849-51)

The C&O Canal president, Samuel Sprigg, reported:

"The water was withdrawn from the canal during the month of February, for the purpose of removing some deposits, and making other repairs, preparatory to the opening of the spring trade, and was re-admitted in the early part of March, and the navigation of the canal resumed, throughout its entire length by the 17th of March. It has since continued in good navigable condition, with interruption, with the exception of a few days at two points, where small breaches occurred; and one or two other points, where leaks were discovered, and the water withdrawn for a day or two, as a precautionary measure; the trade on the canal was not, however, retarded to any injurious extent, and a degree of regularity in the navigation has been maintained."

And yet more wishful thinking . . .

"The repairs of the <?> have been continued with as little interruption to the navigation as practicable; and are now so far advanced, as to give assurance of comparative security against encroachments by high water in the river, at several points, which have heretofore been most exposed; and we trust, by the close of the present year, they will have been so far completed, as to leave but little apprehension for the future safety of the works, and the maintenance of uninterrupted navigation."

"The restriction imposed by the board of public works of Virginia, as to the expenditure of money arising from the sale of the bonds of the company issued for repairs, and guaranteed by that State, to a point not lower than the Potomac aqueduct, has been so far relaxed, as to extend to the first lock below the aqueduct; and the expenditures from this fund, have consequently been strictly confined to repairs and improvements above that point. The other means of the company have not been sufficient to enable them thus far to make repairs below that point, embracing the basin at Georgetown."

"The corporation of Washington have passed an act, authorizing an advance to the company of a sum, not exceeding \$3000, on the bond of the company, payable at its pleasure, with interest payable semi-annually, for the purpose of cleaning out a channel in that portion of the canal lying between the rock creek and tiber tide locks. This arrangement was agreed to on the part of the company, and a contract made for the purpose with William Easby; who thus far executed rather more than a moiety of the work. When it shall be completed there will be sufficient water for boats of the greatest draft navigating the canal, to pass readily into the Washington canal."

Sprigg indicated that up to that point \$184,000 of the repair bonds had been sold (plus a premium of \$394.83) and \$174,123.82 expended, leaving \$26,271.01 still unexpended for repairs.

[182] Board of Directors Meeting, 23-28 June 1851 (Flood Damage Prevention-Financing, Renovation-1849-51, Study-Floods-C&O Canal Company)

The President, Directors, and their party set out for their inspection trip up the Canal, leaving Georgetown on the 23rd and arriving in Cumberland on the 28th. In the minutes for the 23rd, it is recorded, ". . . a statement showing that since said meeting, Bonds for repairs, guaranteed by the State of Virginia, to amount of \$1000 had been sold, realizing with the interest accrued thereon, the sum of \$1016.67."

[182] Board of Directors Meeting, 13 August 1851 (R) (I)

". . . a statement showing that Bonds for repairs, guaranteed by the State of Virginia, to amount of \$15,000, had been sold realizing the sum of \$15,000, being the residue of bonds issued under said act, and constituting with the report of sale, heretofore made, the aggregate amount of \$200,000 authorized to be issued by said act."

#### 1852

[182] Board of Directors Meeting, 26 February 1852 (Flood Damage Prevention-Financing, Renovation-1849-51)

"The Committee on accounts report to the Board that they have examined and approved the following accounts, for which proper vouchers have exhibited, to wit:"

". . . Coupons on the Repair bonds of the Company issued under the act of Virginia of the 15th March 1849 and guaranteed by said State, which have been paid as follows viz payable in

July 1850	\$ 132	
Jany 1851	4445	
July 1851		<u>5330</u>
		9907

say nine thousand, nine hundred and seven dollars, and recommend that said coupons be destroyed by burning."

[CF] Will H. Lowdermilk, History of Cumberland (Washington, D.C.: James Anglim, 1878), 375 (Flood-April 1852)

"April 18 [1852].--A great freshet occurred, the river and creek both overflowing the wall between Bruce's and Brengle's warehouses, on Canal street, and a considerable portion of the town was overflowed. Both the railroad and the canal were badly damaged, the latter suffering to the extent of \$80,000."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to W. S. Ringgold, Clerk, Washington, D.C., 19 April 1852 (Flood-April 1852)

"I fear the Highest Freshet that we have ever had the water has raised 3 1/2 feet since 6 oclock and now rising about 1 foot to the Hour I fear Heavy Damages to the Canal; the rain is still falling."

[207] H. M. Dungan, Superintendent, Cumberland, to Charles B. Fisk, Chief Engineer, 19 April 1852 (Flood-April 1852)

"Our embt. undermined about 11 oclock last night between the ware houses making an opening about midway twelve feet wide, the water in the river was 17 ft A. canal bottom it undermined the North

east corner of the bank warehouse which has fallen has swept away Shrivvers & bells fencing and the shed attached to Bells stable. I had the Stop Lock closed last evening and directed one valve fed through it. I could get no one to do anything yesterday."

[207] H. M. Dungan, Superintendent, Cumberland, to Charles B. Fisk, Chief Engineer, 19 April 1852 (Flood-April 1852)

"My hasty note this Morning did not get farther than Pattersons creek 3 or 400 ft. of the track being washed away there the cars returned, the telegraph wires are also broken east & west, report says the plank road is afloat and several serious gaps in the [illegible] west. Thank god our canal is safe as far as heard from there are 4 boats at the stop Lock one of which passed the brick house or Lk 59 yesterday Mr Worthington informs me all is well as far as old town he learns from Doctr. Fitzpatrick who came up last evening. I hope the waters below have not been generally high. Mr. Patterson informs me this evening the water has been 16 ft 9 in A. at the G. Lock it was then 5 P.M. 13 1/2 ft A. . . . I hope the river will fall enough to night to permit me to open the stop Lock to Morrow, the bridge over the waste was carried away Mr. Patterson tells me the river was 9 A. at the waste last evening and ran over the arm of the Stop Lock gate but was at no time on the coping."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to W. S. Ringgold, Clerk, Washington, D.C., 21 April 1852 (Flood-April 1852)

"The freshet has done very considerable damage to our canal as far as I have seen it which is only 5 or 6 miles in the distance there is several Breaches, and much damage done the canal &c, the water about 5 feet Higher than the Freshet of 1847."

[190] W. S. Elgin, Superintendent, Harper's Ferry, to W. S. Ringgold, Clerk, Washington, D.C., 21 April 1852 (Flood-April 1852)

"I have reached down within 1/2 mile of the Monocacy Aqueduct with my examination of the Canal and I am here stoped in consequence of a Breach But hope to resume again in the morning I find the damage from Weaverton to this place quite Light to what I expected and no worse than they were in 47; I think \$6,000 will make the 20 miles I have passed over Dam No 3 to Monocacy fit for 4 1/2 or 5 feet water."

[CF] The Examiner (Frederick), 21 April 1852, 2 (Flood-April 1852)

"The late Rains" Brief description of the April 1852 flood; mentions the flood waters covering the canal.

[CF] The Herald of Freedom and Torch Light (Frederick), 21 April 1852, 2 (Flood-April 1852)

"Heavy Rain--Freshet." The newspaper reports the Potomac is "covering the Acqueduct and overflowing everything near its banks in Williamsport."

[190] John Page, Georgetown, to "Dr Sir," 22 April 1852 (Flood-April 1852, Widewater-Sustainability)

Page, whose relationship to the company is unknown, describes damage caused by the flood. He is evidently reporting mostly about breaches to the canal in the vicinity of Georgetown. "one where the big brake was in 47, on the loghouse line 500 feet long, 200 feet of which swept out to bottom. the balance so raged & crooked that removal from foundation is necessary"

"Another about 75 feet Long, about 100 yards above it. the water is still seeping [?] through, & may possibly make them unite."

"8 1/2 miles above (G.T.) 2 brakes near each other one 40 & the other 20 feet Long."

"Another commencing at the lock at 7 miles & extending to the small culvert about 100 yards, at magazine another 30 feet long & 4 brake on the Geo Town level. the largest at the waste ware near the bridge about 300 feet one about 600 yds, this side near Gillhouse about 70 feet. the other two are above the bridge & near Lock No 5 their size is not certain."

Page bases his account on what he heard from two boat captains, so this is secondhand information.

[190] H. M. Dungan, Superintendent, Cumberland, to L. J. Brengle, Treasurer, 22 April 1852 (Flood-April 1852)

"our canal is safe til we get to Iowa creek here both banks were cut through below the Aqt [aqueduct?] about 25 ft in width down to about 3 ft above bottom. the upper end of the Tunnel level was submerged in consequence a breach occurred on section 312 above the waste weir above the tunnel sweeping out about 1000 yds. below. . . . the freshet at Old town and below was from one to five feet above an record."

[CF] Alexandria Gazette and Virginia Advertiser, 22 April 1852, 2 (Flood-April 1852)

"The Storm and the Freshet." General description of the April 1852 flood, with a brief paragraph concerning the canal.

[190] W. S. Elgin, Superintendent, Seneca, to W. S. Ringgold, Clerk, Washington, D.C., 23 April

1852 (Flood-April 1852)

Elgin indicates it will take \$10,000 to restore his division to 4 or 5 feet of water in the canal and the heavier damage from the freshet was "at the Upper & Lower end." He thinks navigation can be restored within 6 weeks if he receives the means to do so.

[210] Charles B. Fisk, Chief Engineer, Washington, D.C., to H. M. Dungan, Superintendent, Cumberland, 23 April 1852 (Flood-April 1852)

"I returned to this place yesterday evening. After having passed over the line between Dam No. 6 and Town Creek, and having obtained reliable information in regard to the extent of Damages done to the Canal above Town Creek, and below Dam No. 6, as far down as McCoy's Ferry. On my way down I ascertained that the damage from Dam No. 5 to Seneca is probably about the same as in 1847. Below Seneca, it probably Amounts to \$25,000. And on the whole line I have reason to think that it does not exceed \$80,000. It may be Somewhat less, and on the other hand, it may Somewhat exceed that Amount."

"The time that will be required for the restoration may be 2 1/2 months. Under the circumstances, as the damages on your division is, comparatively, light, it is advisable that the repairs should not pressed to completion, in a way that would add materially to the cost, as there would be no great advantage in having your division ready for navigation a month earlier than the rest of the line. If, however, it can be effected that much earlier, at not much additional cost, let it be done."

"On each of the your levels below Town Creek, there are, Generally, one or two small openings through which the water broke in, and one or more larger breaches or openings, through which the water returned into the river. Besides this, the towpath is in many places left very ragged, and there is also several places deposit left in the Canal. The largest breach is above the waste weir in Sec. No. 312, opposite the berm bank, that was put it, causing a reversed curve. Some 10,000 yards of embankment have, here, I suppose been washed out."

"In repairing the Canal, I think it advisable, first, to close the openings at the head of the levels, as we may have another freshet before the openings at the foot of the levels can be repaired."

"I would not at the outset do more than raise the banks to bear, say five feet of water; you may then boat the rest, in places where the materials are not convenient for embankment. I have spoken with Mr. Lowe on the Subject of giving his attention to the level above Gay's lock, which is much washed And filled in. I did so, as you are not able, I understand, to be much out of doors, and Mr. Summers has as yet no experience in repairs. Summers' force, as his boat is near his lock, can be advantageously employed for the present, within reach of his boat."

"Your upper force, I think should work its way down the Canal, commencing at the upper point damaged. A Separate force Should be organized for the repair of the large breach on Sec. No 312. This might be placed in charge of Lowe."

"If Mr. Patterson is willing to undertake it, I think it would be well, in case you cannot yourself personally Superintend the repairs, to get him to act under General direction from you, to Superintend the work."

"By the time preparation can be made to work with a Sufficient force for the repair of the breach on 312 in time, the water can got down it it, and boats taken there, temporarily fitted up for the men to live in. If not, temporary Shantees must be fixed up."

"Arrangements it is believed will soon be made for means to repair the Canal. In the meantime press on the work with your regular force, and with such additions to it as you can readily obtain without paying high wages."

"As Soon as means are provided, and also when it becomes important to press your work on rapidly, you shall be informed."

[CF] Alexandria Gazette and Virginia Advertiser, 23 April 1852, 2 (Flood-April 1852)

"Chesapeake and Ohio Canal, &c." The newspaper provides a sketchy description of damage to the canal from April 1852 freshet.

[194] W. S. Ringgold, Clerk, Washington, D.C., to George Schley, Director, Hagerstown, 24 April 1852 (Flood-April 1852)

"As far as can be ascertained it is believed by the Chief Engineer that the damage to the Canal can be restored for a sum not exceeding \$80,000, and that about two months will accomplish it. It will be necessary to raise this sum by loan, from various sections interested in the Canal and I am requested by the President to say to you, that you must endeavour to raise \$10,000, in your County from the two Banks there or otherwise. Mr. Van Lear will probably aid you in the matter, and it is desirable to know as early as practicable what assurances of success can be relied upon. Please give the matter your early attention. The loans now to be made will take precedence after the payment of \$36,5000 due to Banks for repairs in 1847."

[207] John Lambie, Superintendent, Georgetown, to Charles B. Fisk, Chief Engineer, 24 April 1852 (Flood-April 1852)

"From what Mr Bryan tells me about the damage at Seneca and what I have seen of the Geo Town level on a closer inspection, I am afraid that it will not be safe to calculate less then \$30000, being required on this division."

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, 25 April 1852 (Flood-April 1852, Harper's Ferry-Sustainability)

"I have been through my Division & just returned making examination of the various Damages done the Canal; in the 1st place I will commence at Guard Lock No. 2 Rushville a breach thought the embankment at Berm side of Lock of 130 feet in width runing paralel with Lock I supose averge depth about 8 feet also across Towpath from the Gard Lock runing up Towpath about 60 feet, 30 x 6, slight damges until you reach Bull Run, from Bull Run to Edwards Ferry will Take about 12,000 yds of Embankment about 10,000 of which is on the 1st mile above Bull run From Edwards Ferry to Monocacy Damages light at the east end & berm of the Monocacy aqueduct a Breach of about 40 feet say 4 feet Below Bottom; from Monocacy Aqueduct to Lock No 28 Damages light say \$500. From Lock No. 28 to Catoctin Aqueduct damages very Light, say \$50. West end & Towpath of Catoctin Aqueduct a Breach of 50 feet about Bottom of Canal From the aqueduct Damages very Light say \$50. above Lock 30, above Lock 30 & to Lock 31 say \$250. Breach at Lock No 31 of about 40 feet & 6 Below Bottom; from thence to Lock No 32 Damages about \$300, from Lock No. 32 to Dam No. 3 Damages very Heavy except Level above Lock No. 33 at Least \$5,000 suming up the whole damage the Least sum to put the water in on this division will be \$10 or 12,000."

[194] Samuel Sprigg, President, Washington, D.C., to the Mayors of Washington, Georgetown, and Alexandria ["respectively"], 26 April 1852 (Flood-April 1852)

"You are no doubt aware that a great Calamity has befallen the Ches & Ohio Canal and all interests connected therewith. The damages I am happy to say are much less than than had been feared."

"Mr. Fisk is of the opinion that \$80,000 will suffice for the necessary repairs, and I hope the Corporation of Washington will come to our rescue in advancing the sum of \$20,000 in money or in your bond to that amount."

"Bonds so issued will be abundantly secure as all loans for repairs take precedence of all other obligations."

"We have confidence that Georgetown & Alex. will each furnish \$20,000 and that the County of Washington & Allegany Md. will each advance \$10,000. These same will make the aggregate necessary."

"Immediate action is of great importance to all interests connected with the Canal."

[207] H. M. Dungan, Superintendent, Cumberland, to Charles B. Fisk, Chief Engineer, 26 April 1852 (Flood-April 1852)

"Mr. Patterson will attend to my duties on the Division he goes to the lowest end on Wednesday and will see the break on [section?] 312, from the length & depth as guessed by Mr Lowe I cannot make it exceed 1600 c. yds. and he says he understood you to say '800 yds are washed yes 1,000 cyds are gone' If so you have multiplied it by 10 in yours of the 23rd, it will be fortunate if he is right in his recollection of what you said at the time. I am organizing for the smaller quantity & can easily increase the force for the greater if it should turn out to be so bad, this bank was originally built of earth 12 ft on top 2 to 1 inside & 1 1/2 to 1 outside slopes, with 4 ft top protection & 2 to 1 outer slope will it not be best to restore the entire earth bank for 5 ft water with carts and boat the protection afterward provided only 1000 cyds are required if however 10,000 are required shall I reduce the earth bank to 8 ft. on top retaining the slopes as before as I presume it will meet your approbation I have directed the berm bank to be cut away (first removing all the rough material) thus leaving 18 in or 2 ft of said bank against the nat. surface"

[207] L. Benton, Superintendent, Lock 38, to Charles B. Fisk, Chief Engineer, 26 April 1852 (Flood-April 1852)

"You wished me to let you know the amount of Damages done on my Division, as near as I can Estimate it the damages is about six thousand dollars, the largest portion of damages is at the Dam. their is considerable contention amongst the Labors they want a \$1.00 per day & I dont feel at liberty to give it until I hear from you . . ."

[CF] Alexandria Gazette and Virginia Advertiser, 26 April 1852, 2 (Flood-April 1852)

"Chesapeake and Ohio Canal" and "The Late Flood." The newspaper provides a brief description of damage to the canal from the April 1852 flood and an early reckoning from Charles B. Fisk, the Chief Engineer, on the cost and time necessary to repair it.

[CF] Alexandria Gazette and Virginia Advertiser, 27 April 1852, 2 (Flood-April 1852)

"The late Flood." The newspaper provides a general description of damage from the April 1852 flood, with some mention of the canal.

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, 28 April

1852 (Flood-April 1852, Harper's Ferry-Sustainability)

"I examined the canal at Dam No. 3 this morning and find the damages at that place much increased since I last saw it about the Guard Lock the Breach around the Guard Lock is above 80 feet the water is still running a road but not wearing I find the feeder down to the Lock No. 35 and a short distance below the Tail [?] of said Lock is much filled up with coarse material But the Feeder Below that point pretty well swept out so I think it advisable to Let the Deposits remain where it is as it is more easily got at where it is, the Breaches where the water keeps out above Crowley Lock is much lighter than I supposed they would be . . ."

[CF] The Examiner (Frederick), 28 April 1852 (Flood-April 1852)

"Damage to the Canal." The Examiner briefly describes the cost of damage to the canal from the April 1852 flood and the time necessary to repair it.

[182] Board of Directors Meeting, 29 April 1852 (Flood-April 1852, Flood Damage-Financing)

"A report from Chs B. Fisk Chief Engr. dated this day was read stating the extent of damage sustained by the Canal, at various points, from the recent freshet, and estimating that the same can be repaired and the Canal put in navigable condition for a sum not exceeding \$80,000."

"The President stated to the Board that he had conferred with several of the Banks in Washington & Alexandria, and had also made communications to the Corporations of Washington, Georgetown, & Alexandria, asking them to aid the Company with advances of money or bonds, to enable them to make the requisite repairs &c. Communications were then read whereupon, on motion it was, Resolved, That the President be authorized and requested to borrow on behalf of this Company, such sum or sums of money not exceeding \$80,000 as may be necessary to pay for the repairs of the breaches caused by the recent heavy freshet, and that the seal of the Company for any such loans, and also to renew said bonds, and to the discount thereon, to however it may become necessary. Resolved, That subject to existing priorities, the revenues and tolls hereafter to accrue to the Company from the Canal and its works, be and they here irrevocably pledged to the payment of the loans that may be made under the foregoing resolution, and for the interest thereon, from time to time, until the same shall be fully discharged."

[190] Charles B. Fisk, Chief Engineer, Washington, D.C., to President and Directors, 29 April 1852 (Flood-April 1852, Widewater-Sustainability, Harper's Ferry-Sustainability)

"Upon the upper 21 miles very little damage is done. There is, in fact, along that portion of the Canal, no breach in any of the Company's works. Along the next 29 miles, viz, from Town Creek down to Dam No. 6, there are eight levels of the Canal, upon each of which there is more or less damage done. On each of these levels, there is generally one, and some cases, two or three small openings made in the towpath, near the head, through which the water entered the Canal and towards the lower end, a breach in the towpath, through which the water broke out into the river. In several places, on these levels, the towpath is left in a rough and ragged state, and at a few places, some deposit has been made in the Canal. No[t] one, however, of the breaches, with the exception of that on the lower end of the level above Lock No. 66, is of any great extent. That one will probably require from 6 to 8,000 cub. yds. of embankment for its repair."

"At Dam No. 6, the river has broken around the Virginia Abutment, making a deep breach, about 200 feet in length, and sufficient to pass all the water now running in the river."

"From Dam No. 6 for 27 1/2 miles down to Dam No. 5, there is no serious breach, although at many points there are numerous small breaches through which the water, in some places from the river broke into the Canal. and in others, from the Canal into the river."

"Between Dams No. 5 and 4, The Canal at a few points is much injured, but not more seriously, if as much as in 1847."

"At Dam No. 4, as in 1847, the river broke over the Guard bank and around the Maryland abutment. The damage, however, at this point and as far down as the Government Dam (Dam No. 3) near Harper's Ferry, does not exceed that of 1847."

"At the Government dam the river has broken around the Maryland Abutment, and in returning to the river over and through the towpath of the level above Lock No. 34, has done damage exceeding that done in 1847. The damage also to the level opposite Harper's Ferry is greater, but to the Canal at the other points between Harper's Ferry and Seneca, the damage is sufficiently less to make the amount of damages in the aggregate between Dam No. 2 and 3 no greater than it was from the fresh of 1847."

"Between Dam No. 2 and the Little Falls dam, the damage, comparatively, as is always the case from high water, is much greater than on the rest of the line. At the lower end of Bear Island a large breach has been made in the high embankment connecting the Island with the main land. This is the most costly breach there is to repair. Its repair may cost \$10,000. Along the rest of the Canal between Seneca and Georgetown, I do not think the damage is greater in the aggregate than it was in 1847."

Fisk makes a damage repair estimate of \$80,000. He adds, "The recent fresh was, from the South Branch down to Harper's Ferry, six feet higher than that of 1847, which was the highest of any,

except the present. . . . If there are marks of higher water along the river as high as the late fresh, within the last 100 years, I have not met with them."

Fisk concludes, "It is proper I should state that if the late fresh had been no higher than that of 1847, which did damage to an amount not less than \$50,000, the Canal, in consequence of work done since, to guard against freshes of that height, would have sustained very little injury, and the navigation would have been interrupted for but a very short time thereby. The canal may therefore be considered as having been placed in a condition almost entirely safe against all freshets, except such, judging from the past, as may occur not oftener than ever 50 years."

[194] Samuel Sprigg, President, Washington, D.C., to William Fowle, President, Bank of the Old Dominion, Alexandria, 29 April 1852 (Flood-April 1852)

". . . the Engineer has reported that the sum of \$80,000 will be sufficient for repairing the damages of the last freshet. . . . The Security will be a pledge of the Tolls which the Co. is authorized by law to pledge for repairs."

"We have to say that there are debts due for repairs the principal of which will not be required for some years--these debts amount to about \$300,000, the interest on which must be paid & forms the only liens prior to the proposed lien."

[194] Samuel Sprigg, President, Washington, D.C., to Walter Lenox, Mayor of Washington, D.C., 29 April 1852 (Flood-April 1852)

Sprigg reports that if money for the repairs is provided "at once" the canal will be back in operation by mid-July.

[210] Charles Fisk, Chief Engineer, Washington, D.C., to W. S. Elgin, Superintendent, 5 May 1852 (Flood-April 1852, Flood Damage Prevention-Ordered, Harper's Ferry-Sustainability)

"The plan you propose of running a guard bank from the Guard lock at Dam no 3 to lock No. 36 I fully approve of. You may therefore carry on the work you are now doing at that point with reference to such a guard bank. I hope, however, before you shall have progressed too far with your work not to admit of it, that I shall be on the ground with you to see whether a feeding flume may not be put in, say where the '200 foot breach' has occurred that will to some extent lessen the constant expense there now arising from deposits."

"The arrangements for money are not yet entirely made. They will, however, I have no doubt soon be closed. as soon as they are you shall be informed."

[207] H. M. Dungan, Superintendent, Cumberland, to Charles B. Fisk, Chief Engineer, 6 May 1852 (Flood-April 1852)

Dungan reports his problems keeping men at work because of the lack of pay, and warns the delay in receiving money will increase the cost of the repairs. He indicates, ". . . Mr Lowe or Thrasher will be up to morrow if they have not before been supplied I expect with 10 carts and 18 men to ready for 5 ft water by the 1st of June so as to use our boats I given Terrell charge of the break and Kimble with part of Summers force will do all necessary to this end between Lock 60 & 62 Summers all below Lk 60 while Mr Lowe will have the general charge and see my orders carried out the break will not exceed 3,000 cyds. and at least 1/3 of this can be put in with boats . . ."

[207] L. Benton, Superintendent, Cumberland, to Charles B. Fisk, Chief Engineer, 7 May 1852 (Flood-April 1852)

"I just came from the Dam this evening, at the stop Lock the Cross Guard Bank is nearly all gone at the abutment of the Dam. the water broke through the long Guard Bank, & took out over, a Hundred feet in Length, from that up some distance the Bank has slipt in at the Guard Lock the cross Guard Bank is gone, & from their down, their is about a thousand feet of the Guard Bank is washed away considerable several considerable gaps in it, & the sand from the stop Lock to the Guard Lock, will average some 2 1/2 to 3 feet. Just below the stop Lock the Tow path is washed considerable, & at the Lower end of the paveing their is a Breach of nearly three Hundred feet in length. Just below it their is a heavy bar of sand, from that down their is considerable sand to Groves Ware House. I have been getting along as I think very well at repairing the damage. I have been put back at the Dam in consequence of the loosing the shantee."

[207] W. S. Elgin, Superintendent, Harper's Ferry, to Charles B. Fisk, Chief Engineer, 3 June 1852 (Flood-April 1852)

Elgin informs Fisk he hopes to have the repairs on his division completed by July 1. He is presently engaged cleaning out the Seneca feeder.

[182] Board of Directors Meeting, 5 June 1852 (Flood-April 1852, Flood Damage-Financing)

"The President stated to the Board, that in conformity with the resolution pf the 29th of April authorizing loans for the repair of breaches in the Canal occasioned by the late flood, loans have been negotiated, and the money to be advanced as may be required by the Company, with the following parties, viz

The Corporation of Georgetown	\$30,000
" " Alexandria	10,000

Bank of the Metropolis	10,000
Patriotic Bank of Washington	5,000
Bank of Commerce Georgetown	2,500
Farmers Branch Bank, Alex.	5,000
Bank of the Old Dominion	5,000
Exchange Bank	5,000
that the water renters at Georgetown	
had advanced on account of rent to	
become due . . .	2,025
and sundry subscriptions had been made	
at Cumberland, amtg to . . .	<u>3,400</u>
total loans negotiated	\$77,925

for which bonds of the Company have been issued to amount of \$47,500, and that other bonds will be issued, from time to time, as the residue of the loans may be required."

"Advances from said loans have been made to the Supt. to be applied to the repair of breaches, amounting to \$35,000, which on motion was approved by the Board."

"Mr. Davigerfield stated to the Board, that after the expenditure of \$75,000 on the repairs of the Canal, if that sum should be found insufficient, and that the additional sum of \$5000 would be sufficient to complete the repairs, that W W Cocoran Esq had agreed to advance that amount on the bond of the Company."

"He also presented a paper from Selden Withers also agreeing to waive their lien upon the future revenues of the Company, heretofore pledged for the payment of interest on the bond of the Company; in favor of any loans which may be made for repairing the Canal, not exceeding \$80,000 . . ."

"A letter from Chs B. Fisk Chief Engr. dated this day was read, relative to the breach from the late flood in the guard bank at Dam No 6, suggesting to the Board, that the obligation on the part of the Company to keep up forever this guard bank, at considerable cost, the present of which, he estimates would cost upwards of 2000\$ can be arranged with the proprietor of the land, by the payment of 2000\$, who will, thereupon, release the Company from the obligation to restore, and keep up this guard bank. The Chief Engineer recommends for reasons therein stated, that such arrangement be made, whereupon on motion it was, Resolved, That the Chief Engineer be authorized to conclude an arrangement with the proprietor of said land, in conformity to the recommendation contained in said letter."

[190] Charles B. Fisk, Chief Engineer, Washington, D.C., to President and Directors, 5 June 1852 (Flood-April 1852, Sustainability-Dams)

In making repairs on the guard bank of Dam No. 6, Fisk suggests, ". . . it may be found best, in plan of restoring the old guard bank at right angles to the Canal with earth, to substitute a wall of masonry, rising to say 5 or six feet above the comb of the dam. The advantages would be that in times of very high water, there would be more room for the passage of water, and the work would be more permanent. The masonry wall would probably cost somewhat, but not much more than the earth bank."

#### "Appendix A"

Fisk recommends improvements to the canal "below the Great Falls and Seneca Falls, and in the neighborhood of Dam No. 3, 4, and 6." However, he does not specify the nature of those repairs.

[180] Twenty-Fourth Annual Report, 7 June 1852 (Flood-April 1852, Sustainability-General)

The C&O Canal president, Samuel Sprigg, reported:

"We had hoped in presenting the twenty-fourth annual report, to have exhibited in a more marked degree, the onward progress of the company; to have shown results more in consonance with the anticipations which have been excited; and to have rested with confidence on the future, in the security and good condition of the canal."

"In the large expenditures made with this view, within the last few years, predicated upon all former experience of the waters of the Potomac, we confidently believed, that this desirable end, had, in a great measure, been attained. The canal and its works were in fact secured against any material injury from floods of the river, such as had been previously known. A freshet similar to that of 1847, the highest then known for a period of sixty years, would have caused but a brief delay, for the restoration of navigation. But the disastrous flood of April last, far exceeded any reasonable precaution for the security of the canal, which would have been deemed necessary. The waters of the river rose six feet six inches higher than the flood of 1847; and, at a point where the greatest damage was sustained, in the vicinity of the Great Falls, rose to the unprecedented height of 64 feet. Two or three feet less elevation, at this point, would have left the canal almost without injury, from Seneca dam, to the Little Falls of the Potomac, a distance of 17 miles."

"The Chief Enginner estimates that the canal may be again restored and placed in a more secure condition than it was previously to the flood, for the sum of \$80,000; and that the navigation



can be again restored early in July. With as little delay as practicable, arrangements were made to procure the means requisite for the repairs, which for the greater part, were advanced to the company on the pledge of its future revenues, (subject to existing priorities,) by the Corporations of Georgetown and Alexandria, and by the Banks of the cities of Washington, Georgetown and Alexandria. No time was lost, in putting as large a force, as could be advantageously employed on such portions of the work, as required the longest period for their completion; and we trust that the expectations of the Chief Engineer will be realized, both in regard to the expenditures, and the time when the navigation of the canal may be resumed."

"To render the canal as effective and reliable of practicable, it will be seen, that an unusually large expenditure was made during the year 1851, amounting in the aggregate to \$90,402.75 of which the sum of \$33,973.30 was expended for general repairs, from the fund realized from the sale of bonds for repairs, guaranteed by the State of Virginia; \$3,501.86, under the head of construction; being for general improvements of the canal; \$51,425.03 for ordinary repairs; and only the comparatively small sum of \$1,502.50, for repairs arising from breaches in the canal."

"This would show the stability and good condition of the work; and is was confidently believed, that the expenditure required for the present year to keep the canal in good order and repair, would have been comparatively inconsiderable."

[180] Charles B. Fisk, Chief Engineer, Washington, D.C., to the President and Directors, 5 June 1852, in Appendix A, Twenty-Fourth Annual Report, 7 June 1852 (Flood-April 1852, Flood Damage Prevention-Proposed, Sustainability-General)

"I addressed a report to the Board, on the 29th of April last, upon the damage done to the canal by the great rise in the Potomac, that occurred on the 18th, 19th, and 20th of that month."

"In that report, I estimated 'that the sum of \$80,000, would be sufficient to do all the work necessary for the restoration of the navigation,' and expressed the opinion, 'that the work could be done, if means were at once provided, and with favorable weather, by the middle of July.'"

"The estimate, then made, I, as yet, see no reason to change, and although there was some delay in providing means, I incline to think the time, named for the restoration of the navigation, will not be exceeded."

"In fact, if the aim were merely to restore the canal to the condition, in which it was, before the fresh, a less sum and a shorter time would suffice. But it was thought best to aim at more than this, when it was found that an expenditure, at a few points, very small, in addition to the cost of repairs, at those points, would prevent should the rise again occur, very nearly, in not, fully one-half the damage that would otherwise be done to the entire line of the canal. (The points alluded to, are five in number. They are, respectively, immediately below the Great Falls and the Seneca Falls, and in the neighborhood of Dams No. 3, 4, and 6. The length of the canal, sustaining damage at these points, does not exceed, in the aggregate, six miles,) and, accordingly, work has been commenced, and is in progress, at these places, in addition to that required to restore the navigation, that will, in the event of another rise in the Potomac, equal to the recent one, reduce the damage, at them, from what it is, about \$40,000, to a sum not over \$3,000. And, although as great, or proportionate, a reduction as this, cannot be brought about, elsewhere along the canal, as at the points just named, by any work we may now do, or that it would be practicable to do, if means were ample, yet I do not hesitate to say that the repairs, generally, will be so made, and upon such plan, as to effect a sufficient additional reduction in damage, from another fresh, equal to the recent one, to make up, in the aggregate, a total reduction, upon the whole canal, of considerably more than one-half."

"In this connection, I would state, that since the occurrence of the fresh of 1847, which, until the late one, was the highest known of, within a period dating, back, many years preceding the commencement of the canal, in 1828; much work has been done to protect the canal against the floods of the Potomac; and, if the late had been of the same height, as that of 1847, the canal, instead of sustaining damage, as it did, *then*, to an amount exceeding \$50,000, requiring from two to three months for repair; would not, in consequence of the work thus done, have been injured over \$20,000, and would have been again navigable, in one month; for it was not, until the river rose considerably above its level, in 1847, that any damage, whatever, was done at the points, particularly spoken of, as those where the greatest damage was done since 1847, for the protection of the canal against high water, did not, at all points, answer that purpose, for a rise like the late one; yet, at many points, but for that work, the damage would have been much greater than it is."

"That the late freshet was unprecedented, for height, so far as our information extended as to the past, is, literally true. I have been in the valley of the Potomac, upon the line of the canal, for the last twenty-three years; and during that period, particularly in the last ten years, have spared no pains to get the highest reliable water marks of the Potomac; and I now state, that I have met with none, above, or even as high, as those left by it, in April last. The fresh in 1847, as already remarked, was regarded as a very high one; yet the late one rose above it, from the Point of Rocks to the mouth of the South branch, a distance of 116 miles, from five to six feet; and immediately below the Great Falls, it rose about *sixty-four* feet above low water, and eight feet above the fresh of 1847."

"In view of the preceding facts, the Canal Company may, I think, congratulate itself upon having a work that will, when the present repairs and improvements making them are completed, be so little liable to serious damage from casualties like the recent one; and to which, a flood in the Potomac, as high, as well as can be ascertained, as any within the last hundred years, could not do damage exceeding \$40,000."

[190] L. Benton, Superintendent, Lock No. 38, to W. S. Ringgold, Clerk, Washington, D.C., 12 June 1852 (Flood-April 1852)

Benton states, "if my force remains with me, I expect to let the water in from Dam No. 4 to Shepherdstown on next Saturday evening & in a few days after all the way through."

[207] John G. Stone, Superintendent, to Charles B. Fisk, Chief Engineer, 14 June 1852 (Flood-April 1852)

"The rain has delayed us some but we will be ready to admit the water at Dam No. 5 the last of this week. Since the river has got down I can now see that nearly all the filling is off of the Dam, indeed I do not believe we can put a full head of water in the Canal next month. The Dam must be tightened or the fall trade will be very poor."

[194] W. S. Ringgold, Clerk, Washington, D.C., to [illegible], Clerk, Committee of Georgetown Corporation, 16 June 1852 (Flood-April 1852, Flood Damage-Financing)

"Loans have been made to the Company for repairing the breaches to the Canal by the following parties viz

Corporation of Georgetown	\$30,000	of which	20,000	has been paid	
" " Alexandria	10,000	"	-----	"	
Bank of the Metropolis	10,000	"	9,000	"	
Patriotic Bank	5,000	"	4,000	"	
Bank of Commerce, Georgetown	2,500	"	1,500	"	
Farm Br Bank, Alex.		5,000	"	2,000	"
Bank of the Old Dominion	5,000	"	2,000	"	"
Exchange Bank		5,000	"	5,000	"
Water notes of Georgetown	2,000	"	2,000	"	
Individual & Bank loan at Cumb	<u>3,400</u>	"	-----	"	
			\$77,900	\$45,500	"

"There are other parties who agree contingently to make up the amount of \$80,000 provided it should be required to complete the repairs, when the above sum shall be expended. Of the amount recd from the Corporation of Georgetown \$15,000 have been paid to Mr. Lambie to be expended on this Division between Georgetown and Seneca Dam and \$5000 have paid to Mr. Elgin to be expended on his Division, from Seneca Dam to Harper's Ferry."

"The Corporation of Alexandria pay their bonds of 1000\$ each, bearing interest from date of which report has yet been sold."

"The balances remaining at the Banks to the credit of the Company, as well as the subscriptions at Cumberland will all be drawn in the course of the present month; and Mr. Lambie informs me that his work has so far progressed, that by the close of the present month it will require the amount still unpaid by the Corporation of Georgetown, say \$10,000, to meet his engagements; which I trust will be available by the Committee."

[182] Board of Directors Meeting, 24 June 1852 (Flood-April 1852, Flood Damage-Financing)

"On motion is was,  
Resolved, That the President be authorized and requested to dispose of, or borrow money on the hypothecation [?] of, the bonds of the Corporation of Alexandria, to be issued on payment of the loan of said Corporation to the Company, for repairing the Canal, in such sums and at such terms, as in his judgment the interest of the Company may require it and also in case said bond be hypothecated [?], that he be authorized to issue the bonds of this Company if requisite, for such sums of money as may be borrowed on said hypothecation; and from time to time, as it may become necessary, to issue requisitions for the payment of said bonds, and for the interest accruing thereupon."

"On motion it was,  
Ordered, That the interest becoming due on the 1st July next, on the bonds of this Company, issued for repairs, and guaranteed by the State of Virginia, be paid at maturity, and that a requisition therefor be deposited with Selden Withers & Co."

"Ordered, That the Treasurer give notice by advertisement of the National Intelligencer, that in consequence of the injury sustained by the Canal from the flood of April last, the large sum required to repair the breaches, and the loss of revenue for two or three months, that the Company will unavoidably, be compelled to suspend the payment of the interest coupons on the bonds issued for the completion of the Canal to Cumberland, becoming due on the 1st of July ensuing."

As further evidence of the company's dire financial straits, at the same Board meeting the Directors ordered the Chief Engineer to identify any surplus company land that might be sold.

[210] Charles B. Fisk, Chief Engineer, Washington, D.C., to William Park, General Superintendent, Baltimore and Ohio Railroad, 25 June 1852 (Flood-April 1852, Sustainability-Dams)

"The time had arrived when it is necessary to decide whether an earth bank or wall of masonry shall be put in at the breach around the Virginia abutment of Dam No. 6."

"May I ask of you the favor of informing me at your earliest convenience by letter, addressed to me at this place whether or not, stone could be obtained for if the masonry wall should be determined on, and transported by the Railroad from the quarry referred to in my letter to you of the 25th ult., and if they can, upon what terms."

[182] Board of Directors Meeting, 14 July 1852 (Flood-April 1852, Flood Damage-Financing)

"The President stated to the Board that in compliance with the resolution of the 24th of June last, he had obtained from the Banks of Alexandria, loans amtg to \$10,000, on the bonds of the Company; on depositing with said Bank for sale, and as collateral security, the same amount of the stock of the Corporation of Alexandria, issued to this Company, in aid of the repairs of the Canal, which on motion, was approved."

[190] Charles B. Fisk, Chief Engineer, Dam No. 6, to W. S. Ringgold, Clerk, Washington, D.C., 16 July 1852 (Flood-April 1852)

The water rises again in July . . .

"The water which was 10 feet below the top of dam no. 6 is now only 2 feet. It is still rising rapidly. By working night and day, and some of the men for 18 successive hours, we have got our bank in a condition that induces me to think we may save it. Yesterday I had very little expectation of doing so."

[190] W. S. Elgin, Superintendent, near Seneca, to W. S. Ringgold, Clerk, Washington, D.C., 16 July 1852 (Flood-April 1852)

Elgin lets Ringgold know he has passed water through his division.

[194] W. S. Ringgold, Clerk, Washington, D.C., to Charles B. Fisk, Chief Engineer, 17 July 1852 (Flood-April 1852)

"I received your letters of the 14th, 15th & 16th Inst, and am glad to learn from the latter that you have a fair prospect of saving the bank at Dam No 6. any disaster there at this time would produce much embarrassment and dissapointment."

[194] William Grason, President, Washington, D.C., to W. W. Corcoran, Washington, D.C., 19 July 1852 (Flood-April 1852)

"The damages done to the Canal by the recent April freshet are now so far completed, that water has been admitted into the entire length of the Canal from Cumberland to Georgetown; but not to the full depth throughout. By friday next, the depth will be Sufficient for all the purposes of navigation. At that time the Sum of 5000\$ in addition to thee sums derived from other sources will be needed for the payment of hands that will be no longer in the Company's employ, and of such bills chargeable to the repair of damages occasioned by the freshet as were to be paid upon the restoration of the navigation. Understanding that you have expressed a willingness under circumstances like those above stated, to loan the Canal Company five thousand dollars . . ."

Note: four superintendents of the canal were dismissed for political reasons in July of 1852. This led to the resignation of Charles B. Fisk, the Chief Engineer. See Charles B. Fisk, Chief Engineer, Washington, D.C., to the President and Directors, 19 July 1852.

[CF] [207] John Lambie, Superintendent, to Charles B. Fisk, Chief Engineer, 1 September 1852 (Flood-April 1852)

"Statement of repairs of damage done by the late Freshet . . ."

[Original in Box 12 of #207]

[190] James Condry, Superintendent, Hancock, to W. S. Ringgold, Clerk, 4 September 1852 (Flood-September 1852)

The water rises yet again in September . . .

"Dam No 6 was nearly gone the last freshet 6 inches more would have run over the imbankment we saved it by working last sunday night"

[190] W. S. Elgin, Superintendent, Edwards Ferry, to W. S. Ringgold, Clerk, 12 September 1852 (Flood-September 1852)

"I am sorry to have to report another Breach in the canal caused by a heavy rain which fell in the neighborhood on yesterday evening. It is on the 35th mile near Hillarys Farm . . ." Elgin inidated the breach was the heaviest on the Division in some years, and would take 10 days and \$1,500 to fix.

[190] John C. F. Salomon, Civil Engineer, Georgetown, to the President and Directors, 27 September 1852 (Flood Damage Prevention-Proposed)

"Having had occasion to survey the line of the Chesapeake & Ohio Canal, for some distance above Georgetown. I have projected a plan for improving the same, and herewith transmit it for your consideration, and request that it may be laid before the Directors of the Canal Co. for their examination, and, in the hope, that it may meet your, and their, approval."

"The accompanying Diagram exhibits the line of the Canal from the Little Falls to the site of 'The Old Chain Bridge.'" [Diagram missing]

"I propose to erect, just above the 'Magazine' (below the Little Falls) a Dam or Breakwater (A) across the Canal, extending from the Peninsula, (formed by the River and the 'Feeder,') to hill-side North of the Canal; said Breakwater to have two Stop-locks therein, viz, one in the 'Feeder' and one in the Canal, (2.3) so that, in case of freshets, the water of the River will be thrown over to the Virginia Bank, (by closing the Stop-locks) and a still-water basin be formed, at the head of the "Feeder," on the North side of the Potomac, leaving the channel, on the South-side, always free and unobstructed."

"The Breakwater should be raised to about ten feet above the level of the Canal."

"The embankment (see dotted red line) on the South side of the 'Feeder,' from the Dam or Breakwater, to the Stop-lock on the Feeder, (now in use) just above the Lock in the Canal, should be elevated to the same height as the Breakwater. The tow-path or embankment (B) in the South side of the Canal, being a continuation of the embankment of the 'Feeder,' should continue at the height to the abutment at the 'Chain Bridge.'"

"Had such a dam or breakwater and embankment existed during the great freshet of April 20 & 21, 1852, the heavy damages then sustained, on the lower levels of the Canal, by the Company, and by traders on its waters, and by mill owners, could not have occurred, as by making still-water above, and shutting out the flood below. No washing could have been made."

"The expenses of such an improvement would be small in comparison with the great advantages that would accrue from it."

"The tow-path both above and below the Breakwater would, of course, require to be graded to inclined plains."

[190] W. S. Elgin, Superintendent, to President and Directors, 29 September 1852  
(Flood-September 1852)

"I have this moment & too late for mail of to day requesting me to communicate to you the cause of the Late Breach on the 35th mile."

"In compliance with the above instructions I respectfully make the following report in regard to it, on Saturday the 12th Inst. there was the heaviest rain that has fallen for years, in the neighbourhood of the Breach, and many ravins and Branches, emptying into this level, which caused the Breach and a very Heavy one it being above 8000 c yds Embankment to rebuild it. I arrived at it on Sunday morning about 4 Oclock and found the Packet Boat President in the middle of it, which I am of opinion caused its extent at Least double to what it would have been had it not got into it. I immediately commenced its repair with all the force I could obtain; But being Taking very Ill during its repair I could not give my personal attention to it for a portion of the time." Still, Elgin managed to have the water on the Canal again by September 24.

As a result of the breach, Elgin launched a probe of the fitness of lockkeepers on his division and recommended the dismissal of the keepers of Locks 26 and 30 for inattention to their duty.

[182] Board of Directors Meeting, 1 October 1852 (Flood-April 1852, Flood Damage Prevention-Proposed)

"A letter from John Lambie Supt. Geotown Divn dated the 29th of Sept. was read, stating that the Lockhouse at Lock No 5 had been carried away by the freshet of April last, and suggesting the propriety of building a suitable Lock house &c"

"A letter from J C F Saloman dated the 27th Sept proposing various improvements on the Canal from the Little Falls to the Chain bridge, accompanied with a diagram, which he thinks if made, will prevent damage from future floods &c &c."

[194] William Grason, President, Washington, D.C., to Thomas L. Patterson, 1 October 1852  
(Flood Damage-Lack of Diligence)

Grason offers Patterson the position of Chief Engineer of the canal. Grason warns Patterson, "Mr. Elgin has been removed in consequence of the accident on his division, which it is generally thought might have been prevented by ordinary attention."

[194] W. S. Ringgold, Clerk, Washington, D.C., to Thomas H. O'Neal, Secretary of State, 16 December 1852 (Flood-April 1852, Flood Damage Prevention-Accomplished)

"The navigation of the Canal was . . . suspended in consequence of the injuries sustained by the heavy flood of April preceeding, and the repairs, then in progress, were not completed so as to admit the water into the Canal & the resumption of the navigation until near the end of July . . .

. The repairs recently made were intended to protect the Canal as far as practicable against a freshet as high as that of April, and it confidently believed that in the want of a similar disaster, much less injury would be sustained, both as to the cost of repairs and the time required to make them. The actual cost of restoring the Canal from the injuries sustained in April last, will amount to about \$100,000, to which must be added the loss of revenue during the suspension of navigation; the general interruption of business connected with, and in some cases devastated [?] from the Canal; the postponement of arrangements contemplated for the coal trade; the want of confidence to some extent in the Canal as a reliable source of transportation, and the entire loss to the Company by the matter [?] cannot be estimated at less than \$200,000."

1853

[190] William P. Sterett, Superintendent, Cumberland, to President and Director, 22 February 1853 (Flood-April 1852, Flood Damage Prevention-Proposed)

"The whole of my division except some nine or ten miles is now in good order, and ready for the Spring trade So soon as the weather will justify its commencement. The portion excepted was injured by the flood of May [?] last, and although the injury will not present the use of the Canal, it will require an expenditure of about four thousand dollars to put it in as good condition as it was before the flood. This sum though need not be expended at once. The sum of twelve hundred dollars expended on it yearly will be sufficient to secure it against all danger and will advance the repairs at that rate untill it is entirely restored. Other parts of the line require constant attention, a considerable portion of the line above the Tunnel should be ripped to prevent the banks from washing. The force that will be required to keep up the ordinary repairs during the approaching season, will be two bosses two or three and about twelve men, laborers, in two parties."

[182] Board of Directors Meeting, 2 March 1853 (Flood Damage Prevention-Proposed)

"A letter from Wm. P. Sterett Supt. Cumb. Divn. dated the 22nd of Feby was read, reporting the state of his Division, suggesting various improvement, thereon, and the extensin of the same to Dam No 6 . . . "

[182] Board of Directors Meeting, 8 April 1853 (Flood Damage-Financing, Flood Damage Prevention-Financing)

The Board of Directors approved payments for:

"2d, The Treasurers payments for interest on Certificate of debt for repairs &c prior to 1845 (issued under the resolution of Board of the 8th of Dec 1857.) from the 1st of Oct, to the 31st of Dec 1852 amtg to \$187.80."

"4th Coupons on the repair bonds of the Company issued under the Act of Virginia of the 15th of March 1849 and guaranteed by said State, which have been paid as follows, viz payable 1 July 1852 \$5760."

[182] Board of Directors Meeting, 9 April 1853 (Flood Damage Prevention-Ordered, Sustainability-Dams)

"The Gen Supt. having represented the expediency of making repairs to Dam Nos 4&5 for their protection."

"On motion it was, Ordered, That the Gen Supt. be directed to have such improvements and repairs made at Dams 4 & 5 as he may deem expedient for the Security and efficiency of said Dams; and that he be authorized to make such contracts therefor, as he may deem expedient and proper."

[180] Twenty-Fifth Annual Report, 6 June 1853 (Flood-April 1852, Flood Damage Prevention-Accomplished)

The C&O Canal president, William Grason, reported:

"The annual report submitted to the stockholders last June, contained a full account of the affairs of the company to that time, and of measures adopted for repairing the damages caused to the canal by the freshet of the previous April."

"It was there estimated that the expenditures for repairs would amount to \$80,000, and that the navigation of the canal would be suspended till the first or second week in July. The amount required for this purpose, was liberally advanced by the banks of Washington, Georgetown, and Alexandria; by the authorities of the last two named cities, and by Messers. Corcoran and Riggs. The cost however, exceeded the estimate, because it was thought advisable to guard, as far as possible, against future accidents, by making improvements at certain points, in addition to the necessary repairs. These improvements increased the whole expenditure to about \$100,000, and delayed the opening of the canal until the last of July. Boats began to pass between Cumberland and Georgetown early in August, but the navigation was again suspended, for about three weeks, in consequence of breaches in the canal, which occurred in that month and September."

"The flood of April and the subsequent breaches limited the operations of the canal, in the year 1852, to a period of six months."

[180] Thomas L. Patterson, Engineer and General Superintendent, Washington, D.C., to the

President and Directors, 1 June 1853, in Appendix A, Twenty-Fifth Annual Report, 6 June 1853  
(Flood-April 1852, Flood Damage Prevention-Accomplished, Flood Damage Prevention-Proposed)

"The whole line is now in excellent boating order, and the levels, with two or three exceptions, have from five feet nine inches to six feet depth of water, and will all be capable of bearing the full depth of six feet, so soon as portions of the banks shall have been raised to the proper height; this work has been steadily going on since the opening of navigation in July last. The draft of water at present allowed to boats, is four and a half feet, and for this draft, there is sufficient depth of water in all parts of the Canal except for a short distance in Washington city, where the depth has been lessened by the formation of bars, which are now being removed."

"The damages caused by the freshet of April, 1852 have been repaired in the most thorough manner, and the plans of Mr. Fisk for that purpose, have been carried out, so far as the means at our disposal would admit."

"It is a subject of congratulation, that this freshet occurred when the trade of the Canal was in its infancy; and the fact, that a freshet six feet higher than any ever known or attempted to be guarded against, should have done, comparatively, so little damage, cannot fail to give well founded confidence in the security of the Canal, when it is considered, that the points where two thirds of this damage was sustained, have been rendered secure against even a higher freshet, by the substitution of a heavy wall of masonry for the embankment carried away at Dam No. 6 and by raising the guard banks at other points several feet higher than the level of the freshet, and paving and rip-rapping them."

"The only work, for security, still unfinished, is at the 'Great Falls' of the Potomac; this is now in course of construction by Mr. Lambie, the energetic superintendent of the Georgetown Division, and will be completed early in July. It is not probable, when this work shall have been completed, that the navigation would be obstructed for more than a few days by any freshet not higher than that of last year."

Since the opening of the canal to Cumberland, wastes have been constructed on all the levels subject to overflow by high water in the river. I have directed them to be extended, where it was practicable, and new ones constructed at other suitable points, so that the canal may be considered secure from breaches of any importance, caused by such overflow."

"The Locks are, generally in good order. Some of them require new gates, and other repairs which can be effected by the mechanical force ordinarily employed by the several superintendents without any suspension of navigation. The construction of a feeder flume has been commenced at Guard Lock No. 4, which will do away with much difficulty heretofore existing at that point, owing to the suspension of feed during the lockage of boats."

"The aqueducts are in good condition, and require no repairs."

"The Culverts are in good condition with very few exceptions, and these will be repaired in due time."

"The Dams at 'Little Falls' and Seneca, require extensive repairs, to put them in permanent condition to preserve water at a proper height, to supply the large quantity of water required for the lower end of the Canal. These repairs have been going on during the last season, and will be continued, from time to time, as they can be made to advantage."

"Dam No. 4 will be raised and tightened so as to furnish a full supply of water at the required level; this can be effected at small cost, and will do away with the difficulty experienced at that point, during low stages of water."

"A portion of Dam No. 5 will be taken in hand, as soon as the height of the water in the river will permit, and its section changed so as to conform more nearly to that of Dam No. 6--a change which will free it from the effects of reaction during freshets, by which it has heretofore been very much injured."

[190] John Lambie, Superintendent, Georgetown, to W. S. Ringgold, Clerk, 12 July 1853  
(Flood-April 1852, Sustainability-Dams)

Lambie complains the damage in Dam No. 1, created by the April 1852 freshet, was making it difficult for him keep up the water level in the lowest portion of the canal, and that sand bars left over from the flood were further impeding navigation.

[182] Board of Directors Meeting, 28 July 1853 (Flood Damage-Financing, Flood Damage Prevention-Financing)

The Board of Directors approved payments for:

"3d, The Treasurers payments for interest on Certificate of debt for repairs prior to 1845 (issued under the resolutions of the Board of 8 Dec 1847) from the 1st Jan'y to the 30th of June, 1853 amt'g to \$1499.97."

4th Coupons on the repair bonds of the Company issued under the act of Virginia of the 15 Mch 1849 and guaranteed by said State, which have been paid, viz, payable on the 1st of July 1852

\$210 and recommend that said coupons be destroyed by burning."

[180] Report of William Grason, President, to Adjourned Stockholders Meeting, dated 3 August 1853 (Sustainability-Dams)

"The condition of dams Nos. 4 and 5 was generally known that it was not considered necessary to make a reference to it in the annual report of the President and Directors. But as the trade of the canal has been recently interrupted by that cause, the stockholders may probably desire some information on the subject. These dams, badly constructed at first, and injured by repeated floods, have not been in a proper condition for many years past to supply the levels below with sufficient depth of water in very dry seasons. Mr. Fisk, in his answers to Capt. Swift and Mr. Hale in 1846, informed these gentlemen that dams Nos. 4, 5, and 6 required considerable repairs to secure a sufficient supply of water in ordinary seasons. He informed me also, soon after I became connected with the company, that it would require about \$40,000 to repair, or rather to reconstruct dams Nos. 4 and 5; and that he was turning his attention to the subject when the flood of 1852 made it necessary to exert all his energies and to apply all the resources of the company to the great object of restoring the navigation of the canal. Under his direction the object was accomplished; and dam No. 6, which had been swept away, was not only repaired, but improved in such a manner as to secure it from similar accidents. This improvement, however, was not commenced till late in September last [1852]; at which time the company had expended in repairs about \$25,000 beyond the amount borrowed for that purpose. To pay this balance and to meet current expenses of the company required all its revenues; and it was therefore impossible to make the necessary improvements in dams Nos. 4 and 5 last fall. And this was considered less important because it was the opinion of Mr. Fisk that, with occasional repairs, they might be made to answer till the company has the means of placing them in a proper condition. But as the opening spring trade prevented a prospect of larger revenues, and as the importance of keeping the canal in navigable order was in proportion to its increasing business, the Board determined to take the necessary steps for thoroughly repairing both dams with as little delay as possible.

It was known that the actual repairs could not be commenced while the water was high in the river, which was the case till the last of May; but it was considered necessary to provide the materials in time, and the board consulted the chief engineer on the subject early in March and finally passed the following order on the 9th of April:"

'Ordered: That the General Superintendent be directed to have such repairs and improvements made at dams Nos. 4 and 5 as he may deem expedient for the security and efficiency of said dams; and that he be authorized to make such contracts therefor as he may deem expedient and proper.'

"This order was intended to give him full authority to contract for lumber and other materials, and for the employment of necessary force, and to commence the work and direct every thing according to his own judgment. In a written report, just made to the Board, he states that he had taken all the proper steps in the discharge of his duty; that, as soon as the fall of the river discovered the defects in the dams, he employed a considerable force in depositing gravel, and slate in proper places to stop the leaks, and to prevent them in future; and that he now has a large number of laborers engaged in the work, which will be continued till the repairs are completed."

[182] Board of Directors Meeting, 8 September 1853 (Sustainability-Dams)

"Ordered, That the Engr & gen Supt be directed to report to the Board, at their next meeting, the present state and condition of Dams Nos 4 & 5; the repairs that may require to render them effective; the probable cost of such repairs, and time required to make them, and also his opinion of the expediency of making such repairs, in whole or in part, or, of reconstructing in whole or in part said Dams, or either of them, the most suitable plan for such repairs, or reconstruction; and the probable cost as time to effect them."

[190] B. F. Semmes, Georgetown, to Unknown, 8 September 1853; Robert Watson and James Fitzpatrick, to Unknown, 8 September 1853 (Miscellaneous)

Semmes reports on the state of the C&O Canal between Georgetown and Hancock, and Watson and Fitzpatrick on the canal between Hancock and Cumberland.

[182] Board of Directors Meeting, 28 September 1853 (Sustainability-Dams)

"A report from T. L. Patterson Eng & Gen Supt. dated this day was read, relative to Dams Nos 4 & 5, making estimates for repairs or reconstruction of said Dams; which having been considered; as the season of the year was so far advanced, as to render it unsuitable for the repair or reconstruction of the dams, the Eng & Gen Supt. was directed to proceed under the order of the 9th of April last, and collect at the proper point, such materials as may be required for repairing the Dams &c."

1854

[182] Board of Directors Meeting, 9 March 1854 (Flood Damage-Financing, Flood Damage Prevention-Financing)

The Board of Directors approved:

"2d Treasurers payments for interest on certificates of debt for repairs &c prior to 1845 (issued under the resolution of the Board of the 8th of Dec 1847) from the 1st of July to the 31st of Dec 1853, amtg to \$378.64."

Note: there is no record of payment made on the repair bonds guaranteed by the State of Virginia in 1849.

[182] Board of Directors Meeting, 2 June 1854 (Flood Damage-Financing, Flood Damage Prevention-Financing)

The board does not mention any payments made on the repair bonds guaranteed by the State of Virginia in 1849, during the review of accounts, although there is discussion of certificates issued by the company in lieu of interest on unpaid bonds for the completion of the C&O Canal to Cumberland.

[180] Twenty-Sixth Annual Report, 5 June 1854 (Flood Damage Prevention-Abandoned, Sustainability-Dams)

The C&O Canal President, William Grason, reported:

"The present condition and management of the canal cannot be understood without a knowledge of the circumstances which attended its completion to Cumberland. It will be recollected that, while the unfinished portion of it was under contract, it was found necessary to make extensive repairs between dam No. 6 and Georgetown, so as to prepare the whole line for the increased trade expected from its completion."

"The canal below dam No. 6, originally defective in the construction of its dams and banks, had been seriously injured by the freshets of 1843, '46, and '47; and its condition was becoming worse every year, because the revenue of the Company had never been sufficient to keep it in repair. In General Coale's letter of resignation it is stated, that the lower part of the canal was in 'such bad condition in consequence of the previous inability of the Company to procure the necessary means to put and keep it in repair, as to be ordinarily incapable of floating boats with more than from sixty to seventy tons, and almost every overflow of the Potomac produced serious breaches in the culverts and embankments, and temporarily suspended navigation.'"

"In his report of February, 1851, he states, that in 1846 and '47, 'a series of freshets, which, in magnitude and rapidity of succession, were without example, occasioned considerable damage to the canal, particularly on the lower division; and scarcely was sufficient time afforded to mend the breaches occasioned by one, before they were renewed by another inundation of the Potomac.'"

"It is also stated in the same report, that in 1848, 'boats could seldom carry more than seventy tons, in consequence of the accumulation of deposits in the bed of the canal, and the insecurity of the embankments, which prevented the admission of the full depth.'"

"The President and Directors, perceiving the necessity of repairing the lower division of the canal by the time the unfinished portions were completed to Cumberland, and having no other resource, appealed to Virginia for the means of accomplishing this at \$200,000; and expressed the opinion, that, 'with this sum they felt satisfied that the canal could be put in complete and thorough repair, and rendered capable of maintaining a navigation sufficient for all necessary purposes.'"

"The Legislature of Virginia passed an act, in March, 1849, to guaranty the bonds of the Company for the amount specified; and the repairs and improvements were commenced in August of the same year; and completed in time for the opening of the canal to Cumberland. It was the impression of General Coale, as communicated to the stockholders, the 27th of February, 1851, that 'the canal was then strong, and in excellent order, throughout the entire line.'"

"This impression, derived from the reports and opinions of others, appeared to be justified by the events of 1851, during which year, however, there was neither drought, freshet, nor trade, of sufficient extent to test the condition or capacity of any part of the repairs, and of the original works, but left ample evidence that the aid granted by Virginia, was not sufficient for the purpose for which it was required. Indeed, it could hardly have been expected, that one hundred and thirty-four miles of canal, in the state already described; requiring the removal of obstructions, and the reconstruction of dams, culverts, and embankments, could have been placed in the condition supposed by General Coale, without the expenditure of a much larger sum than two hundred thousand dollars."

"the dams from No. 5 to the Little Falls inclusive, having been badly constructed, and subsequently injured by freshets, required annual repairs; and have remained in an imperfect condition to the present time. Dam No. 6 was materially injured by the flood of 1852, but the earthen bank, which was then destroyed, has been replaced by a substantial stone wall, which secures it from all ordinary accidents. When the present Board came into office, dams No. 4 & 5 were described by Mr. Fisk, as originally defective, and as being then in an unsafe and leaky condition; and it was his opinion, that it would require \$40,000 to make them efficient and secure. He thought, however, that temporary repairs might answer, to prevent leakage, till the Company had the means of improving them permanently. Mr. Fisk was then occupied in directing the repairs, which were made necessary by the recent flood, and which required the expenditure of more than \$100,000. Our predecessors had made great efforts to provide the requisite funds, and had succeeded in borrowing \$75,000. The present Board borrowed an additional sum of \$5,000, and were obliged to depend upon future tolls for the balance. The trade of the canal, after having been entirely suspended for more than three months, was resumed in July, but the repairs of dam No. 6 were not completed till the following October. The credit of the Company being then exhausted, and its resources pledged for expenses already incurred, it was considered necessary to postpone arrangements for rebuilding dams No. 4 and 5, till some improvement in its affairs



afforded a prospect of succeeding in the attempt. In the spring of 1853, the revenue began to increase, and preliminary steps were then taken to repair dam No. 5, at which point, boats were most likely to be delayed. But the difficulty of procuring and delivering timber at the proper time, and the probability of a falling off in the revenue, in consequence of the detention of boats, prevented the commencement of the work during last summer. The only alternative left, was to endeavour to stop the leaks in the dam with earth, gravel, and other materials, which means had been previously used for that purpose with apparent success. But the effect of such remedies is always uncertain, because the leaks are concealed by the water, and the materials, if deposited in the right place, are apt to be removed whenever there is a sudden rise in the river. As soon as the dry weather commenced, a large force was employed at the dam; but the efforts to prevent it from leaking, though occasionally attended with partial success, were generally unavailing. Whenever the river was low, boats were delayed at this point; and the trade from Cumberland was interrupted for about five weeks; in June and July, in which months there was a severe drought. In July, committees of the Board visited the different divisions of the canal, with a view of ascertaining the condition of the whole line. The Chief Engineer and Mr. Byrne, in company with the President of the Company, examined every portion of it between Harper's Ferry and dam No. 5. Boats were then aground, immediately below the dam, though there appeared to be a sufficient supply of water in the basin above it. It was discovered, by sounding, that, where the boats were aground, there was less than four feet of water, while it was known that the lower portions of the same level were of the requisite depth. This part of the level, which was too shallow, for about a mile in extent, was deepened last winter; and as steps have been taken to repair the dam thoroughly, according to the plan recommended by the Chief Engineer, it is believed that the trade of the canal will be less liable to the interruptions, which have occasioned so much loss and inconvenience."

"Dam No. 4, though it has been kept tight enough to supply the level below it, is considered more insecure than dam No. 5, and more likely to be injured by floods. It is the opinion of the Chief Engineer, and of others whose judgment can be relied on, that, on account of its original defects, it will cost more to repair it thoroughly than to make a new dam alongside of it, which can be done without interfering with the navigation of the canal. Steps have been taken to ascertain the cost of a new dam; and competent and respectable parties have proposed to undertake the work on reasonable and satisfactory terms. But as the official term of the present Board was about to expire, we preferred leaving it to our successors to decide the question, whether a new dam ought to be made or the old one repaired, and to enter into such contracts, for either purpose, as would be most satisfactorily to themselves. The dams at Seneca and the Little Falls, which also required extensive repairs, have been considerably improved, and the current revenue will now be sufficient, not only to reconstruct dam No. 5, but to keep the entire line of the canal in proper order, if the necessary amount can be borrowed for rebuilding dam No. 4. This amount will only be required in small sums to meet the monthly requisitions of the contractor; and as so many capitalists have pecuniary interest in the operations of the canal the necessary funds could probably be procured without difficulty; especially when it is known, that the expenditure for so useful a purpose would not only furnish the means of repaying the loan, but would soon enable the Company to resume the payment of interest on its preferred bonds."

Some more wishful thinking . . .

"When the contemplated improvement are made in the dams, nothing will be required except ordinary repairs to keep the canal in navigable order, till the number of boats is so largely increased as to make it necessary to provide feeders for the levels near Cumberland. The experience of last summer proves that a considerable addition may be made to the trade of the canal, without an additional supply of water above dam No. 6. During the extraordinary drought which then prevailed, boats of the largest size passed through these levels without difficulty; and whenever the increasing trade makes it necessary to provide feeders, the consequent additional revenue will afford the means of defraying the expense."

[182] Board of Directors Meeting, 6 July 1854 (Flood Damage Prevention-Ordered, Sustainability-Dams)

"The Committee appointed last evening to report upon the inspection and travel on the Canal, made the following report:"

"The undersigned Committee appointed on behalf of the Directors of the Ches. & Ohio Canal Company to report to the Board the result of their inspection and travel upon the Canal, beg leave most respectfully to report: That they found the general line of the Canal in much better condition than they expected, from the rumours they had heard in regard to it. They found that all the points along the line of the Canal where the freshets of 1847 & 1852 had so terribly injured the work, and for so long a time in 1852, stopped all operations upon it, had been so repaired or reconstructed, as in the judgment of your Committee to render like disasters hereafter highly improbable, if not impossible. In saying this much however, your Committee feel bound in candor to state, that the canal is far from being perfect or complete; but that a considerable amount of money is now required to be expended on the work, to render it at all points secure and properly to develop its resources. They further beg leave to say, that they are not at present prepared in detail to submit these things to the Board."

"With regard to Dams Nos 4&5 upon the Canal, your Committee report, that they found them generally in bad condition, requiring attention. They are not at this time, in the absence of any written report or recommendation of the Chief Engineer with respect to these dams, prepared to recommend precise action to the Board. The Board directed particular care and attention to be paid to both dams, by the Superintendents, until such report can be had, and final action decided upon. They do not anticipate any immediate bad result from either dam, with care and proper prudence and attention on the part of the Superintendents."

"Your Committee recommends that a written report of the Chief Engineer with regard to both these dams, with full statistics as to amount of material, cost, time of construction &c, the performance of construction of new work, or repair of old work, and the reason in either case &c, be required to be made to the next Board meeting in August."

"Resolved, That the resolution of the 9th of April 1853, directing the Eng & gen Supt. to make certain repairs at Dams Nos 4 & 5 and authorizing him to contract therefor at his direction, be and it hereby rescinded, and that the Eng & gen Supt. be directed to report to the next meeting of the Board, what arrangements and expenditures have been made under said order."

"Ordered, That the Supts. of the Antietam & Williamsport Divisions, on which are located Dams Nos 4 & 5, be directed immediately to execute such work on said dams, as may be necessary and pressing to keep up the supply of water, and the navigation of the Canal uninterrupted; and that they report in writing forthwith to the President & Directors the measures taken therefor."

[182] Board of Directors Meeting, 10 August 1854 (Sustainability-Dams)

"A report from Tho. L. Patterson Eng. & gen Supt. dated this day was read, relative to the condition and repair of Dams Nos 4 & 5 &c &c, which on motion was laid upon the table."

[182] Board of Directors Meeting, 19 October 1854 (Sustainability-Dams)

"A report from A K Stake gen Supt. dated this day, relative to the condition and repairs of Dams Nos 4 & 5 &c &c."

[CF] [190] A. K. Stake, General Superintendent, to [President and Directors], 19 October 1854 (Sustainability-Dams, Flood Damage Prevention-Accomplished, Flood Damage Prevention-Proposed) "Special Report"

"In obedience to your order, I submit the following report: Having given all the time I could, consistent with my other duties, to an investigation of the condition of Dams No 4 & 5, I have arrived at the following conclusion: at Dam No. 4 three plans are proposed: First a dam of Masonry this is of course the best and most reliable means of Securing a Supply of water to the Antietam division, the objection I see to this plan is the time necessary for its construction, this would consume two or perhaps three seasons. I estimate the cost of a good masonry Dam at but little of less than 65 thousand dollars."

"The Second plan proposed is a Succession of cribs of timber thrown across immediately below the present Dam, and Secured to it. This is perhaps the cheapest method that could be adopted, but, there are objections to it which would make it preferable to adopt the third plan, which is to thoroughly overhaul the old dam, replacing the decayed timber, renewing the filling, and remedying the defects known to exist in its original construction, this could be done by means such are now being used at Dam No 5, and at cost which would not exceed 25000\$ and might fall short of that amount, the expense would be regulated by the amount of timber and materials necessary to be removed and replaced. My estimate will cover the largest amount that could possible be required. I feel assured that much of that would be saved. I consider this as the best method, next to a Masonry Dam, first because it could be done [in] sections of 150 feet and the cost would probably run through two or three seasons while a Sufficient amount of leakage would probably be cut off in the very first section to secure a supply of water. Second because when done, the dam would be decidedly better than when first constructed, and Third because each Section would be complete in itself and no damage could occur to the New work by delay."

"The repairs now going on at Dam No 5 are progressing quite satisfactorily, and the plan, an experiment at first, may be regarded as entirely successful. We have had a plentiful supply of water at that point this season. While, by reference to the annual report made in June 1854, it will be seen that the obstruction growing out of a Scarcity of water at Dam No 5 is spoken of as one of the prominent checks to the business of the Canal during the preceeding season. The accompanying diagram will shew the method of making those repairs in detail, and although we have necessarily had to run some risks of high water &c precautions may be taken in future to materially lessen these risks, by having timber and other materials prepared and ready to be put in without the delay of preparations after the work is commenced"

"Dams No 2 & 3 are considered Sufficient for all our purposes; But repairs are necessary upon the dam No 1, 5 miles above Geo Town, this dam is Simple in its construction, and may be repair without the expenditure of much money, a portion of the force usually employed, in ordinary repair upon the Geo Town division have been employed upon this work for some time past. Ultimately it may, and probably will, be found necessary to enlarge the feeder below that dam which will require the expenditure a considerable Sum"

"The present condition of Dam No 4 is extremely bad and we are in danger of breaches through it in the course of the Coming winter and Spring they are, however, beyond remedy this Season, and it is a risk we are compelled to run, such breaches have occurred in this dam, and would not add much to the repairs upon this dam." [Original in Box 44 of #190]

[190] A. K. Stake, General Superintendent, to the President and Directors, 19 October 1854 (Sustainability-Dams, Flood Damage Prevention-Accomplished, Flood Damage Prevention-Proposed)

In his monthly report, Stake makes the following pertinent comments:

". . . the Superintendent of the Williamsport Division is now, and will probably be for a season

or two, engaged in making repairs upon Dam No 5 . . . A considerable portion of my time since the last meeting has been devoted to the repairs now going on at Dam No 5 and they have been pressed forward as vigorously as was possible under the circumstances, and are now in such a state of forwardness to say that the first Section 200 feet will be completed (or nearly so) at the close of the present month. At Dam No 4, nothing has been done since your last meeting, we have had all the water the Dam would afford us at this point, which is not sufficient to fill the canal at anytime without an addition to the height by means of boards set up edgewise upon the comb of the dam. There is a portion of canal between guard lock no 5 and the Stop lock which, owing to the high waters having washed in portions of the Guard banks, has become so shallow as not to admit of Boats passing heavy draught unless we have a Superabundance of water, this difficulty the superintendent assures me, will be removed this winter."

[190] B. F. Hollman, Superintendent, Williamsport, to the President and Directors, 3 November 1854 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"I am happy to inform you that, the portion of the Dam [No. 5] now under reconstruction has advanced so far towards its completion The we shall be able to complete the lower Breast or Front of the Dam on Monday next, (except sheeting it) and if not delayed, for want of Sheeting I expect to make a final finish of that portion under reconstruction in Ten or Twelve days."

[182] Board of Directors Meeting, 8 November 1854 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"The report of A K Stake gen Supt. dated 29th of October on the subject of the condition & repairs of the Dams presented at the last meeting, was considered, and on motion was referred to a Committee . . . to report up on to the Board at their next meeting."

[190] B. F. Hollman, Superintendent, Williamsport, to the President and Directors, 25 November 1854 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"The present Section of the Dam now under reconstruction and repair is entirely finished so far as the Sheeting &c is concerned except about fifty feet which is unfinished for want of Ice guards which I will procure during the next week and make a final finish the weather permitting."

[190] William P. Sterett, Superintendent, Cumberland, to the President and Directors, 30 November 1854 (Flood Damage-Localized)

"Owing to the late heavy showers of rain, we have had an other rock slide in the deep cut below the Tunnel, being the fourth since Spring, causing a suspension of Navigation, at that point for forty hours in the early part of this week."

[CF] [190] B. F. Hollman, Superintendent, Williamsport, to the President and Directors, 11 December 1854 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

Hollman provided an itemized accounting of his reconstruction and repairs at Dam No. 5, amounting in total to \$10,455 for the section he had completed. There is also a cross section of his reconstruction of Dam No. 5 with this accounting. [Original in Box 44 of #190]

[182] Board of Directors Meeting, 16 December 1854 (Flood Damage Prevention-Ordered, Sustainability-Dams)

"The committee to whom was referred the report of the general Superintendent dated the 19th of October relative to the repairs or reconstruction of the Dams &c, recommended that the repair of Dam No 4 be made on the third plan suggested by the gen Supt in said report, and similar to the repairs commenced, and now making at Dam No 4, whereupon, after consideration, on motion it was, Ordered, That the general Superintendent of the Canal, be directed to provide such materials as in his judgment may be necessary for repairing Dam No 4 on the third plan recommended in his report of the 19th of Oct. last and similar to the repairs recently made at Dam No 5."

"On motion it was, Ordered, That the general Superintendent be authorized, at his direction, to have the water drawn from the Canal, or such parts thereof as he may judge requisite, for the purpose of clearing out and repairing the same, and for such duration as he may deem it necessary, in view of the trade of the Canal, and the urgency of the repairs required."

1855

[182] Board of Directors Meeting, 25 January 1855 (Flood Damage-Financing)

The Committee of Accounts in a report dated 14 December 1854, reported:

"2d, The Treasurers account for interest paid on Certificates of debt due for repairs &c prior to 1845, from the 1st of Jany to the 1st of July 1854 . . . amounting to \$1804.85."

The Committee of Accounts in a report dated 24 January 1855, reported:

"3d, The Treasurers account for interest paid on Certificates of debt for repairs &c prior to 1845 from the 1st of July to 31st of December 1854 . . . amounting to \$1164.81."

[190] John Lambie, Superintendent, Georgetown, to W. S. Ringgold, Clerk, 31 March 1855 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"The river has been falling fast all week, and the feeder level at Seneca is several inches down. We are boating stone and getting ready to repair the Dam--have given orders for the water to be drawn off the Basin this evening, so that a chanel can be made from it to the Coal Wharf ay Easby, which is very much filled up. I intend filling the level on tuesday night."

[190] Horace Benton, Superintendent, Georgetown, to W. S. Ringgold, Clerk, 2 May 1855 (Flood Damage Prevention-Accomplished, Maintenance-Dredging, Sustainability-Dams)

"The basin at Georgetown is becoming very shallow, and in consequence of the mudmachine being So much out of Order, (and I think a waste of money to attempt to repair it, only with a new one) that I am at a loss to know what to do in the matter."

"I am engaged in the repairs of the towing path, and in consequence of a breach in the temporary Dam at Seneca I had to Send a force their for a few days. the Dam at Little Falls in Still progressing. The parties Concerned are at work on towing path, oppesit Boyce & Taylor's Mill this Division is in good navigable order."

[190] A. K. Stake, General Superintendent, Washington, D.C., to the President and Directors, 5 May 1855 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"The repairs upon Dam No 4 have not yet been commenced, but some progress has been made in procuring materials for the Same, a commencement will have to be made in a verry short time, and the work pushed forward with all possible dispatch. The force of hands employed upon Dam No 1 has been reduced one half and in view of the condition of the Same, the supply of water being ample, I Shall Continue the present force long enough to render the work already done Secure, which will probably be by the first day of June, at which time all operations may be Suspended at that point, until the Board may find itself in the possession of the the Means of Completing it, Some sleight detentions have occured at Dam No 2 (Seneca), but sleight repairs have been made upon it and an abundant supply of water is now afforded, to acomodate the trade."

[190] Horace Benton, Superintendent, Georgetown, to W. S. Ringgold, Clerk, 18 May 1855 (Flood Damage Prevention-Accomplished)

"The dam at little Falls is Still progressing, together with the general repairs of towing path . . ."

[190] A. K. Stake, General Superintendent, Williamsport, to "Dear Sir," 24 May 1855 (Flood Damage Prevention-Accomplished)

"I am preparing to attack Dam No 4 about the first of June if we can have the funds to go on. The coffer dam is being prepared here, under my own Supervision. I expect to have have them completed on, or about, the first of June."

[190] Horace Benton, Superintendent, Georgetown, to W. S. Ringgold, Clerk, 31 May 1855 (Flood Damage Prevention-Accomplished)

". . . we have been boating Some Stone for the Dam at Little Falls on the Maryland Side, the work on the Va. Side is still progressing, together with the general repairs of Locks & Lock Gates & towing path, &c . . ."

[190] Charles Clarke, Superintendent, Shepherdstown, to the President and Directors, 1 June 1855 (Flood Damage Prevention-Accomplished)

Reports he working on tightening a dam [No. 3? at Harper's Ferry].

[190] A. K. Stake, General Superintendent, Washington, D.C., to the President and Directors, 1 June 1855 (Flood Damage Prevention-Accomplished)

"I have set a Small force of hands to work upon the coffer dams intended for Dam No 4, and design pushing the operations, at that point, on as rapidly as our means will allow."

[180] Twenty-Seventh Annual Report, 4 June 1855 (Flood Damage Prevention-Accomplished, Flood Damage Prevention-Ordered)

The C&O Canal President, Samuel Hambleton, reported:

"Soon after the qualification of the present Board, they felt it their duty to make a tour of inspection upon the entire line of the canal, in order to examine its condition, and inform themselves of its situation."

"The Board found the canal generally in better condition than was anticipated; and were favorably impressed with its capacity, with slight expenditure, greatly to increase its trade and revenues. . . . Rigid rules were prescribed for the conduct of the superintendents upon the line of the canal. Weekly reports were required of them upon their respective divisions, which have since been regularly made to the office at this place. Monthly reports were also enforced on the general superintendent; the good results of both which requirements have been manifested."

"The Board deeming the continuance of the office of Engineer of the Company, at a salary of \$1800 per annum, an unnecessary expense, as no repairs or construction requiring scientific plans and estimates were within the present means of the Company, abolished this office and substituted that of General Superintendent, with a salary of \$1200 per annum, in its stead. The good results of this policy have been manifested to the Board. They secured the services of Mr. A. K. Stake upon the canal, whose practical knowledge of the canal, having been engaged upon it in various capacities for many years; his untiring energy in the service of the Company, passing twice a month over the greater part of line, and his regular monthly reports in writing of its condition, were found to be far preferable to the results of the former office of Engineer. A rigid system of economy was ordered and enforced. Immediate steps were taken to make the necessary pressing repairs which had been recommended by my predecessor, and which were found necessary by the Board upon inspection. Of dam No. 5 . . . . The present Board took immediate steps for repairing this dam. It was done in the most substantial manner by the division superintendent, Mr. Hollman, under the general supervision of the General Superintendent. The cost of repairs of this dam thus far, amounts to \$11,019.51, and has been paid from current revenues of the Company. No detention or obstruction of the canal has occurred at this point since, nor is any anticipated."

"Of dam No. 4 . . . . The Board early directed its attention to this point also. It caused a detailed statement to be prepared by the General Superintendent, of the most practicable means of remedying the present situation of the dam. He submitted three plans, with estimates of cost respectively; two for repairing the present dam, and one for the construction of a new one. The Board, upon mature deliberation, adopted one of the plans for repair recommended; the plan adopted is similar to that so successfully employed on dam No. 5. This work is now progressing, meantime steps have been taken to prevent any immediate bad results from its condition, and no material detention to the trade of the canal had occurred during the year, at this point; and the repairs will be prosecuted as were those at dam No. 5, without interruption to the current business of the canal."

"A general survey of the canal from dam No. 6 to Georgetown was had, and all immediate and pressing repairs made. The general condition of the lower line of the canal from this attention, and the repairs alluded to, (as all obstructions had heretofore occurred on this portion of it,) induced the Board to entertain sanguine hopes of an increase of trade and revenue for the current year." Instead, the year saw a bad drought that suspended navigation for four months because of a lack of water on the canal.

[190] Asahel Wilison, Superintendent, Cumberland, to the President and Directors, 26 June 1855 (Flood-June 1855)

". . . the heavy rains of late have washed the embankments Some, but nothing Serious . . ."

[190] W. McGregor, Superintendent, Point of Rocks, to the President and Directors, 28 June 1855 (Flood-June 1855)

"the late Rains has washed A Small barr in to the Canal about two miles above this place which has been Removed with hand scoops."

[190] A. K. Stake, General Superintendent, to the President and Directors, 29 June 1855 (Flood-June 1855, Flood Damage Prevention-Accomplished)

"The Canal Since my last report, has continued in good navigable condition, the only interruption being a bar filled in at a point three miles above Wmsport and upon the Wmsport division Caused by a very heavy rain in that region on the 24th inst. the matter was promptly attended to and the interruption continued only about forty hours. The late heavy rains, some of them unprecedented, have demonstrated the strength of the work to resist them, and the small amount of damage sustained thereby is Calculated to give increased confidence in it. The supply of water continues to be ample for all our purposes but in view of the probability if a scarcity our efforts have not been delayed in pushing forward the contemplated repairs on Dam No. 4 . . . the Coffor dams are now ready to be put it and every arrangement made to avail ourselves of the first favorable moment to commence operations immediately upon the Dam, no opportunity having been as yet afforded, owing to the stage of Water in the river."

[190] Horace Benton, Superintendent, Georgetown, to W. S. Ringold, Clerk, 6 July 1855 (Flood Damage Prevention-Accomplished)

". . . we are Still at work on the 'Little Falls Dam' and the general repairs on the towing path."

[190] A. K. Stake, General Superintendent, Williamsport, to "Dr Sir," 23 July 1855 (Flood-June 1855)

"The reports for the week ending 21st, are all in and the Canal is in good navigable condition, there has been some sleight interruption caused by drawing off of several levels to remove the wash brought on by the late heavy rains."

[190] L. Benton, Superintendent, Shepherdstown, to W. S. Ringgold, Clerk, Washington, D.C., 2 August 1855. (Flood-August 1855)

Benton reports a "very heavy rain last evenin" in which "the road culvert" is washed out."

[190] A. K. Stake, General Superintendent, to President and Directors, 2 August 1855 (Flood-August 1855, Flood Damage Prevention-Proposed)

"The Canal Continues in good navigable Condition interrupted only by the filling caused by heavy rains, the number and extent of which have been unprecedented, the interruptions from this cause are generally of short duration as measures are to have the remedy promptly applied. . . . The Superintendent of the Cumberland division is of the opinion that a permanent log should be placed upon Dam No. 8, in lieu of the temporary plank stucture we have been placing there, and which is carried off at every rise in the river."

[190] A. K. Stake, General Superintendent, to W. S. Ringgold, Clerk, 2 August 1855 (Flood-August 1855)

Stake reports a "very heavy breach on the Antietam Division, a road culvert has been almost entirely carried away, and a large quantity of embankment." It is not certain how much this was related the heavy rains of that month. More specifically, "The Culvert is immediately above Piper's Warehouse, Mercersville, between the 80 and 81st mile point."

[182] Board of Directors Meeting, 3 August 1855 (Flood-August 1855, Flood Damage-Financing)

"A letter from Levin Benton Supt. of the Antietam Division dated the 2d Inst. was read advising of a large breach in the Canal, from the washing away of the road culvert near Pipers warehouse."

The Committee of Accounts in a report dated 1 August 1855, stated:

"2d, The Treasurers payments of interest on Certificates of debt for repairs &c, prior to 1845 (issued under the resolutions of the Board of the 8th of Dec 1847) from the 1st of January to the 30th of June 1855, amounting to \$1624.86."

[190] Lewis G. Stanhope, Superintendent, 7 Locks, to A. K. Stake, General Superintendent, 4 August 1855 (Flood-August 1855)

Stanhope reports "my division is in navigable order with the Exception of the 4 mile Level Below Wm Port in Consequence of the Heavy Rain."

[190] A. K. Stake, General Superintendent, to W. S. Ringgold, Clerk, 2 August 1855 (Flood-August 1855)

"The work upon the breach is not progressing as rapidly as I could desire, owing to the conditions of the river which has been too high to allow a proper commencement to be made."

[190] W. McGregor, Superintendent, Harper's Ferry, to A. K. Stake, General Superintendent, 11 August 1855 (Flood-August 1855)

McGregor reports, "the wash from the late Rains are in so many diferent places that it takes Some time to through with them," although no boats had been delayed as a result.

[190] Levin Benton, Superintendent, Oldtown, to A. K. Stake, General Superintendent, 11 August 1855 (Flood-August 1855)

Benton reports sand bars on his division left by the rain which have forced him to suspend navigation to remove them, and dig out and repuddle some culverts.

[190] Lloyd Lowe, Superintendent, Oldtown, to W. S. Ringgold, Clerk, 18 August 1855 (Flood-August 1855)

"I have improved the opertunity offered by the suspention of navigation to remove a slide and bars that required drawing the wastes off the level to do so."

[190] Denton Jacques, Superintendent, Clear Spring, to "Hon Board Directors," 18 August 1855 (Flood-August 1855)

"I have bin over my division this weak and at this time it is in good order. A few days after thee breach at Marsh run I drew the water off of the Hancock level and removed several bars that had bin washed in by the resent rains."

[182] Board of Directors Meeting, 7 September 1855 (Flood-August 1855)

"A report from A K Stake, gen Supt. dated the 6 Inst. was read, stating the general condition of the Canal, repairs of the late breach &c &c."

[194] Samuel Hambleton, President, Washington, D.C., to Thomas W. Ligon, Governor of Maryland, 14 December 1855 (Flood-August 1855)

"The navigation of the Canal has been maintained with great regularity, and with an ample supply of water during the entire season, with the exception of three or four weeks in the month of August, when it was partially suspended owing to a road culvert being undermined and carried away by heavy rains; no other material interruption in the navigation has occurred since the opening of the Canal in March last."

"The Canal is now believed to be in better condition than at any period since the great flood of April 1852. And can, with comparatively moderate expense be so maintained from its present limited revenues; tho' it would be desirable if a more extended trade could be anticipated to make other improvements upon it that would give greater assurance of its reliability to facilitate that object."

## 1856

[182] Board of Directors Meeting, 24 January 1856 (Flood Damage-Financing)

"2nd, The Treasurers payments of interest on certificates of debt for repairs prior to 1845 (issued under the resolutions of the Board of the 8th of Dec 1847), from the 11th of Sept to the 31st of Dec 1855 . . . amounting to \$407.92."

[182] Board of Directors Meeting, 31 May 1856 (Flood Damage-Financing)

"2nd The Treasurers payment of interest on certificates of debt for repairs prior to 1845 (issued under the resolutions of the Board of the 8th Dec 1847,) from the 1st of Jan'y to the 29th of May 1856 . . . amounting to \$1323.78."

[180] Twenty-Eighth Annual Report, 2 June 1856 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

The C&O Canal President, Samuel Hambleton, reported:

Quoting in the 1856 stockholders report from his report on the canal to the governor of Maryland, dated 14 December 1855, Hambleton stated, "The canal is now believed to be in better condition than at any period since the great flood of April 1852, and can, with comparatively moderate expenses, be so maintained from its present limited revenue, tho' it would be desirable if a more extended trade could be anticipated, to make other improvements upon it that would give greater assurance of its reliability to facilitate that object."

Hambleton continued in the main body of the report, "I have the pleasure to inform the stockholders, that the general condition of the canal is still better at this time than at any period since the great freshet of 182, according to the report of the General Superintendent. The repairs reported in my last communication to the stockholders as having been done upon dam No. 5, have fully verified the statements of that report, and justified the action of the Board in the premises. That dam is now deemed safe, and although not such as the Board would desire, yet no immediate apprehensions are entertained in regard to it."

"Policy and prudence however would dictate, if the resources of the Company would permit, the continuance of similar repairs to the remaining portion of this dam."

"The expenses attending the repair of this portion of that dam would not be at all in proportion to that already incurred, the most expensive and important portion being already completed."

"In regard to Dam No 4. . . . I have now to report, that but little progress in the actual construction of the repairs determined upon as above stated has been made, owing to the general full supply of water in river Potomac. For the prosecution of these repairs a low stage of water is necessary; and no immediate danger at this point being apprehended nothing more has been done than the construction of the necessary coffer dams, now upon the spot ready at any moment to be put in whenever the stage of water or the necessities of the work may require."

"All necessary materials of every kind of have also been accumulated and brought together at this point for such work as is necessary, and all expenses for the same fully defrayed."

[190] A. K. Stake, General Superintendent, Williamsport, to the President and Directors, 11 June 1856 (Flood Damage Prevention-Accomplished, Flood Damage Prevention-Proposed, Sustainability-Dams)

"The usual precautions have been taken against a failure in the supply of water. At Dams No 1 &

2, temporary repairs have been rendered necessary by the damage done them by the ice. At Dam No 4 the temporary plank Structure has been put on, as also at Dam No 8. By these means we have, so far, had abundance of water, and will continue to have a full supply, without the occurrence of an unusually dry Season. I would, however, recommend an early commencement of the repairs Contemplated upon Dam No. 4. The necessary materials have been Secured, the timbers for the Coffor dam framed, and everything in readiness for an immediate commencement of the work of repairing a Section (one third) of that Dam."

"I would also Suggest the importance of repairing another section of Dam No. 5, the section already Completed having rendered entire Satisfaction. The plan of repairing these dams in sections, was adopted as the safest & best means of accomplishing that end, & I see no reason for a departure from it, upon the other hand; experience has demonstrated the plan to be a good one."

[182] Board of Directors Meeting, 13 June 1856 (Flood Damage Prevention-Accomplished, Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed)

"A report from A K Stake Genl Supt, dated the 11th Inst was read . . . recommending an early commencement of the repairs of Dam No 4, and suggesting the importance of repairing another section of Dam No 5;"

"A certificate of the inability of the Company to pay the interest on the bonds of this Company guaranteed by the State of Virginia becoming due on the 1st of July next, in accordance with the act of the Legislature of Virginia passed on the 13th of Feby last, was prepared and signed by the President & Directors present."

[190] A. K. Stake, General Superintendent, Williamsport, to "Dr Sir," 15 June 1856 (Flood Damage-Localized)

"H Benton, June 14, 'The Geo.Town division is in good order at present, with the exception of Some bars washed in by a very heavy rain on Sunday last; I had to draw the water from the Basin at Geo Town to remove a bar at the Stone Mill, which took about two days. The Mud machine had to be used upon the Geo Town level . . .'"

[182] Board of Directors Meeting, 26 June 1856 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"A report from A K Stake Genl Supt, dated the 25th Inst was read . . . renewing the recommendation made in his former report for the early repairs of Dams Nos 4 & 5 as then suggested, and being of great importance to secure a future supply of water, and render the Dams secure &c"

[182] Board of Directors Meeting, 24 July 1856 (Flood Damage Accomplished, Sustainability-Dams)

"A report from D. Stottlemeyer Gen Supt. dated the 23rd Inst. was read, as to the the general condition of the Canal &c &c, and on motion was ordered to be filed."

"On motion it was, Ordered, That the Gen Supt report to the Board as early as practicable, the character, quantity, and value of the materials collected for the construction or repair of Dam No 4, also the length that is is absolutely necessary to repair or newly construct at this time, and the probable Cost of such portion to be first repaired; and whether it would be more advantageous to make such repairs by contract, this order not to be construed to suspend the repairs now in progress."

[182] Board of Directors Meeting, 26 August 1856 (Flood Damage-Financing)

"3d, The payment of interest on Certificates of debt for repairs &c prior to 1845 (issued under the resolutions of the Board of the 8th of Dec 1847,) made by W. S. Ringgold late Treasurer, from the 30th of May to 16th of June 1856 . . . amounting to \$120.29 and that a balance of \$245.35 remaining on hand, was duly paid over to Sam M. McGraw the present Treasurer, as per his receipt therefor."

[182] Board of Directors Meeting, 27 August 1856 (Flood Damage Prevention-Ordered, Sustainability-Dams)

"On motion it was, Resolved, That a masonry dam of the plan heretofore proposed by Tho. L Patterson former Engineer & general Supt. of the canal, be constructed on the site selected below Dam No 4; and that the Clerk be directed to advertise to receive proposals for constructing the same, until the 1st day of October next, in the following newspapers, viz: Union & Intelligencer, Washington City; & Baltimore Sun, three times a week; and Union Frederick, Hagerstown Mail, Alleganian Cumberland, Md; Lancaster Intelligencer & Harrisburg Democrat Press; once a week till the 1st of Oct. next."

"Resolved, That Tho. L. Patterson be employed to examine and make an estimate for a masonry dam on a suitable site, as a substitute for Dam No 5; and to report thereon to this Board as early as practicable."

[182] Board of Directors Meeting, 3 October 1856 (Flood Damage Prevention-Ordered,



Sustainability-Dams)

"The Board then proceeded to consider the proposals, made for constructing a masonry dam at the site of Dam No 4 in accordance with the specifications there for. Various bids were examined. Mr. Divecmon [?] moved that the bid of John Humbrid & Co. be accepted. Mr. Grove moved that the bid of W. Browne & Charles Clarke be accepted."

Humbrid and company received the contract specifying that the masonry dam be completed by January 1, 1858.

"A letter was from Tho. L Patterson dated the 30th of Sept was read, communicating an estimate & plans for rebuilding dam No 5 with masonry, in accordance with the resolution of the Board of the 27th of Augt. last, after consideration on motion the same was laid over to the next meeting of the Board."

[182] Board of Directors Meeting, 7 November 1856 (Flood Damage Prevention-Ordered, Flood Damage Prevention-Proposed, Sustainability-Dams)

"A report from D. Stottlemeyer gen Supt. dated the 6th Inst was read, stating the various improvements and repairs which he deemed necessary to be made on the canal during the ensuing winter for its protection and effective navigation &c, estimating the cost thereof at about \$20,000, after consideration on motion it was, Ordered, That the gen Supt. of the canal be authorized and directed to materials required for such repairs and improvements as may be deemed necessary for the preservation of the works of the canal at the several points required."

"On motion is was, Resolved, That a masonry dam on the place proposed by Tho. L Patterson in his report of the 30th of Sept. last, be constructed on the site Selected below Dam No 5, and that the Clerk be directed to advertise to receive proposals for constructing the same, until the 9th of Dec. next in the following news papers viz: Union at Washington, Mail at Hagerstown, Alleganian [?] at Cumberland, once a week until the 9th of December."

[182] Board of Directors Meeting, 11 December 1856 (Flood Damage Prevention-Ordered, Sustainability-Dams)

"The Board then examined various proposals made for the construction of Dam No 5, and after consideration, on motion is was, Ordered, That the subject be laid over to the next meeting of the Board."

1857

[182] Board of Directors Meeting, 7 January 1857 (Flood Damage Prevention-Financing)

"A certificate of the inability of the Company to pay the interest on the bonds of the Company guaranteed by the State of Virginia, which became due on the 1st of Jany inst, in accordance with the Act of the Legislature of Virginia passed on the 13 February last, was prepared & signed by the Board of Directors."

[182] Board of Directors Meeting, 8 January 1857 (Flood Damage Prevention-Ordered, Sustainability-Dams)

"The Board proceeded to consider the proposals made for constructing a masonry Dam at the site of Dam No 5, in accordance with the specifications, therefor, various bids were examined, whereupon on motion it was, Resolved, That the proposal of W. Brown, John Gorman & David Lemmon for constructing a masonry dam at the site of Dam No 5 in accordance with the specifications and plan, be accepted by the Board, and that a contract therefor be prepared in conformity to said specifications, providing for the completion of said dam on or before the first day of June 1858 . . ."

[182] Board of Directors Meeting, 4 February 1857 (Flood-February 1857)

"A report from D. Stottlemeyer Gen Supt. dated this day was read, stating . . . that the repairs & improvements making on the canal had been retarded in consequence of the severity of the weather &c . . ."

[182] Board of Directors Meeting, 5 March 1857 (Flood-February 1857, Flood Damage-Financing)

"The President stated to the Board that in view of the large amount required to repair the breaches of Dams Nos 4&5, and other injuries to the canal occasioned by the recent ice freshet, and for rebuilding said dams, and the steam pump under existing contracts, that it may become necessary to borrow money, or to anticipate the future accruing tolls of the Company, in aid of the current revenues; that in such event, several of the Coal Companies of Allegany Co. had proffered to the Company advances of money for this purpose, in anticipation of the tolls to be paid by them for the year 1858, and that in addition to advances to be made by the Coal Companies, other loans may be necessary, whereupon, On motion it was, Resolved, That the President be and he is hereby authorized and requested to borrow on behalf of the Company, from time to time as it may become necessary such sum or sums of money not exceeding

\$50,000 for the purposes above mentioned and that he be authorized to issue bonds under the seal of the Company for any such loans, and to renew the said bonds, and to pay the discount thereon wherever it may be required."

Resolved, That subject to existing priorities, the revenues and tolls hereafter to accrue to the Company from the canal and its works, be and they are hereby pledged to the payment of the loans that may be made under the foregoing resolution, and that the President be authorized to issue requisitions for the payment of said loans, and for the interest thereon, from time to time, until they shall be fully discharged.

Resolved, That such part of said sum of \$50,000 as may be advanced by the several Coal Companies of Allegany County Md, in anticipation of tolls that may accrue to the Company upon shipments of Coal made by said Coal Companies on the canal, be refunded to said Companies from the tolls accruing from them, during the year 1858, if required."

[190] James P. Wade, Superintendent, Georgetown, to the President and Directors, 2 April 1857 (Flood-February 1857, Maintenance-General)

"Allow me to lay before you a brief statement of work done on the Geo Town [division] during the suspension of navigation; to wit:

"Removal of deposit at the head of lock No 26"

"Masonry repair of flume at; & flooring & other carpenters repair of said Lock."

"Removal of four very Large & three small sand bars on level below Lock aforesaid."

"A Complete renewal of Broad Run Trunk."

"Masonry & carpenters repairs of Lock No 25, and repair of wall & pavement at Lower end of the same. Removal of three Large & three small sand bars on Level below Lock 25."

"Repair of wall at Lower end of lock No 24."

"Removal of two Large sand bars on Level below Lock No 23. Carpenters repair of Lock No 22 & Removal; of three very Large & three small sand bars below, the same. Masonry & Carpenters repairs of Lock No. 21. Removal of one very Large & two small sandbars on level below Lock Last mentioned.

"Masonry repairs of Lock No 17 & 16."

"Removal of one Large & three small sand bars on level below Lock No 15, and removal of Rocks (heretofore an occasional obstruction to boats) on Level [illegible] below Lock 15."

"Carpenter repairs of Lock No 14 & Carpenter & masonry repairs of lock No 13."

"Masonry repairs of Lock 12."

"Removal of deposit below Lock No 10."

"Carpenters repairs of Lock No 10."

"Masonry & carpenters repair of Lock No 9"

"Removal of deposit & repairs of Culvert on Level below Lock No 9."

"Carpenters repair of Lock No 8, and removal of sand bars & repair of; & removal of three sandbars below Lock No 7."

"Masonry & carpenters repairs of Lock No 6."

"Repairs of little Falls dam."

"Carpenters repairs of lock No 5 & renewal of bridge across the feeder at said Lock."

"Repairs of tow path below Lock No 5, and renewal of towbridge below said Lock. Repairs of breaches on level below Lock No 5, (including tumbling dam not yet completed)."

"Removal of three very large & five small sandbars on level below lock No 5 and repair of Culvert on said level."

"Carpenters repairs on lock No 4"

"The whole of the sand bars & also deposits, have been thoroughly removed except the basin & canal east of basin which is now being Cleaned out. With this exception the canal may be said to be in good navigable order, since the repairs of Lockgates &c now known to be, necessary to be made can be done without interruption to navigation. Seneca Aqueduct has been injured by the severity of the past winter & has only shown its defects since the water was let on. Otherwise it would have been repaired. I have improved its condition so much as to justify the opinion that no fear be entertained of any interruptions to navigation."

"The tumbling dam below Lock No 5 will be completed in three or four days, but even now if it were absolutely necessary a full water could be received."

[190] James P. Wade, Superintendent, Georgetown, to W. S. Ringgold, Clerk, 11 April 1857  
(Flood-February 1857)

"Every thing has gone on favorably during this week At work at Dams No 1 & No 2 . . . We are still repairing towpath on GeoTown Level & paving in front of tumbling Dam, with which exception the Tumbling Dam is completed near operating Say east if Basin & expect to Set the water on west of the Stop Lock (which will be made sufficiently tight to keep off the water) on monday night next. It had become necessary to draw off the water on order of facilitate the removal of Bridge opposite Little falls chain Bridge."

[190] Charles Clarke, Superintendent, Shepherdstown, to Samuel Magraw, Treasurer, 21 April 1857  
(Flood-February 1857)

"I am happy to state to you that the repairs on Dam No 4 are done at which we finished on the 17th inst Except graveling and stoping Leakage under the new cribs which is I think perfectly secure for the season the old part of the Dam is verry hollow in many parts of it. The Monocacy Division is in good Boating order at the present time the Riverlock at Shepherdstown is impassible occasioned by sediment from the River Deposited in winter by the Ice freshet . . ."

[190] James P. Wade, Superintendent, Georgetown, to W. S. Ringgold, Clerk, 28 April 1857  
(Flood-February 1857)

"Deltzell (boss) has now some eighteen hands, this is necessary in view of further repair of towpath on Geo Town Level, damaged by the freshet, it is also necessary in view of continued operation on Dam No 1" Deltzell will need even more laborers to clear out the Georgetown basin.

[182] Board of Directors Meeting, 1 May 1857 (Flood Damage-Financing)

"The President stated to the Board, that he had negotiated loans for repairing the canal, under the resolutions of the Board of the 5th of March last, by drafts drawn upon the following parties, to be refunded from the tolls accruing to the Company in 1858 viz

the Cumberland Coal & Iron Co.	\$5000	
American Coal Co.		1500
Borden Mining Co.		2500
Cumberland & Pennsylvania RR	2500	
Allegany Mining Co.		1750
Allen M. Sherman		<u>2500</u>
Aggregate		\$15,750"

"A letter from Tho. L Patterson dated the 29th of April was read, relative to work done on Dams No 4 & 5 by the contractors for rebuilding said dams; enclosing estimates for work done during the month of April; suggesting the expediency of appointing an Inspector of Masonry for said dams . . ."

"Resolved, That Tho. L Patterson be and he is hereby appointed Engineer & Inspector of Masonry at Dams Nos 4 & 5; that he be required to devote his services to the same, and to such other Engineering duties as may from time to time be directed by the Board."

Note: Unrau talks about a number of freshets coming down the Potomac during this period. They are, however, weakly reflected in the correspondence of February-May 1857. The correspondence for this period appears to be somewhat fragmentary. From Unrau's documentation, it would appear that the board minutes and stockholders reports better document these freshets. The freshets appear mostly to have damaged Dams 4 and 5, which were in the process of being replaced by masonry dams. From the correspondence it would seem that the high water came in two waves, in May and June, respectively.

[190] Thomas L. Patterson, Engineer, Dam No. 5, to "Dear Sir," 7 May 1857 (Flood-May 1857)

"Dam No. 5 has been considerably injured for two hundred feet of its length, being the second crib which was put it. It will probably require until the first of June to repair the damage. The water has fallen nearly seven feet since its highest point yesterday morning."

[190] Charles Clarke, Superintendent, Shepherdstown, to W. S. Ringgold, Clerk, 7 May 1857  
(Flood-May 1857)

"The water is now falling rapidly after a rise the highest we have had for 5 years it did not overflow any of towpath the injury to Dam No. 4 is considerable probabaly 100 feet of Breach in the old Part all the new Cribbing is safe and sound as a Rock when we left yesterday at 1 ock the water was falling . . ." Clarke indicates he only thinks navigation will be stopped for a few days.

[190] D. Olivia, Superintendent, Hancock Division, to W. S. Ringgold, Clerk, 11 May 1857  
(Flood-May 1857)

"I am sorry to have to report the unfortunate circumstance of another accident to Dam No 5 by washing a portion of the crib work away and therefore an other detention in the navigation of the

Canal." Olivia is uncertain yet of the damage to the dam.

[194] W. S. Ringgold, Clerk, Washington, D.C., to Dr. James Fitzpatrick, Cumberland, 12 May 1857  
(Flood-May 1857)

"The several disasters on the Canal are very discouraging & cannot but produce embarrassment."

[190] James R. Wade, Superintendent, Georgetown, to W. S. Ringgold, Clerk, 23 May 1857  
(Flood-May 1857)

Wade reports the canal in "good navigable order."

[190] D. Olivia, Superintendent, Hancock Division, to W. S. Ringgold, Clerk, 25 May 1857  
(Flood-May 1857)

"The repairs at Dam No 5 are progressing very well and owing [to] the high waters the levels below Dam no 5 are not in good order but have made arrangement to have them attended to The balance of my division is in good order."

[190] Charles Clarke, Superintendent, Shepherdstown, to W. S. Ringgold, Clerk, 28 May 1857  
(Flood-May 1857)

"I returned yesterday evening from Weaverton and Harpers ferry where the water is off the Canal for the purpose of cleaning out sand & sludge at the Ferry feeder where an Extraordinary quantity of wash has be carryed in by the two late freshets it being the fourth cleaning this winter and spring that point the quantity now Will require the labour of one 100 days labour at least to remove it all of which will be ready by the 29th and the water put in on the night of the same."

"The Embankment on the culvert at what is called the Stone mill Lock near weaverton gave way on the Berm side Causing a large sink and carying down a portion of the Flume wall which will require the Labour of 35 to 40 days all of which was cleaned out and commenced filling up when I left yesterdy and will be in order to the water by Friday the 29th. . . . large deposits of sand and mud at all the guard Locks and the river Lock at Shepherds town which will require a great deal of Drudging to clean them out." Not able to report on the condition of Dam No. 4.

[182] Board of Directors Meeting, 29 May 1857 (Flood-May 1857, Flood Damage-Financing)

"The President stated to the Board that in pursuance of the resolution of the Board of the 5th of March last, he had negotiated additional loans on the bonds of the Company as follows:

Bank of the Metropolis at 90 days	\$10,000	
Bank of the Old Dominion " "	5,000	
[illegible] Bank, Md. " "		5,000
Corporation of Georgetown for their note payable one year after date discounted at the Farms & Mechs Bank of Georgetown in exchange for the bond of the Company to the Corporation of Georgetown payable one year after date for	<u>5,000</u>	
Aggregate		\$25,000"

"The President further stated to the Board, that it view of new breaches in the Dams, and the vigorous prosecution indispensable for rebuilding Dams No 4 & 5, additional loans would be required beyond the Sum of \$50,000 authorized by the resolution of the 5th of March, whereupon, On motion it was, Resolved, That the President be authorized and requested to borrow on behalf of the Company, such further sums of money as may be required for the purposes stated, not exceeding the sum of \$50,000, subject to, and in conformity with the provisions of the resolutions of the 5th of March last, authorizing loans."

[190] Charles Clarke, Superintendent, Shepherdstown, to W. S. Ringgold, Clerk, 29 May 1857  
(Flood-May 1857)

". . . Dam No. 4, where I am sorry to state the have been unfortunate in puting in the crib yesterday it broke in the middle and went over leaving a portion of one end on the comb 30 feet of which maybe got the ballence is a complete wreck."

"we are going on with the other crib and made arrangement for Timber to replace the broken one Should the water keep down we will be able to have the Breaches closed by to morrow week."

[190] R. M. Sprigg, Superintendent, Cumberland Division, to President & Directors, 30 May 1857  
(Flood-May 1857)

Reports his division in good order.

[190] Charles Clarke, Superintendent, Shepherdstown, to W. S. Ringgold, Clerk, 1 June 1857  
(Flood-May 1857)

"The water is in the canal from the Harpers ferry Dam where it was out for repairs and Cleaning out the mud at the feeder level it is hoped that the navigation will be resumed by the 10th inst on the whole line."

[190] D. Olivia, Superintendent, Hancock Division, to W. S. Ringgold, Clerk, 1 June 1857 (Flood-May 1857)

"Since my last report we have had Several leaks and sinks upon the tow path all of which have been attended to and the the levels are in good order and hope ere long to have the Dam [No. 5] so repaired as to enable in to put the water into the Canal."

[LIB-PHP] Twenty-Ninth Annual Report of the President and Directors of the Chesapeake & Ohio Canal Company to the Stockholders, June 1st, 1857 (Frederick, Md.: Johnson, Koontz, & Cole Printers, 1857) (Flood-February 1857, Flood-May 1857, Sustainability-Naivete)

In the annual report, the President, William P. Maulsby presents a reduction in the number of repair superintendents from six to four as a measure which will actually improve the speed and efficiency of repairs on the canal. He argued (p. 4), "The work, actually done on the line is by, and under the immediate supervision of, the Bosses. These being responsible to, must wait for, in theory at least, and too frequently in practice when not really necessary, the directions of the Division Superintendent. The Division Superintendent, being responsible to the General Superintendent, and not amenable for a failure to make repairs, except such as, and when, ordered by the General Superintendent, might wait for directions of that officer; and thus it did occur that the whole trade on the Canal, at a period not remote, was suspended for several days because of the breaking of a Lock-gate, which might have been repaired in a few hours; (the means being offered by a gentleman residing adjacent to the spot,) but was not done until employees of the several grades could meet and consult each other, and obtain the authority, professed in all events to be, deemed requisite. The circumstance is mentioned but is mentioned but as an instance illustrating to general a habit. The members of the Board saw, on their own inspection, that repairs were not made with the promptness which they deemed due to the interests dependent on the Chesapeake and Ohio Canal, and in their attempts to trace out the cause they found themselves involved in a maze of uncertainty, the ultimate responsibility generally resting where a charge of manifest negligence could not well be sustained against the individual officer, altho' the interests mentioned were not the less sorely suffering; and by relieving the difficulty, to an extent at least, they abolished the office of General Superintendent, thus making the Division Superintendents responsible directly to the Board. An incidental result of this action has been a saving to the the Company of Three Thousand Two Hundred and Fifty Dollars--two Division Superintendents at \$900.00 each and the General Superintendent at \$1200.00 for salary and \$250.00 an allowance made by a former board for his travelling expenses--although the primary result of this reduction of officers was, not a reduction of expenses, but a promotion of efficiency." Maulsby believed the canal might benefit from an even further reduction in the number of superintendents in the future.

Speaking of the business prospects of the canal, Maulsby indicated (p. 6), "It will be perceived that the revenues of the Company have not advanced continuously and regularly from the date of its completion, but have fluctuated. The diminution in 1852 was doubtless attributable to the extraordinary freshets of that year which necessarily hindered navigation for a long period of the season. The repairs and improvements, then so extensively made, appear to have stimulated confidence in those engaged in boating and in shipping per Canal, and to have begotten a hope a hope that hindrances and delays might thereafter be avoided; and in consequence, the succeeding year brought with it the natural fruit, a large increase in trade and revenue."

Like other C&O Presidents, Maulsby engaged in wishful thinking (p. 9), "The ordinary casualties to which this, like all similar works is necessarily subject from freshets, breaches, leaks, &c., &c., are comparatively unimportant, and become each year less frequent because of the greater solidity which each year imparts to the embankments." The real problem, according to Maulsby, was Dams No. 4 and 5, and their inability, because of leakage problems, to supply sufficient water during dry water periods. The Company spent \$10,000 during 1856 making temporary repairs to these dams, so they would hold back enough water. Because it was estimated that a similar expenditure would be required each year on Dams 4 and 5 to guarantee sufficient water with the existing wooden dams, the Board determined to build new masonry dams to replace the old wooden dams as fast as the company's revenues would permit. The company even let a contract for Dam No. 5.

Early in 1857, disaster struck (pp. 12), followed by subsequent misfortunes. according to Maulsby, "In February the severity of the weather relaxed, and there occurred an Ice Freshet such as had not for very many years, if ever, occurred before. The decaying structures at Dams 4 and 5 gave way, the former being much injured, the latter totally swept off from the Virginia abutment to the repaired portion of the Maryland side--over Five Hundred Feet. Measures were immediately taken to repair the damages thus occasioned, and about the 25th of February a large and efficient force of workmen were engaged in making the repairs. It was proposed to complete them, and reestablish navigation by the 1st of April, if possible, or as soon thereafter as practicable, and the plan of repairs was adopted with that view. Those at No. 4 were completed.

Those at No. 5 being much more extensive, and embracing the stoppage of the entire waters of the River for a distance of over Five Hundred feet, were pressed forward with the utmost energy, and on the 12th of April the breach was closed, leaving but a few days to be occupied in completing the filling of the cribs with stone, and sheeting them. On that day a freshet occurred, which aided a few boats, in waiting at that point, to pass but which also carried away a portion of the work, which had been entirely filled, and was deemed most secure of all, but of which foundation proved to be defective. Again was the work entered upon and on the 4th of May had so far

progressed as to require but a few days for final completion. On that day another Freshet occurred, which assisted in passing a large number of boats in waiting, but which finally succeeded in sweeping off about one halt [sic] of all the work that had been done, after a struggle between the structure and the flood extending from Saturday until Tuesday, and also in injuring and weakening all that was left. The Work was resumed, in the hope that on this day navigation would be restored. A fourth Freshet occurred during the week before last, which had the effect of putting back operations for some days, but caused no other material injury at No. 5, and at this time it is the expectation of the Board that navigation will be resumed the 16th instant, at latest. This last freshet carried away a small portion of Dam No. 4, but that too will be repaired by the day named. These repeated frustrations of the confident hopes of the restoration of navigation at the periods indicated, involving as each did a large additional expenditure for further efforts at repair, have severely taxed the patience and feelings of the Board, as well as of all those parties anxiously awaiting the event, but it was plain that no course remained other than to continue labor--to wait patiently till the Destroyer had passed, and then survey calmly and carefully the ravages which marked his desolating course, and lose no time from vigorous efforts to blot out those ravages in useless regrets and complainings." According to Maulsby, the repairs of Dams No. 4 and 5 were temporary in nature and only masonry dams would insure the canal's safety against ice freshets. The company had been forced to borrow \$40,750 from banks, cities along the canal, and coal companies, to make the temporary repairs from the damage of the freshets of early 1857.

[190] D. Olivia, Superintendent, Hancock Division, Dam No. 5, to W. S. Ringgold, Clerk, 8 June 1857 (Flood-May 1857)

Still engaged on repairs to Dam No. 5 and repairs to the canal itself.

[190] Charles Clarke, Superintendent, Shepherdstown, to W. S. Ringgold, Clerk, 13 June 1857 (Flood-June 1857)

Reports rain, rising levels in the river, and some additional damage in the canal. He states, "I have been over the Division from the Point of Rocks to Dam No 4 on the two days last passed and I am happy to state that no serious damage has been done except washes and bars from the Bearn and hill sides which are numerous from the Point of Rocks to the Dam No 4 where the water will have to be taken off of the whole line of that Distance in order to have the Bars removed . . ."

[190] D. Olivia, Superintendent, Hancock Division, to W. S. Ringgold, Clerk, 15 June 1857 (Flood-June 1857)

Olivia reports very little work on Dam No. 5 in consequence of the high water. Instead they have been trying to remove sand and sediment from the canal washed in by the high water on the river.

[190] John G. Stone, to "Dear Sir," 16 June 1857 (Flood-June 1857)

"I am very sorry to say that the Crib at Dam No. 5 broke out and is a complete wreck, the crib was put in this morning and in about 3 or 4 hours it broke."

[190] Charles Clarke, Superintendent, Shepherdstown, to W. S. Ringgold, Clerk, 19 June 1857 (Flood-June 1857)

"We have been visited here on Wednesday with one of the most heavy rains that has been known to fall in the memory of the oldest living in this place." Clarke reports it filled the canal, which had been drained to get out sand and sediment, with water and double the sand and sediment in it before." He reports further that the rain was not so heavy below Shepherdstown and that the canal was safe there except for more mud being washed in.

[190] R. M. Sprigg, Superintendent, Cumberland Division, Cumberland, to President & Directors, 20 June 1857 (Flood-June 1857)

Sprigg reports his division in good order except for some leaks which have been attended to.

[190] D. Olivia, Superintendent, Hancock Division, to W. S. Ringgold, Clerk, 22 June 1857 (Flood-June 1857)

Olivia reports the loss of the crib on Dam No. 5 and states that many sand bars have been washed into the canal between Dam No. 4 and 5, which his crews are working hard to remove.

[182] Board of Directors Meeting, 1 July 1857 (Flood Damage-Financing, Flood Damage Prevention-Financing)

"A certificate of the inability of the Company to pay the interest on the bonds of the Company guaranteed by the State of Virginia which became due this day, in accordance with the act of Legislature of Virginia of the 13th of Feby last, was prepared & signed by the President & Directors . . ."

"2d The Treasurers payments of interest on Certificates of debt for repairs &c prior to 1843 (issued under the resolutions of the 8th of Dec 1847) from the 1st of Jany to the 30th of June 1857 . . . amounting to \$1443.79."

Note: the contractor for the construction of the new Dam No. 4, Humbrid and Robinson, appealed to the Board for compensation, because of damages sustained to the construction of the new dam because the old dam broke when subjected to floods experienced in the Potomac during the Spring of 1857. The Board referred the request to Thomas L. Patterson.

[190] Charles Clarke, Superintendent, Shepherdstown, to W. S. Ringgold, Clerk, 1 July 1857 (Flood-June 1857)

Clarke reports the damage from the rains of June 17 as being \$500 and that he does not expect to have the canal cleaned out before the end of that week

[190] R. M. Sprigg, Superintendent, Cumberland, to President & Directors, 4 July 1857 (Flood-June 1857)

Sprigg reports the Cumberland Division in good order.

[190] James R. Wade, Superintendent, Georgetown, to W. S. Ringgold, Clerk, 7 July 1857 (R)

Wade reports, "The supply of water being now cut off from Harper's Ferry feeder we avail ourselves of the opportunity presented for removal of sand bars above Seneca, both on the 8 miles & the 9 mile Level, some of which are very Large. from Seneca down we have plenty of water & all is in good navigable order except sand bars here on the Geo Town Level which I think of removing in a few days."

[190] James R. Wade, Superintendent, Georgetown, to W. S. Ringgold, Clerk, 11 July 1857 (Flood-June 1857)

"The sand bars formed on level above Lock 25 and much Larger than we expected to find them, but will be removed as speedily as possible."

[190] Denton Olivia, Superintendent, Hancock Division, to W. S. Ringgold, Clerk, 13 July 1857 (Flood-June 1857)

Olivia reports that his division is getting into good order and will be in good order by the time water is readmitted to the canal.

[190] James R. Wade, Superintendent, Georgetown, to W. S. Ringgold, Clerk, 18 July 1857 (Flood-June 1857)

"The heavy rain on Saturday Last did serious injury to the 8&9 mile Levels by washing in deposits of sand & We had very nearly finished the removal of bars when it began to rain, in consequence of which bars were formed to greater extent than previously"

"The bars on those levels will all be removed by or before monday next, but until the Levels are filled there can be no security against the formation of bars by rains."

"I shall proceed to remove the bars on the Geo Town Level the first of next week."

"The canal is in good navigable order from Seneca down."

[190] Charles Clarke, Superintendent, Shepherdstown, to W. S. Ringgold, Clerk, 22 July 1857 (Flood-June 1857)

Clarke reports the canal being filled from Dam No. 4 on down the canal. Hopes the improvements on the dam (the cribs) to be finished by the end of the week."

[190] Charles Clarke, Superintendent, Shepherdstown, to W. S. Ringgold, Clerk, 30 July 1857 (Flood-June 1857)

Clarke reports that navigation on his portion of the canal has been restored.

[190] R. M. Sprigg, Superintendent, Cumberland Division, to the President and Directors, 1 August 1857 (Flood-June 1857)

Sprigg reports boats running on his part of the canal.

[190] D. Olivia, Superintendent, Hancock Division, to W. S. Ringgold, Clerk, 3 August 1857 (Flood-June 1857)

Olivia reports the resumption of navigation on his division.

[182] Board of Directors Meeting, 5 August 1857 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

The Board of Directors received a letter from Humbrid and Robinson indicating they could complete the new Dam No. 4 in the present season, unless hit by more high water, but they could only do so if they were indemnified a least \$1 extra per perch of masonry for the extra expenses of hiring more men and equipment. After discussion the Board of Directors agreed to these terms contingent on Humbrid and Robinson waiving any compensation for their flood losses.

At the same meeting, the Board gave John Gorman and Co., the contractors for the new masonry dam at Dam No. 5, the inducement of an extra \$1.75 per perch, if they agreed to complete the dam on or before January 1, 1858. It raised the price per perch in the contract from \$5.50 per perch to \$7.25 per perch.

[182] Board of Directors Meeting, 13 September 1857 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

The Board and President met with Humbrid and Robinson on this date. The contractors agreed to the terms offered by the Board at the previous meeting, but tried to get some flexibility in terms of the January 1858 completion date. The Board apparently refused to accommodate the contractor (having been induced to pay more money on the prospect of the new dam being completed on time despite the flooding of 1857). The exception was board member James Fitzpatrick, who insisted his reservations to the January 1858 deadline be recorded in the minutes.

[190] T. L. Patterson, Engineer, to the President and Directors, 1 November 1857 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"I send herewith estimates of work down in the month of October by the Contractors for Dams No 4 and No 5."

"Owing to the apprehensions of the Contractors that the Company would be unable to pay a large estimate, a very small quantity of work has been done compared with what might have been accomplished had the work been driven with energy. Nothing has been done since the last meeting of the Directors towards extending the foundation of Dam No 4. The work has, however, been completed for a distance of 180 feet from the Virginia abutment except the wooden protection on the top slope for which the contractor is delivering timber. a tight coffer dam has been extended outward enclosing a space 72 feet long with an opening of from 25 to 30 feet."

"Dam No 5 has been extended 74 feet since the last Estimate and the foundations is secured for a distance of 162 feet from the Virginia abutment. The Contractors are going on to complete this portion and to Secure it against the Spring freshets."

[182] Board of Directors Meeting, 6 November 1857 (Flood Damage-Financing, Flood Damage Prevention-Financing)

"The President stated to the Board that the loans negotiated be him under the resolutions of the Board of the 5th of March and 29th of May last, for restoring the navigation of the canal and rebuilding Dams Nos 4 & 5 were made with the understanding that they would be repaid within a year, from the first accruing surplus revenues of the Company, and that the good faith of the Company would be violated unless complied with, whereupon on motion it was, Resolved, That the loans negotiated under the resolutions of the Board of the 5th of March & 29th of May last for repairing and restoring the navigation of the canal, and for rebuilding Dams Nos 4 & 5, are hereby declared to have been made with the parties from whom borrowed, payable from the first accruing surplus revenues of the Company, and in the opinion of the Board, such understanding should be carried out in good faith."

[190] T. L. Patterson, Engineer, to the President and Directors, 6 November 1857 (Flood Damage Prevention-Proposed)

"I propose to construct a crib enclosing the end of the masonry and connecting it with the old dam. This crib will be filed with stone and planked so as to be tolerably tight in order that, in case of high water, the space between the old and run dams shall be full of water and the new work not exposed to the shock of a mass of water falling against it. I estimate the cost of this work at \$800. I think it probable that cheapness of labor may reduce the cost to some extent."

"Dam No 5 is much less exposed to injury from the fact that the remains of the old dam are still standing above it and of sufficient height to protect it in a great measure. It would add to its security if about five hundred cubic yards of gravelling were put in so as to fill up the space between the old dam and new. a small amount expended in strengthening the outer end of the masonry would in my opinion render the masonry safe against injury from freshets. I estimate the cost of the work at \$300."

[194] William P. Maulsby, President, to the Governor of Maryland, 7 November 1857 (Flood-February 1857, Flood-May 1857, Flood-June 1857, Flood Damage Prevention-Accomplished, Sustainability-Dams)

"At the date of the Annual Report [June 1857] navigation continued suspended in consequence of the injuries to Dams Nos. 4 & 5 caused by the ice freshets of February last, effectual repairs of which had been prevented by a succession of Spring freshets but it was then Expected that the repair would be completed & Navigation restored within a few days. In this expectation the Board was disappointed in consequence of the occurrence of further freshets. Navigation was not restored until about the middle of August. At that time however a large number of Boats loaded with Coal had accumulated at Dam No. 5, and were in readiness to proceed to tide, so soon as the repairs at that point permitted. In consequence during the remainder of the Month of August Tolls were received to Amt of \$19,784.74. Early in September a break in the bank of the Canal



occurred near Williamsport which caused in consequence of the Low stage of the Water in the Potomac River an interruption of the Navigation for several weeks. This breach resulted from the fact that the Embankment had been originally Constructed on a rock outwards or towards the river, & which in the nature of things must sooner or later have given way. It did not result from any want of Careful attention on the part of the Superintendent, as after a careful examination I believe. The breach was repaired in a few days, but there was not sufficient Water in the river speedily to replace that which had been lost from the levels and consequently navigation was interrupted nearly the Entire month. The entire receipts from Tolls during September amounted to the Sum only of \$11,594.66. About the time when navigation was again fully restored & the entire line of the Canal was in such condition as to afford to boats a passage more free from obstruction and hinderance of any character than had been the case for years. . . . The Canal being kept in good order & with the force now on it, may safely be expected to yield the ensuing season Tolls at the rate of \$30,000 per month. It has not done so the present season only because Dams Nos. 4 & 5 which had been defective from their original construction had been permitted through a long series of years to become so ruinous as to have entirely yielded to an Ice Freshet. The Chesapeake and Ohio Canal is generally understood and believed to have been an important work & to have fallen short by actual experiment of the expectation of the public, and that this resulted from the inherent nature of the Work itself. My observations which has been in Some degree and minute has led me to a different Conclusion. The Canal has been nominally, but never really finished. The Chief points of difficulty have been the Dams mentioned. They have never been perfect structures, and so indispensable are perfect Dams at those points that without them the Canal never could have in the past and never can in the future present an inviting aspect to transportation. A year ago the present Board estimated fully this view & entered into Contracts for the erection of solid Masonry dams. Those Contracts invited the aforementioned increase of boats. If the old dams had remained over the last winter and during the present Season the Masonry Dams would have been Constructed & paid for by the 1st of January next. Their destruction in February last has involved the Company in all its difficulties of the present season. Notwithstanding all the difficulties all those difficulties. Notwithstanding that navigation has been interrupted from one cause and another during the entire season and the Company without Credit and without means of its own has been Compelled to find enormous Sums for it to expend in temporary repairs. It has steadily pressed on, to the last extent of rapidity at all practicable, the construction of the Masonry dams, and has actually paid on account of them \$34,491.53. That at Dam No. 4 has been finished to the Extent of about 180 feet and that No. 5 to the extent of about 160 feet and large quantities of materials are on hand for their prosecution next season within which they can be certainly be finished. With the masonry dams completed, I believe that the entire character of the Canal in respect to promotion of public & private convenience, and of the production of revenue will be revolutionized. It will no longer be regarded as an unfortunate work. Stopped of navigation from lowness of water will no longer occur navigation will be continuous and regular from the commencement to the termination of season, except only such Contingencies as necessarily and naturally belong to Canals. To wit, the liability to occasional accidents to their banks, &c. It may be noted that the Chesapeake & Ohio Canal had shown itself during the past season to be less liable to ordinary casualties as breaches &c than most other canals in this Country. Notwithstanding the extraordinarily violent character of the freshets of the past Spring & early summer which carried away large portions of the banks of most Canals in the Country the only breaches which occurred in the banks of this Canal where repaired each in a space less than ten days. All other causes than those proceeding from the defectiveness of Dams No 4 & 5 would not have produced interruptions of navigation during the present season to an extent in the aggregate of one month."

"I consider the Chesapeake & Ohio Canal to be more valuable this day than it has been since the day of its opening to Cumberland, because it has upon it a much larger number of boats, horses, mules men and equipment than ever before, because the body of the Canal is now more free from obstructions and the banks more solid and durable, because the locks & gates are in better order than they have been for many years, because the mining interests of Allegany Co are better developed and are connected with more real Capital than heretofore, and beyond question look to this work as the only practicable outlet, And because Masonry dams at Nos. 4 & 5 are in process of actual Construction. The Canal will in fact only [be] finished when these dams are completed. And this is the view taken by every substantial interest connected directly on business on this work . . ."

[190] T. L. Patterson, Engineer, to the President and Directors, 30 November 1857 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"Very little masonry (on the abutment) has been laid at Dam No 4 and the work done has, chiefly, been upon the timbering of the top of the Dam. Timber is being delivered for the crib to secure the masonry and I hope that by the 15th of the month the crib will be completed."

"Dam No 5 has been leveled up for the coping, but no coping has been laid. The Contractor is gravelling the rear of the Dam and securing the end of the masonry. This can be done with little difficulty and at no great cost. Owing to its distance below the new crib work the masonry will not be in much danger from freshets."

[182] Board of Directors Meeting, 30 December 1857 (Flood Damage Prevention-Financing)

"A certificate of the inability of the Company to pay the interest on the bonds of this Company guaranteed by the State of Virginia, which becomes due on the 1st of July next, was prepared and signed by the President & Directors present . . ."

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[190] T. L. Patterson, Engineer, to the President and Directors, 2 February 1858 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"Owing to the present circumstances of the Company very little work has been done at the Dams. At Dam No 4 the Contractor is engaged in completing the planking and covering of ice guard of that part of the masonry which has been finished. the prevalence of high water during the last month having prevented them from working at it. I deem it very important for the early prosecution of the laying of masonry that the Maryland abutment should be prepared as soon as possible. . . . There will be about 1600 perches of masonry in this abutment and connection wall."

"The contractor for Dam No 5 has had a small force engaged in preparing for coping & ashlar, & had also completed the work begun for the protection of the masonry and this may be considered perfectly safe."

[182] Board of Directors Meeting, 16 March 1858 (Flood Damage-Financing)

"1st. Payment of interest . . . on certificates of debt for repairs &c prior to 1845 (issued under the resolutions of the Board of the 8th of Dec 1847) from the 1st of Jan'y to 20th of Feby 1858 . . . amounting to \$946.85."

[182] Board of Directors Meeting, 17 March 1858 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

The Board further modified the contract of John Gorman & Co., the contractors building the new Dam No. 5. Under the modification of the contract on 5 August 1857 they would be paid an extra \$1.75 per perch of masonry if they could complete the dam by January 1, 1858. However, Gorman & Co., proved unable to do so "in consideration of various obstacles." In consequence of the obstacles, the Board did not penalize them the entire \$1.75 premium for failing to meet the New Year's deadline, instead it reduced the premium by \$.50 per perch, paying them in the end \$6.75 per perch of masonry for completing the new dam five.

[182] Board of Directors Meeting, 30 March 1858 (Flood Damage-Financing, Flood Damage Prevention-Financing)

"Resolved, That the President be requested to confer with the several mining companies of Allegany County, and with such others as he may deem expedient, to defer for a year the payment of the loans negotiated for the repairs and rebuilding of Dams Nos 4 & 5; and also procure such additional advances as may be needed for rebuilding said Dams during the present season, if practicable."

[182] Board of Directors Meeting, 5 May 1858 (Flood Damage-Financing, Flood Damage Prevention-Financing)

In this meeting, the President notes that the Borden Mining Company has agreed to defer repayment of the advances made the canal company for repairs and the rebuilding of Dams No. 4 & 5 until 1 May 1859, provided that the interest accrued be added to the balance. [Note: Borden had stopped paying tolls according to minutes of the 30 March 1858 Board meeting]

[182] Board of Directors Meeting, 6 May 1858 (Flood Damage-Financing, Flood Damage Prevention-Financing)

The Board met with representatives of the other coal companies shipping coal on the canal and reached an agreement to defer repayment of their loans to the canal for repairs and rebuilding of Dam No. 4 & 5 on the same terms as the Borden Mining Company. Further, they indicated to the Board that further loans might be forthcoming to the Canal Company, if more resources were needed for the aforementioned purposes. The Board also directed "That the Gen'l Supt of the Canal be authorized to appoint a suitable person to superintend the building of Coffer dams at Dam No. 4, and if such person can also superintend and inspect the masonry and cement of said dam, that he be required to do so;"

[190] John G. Stone, Engineer and General Superintendent, to "Dear Sir," 26 May 1858 (Flood-May/June 1858, Sustainability-Dams)

"We have an other high freshet, but I do not think we shall loose anything but time & about 20 ft. more of Dam 4. this will not delay the repairs much, I have Timber & Stone ready and only want low water that we may get to work."

[190] John G. Stone, Engineer and General Superintendent, to the President and Directors, 31 May 1858 (Flood-May/June 1858, Sustainability-Dams)

"The navigation of the canal is now interrupted at two point on the line, at Dam No. 4 & the Tunnel."

"On the 9th of this month about 100 ft. of Dam No 4 was carried away by a freshet, the loaded boats, however, passed until the 13th. Two freshets have occurred since taking away at each time about 20 ft. more of the dam. The Timber is all ready for the repairs, as soon as the water fall . . . ." Stone estimated it would take sixteen more days to restore navigation at Dam No. 4 and take care of the slide at the Paw Paw Tunnel. The contractors on the dams were spending their time quarrying stone, because the high water would not permit to work on the dams themselves.

[182] Board of Directors Meeting, 4 June 1858 (Flood Damage-Financing, Flood Damage Prevention-Financing)

"2nd The Treasurers payments of interest on Certificates of debt for repairs &c prior to 1845 . . . amounting to \$120.52. . . . 4th Certificates of debt, for repairs &c prior to 1845 . . . amounting to \$425.11 issued for renewal and redemption of former certificates to the same amount, under resolutions of the Board of the 13th of Oct 1855."

[190] A. K. Stake, Superintendent, Williamsport, to W. S. Ringgold, Clerk, 4 June 1858 (Flood-May/June 1858)

"It is still raining occasionally, a heavy gust passing over us this evening & God only knows when they will be able to resume operations at Dam No 4, though the river fell rapidly today, one of the buttresses against which the cribs were resting at Dam No 5, was carried off by the late rise. I am unable to Say Whether any Serious consequences will result from it or not, as the Water is still too high to determine but I think it will be found advisable to replace it as soon as the water is low enough."

[182] Board of Directors Meeting, 5 June 1858 (Flood Damage Prevention-Financing, Sustainability-Dams)

"On motion, it was:

"Resolved, That a committee of three be appointed, the President being one of the number, to confer with the several Coal Companies and others interested, in regard to a loan of money sufficient to enable the Company to complete Dam No 5 the present season, and in the event of a failure to negotiate a loan, that the work at said Dam be suspended."

[182] Board of Directors Meeting, 7 June 1858 (Flood Damage Prevention-Ordered, Sustainability-Dams)

"The estimate of John G. Stone Eng. & Genl Supt for work done on dams Nos 4 & 5 under contracts for rebuilding, were presented."

"On motion it was:

Resolved, That the Engr & Genl Supt of the Canal be authorized at his discretion to contract for building the Coffer dams at Dam No 4, or to have them built by superintendence if in his judgment he shall deem it more advisable and for the interest of the Company, that that they be constructed by the contractors under the provisions of their contract."

[180] Thirtieth Annual Report, 7 June 1858 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

The C&O Canal President, L. J. Brengle, reported:

"We regret the discouraging aspect we are constrained to present, both as to the condition of the Canal, the finances of the Company, or the immediate prospect of relief from its present embarrassed state." Note: in the spring of 1858 there was a big shake up at the top of the C&O Canal Company, with the incumbent president and directors voted out of office.

"It is known to the stockholders that from the ice freshet in the spring of 1857, Dams No. 4 & 5 were ruinously injured, requiring great expenditures for repairs, and several months time to restore the navigation, and in the meanwhile the company were in a great measure deprived of its revenues."

"Whether these disasters could have been altogether, or in part avoided by timely precaution and efficient management, we do not allege, but it is believed by experienced and well judging persons who were familiar with the condition of these dams, and who represent them, as then in as good condition to resist such freshet, with proper care and moderate expenditure as they have hitherto done for the past ten years, or whether from inexperience inefficiency of the parties engaged in their restoration, certain it is, that these calamities have involved the Company in less from extraordinary expenses incurred and deficiency of revenue, which may fairly be estimated at \$300,000."

"The Board immediately preceeding the present board on assuming the direction of the affairs of the Company proceeded at once to change the organization which had existed on the line of the Canal since its completion to Cumberland, by removing in the first place the General Superintendent and all six division Superintendents; who were all experienced, well tried men, and had long been connected with the Canal, then reduced the Superintendents from six to four, and appointed a General Superintendent and four division Superintendents to these responsible positions who, with a single exception have hitherto never been connected with the Canal, and of

we are informed had no experience or knowledge of such duties as pertained to their stations. In a few months thereafter the Office of General Superintendent was abolished, thus leaving the whole line of the Canal of 186 miles under the direction of four division Superintendents, without experience themselves, without the immediate direction & control of an experienced head, and with no general system of management. To this mistaken policy chiefly we think, can be attributed the disasters which have occurred. The present Board believing that past-experience justifies the course, have restored the former organization of the line of the Canal, by establishing six divisions, and with two exceptions, have appointed the former experienced Superintendents of divisions. We have also appointed John G. Stone Esq. Engineer & General Superintendent who being long connected with the Canal in former years it is believed from his experience, energy and capacity, that he will render very efficient services in this station."

"With this organization on the line of the Canal it is confidently hoped that renewed energy vigor and economy will be experienced in the management of the work, and it will result in a more reliable and less interrupted navigation of the Canal, than has existed for the past two years. Dam Nos. 4&5 which have been the source of so much trouble and anxiety for some years past, are still in a most precarious condition. The late Board entered into contracts before the disasters of the last spring, to replace the two old dams by masonry dams at their respective sites. Owing to the breaches in the old dams, the prosecution of work in the new structures have been delayed, as well from interruptions caused by these breaches, as from want of means to prosecute them as vigorously as could have been desired, nearly the whole resources and credit of the Company having been absorbed in repairing the old structures. The amount expended in these repairs to the first of April last have exceeded the sum of \$90,000. They still remain in a very insecure condition, the first, or Dam No 4 more especially and breach has recently occurred there which has partially interrupted the navigation, and owing to the prevalence of high water in the river since, it may yet be two weeks before navigation will be restored fully. Dam No 5 is deemed more secure, and it is thought may be relied upon for some time except in extraordinary freshets, but it is not tight, and when the water in the river is low, cannot afford an adequate supply for full navigation. The only hope therefore to render the navigation reliable at these points is, to complete the new dams as early as practicable. About one-fifth of the masonry, or 160 feet in length of each of these dams have been completed, and with adequate means (estimated at 100,000\$) it is believed that both structures could be so far completed during the present season as to render them secure, and the navigation reliable. In the absence of present means, or the immediate prospect procuring a sufficient amount for both Dams, it is thought advisable to apply all the resources at command, to the extension, as far as practicable, completion of dam No 4, as being more unsafe, and less reliable than Dam No 5, but that both dams should be completed as soon as means can be obtained, the Board are fully sensible. According to the estimate of the Eng' & Genl Supt. the work done to 1 of June on the new dam No 4 amounts to \$34,141.65 and on the new dam No 5 to \$23,640.50, of these amount \$44,181.53 have been paid to the contractors. Other portions of the Canal are represented by the Superintendents to have materially deteriorated during the past two years, notwithstanding the large expenditure which have been made and to require the utmost vigilance and such additional expenditures as the means of the Company will admit to maintain successful navigation."

[190] John G. Stone, Engineer and General Superintendent, Point of Rocks, to "Dear Sir," 15 June 1858 (Flood Damage-Localized, Harper's Ferry-Sustainability)

"The rain of Saturday caused a small brake on the 9 mile level, it will be repaired by the day after tomorrow. We have a bad bar in the feeder level above Harpers Ferry, which will take about 8 or 10 days to remove."

"The water is falling & I hope to be able in a few days to get to work at the Dam."

[182] Board of Directors Meeting, 30 June 1858 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"Resolved, That in pursuance of the provisions of the contract, that the work on Dam No 5 be suspended until otherwise ordered so soon as the works are properly secured . . ."  
"Ordered, That a committee be appointed by the President to visit Dam No 4, from time to time, during the progress of the work, and to report thereon to the Board at their future meeting."

[190] L. J. Brengle, President, Frederick, to W. S. Ringgold, Clerk, 9 July 1858 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"The repairs at Dam 4 are progressing finely. The cribs are all in and by to day fully completed with the exception of the key crib, that will be ready & on Monday morning will be put to its place. Stone says empty can pass on Tuesday & Wednesday the navigation will be fully restored, unless an accident should occur in putting in the key crib, which he has no fear of, so I think we may certainly calculate on the navigation by Wednesday next."

[190] A. K. Stake, Superintendent, Williamsport, to W. S. Ringgold, Clerk, 20 July 1858 (Flood-May/June 1858)

Stake reports the canal is now in navigable order, but no traffic passing because of a strike.

[182] Board of Directors Meeting, 6 August 1858 (Flood Damage Prevention-Financing)

"The President states to the Board that he had obtained a loan of \$3000 for 90 days at the Washington County Bank in aid of the repairs at Dam No 4 on his private guaranty, which on motion was approved by the Board . . ."

[182] Board of Directors Meeting, 7 August 1858 (Flood Damage Prevention-Accomplished, Flood Damage Prevention-Financing, Sustainability-Dams)

"Resolved, That the Committee heretofore appointed to visit Dam No 4, be and they hereby authorized to arrange with the Contractors (for building said Dam No 4) as to extra compensation for construction tressel work and derricks, and they they consult with the Engineer & Genl Supt in relation thereto."

"Messrs. Tilden, Green, Henderson and other representing various Coal Companies appeared before the Board to confer on the subject of a loan from said Coal Companies to this Company, for the purpose of completing Dams Nos 4 & 5, and after a long interview and full communications on the subject, stated that they were not then prepared to submit the terms of such negotiations, but after further consultation would do so . . ."

[182] Board of Directors Meeting, 9 August 1858 (Flood Damage Prevention-Accomplished, Flood Damage Prevention-Financing, Sustainability-Dams)

This was a momentous board meeting. The contractor for the rebuilding of Dam No. 5, John Gorman and Company, asked to be released from the contract, to which the Canal Company assented. The Board transferred the contract to William Brown. The representatives of the coal companies also offered to loan the Canal Company, up to \$100,000 to complete the masonry dams. With the offer of the loan came strict conditions about the payment of money to contractors, and it provided for the repayment of the loan in the form of interest bearing toll certificates. The Canal Company acceded to the conditions of the loan.

[182] Board of Directors Meeting, 3 September 1858 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"A report from John G. Stone Engr & Genl Supt dated the 1st was read, stating that . . . the masonry dams were progressing well, and that no doubt was entertained of their completion this season;"

William Brown, the contractor for Dam No. 5, indicated to the Board by letter that he would be unable to fulfill his contract. The consequence of which that the board annulled the contract and transferred it to Lewis G. Stanhope [the former canal superintendent of the Hancock Division].

[182] Board of Directors Meeting, 4 September 1858 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

The board executed a contract with William Simms of Baltimore for the construction of coffer dams at Dam No. 4.

[182] Board of Directors Meeting, 8 October 1858 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"On motion . . . it was Resolved, That the Committee appointed to visit Dams No 4 & 5 during the progress of their construction be discontinued, and that the President when visiting said Dams officially, be authorized to require the attendance of one or more of the directors at his discretion."

[182] Board of Directors Meeting, 4 November 1858 (Flood Damage Prevention-Financing, Sustainability-Dams)

"A communication from L G Stanhope contractor of Dam No 5 was read, stating the great difficulties and expense incurred by him in procuring a foundation for the dam, estimating his loss thereon at \$12,500 and asking the Board to indemnify him therefor, and that an advance be made to him on the money retained on his estimate after consideration on motion it was Ordered, That the said communication be referred to a committee . . . to examine and report thereon at the next meeting of the Board."  
Ordered, That so soon as the funds of the Treasury will admit thereof, the sum of \$2000 be advanced to the contractor on account of the money retained on the estimate."

[182] Board of Directors Meeting, 5 November 1858 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"On motion it was, Resolved, That the Eng & Genl Supt of the Canal be directed to require the Contractor of Dam No 4 to commence immediately and to prosecute as rapidly as possible the gravelling required at that

dam pursuant to their contract, and in the event of their failure to do so; that the Engr & Gen Supt be directed to have said work done, and that any additional cost thereof beyond the contract price be charged to the contractor."

[190] Robinson & Gorsuch, Contractors, Washington, D.C., to the President and Directors, 9 December 1858 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"At Dam No 4, as it known to most of your body, we have but two small gaps to fill to fill to complete the masonry, in the whole day about eight or nine hundred perches, or two or three weeks work. . . . it is now too late in the season and the water too high to hope to close the work with masonry."

#### 1859

[182] Board of Directors Meeting, 6 January 1859 (Flood Damage Prevention-Accomplished, Flood Damage Prevention-Financing, Sustainability-Dams)

"A Certificate of the inability of the Company to pay the interest on the bonds of the Company guaranteed by the state of Virginia, which became due on the first of January inst . . . prepared and signed by the President and Directors present, and was ordered to be transmitted to the Board of Public Works of Virginia"

"A letter from John G. Stone Engr & Genl Supt, dated the 5th inst was read, stating that, subject to the approval of the Board, he had contracted with J. P. Shannon to put in two Cribs at Dam No 4 for \$5275, the work [to] be completed by the 20th of Feby ensuing." The board approved the contract. The contractor for Dam No. 4, Robinson and Gorsach, asked for a final estimate and settlement of accounts on their work. The board directed that the estimate be presented at the next meeting.

[182] Board of Directors Meeting, 7 January 1859 (Flood Damage Prevention-Accomplished, Flood Damage Prevention-Financing, Sustainability-Dams)

"On motion the following resolutions were adopted  
No. 1, That the Engineer & Genl Supt of the Canal be authorized to contract for putting in the cribbing at Dam No 5, under his direction if he deems it advisable to do so, and that the work be urged on, without delay."  
No. 2, That the Company will issue two certificates to the amount of Twelve thousand dollars allowed L. G. Stanhope contractor of Dam No. 5; provided, the Coal Companies will agree to cash said permits on the same terms they have heretofore cashed them, and be it further Resolved that the Company will give Robinson & Gorsuch Contractors at Dam No 4 Certificates on the same terms . . ."

[182] Board of Directors Meeting, 3 February 1859 (Flood Damage-Financing)

"3rd The Treasurers payment of interest on certificates of debt for repairs &c prior to 1845 . . . amounting to \$1226.02. . . . 5. Certificates of debts for repairs &c prior to 1845 . . . amounting to \$641.94 issued for renewal and redemption of former certificates to the same amount under the resolutions of the Board of 13th Octr 1855."

[182] Board of Directors Meeting, 3 March 1859 (Flood Damage Prevention-Financing)

"On motion it was Resolved That the several Coal Companies & others who loaned to the Company \$31,500 in 1857 for repairs of the Canal, and which sum now stands credited to them respectively on the books of the Company, be requested to receive the same in orders receivable for tolls, payable one third on the first of May next, One third in the first of June next, and the remaining third in the first of July next . . .  
Resolved that the parties who hold certificates receivable in payment of tolls during the year 1859 be requested to defer the presentation of any part of the same until the first part of August next, and that from and after that time, monthly, as the tolls accrue from them, that one half of said tolls be paid in cash, and the residue in certificates."

[182] Board of Directors Meeting, 4 March 1859 (Flood Damage Prevention-Financing)

The board ordered the contractors for Dams 4 & 5 be paid for their final estimates in toll certificates.

[182] Board of Directors Meeting, 8 April 1859 (Flood Damage Prevention-Financing, Flood Damage Prevention-Ordered, Sustainability-Dams)

"The following preamble & resolution were presented

'Whereas it is desirable for the successful navigation of the Canal & the maintenance of the water grants already made or which shall hereafter be made on the Georgetown level of the Canal, that the dam at the Little falls of the Potomac should be thoroughly repaired and rendered fully efficient and it is understood that parties desiring to lease water are willing to make advances for that purpose.'

"2nd That said parties will advance to the Company as it may be required, such sums as the Chief Engineer may deem requisite for the above named improvement which together with the Bonus received for water grants shall be applied to repair & make efficient Dam No. 1."

W. S. Ringgold, Clerk, Washington, D.C., to John G. Stone, Engineer and General Superintendent, Four Locks, 29 April 1859 (Flood-April 1859)

"I regret to learn that the Canal has again been seriously damaged by the flood and that favorable prospects for business will again be interrupted."

[182] Board of Directors Meeting, 4 May 1859 (Flood-April 1859, Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed, Sustainability-Dams)

"A letter from John G. Stone Esq Engr & Ge Supt dated this day was read stating that owing to the difficulty in procuring money to complete Dams No 4 & 5, and the importance of securing dam No 4, he recommended that the work upon Dam No 5 be suspended for the present & that Dam No 4 be put under Contract to be completed immediately, and that Dam No 5 can be finished before the winter sets in."

Note: a freshet had damaged Dam No. 4 in April.

The board agreed to contract with L. G. Stanhope for completing Dam No. 4 and also agreed to further plans if Stanhope did not accede to their plans. The Board also authorized the President to borrow up to \$10,000 to pay for rebuilding and repairing Dam No. 4.

[190] A. K. Stake, Superintendent, Williamsport, to "Dear Sir," 5 May 1859 (Flood-April 1859, Sustainability-Dams)

"The Weather, so far, is favourable to an early repair of Dam No 4 though as yet nothing has been done except some arrangements made for materials, tools, &c."

"In my opinion the interruption need not exceed one month possibly it may not reach that. The Canal otherwise is in tolerably good order."

[182] Board of Directors Meeting, 18 May 1859 (Flood-April 1859, Sustainability-Dams)

The board minutes indicate it had successfully contracted with Stanhope to rebuild and repair Dam No. 4. It also ordered the General Superintendent to contract with George Hughes "for repairs and filling in the Guard bank at Dam No. 4 at the rate of 25 cts per cubic yard for earth to be commenced as soon as the Cribs are put in . . ."

[190] A. K. Stake, Superintendent, Williamsport, to W. S. Ringgold, Clerk, 21 May 1859 (Flood-April 1859)

Stake reports that light boats are passing freely through his division and that heavy boats will be "passed down tomorrow night."

[194] W. S. Ringgold, Clerk, Washington, D.C., to R. Johnston, President, Alexandria Canal Company, 25 May 1859 (Sustainability-Dams)

"I have yours of 24th inst There has been no Estimate made for repairing Dam No. 1 & enlarging the feeder Since 1853, but the whole Sum required will not exceed \$25000 or in addition to the bonus \$6000, and loan of 15 to \$19000."

"The whole Sum of \$200000 realized from the Guarantee bonds [authorized by the State of Virginia in 1849] and a much larger Sum, was expended in repairing the Canal at points deemed at the time more essential for its protection than Dam No 1"

"No part of that fund can therefore be now made applicable to the repair in Question."

[LIB-PHP] Thirty-First Annual Report of the President and Directors of the Chesapeake and Ohio Canal Company to the Stockholders, June 6th, 1859 (Frederick, Md.: Schley, Haller & Co., 1859) (Flood-April 1859, Flood Damage-Financing, Flood Damage Prevention-Financing, Flood Damage Prevention-Ordered, Sustainability-Dams)

The President, L. J. Brengle, reported (pp. 3-6):

"With the exception of the partial suspension of navigation then existing from the breach in Dam No. 4, the repair of which was prolonged beyond our anticipation, from the prevalence of high water in the river, no casualties of a similar character have materially interrupted regular transportation upon the Canal until the end of April last when a heavy flood in the river at that point again occasioned considerable damage, by a breach in the old dam, and to the guard bank; by which a portion of the new masonry dam on the Maryland side, which had not been finished was carried off." The breach resulted in a three week suspension of navigation.

"The current repairs for the past year have been unusually large, owing to the neglected and dilapidated condition of many portions of the Canal, and its incidental works. It is now believed to be generally in better order than it has been for some years past, and that with proper vigilance permanent navigation may be relied upon."

"The precarious condition of dams Nos. 4 and 5 was adverted to in our last report, and the opinion expressed, that until they were rebuilt, there could be no assurance of reliable navigation. The expenditures made on temporary repairs of these old structures during the past two years have exceeded \$100,000; and yet they were in such condition as not to afford a supply of water for navigation when the river was low, and were liable to be broken, or carried away on any material rise in the river, as was the case recently at dam No. 4."

"To repair the breach in dam No. 4, in May 1858, cost \$19,000, and the disaster to the old dam and guard bank, which occurred in April last, has cost \$5,000. It is estimated that the injury done to the new masonry dam by this flood will cost about \$10,000 to restore it to its previous state, and more than these sums were lost to the Company by the suspension of the revenues; such casualties we were subjected to at any moment involving large losses to the Company, as well as to those engaged in transportation upon the Canal. At the time of our last report, work to the amount of \$58,000 had been done on the new masonry dams at these points, and these also were unprotected, and exposed to be carried off by the first freshet in the river."

"Under this aspect, the only possible hope to secure these works, and maintain navigation on the Canal, was to complete the new dams. The means and credit of the Company were completely exhausted by former loans for repairs, and no other source was presented than an appeal to parties interested in transporting upon the Canal. The Mining Companies of Allegany in this resort, with commendable zeal and promptness, at length came to our aid, and arrangement was made with them, to supply in part, the means to continue work upon the new dams, by anticipating the tolls on Coal to be shipped by them during the present year, for which certificates were issued receivable in payment of tolls to accrue during the year 1859; and to be good thereafter, if not redeemed within the present season. These certificates were, from time to time, paid to the contractors on their monthly estimates and were cashed by the parties in question. This arrangement will secure the completion of the two dams . . ."

"The Company were without resources to resume actively the reconstruction of the new masonry dams Nos. 4 and 5 until the arrangements effected with the Coal Companies in August last, and though late in the season, it was hoped that with favorable weather, they could be so far completed before the winter, as to render them secure. The Contractors were urged to this, and it was confidently expected that Dam No. 4, which had been far advanced, would have been entirely closed in; but toward the end of the season, when a brief period of favorable weather would have enabled them to effect its completion, the water in the river became too high, and compelled them to suspend their operations, leaving two openings in the dam for the passage of water, and it became necessary to build cribs for its protection. No injury has been done to either dam during the winter, and till the flood in April last, everything appeared favorable for the early completion of both. The former contractors of dam No. 4 in January last, asked that their contract be closed and settled to time, which was assented to by the Board. Since the late disaster to the dam, a new contract has been made for its completion with another party, at rates similar to the late contractors, which provides for the completion of the dam on or before the first of August ensuing."

"Dam No. 5, it is believed, will not be exposed to injury for the present and it is thought advisable to concentrate all the resources of the Company in the first instance to the completion of Dam No. 4, and if finished as soon as expected, there will then be sufficient time before the close of the season, also, to complete dam No. 5, to its junction with the existing dam on the Maryland shore, as originally contemplated, which will render it secure and effective."

The Engineer and General Superintendent, John G. Stone, reported (pp. 10-11):

"During the last year many important repairs and improvements have been made on the Canal. Flumes have been built to the different Locks where they were needed, tumbling wastes made . . . the dam at Cumberland raised . . . A force of men, independent of those employed for ordinary repairs, have been and now employed going up and down the line with a Dredging machine, clearing out the sand bars as they form on the different levels."

"The late freshet did much damage to Dam No. 4, not however, as much as has been done by former ones. About 100 feet of the guard bank was washed away by the water getting over the bank just above the abutment where the crib of the old Dam connected with the bank, part also of the crib work put in last Spring was carried away. The water remained high enough to enable loaded boats to pass until the night of the 2d of May, after which time the navigation was stopped at this point. The repairs were immediately commenced and navigation restored by the 19th for empty boats, and by the 23rd for loaded ones. The high water did no damage but at this point, although



many levels were entirely overflowed. The guard bank at this Dam has been repeatedly overflowed and washed away by high waters; it must be subject to the same injury every freshet that occurs, unless it is raised above the highest water and then protected with stone."

"The masonry of this new Dam was injured by the drift coming against it, the old dam being higher than the new one, and being just above it, forced the timber that came down the river against the masonry with such violence as to remove a large quantity of the stone from the new dam [?]."

"This will be the case again if we should have another such a freshet before the old dam can be removed so as to lower it below the level of the comb of the new one. As the drifting timber passed over the old dam, it struck with such force against the masonry, that the jar could be distinctly heard by persons standing on the abutments, of course no masonry could resist such a power."

"Dam No. 5 was not injured and has 400 feet completed, 100 feet more with a small crib will make this dam secure."

"The old dam is injured to such an extent that there is no doubt but another such a freshet as the late one, will wash away the crib next to the Virginia side."

"The navigation of the Canal next year depends entirely upon having this dam continued 100 feet more and then secured to the end of the old dam on the Maryland side."

[182] Board of Directors Meeting, 7 June 1859 (Flood Damage-Financing)

"2nd The Treasurers payments of interest on Certificates of debt for repairs &c prior to 1845 . . . amounting to \$1747.83."

"3rd Certificates of debt for repairs &c prior to 1845 . . . amounting to 30.96 issued for renewal and redemption of a former Certificate for same amount, under the resolution of the Board of 13 Oct. 1855."

[182] Board of Directors Meeting, 14 July 1859 (Flood Damage Prevention-Financing)

The Board and Directors issued the standard bi-yearly certificate indicating they were unable to pay interest on the repair bonds guaranteed by the state of Virginia.

The President reported the company was unable to repay the toll certificates used to finance repairs on Dams No. 4 & 5 and that he sought authority to negotiate with the coal companies, "with a view to defer for some months, the payment of the toll certificates" so that in the present the entire resources of the Company could be applied the current needs of the canal, among them rebuilding dams. This authority was granted by the board.

[190] John G. Stone, Engineer and General Superintendent, to the President and Directors, 1 September 1859 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Dam No 5 is not in a condition to resist an other freshet. The old Dam, on the Virginia side was very seriously injured by the last freshet." [of April 1859?]

"I recommend that the Stone Dam be continued 100 ft. and then secured to the old dam on the Maryland side, or that the old dam be repaired and made as secure as possible. The repairs can be done for about \$2000. To continue the stone dam and secure it will cost about \$15000. There will be no certainty of the navigation next spring unless the work is done."

[182] Board of Directors Meeting, 8 September 1859 (Flood Damage Prevention-Ordered, Sustainability-Dams)

Final estimates for the repair of the Guard Bank at Dam No. 4 were made, indicating the project was near completion.

"A letter was received from John G. Stone Engr & Genl Supt. dated the 1st inst was received stating that Dam No 5 was not in a condition to resist another freshet, and recommending that the masonry dam be continued 100 feet, secured to the old dam on the Maryland shore, or that the old dam be repaired and made as secure as possible estimating the cost of continuing & securing the stone dam at \$15,000; or repair the old dam at \$2000, and unless this be done that in his opinion there will be no certainty of the navigation being secured."

"After consideration, on motion it was Resolved That the contractors of Dam No 5 be requested to make immediate preparations for continuing the work on the masonry dam at Dam No 5, so as to secure the completion thereof as early as practicable."

[190] A. K. Stake, Superintendent, Williamsport, to W. S. Ringgold, Clerk, 17 September 1859 (Flood-September 1859, Sustainability-Dams)

"We have had another rise in the river, exceeding the April freshet by about 18 inches, each level upon my division was overflowed but, besides the bars formed, no other damage was done, a few days will be required to restore navigation, Dam No 5 is Safe, but I regret to learn that there has been serious damage done to Dam No 4, a portion of the finished dam, (that part built by Humbine and Robinson) has been carried away."

[190] J. G. Stone, Engineer and General Superintendent, to "Dear Sir," 19 September 1859 (Flood-September 1859, Sustainability-Dams)

"Dam 4 is very seriously injured, the damage is on the work dam by R.&H. in 1857 [?]. The balance of the masonry is not hurt. Dam 5 all safe. The guard bank gone. . . . A few small Brakes. The Dam is the worst."

"The water is too high to see the amt. of Damage."

[190] L. J. Brengle, President, Frederick, to W. S. Ringgold, Clerk, 23 September 1859 (Flood-September 1859, Sustainability-Dams)

"Stone writes me that about 150 feet of dam 4 next to Virginia abutment was carried off by the freshet, but don't know whether is down to foundation or not, as the river is too high to see extent of damage, the rest of the masonry not injured, the guard bank on Md. side just put in has washed, and several slight breaches on the line of Canal. Dam 5 all safe. Brown's cribbing and Cofferdam has been carried off. He states that it will take 4 weeks to restore navigation."

[194] W. S. Ringgold, Clerk, Washington, D.C., C. E. Detmold, New York, 26 September 1859 (Flood-September 1859, Flood Damage-Financing)

"The injury of the Canal by the late freshet, is of such extent as will require all the means for its repair that the Company Can Command, and trust in the emergency, that the Coal Companies will Consent, to pay in Cash, the tolls due from them for the past three months, otherwise I do not know how we can accomplish it."

[182] Board of Directors Meeting, 28 September 1859 (Flood-September 1859, Flood Damage Prevention-Proposed, Sustainability-Dams)

"A letter from John G. Stone dated this day was read, stating that the late freshet had done considerable damage to Dam No 4 and the level below Shepherdstown; that the masonry of the dam that was finished in 1857 to the length of about 175 feet was removed. that a crib can be put in on the old dam which will restore the navigation, when the masonry can be rebuilt and that all the canal would be in good order by the first of next week except from Harpers Ferry to Dam No 4, and owing to the late season, recommending that a crib be put in from the masonry of Dam No 5 to the old dam repaired by the Hollman that in his opinion this well secure that dam for several years, and that the masonry dam can there be finished, whenever the Board may choose, and that a crib be also put in front of the opening at Dam No 4 on the Maryland side and then fill between the old and new dams with stone, also suggesting that the guard bank which was washed away at Dam No 4 should not be rebuilt till the dam was finished as it was not necessary for navigation and could be put in during the winter. after consideration on motion it was Resolved That the President & Engr & Gl Supt be authorized to make such arrangements or Contracts as in their opinion will be most conducive to the interest of the Company in effecting the repair of the breaches occasioned by the late freshet, so that navigation may be restored as early as practicable and the dams made effective and secure . . ."

[190] John G. Stone, Engineer and General Superintendent, to "Dear Sir," 29 September 1859 (Flood-September 1859, Sustainability-Dams)

"Dam 4 is very seriously injured, the damage is on the work done by R. & H. in 1857 [9?]. the balance of the Masonry is not hurt. Dam 5 all safe. the guard bank gone. Also the crib & coffee dam."

[190] John G. Stone, Engineer and General Superintendent, to "Dear Sir," 3 October 1859 (Flood-September 1859)

"Mr. L. Benton will have the breach at Antietam done this week." Reports need for money to pay laborers. Otherwise they will quit working.

[190] L. Benton, to "Dear Sir," 3 October 1859 (Flood-September 1859)

"Navigation will be restored in 10 days or two weeks."

[190] J. G. Stone, Engineer and General Superintendent, to "Dear Sir," 10 October 1859 (Flood-September 1859)

"I think we shall be able to pass the loaded Boats by the last of the week."

[190] L. J. Brengle, President, Frederick, to W. S. Ringgold, Clerk, 31 October 1859 (Flood-September 1859, Sustainability-Dams)

"I saw Stone, Stanhope, & Brown on Saturday, they will commence laying stone to day at Dam 4 & the timber for the cribbing at Dam 5 is all out ready to be sent to the dam to be put in."

[182] Board of Directors Meeting, 11 November 1859 (Flood-September 1859, Flood Damage-Financing, Sustainability-Dams)

The minutes for this board meeting reveal the company had gotten the coal companies to agree to pay their July and August tolls in cash, rather than in toll certificates (accrued from loans to the Canal Company in 1857), and that these funds were to be used to complete the repairs and rebuilding of Dams Nos. 4 and 5. The funds were to be dispensed in parts as the work progressed.

"A proposal from L G Stanhope dated the 28th of Octr was read, for rebuilding the masonry of Dam No 4 in the Virginia side of the river, carried away by the recent freshet, in a substantial manner to be completed by the 1st of July next at the following rates viz

Masonry per perch of 25 Cubic feet	\$6.50
Rubblestone for filling between the Old & New Dam	1.00
Timber, Iron, boring &c at the same rates as their former contract for Dam No 4	
Embankment on the Maryland side of Dam No 4 per cubic yard	25 cts
Cribbing the opening of Dam No. 4 on the Maryland side and also cribbing the gap at Dam No 5 between the new masonry dam and the Hollman dam, under the direction of the Engr & Gl Supt of the canal for the sum of	\$12,500.00

all to be completed by the 1st day of Jan'y 1860"

"The President stated to the Board that he had accepted said proposal, reserving the right to suspend the work or any portion of it whenever he may deem it necessary to do so, and that the work to be done under the direction of the Engrt. & Gl Supt of the Canal, which on motion was approved & confirmed by the Board."

"A letter from J G Stone Engr & Gl Supt of the Canal dated the 10th inst was read stating that the Contractor for rebuilding the coffer dam at Dam No. 4, claimed 625\$ for putting in the second Coffer dam at Dam No 4, also \$1125 for clearing the foundation of Dam No 4, which he had required to be done to expedite the work."

[182] Board of Directors Meeting, 6 December 1859 (Flood-September 1859, Flood Damage-Financing, Sustainability-Dams)

The agreement reached with coal companies for cash payment of tolls for July and August of 1859 (in lieu of toll certificates) would be paid in parts, as work on the repairs and rebuilding of Dams 4 and 5 progressed. Thirty percent would be paid, "upon receipt of the Agent of said Companies that the cribbing of Dam No. 4 is Complete, and all other work on Dams No. 4 & 5 progressing satisfactorily and nearly 40 per cent of the work done done; and a further sum of 30 percent on the 10th of January upon certification of such agent that the cribbing on Dam No. 5 is completed, and all other work on both Dams, sufficiently advanced to secure both dams against ice freshets; and the balance of said tolls to be paid on the certificate of such agent that the work on both dams is satisfactorily completed, according to the plans, & provided the work is all completed by the 20th of Jan'y next."

[190] L. J. Brengle, President, Frederick, to "Dear Sir," 15 December 1859 (Flood-September 1859, Sustainability-Dams)

"In a letter from Stanhope a few days ago he informs me that about 40 feet of the cribbing at Dam No 4 was carried off by the late rise in the river, and also part of the filling at the Guard Bank at said dam." Brengle attributes the damage to a defective design in the dam: ". . . the cribbing was only about 4 or 5 feet above low water, and without much stone in them to keep them at their places." He criticized J. G. Stone, the Engineer and General Superintendent of the canal who had assured him the low cribbing would not be a problem. Brengle was deeply worried about what a catastrophic flood in the spring would mean for the company since it was so deeply in debt.

## 1860

[182] Board of Directors Meeting, 5 January 1860 (Flood Damage Prevention-Financing)

The Board and Directors issued the standard bi-yearly certificate indicating they were unable to pay interest on the repair bonds guaranteed by the state of Virginia.

[190] L. Benton, Superintendent, Sharpsburg, to "Dear Sir," 15 January 1860 (Flood-January 1860)

". . . the Ice past of the River on last Friday eving and but little damage done so far it has not inguard the new Dam any & have done but little damage to the cribs it washed out Stanhopes & Browns crib a gane. The Ice must of piled up 10 feet a bove the dams the water was rather hight

yesterday to ascertain the exact damage to the olde par of the dam . . ."

"I have heard thar is no damage to Dam No 5."

[190] L. J. Brengle, President, Frederick, to W. S. Ringgold, Clerk, 17 January 1860  
(Flood-January 1860, Sustainability-Dams)

"Stone and others have written giving me the sad intelligence that the breaking up of the ice in the river, has carried off part of the old dam at no 5. Dam no 4 no injury."

"A meeting of the Board is requested at an early day to see what can be done to secure navigation by cribbing dam 5 between the new Masonry & Hollman dams. This Tracy says can be done & before the Spring business commences, if immediate steps are taken to do the work."

[182] Board of Directors Meeting, 20 January 1860 (Flood-January 1860, Sustainability-Dams)

"The Board then considered the damages done to Dams Nos. 4 & 5 by the late ice freshet, and after conference with Engr & Gl Supt & Mr. Tracy agent of the Coal Companies as to the extent of injury and means for repairing the same. On motion it was

Resolved That the President & such of the Directors as may find it convenient visit New York in company with Mr. Tracy to confer & arrange with the Coal Companies for the repairs of said dams, and that they be authorized to make such contract for repairing Dam No. 5 as they may deem expedient and proper."

[182] Board of Directors Meeting, 28 January 1860 (Flood-January 1860, Flood Damage Prevention-Financing)

"The President stated to the Board, that in pursuance of the resolution of the Board on the 20th inst, he with [three directors] visited New York to confer with the Coal Companies, relative to the manner and means requisite to repair the damage to Dams Nos 4 & 5 occasioned by the late ice freshet. That the Coal Companies required the Canal Co. 'to place the work on Dams Nos 4 & 5 in the hands of Mr. Tracy to contract with such parties as may think proper, to execute and deliver said contracts, in order that the work may be done promptly and efficiently according to the plans accepted on the 16th of Nov; and the work not to cost more than \$25,000 to \$30,000; that the Canal Company issue toll certificates to the contractors for the work as it progresses upon the certificates of Mr. Tracey.'" The C&O Board evidently found these terms unacceptable, because it put the canal company substantially under the control of the coal companies. "The President further stated that the members of the Board who were present, deemed these conditions inadvisable, and that the present meeting was called to devise some other mode of effecting the repairs. after consultation on the subject, there being no acceptable proposition before the Board to effect the repairs [the board adjourned]."

[182] Board of Directors Meeting, 3 February 1860 (Flood-January 1860, Flood Damage Prevention-Ordered)

"A letter from Hasselt & Herr dated this day was read, proposing to put in the crib at Dam No 5 according to plan and under the direction of the Engr & Gen Supt. for the sum of \$12000 and to prosecute the work with due diligence provided the Company allow the use of such materials of the old dam, and of any boats belonging to the Company that can be spared as the Eng & Gen Supt may direct. payment therefor to be made when the work is fully completed, and if the same be not paid in money, that certificates for tolls receivable in 1861 be issued on the same terms as those issued to the Coal Co's if desired by them. after consideration, on motion it was, Resolved, that the terms and conditions proposed by Hasselt & Herr for cribbing Dam No 5 be accepted by the Board, and that said parties proceed forthwith to effect the repairs as early as practicable."

[182] Board of Directors Meeting, 1 March 1860 (Flood Damage-Financing)

"3d, The Treasurers payment of interest on Certificates of debt for repairs &c prior to 1845 . . . from 1 June to 31 Dec 1859 . . . amounting to \$1390.48."

[182] Board of Directors Meeting, 2 March 1860 (Flood-January 1860, Flood Damage Prevention-Financing)

"Ordered, That the contractor of Dam No 4 be directed to proceed forthwith to repair the breaches in said dam, occasioned by the recent freshet [the January ice freshet?], supposed to amount to about \$3000; under the direction of the Engr & Gen Supt, and in case of failure to do so, that Engr & Gen Supt be directed to have the same repaired by the Division Superintendent."

"Ordered, That certificates for tolls receivable on or after the 1 of Oct. next to an amount not exceeding \$4000 be issued by the Clerk to meet the cost of said repairs, on the certificates of the Engr & Gen Supt., as the work progresses, and that \$1200 of said certificate be issued to commence said work."

[190] John G. Stone, Engineer and General Superintendent, 4 Locks, to "Dear Sir," 18 March 1860  
(Flood Damage Prevention-Accomplished)

"Hasselt & Herr have two cribs in and can put the Balance in if there is no interruption from rain in about 8 or 9 days."

[190] John G. Stone, Engineer and General Superintendent, 4 Locks, to "Dear Sir," 25 March 1860 (Flood Damage Prevention-Accomplished)

"The high water has stopped the work at Dam 5. We expect to commence again by Sunday. If the water gets down we shall soon be ready for navigation. One week is all we want, but it must be a week that we can work."

[190] John G. Stone, Engineer and General Superintendent, to "Dear Sir," 26 March 1860 (Flood Damage Prevention-Accomplished)

"We expect to put an other Crib in today, the water is still high. There is 14 ft. water and running pretty swift. Still we will try what can be done. If no accident occurs we shall have all the cribs in by Monday or Tuesday next."

[182] Board of Directors Meeting, 5 April 1860 (Flood Damage Prevention-Accomplished)

"A letter from John G Stone Engr & Genl Supt. dated the 4th inst was read stating that the Crib work contracted for by Hasselt & Herr at Dam No. 5 was completed. that the Virginia abutment of said dam is in a dangerous condition and should be immediately protected by a crib built of oak, hewed timber firmly secured, and that the filling above the crib first put in should be done and when all such work is done, that the dam will last for 15 or 20 years, and give a full supply of water . . ."

[182] Board of Directors Meeting, 6 April 1860 (Flood Damage Prevention-Accomplished, Flood Damage Prevention-Financing)

"Ordered That the Engr & Genl Supt of the Canal be directed to have the requisite repairs made to secure the Virginia abutment of Dam No 5 and that the Clerk be authorized to issue for such purpose, when required, certificates for tolls receivable during the year 1860 to an amount not exceeding \$3000 bearing interest from the date thereof."

[190] L. Benton, Superintendent, Sharpsburg, to W. S. Ringgold, Clerk, 15 April 1860 (Flood Damage Prevention-Accomplished)

"I suppose you feel I am anxiety a bout Dam No 4 I am undr the Impresioun thar is but little damage done to the cribing I left thar late last eaving the wartr is rother high yet to tell to a surteny. the stone structure is not Ingurd attaal thar is a good many Breaches on my Divisioun & som san bares"

[190] John G. Stone, Engineer and General Superintendent, to "Dear Sir," 24 April 1860 (Flood Damage Prevention-Accomplished)

"I have just received a note from Stanhope saying the Virginia Crib is all done except putting on the Sheeting. He has commenced to repair the ends of the gap on the Maryland side so as to make them secure."

"Stanhope writes they have used all the material on hand and will be stopped for the want of Logs. The work will be very much put back if we do not get money very soon."

[182] Board of Directors Meeting, 26 April 1860 (Flood Damage Prevention-Accomplished, Flood Damage Prevention-Financing)

"The President read to the Board correspondence held by him with Mr. Detmold relative to advances asked of the Coal Companies for repairs required at Dam No 4 &c. the Coal Companies decline for the present to make further advances for the purpose. Mr. Bowles stated to the Board, that he believed that he could have certificates for tolls receivable during the year 1860 to the amount of 5000\$ or 6000\$ bearing interest, cashed without discount for the purpose of the repairs, whereupon motion is was, Ordered, That the Clerk be authorized and directed to issue certificates for tolls receivable in payment of tolls to accrue during the year 1860, to an amount not exceeding \$6000 bearing interest from date, and place the same in the hands of Mr. Bowles director, to be by him cashed and the proceeds deposited to the credit of the Company in Bank; and that requisitions be issued therefor as may be required to the Superintendents to be applied to the repairs requisite for restoring the navigation of the canal."

[182] Board of Directors Meeting, 4 May 1860 (Flood Damage Prevention-Financing)

"On motion it was, Resolved, That a committee consisting of the President & Messrs Spates, Holmes, Heckart directors, be appointed to visit Dam No 4 and that the several division Superintendents and the contractors for rebuilding the dam, be directed to meet said committee at the dam on Wednesday the 9th inst."

"Resolved, That said committee be also requested to confer with the several Coal Companies and to make some equitable arrangements with them for the payment of a portion of their tolls hereafter to accrue, in money, to enable the Company to make the requisite repairs of the canal, and to ensure uninterrupted navigation thereon."

[182] Board of Directors Meeting, 15 May 1860 (Flood Damage Prevention-Financing)

"On motion it was, Resolved, That the Counsel of the Company be requested to give his legal opinion as to the validity and legality of the certificates for tolls heretofore issued by the Company, and the liability of the Company to receive the same in payment of tolls when presented; or whether the same may be temporarily postponed."

"The committee appointed at the last meeting of the Board to visit dam No 4, reported that they had performed the duty, but were not attended by the general Supt as directed, and in consequence of such remissness had suspended him from service, and had temporarily appointed A. K. Stake as Gen Supt. and had also engaged the services of Edward Watts Engineer to inspect and make an estimate of the dam, which on motion it was approved by the Board."

"Mr. Watts appeared before the Board and read a report on the condition of the dam, and presented an estimate for its completion in a substantial manner, estimating the whole cost at \$38,723.69."

[182] Board of Directors Meeting, 16 May 1860 (Flood Damage Prevention-Accomplished)

The Board of Directors at this meeting cancelled their contract of 18 May 1859 with L. G. Stanhope for repairs on Dam No. 4 for non-fulfillment and it voided its agreement of with Stanhope for him to rebuild the masonry of the Virginia side of Dam No. 4 according to his proposal of 28 October 1859.

[182] Board of Directors Meeting, 1 June 1860 (Flood Damage Prevention-Financing)

The board proposed to stop accepting toll certificates, in order that the canal might earn some cash to funds its operations. However, the company's attorney told them they were legal debts of the company and could not be cancelled without the consent of the holders. The board agreed to send representatives to discuss arranging cash payment of tolls with the coal companies.

"Edwd Watts appeared before the Board and read a report on the present condition of dam No 4 and presented an estimate of the cost of its completion, amtg to \$38,691.19 which was ordered to be filed."

"A report of A K Stake Gen Superintendent dated this day was read, stating the general condition of the canal;"

[182] Board of Directors Meeting, 2 June 1860 (Flood Damage Prevention-Ordered)

On motion it was, Ordered, That so soon as the committee appointed to visit New York, shall return, if a satisfactory arrangement for money shall have been effected, that they meet in Washington and enter into contract with Wm Brown for the completion of Dam No 4 provided his proposal therefor shall be satisfactory; otherwise, that they be authorized to contract with any other responsible bidder; and that such contract shall provide for the completion of the dam within ninety days from its date, so as to prevent all risk of detention of the canal on account of the imperfections of the dam, unavoidable freshets and their duration only."

[LIB-PHP] Thirty-Second Annual Report of the President and Directors of the Chesapeake and Ohio Canal Company to the Stockholders, June 4th, 1860 (Frederick, Md.: Schley, Haller & Co., 1860) (Flood-April 1859, Flood-September 1859, Sustainability-Naivete, Sustainability-Dams)

In this report, the C&O Company President, James Fitzpatrick, announced a management reorganization, designed to promote (p. 4) "a rigid, responsible, practical and economical system. [The Board] have abolished the offices of Division Superintendents, which they considered were disbursing agents, and substituted for them, eighteen Bosses or Supervisors, each of whom will have charge of a certain number of miles, ranging in extent according to the condition of the work, as some parts of the Canal require more vigilance and labor to repair and preserve it in navigable order for five miles, than other parts will for fifteen. The Board retained the office of General Superintendent, and that officer, who is familiar with the condition and wants of every mile of the Canal, will assign their respective divisions to the eighteen Supervisors, but no distance will exceed five miles."

(p. 5) ". . . the Canal in many parts is in bad condition and needs much reparation. It is not contemplated to employ additional force; but those in the service will have ample work to restore it to strength and safety, and put banks to regular breadth and height by the addition of proper materials." Fitzpatrick believed the locks required attention, particularly the composite locks.

Fitzpatrick also described the saga of the Dams 4 and 5 (pp. 6-13). "Dams No. 4 and 5 have been the fruitful sources of innumerable disasters to the Canal for some years. It will be recollected, that the heavy freshets of 1857 swept them away, and that for the purpose of restoring navigation as speedily as possible, Col. William P. Maulsby, the efficient and energetic President of the Company at the time, under the advice of the Engineer then in the service of the Company, aided by the acknowledged ability of Captain Meigs, had cribs of wood heavily laden with stone and sheeted, stretched across the river in the place of these two Dams as temporary substitutes, until such time as the solid stone Dams, a short time previously put under contract, could be built."

"These Crib Dams, exposed to the violent and sudden freshets, floating timber and ice, were not

relied upon to keep permanent navigation and sustain the business interests connected with the Canal in uninterrupted activity. The frequent removal of these cribs, and the necessity of putting others in their places, have imposed on the finances of the Company burdens that the revenues have not been able to meet. The revenues were inadequate to meet the steady and continued drain. Immense sums have been swallowed up in the effort to keep up the navigation with these means so inadequate to resist the sudden violence and power of the river."

"Having ample information, through their officer, of the deplorable condition of Dams 4 and 5, and anticipating the difficulties and disasters that have since resulted, the Board determined to contract for the building of two stone Dams. to have them prosecuted with energy and completed within the shortest possible period, as works of vital necessity to the preservation of the credit and usefulness of the Canal."

"Acting under this spirit, they accordingly put Dam No. 4 under contract on the 18th day of October 1856, with a thorough understanding, as set forth in the contracts of that date, that it should be completed on or before the 1st day of January 1858; having had, prior to the execution of the contract, through their Engineer, Mr. Patterson, an estimate of the number of perches of masonry with the cost of the same, namely: 9600 perches, and costing \$60,834.51. The contractors binding themselves to expend \$2,500 in coffer dams, which the Engineer from estimates made considered ample for that purpose. But in case the coffer dams cost more than this amount, then the Canal Company were to be subject to any additional expense over this sum, all of which was to be expended under the direction of the Engineer."

"Dam No. 5 was also put under contract on the 9th day of January 1857, to be completed on the 1st day of June 1858. The estimate of which, as made and furnished by the same gentlemen, contained 9000 perches, and would cost \$56,338.00. To which must be added 10 per ct. for contingencies \$5,633, making a sum total of \$61,971. Although every effort had been made, urging their completion within the time fixed by the terms of the contract; and additional inducements offered, by an increase of price of one dollar a perch on Dam No. 4, and \$1.75 per perch on Dam No. 5, on the 5th and 6th of August 1857; yet it is to be regretted they failed to finish them, and they still remain in an exposed and unbuilt condition."

"The floods of 1859 caused much injury to the Canal. The first occurred in the month of April, and occasioned a breach in the old Dam No. 4, and to the guard bank at that point, and carried away a portion of the new unfinished masonry on the Maryland side of the river. In September of the same year, another flood carried away a considerable portion of the new masonry on the Virginia side of the river; and more recently other disasters have occurred from high water, by the removal of some of the cribs of other structures, as well as the guard bank (which had been partially reinstated,) to restore navigation. The large and extraordinary sums expended on these temporary structures, if timely applied, would have been more than sufficient to have completed the masonry dams, and the losses incurred by these expenditures, as well as the loss of revenue, by the suspension of navigation, would have been avoided."

"Sad experience has proved, that the Canal cannot enjoy prosperity or repute, until the Dams are completed. The Board has determined to place Dam No. 4 under contract immediately, and have it finished in the early part of September next. This will stop up one of the two chief sources of the Company's misfortune. Dam No. 5 would be put under contract also, but an exhausted treasury forbids it. Nothing can be done on it this season, but such work as, in the judgment of Mr. Watts, may be necessary to secure the work from accident, already done. But it is intended to let that dam and have it completed during the summer of next year."

The General Superintendent, A. K. Stake, reported flood damage along the various divisions of the canal (pp. 16-18) in Appendix A.

"The Cumberland division is in tolerable condition, the April freshet made some inroads upon the guard banks immediately below Dam No. 8, so as to render it necessary to have some work done before another freshet should occur . . . the only safe and reliable security against all future damage would be a masonry wall; but, temporary relief may be obtained by a heavy rip-raping of stone."

"The Hancock Division, received also some injury by the April freshet; immediately below Dam No. 6, similar inroads have been made to those at No. 8, and will ultimately give trouble if not attended to; some further injuries were received at several points by washes upon the tow-path . . ."

"The Williamsport Division, being a low location received very serious injuries by the freshet of April, which were afterwards aggravated by a freshet in May. . . . Dam No. 5, located upon it, received little or no damage, except the abutment of Virginia side, which cannot be regarded as safe. . . . The Antietam Division, being in a similar location to the above, received considerable injury by the freshets of April and May, and will require close attention to insure navigation. The Dam No. 4 is in a miserable condition until it is completed. The guard bank, already twice reconstructed, is out again and cannot be put in, so as to be relied upon, until the dam is completed."

"The Monocacy Division, was injured some by the high water, but very little; the general condition of this division is tolerably good; the constant filling up taking place at the feeder of Dam No. 3, will require attention to insure navigation for loaded boats;"

"The Georgetown Division is in tolerably good condition; the dam at Seneca will require attention as soon as the river falls, but being of a temporary character, will not require much money. The dam No. 1 is in a very bad condition, the lock-gates are out of order and great care and

attention will be required to insure navigation."

Note: on pp. 20-25, in Appendix B, there are detailed specifications, instructions,, and material and cost estimates for the construction of masonry Dams 4 and 5, made by Edward Watt, the Engineer on the project. One interesting point that Watt makes about the old Dam No. 5, is that it was built on an insecure foundation, and this helps to explain its particular vulnerability to freshets (p. 24).

[182] Board of Directors Meeting, 9 June 1860 (Flood Damage Prevention-Financing)

At this meeting an agreement was read between the canal company and the coal company. The coal companies agreed to advance the canal company \$10,000 in anticipation of future tolls. To pay cash for tolls accrued in July, half cash, half certificate for August and September tolls, and entirely in toll certificates after September. The money loaned to the company was to "be applied to the preservation of the navigation and the construction of Dam No 4 which shall put under contract immediately and urged to completion by 15 of September . . ."

The company accepted the proposal of William Simms and James F. Brown to finish the masonry dam at Dam No. 4 and build a guard bank.

[182] Board of Directors Meeting, 6 July 1860 (Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed, Sustainability-Culverts, Sustainability-Dams)

The Board and Directors issued the standard bi-yearly certificate indicating they were unable to pay interest on the repair bonds guaranteed by the state of Virginia.

"A report from A K Stake Gen Supt dated this was read as to the condition of the canal, stating that it was in worse condition than he had at first supposed, and that interruptions to the navigation had occurred from the leaky condition of the cribs at Dam No 4, and the giving way of a trunk at March run, and that recommending that the culvert at that point should be rebuilt . . ." The Board authorized the culvert be rebuilt.

[182] Board of Directors Meeting, 6 September 1860 (Flood Damage Prevention-Ordered)

"The President presented a contract for rebuilding a culvert, three miles below Dam No. 4 . . . which on motion was approved by the Board."

[190] James Fitzpatrick, President, Cumberland, to "Dear Sir," 14 September 1860 (Flood Damage Prevention-Accomplished)

"I returned from No 4 Dam last night; There I met Watts, Stake, & Cowdy. The work has certainly progressed very well . . . Now is the critical time with the work, in order to get in his [Watts, the contractors] coffer dam. His immense crib on the Maryland side will be fully completed on Monday evening next, it is substantial and fully reliable for the purposes designed."

[182] Board of Directors Meeting, 5 October 1860 (Flood Damage Prevention-Financing)

The minutes of this meeting indicate the coal companies agreed to pay half their tolls in cash, the other half in certificates until further notice, although they reserved the right to pay for tolls entirely in certificates.

[190] James Fitzpatrick, President, Cumberland, to "Dear Sir," 6 November 1860 (Flood-November 1860)

"I have news from all parts of the Canal, and all the injuries sustained, can be remedied from two to four days, sans and except the Abutment of Dam 5 on the Virginia side, which is carried away."

[190] Thomas Charlton, Superintendent, Williamsport, to the President & Directors, 7 November 1860 (Flood-November 1860, Sustainability-Dams)

"I would inform you that the 'freshet' has injured my Division as follows. Along the "high rocks", about 300 yards of the lining of Tow-path is gone. A small breach this side of "Sharp less" about 70 feet in length and 4 1/2 ft in depth; and a heavy bar near the Guard Lock. I am now at work repairing breach &c which I want to get done before the Water falls off of the Pool.

"The Buttment on the Virginia side of Dam No 5 is washed away; and I would like to know which is to be done with it."

"P.S. There is also a considerable bar at Millers bend."

[182] Board of Directors Meeting, 14 November 1860 (Flood-November 1860, Flood Damage-Financing)

'3d, The Treasurers payments of interests on certificates of debt for repairs &c prior to 1845 . . . from the 1st of Jany to the 31st of May 1860 . . . amounting to \$1268.23."

"Ordered, That Edward Watts Engineer be directed to superintend and direct the repairs of the crib at Dam No 5 in addition to the other duties required of him."



"A report from A K Stake Gen Supt dated the 13th inst. was read stating the injuries sustained by the canal from the recent freshet, estimating it will require from \$7,000 to \$10,000 to repair the same, and suggesting the necessity of making cash payments for said repairs &c. whereupon after consideration,  
On motion it was,  
Ordered, That such sums of money as may from time to time, be required to pay for the repairs, be paid to the paymaster on the requisition of the general superintendent . . ."

[190] James Fitzpatrick, President, Cumberland, to W. S. Ringgold, Clerk, 3 December 1860 (Flood-November 1860, Flood Damage-Financing)

"The damages at the Dam [4?] and the putting in of the Crib will swallow up easily the five thousand dollars you gave Mr. Stake."

[190] Edward Tiller, Engineer, Hagerstown, to James Fitzpatrick, [Director], President, 10 December 1860 (Flood-November 1860, Sustainability-Culverts)

Tiller indicates that the repairs needed on Culvert [the one below Dam No. 4?] and Dam No. 4 will be completed if at all possible in time for the spring navigation. He also states, "I have examined the Guard Bank and Culvert, in reference to its repair. To perfect that part of the work, I deem it necessary, that an outside slope wall be built, facing the embankments near the Pierhead, at the Lock, and Culvert, that it may be made secure against Ice, and spring freshets." Tiller thought these improvement would cost about \$2,000, and suggested they be done under supervision of the canal personnel, rather than be contracted out.

[182] Board of Directors Meeting, 13 December 1860 (Flood-November 1860, Sustainability-Culverts, Flood Damage Prevention-Proposed)

"A report from A K Stake Gen Supt dated this day was read, stating that the repairs at Dam No 5 were not completed, but were progressing satisfactorily . . ."

"A letter from Edwd Watts Engr. dated the 10th inst. was read, relative to the work on the Culvert below Dam No 4, expressing the belief that it will be completed in season, and recommending the building of an outside slope wall at Dam No 4 to secure the lock and culvert against freshets &c, which on motion was laid upon the table."

"A letter from Mrs. S. Jane Colleton dated the 12 of Nov. was read, urging the constructing the abutment at Dam No 5 for the protection of her property . . . On motion, the Clerk was directed to inform Mrs. Coleton that the Engineer of the Company deemed the abutment in its present condition secure against ice or spring freshet . . ."

[190] A. K. Stake, to Unknown, 13 December 1860 (Flood-November 1860, Flood Damage Prevention-Proposed)

"I am happy to announce that navigation was fully resumed by the time named in my last report, boats are not running as full as could be desirably on account of the prevalence of cold weather. . ."

"The repairs at Dam No 5 are not yet Complete but are progressing Satisfactorily in the mean time the pool continues to afford a full supply of water."

"The cross bank and guard bank at Guard Lock No 4, should be rebuilt; otherwise we may be subjected to serious damages at that point."

[194] W. S. Ringgold, Clerk, Washington, D.C., to M. June Coleton, Little Georgetown, Va., 15 December 1860 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"I am directed to inform you the Engineer of the Company deems the repairs made at the abutment of Dam No 5 sufficient to resist any freshet likely to occur . . ."

#### 1861

[182] Board of Directors Meeting, 6 February 1861 (Flood Damage-Financing)

"3d The Treasurers payments of interest on certificates of debt for repairs &c prior to 1845 . . . from the 1st of June to the 31st of Dec 1860 . . . amounting to \$1015.90."

[190] H. D. Carleton, Collector, Cumberland, to W. S. Ringgold, Clerk, 13 April 1861 (Flood-April 1861)

"The watter is very high here to day within about 10 inches of being as high as it was last fall. I fear their will be much damage done to the canal."

[182] Board of Directors Meeting, 17 April 1861 (Flood-April 1861)

"The President stated to the Board, that in view of the recent heavy freshet in the river, it was apprehended that much damage had been sustained by the canal, and that it may become necessary to anticipate the revenues of the Company for the repairs thereof, whereupon, after consideration on motion, it was

Resolved, That the President be authorized and requested to borrow on behalf of the Company, such sums of money as he may deem necessary and expedient to restore the navigation of the canal, not exceeding \$10,000 for such period as may be required, to be repaid from the accruing revenues of the Company during the present season, which are hereby declared to be pledged for the redemption of the same and the interest to accrue thereon . . ."

[190] Alfred Spates, Cumberland, to William S. Ringgold, Clerk, 6 May 1861 (Flood-April 1861)

". . . the repairs on the Canal Can be finished in a few days, and a meeting called."

[190] Alfred Spates, President, Cumberland, to William S. Ringgold, Clerk, 6 May 1861 (Flood-April 1861)

"The water will be in the entire Canal Tuesday, Certain the repairs are all finished . . ."

[194] W. S. Ringgold, Clerk, Washington, D.C., to Alfred Spates, President, Baltimore, 15 May 1861 (Flood-April 1861)

Not just flooding caused damage to canal, but also war.

"I am glad to learn of the completion of repairs on the canal and the readiness for navigation, but if the interruption which you anticipate by the Virginians be correct it will be of little avail."

[190] Alfred Spates, President, Baltimore, to W. S. Ringgold, Clerk, 13 June 1861 (Damage-Civil War)

"The Canal is badly injured in many places from Harpers Ferry up 4 of the Locks are a destroyed and much other damage done the Canal as well as the burning of a number of Boats &c &c. a grate destruction to the Canal and Canal interests has been made by the Virginians."

[190] A. K. Stake, General Superintendent, Williamsport, to Alfred Spates, President, 26 June 1861 (Flood Damage Prevention-Accomplished)

"I am trying to get stop plank for the Stop lock at Dam No 4, as without them we are not safe there even from ordinary freshets."

[190] A. K. Stake, General Superintendent, Williamsport, to Col. A. Spates, President, 6 July 1861 (Flood-July 1861)

Stake refers briefly to the July freshet in this letter. More concerned with discussing the problems Confederate troops are making for the canal in attempting to disrupt navigation. He states, however, "with the exception of the work at Harpersferry of which you are cognizant there has been little or nothing done, I am however [illegible] that operations will be commenced [to repair the canal] on Monday the 8th and that eight to ten days will suffice to restore navigation."

[182] Board of Directors Meeting, 9 July 1861 (Flood-July 1861)

"A letter from A K Stake dated the 6th inst was read, stating the measures adopted by him for repairing the canal &c . . . A report of A K Stake Gen Supt., of the Canal dated the 3rd of June was read as to the condition of the canal &c &c . . ."

[190] James Fitzpatrick, Cumberland, to Alfred Spates, President, 15 July 1861 (Flood-Summer 1860, Sustainability-Dams)

Note: an interesting letter discussing earlier freshets in 1860.

"You will recollect that in May 1860 we took charge of the Canal; considerable portions of the Canal were submerged by a big freshet, we, on the receding of the waters, found all the cribs at Dam 4 in such a leaky condition, that navigation was suspended at that point, until we with a force of men & the expenditure of \$42,000 filling up those empty cribs, restored the navigation.

In addition to this, Dam 5 was also a sufferer and before we could procure average depth of water at that point, we were compelled to expend \$2800. It took us a part of the month of May and the whole of June to secure both those Dams. . . "

"The year 1860 was remarkable for frequent and extraordinary freshets. in many of the months we had two, which retarded the construction of Mason work then in progress, and doing more more or less injury to the work under Contract."

[190] Alfred Spates, President, Hagerstown, to W. S. Ringgold, Clerk, 20 July 1861 (Flood-July 1861)

"The whole of the repairs on the Canal have been finished except the late ones at Edw Ferry & the Culvert above the Tunnell those can be finished in 10 days from today. I am on my way to the Culvert now."

"All the repairs at Williamsport Dam No 4 &c &c have been finished and the water in the Canal"

[190] Alfred Spates, President, Williamsport, to W. S. Ringgold, Clerk, 24 July 1861  
(Flood-July 1861)

"The water is so low at Dam No 5 that the Canal Cannot be worked I have a force now at work on the Dam to tighten it up and hope to finish this week. the work at Edwards Ferry is now about finished when we raise the water at Dam No 5 the Canal will be in order to the Tunnel."

[190] Alfred Spates, President, Hagerstown, to W. S. Ringgold, Clerk, 1 August 1861 (Flood-July 1861)

"All the repairs on the Canal between Georgetown & the Tunnel have been finished Dams No. 5&6 both repaired & plenty of water."

"The Canal is in Good navigable order from Dam No. 6 to Georgetown. The Loaded Boats east of Dam No. 6 Can pass down with ease and some of them will be down soon from Williamsport & above."

[190] Alfred Spates, President, Canal Tunnell, to W. S. Ringgold, Clerk, 13 August 1861  
(Flood-July 1861, Sustainability-Culverts)

"I have here and at the Culvert 4 miles above 80 men & 20 Horses & Carts. the slip of rock there is very heavy. the Brake at the Culvert is very large. I Can finish both in 10 days from today, when the entire Canal will be in good navigable order."

[190] Alfred Spates, President, Canal Tunnell, to W. S. Ringgold, Clerk, 25 August 1861  
(Flood-July 1861, Sustainability-Culverts)

"I have finished the repairs at the Brake 4 miles above & finished taking out the slide of Rock at this place. the water will be put in tomorrow (monday). the Canal is now in Navigable Order from Cumberland to Georgetown."

[182] Board of Directors Meeting, 1 October 1861 (Flood Damage Prevention-Financing)

The board minutes of this date suspend the canal's practice of accepting toll certificates, "in consequence of the suspension of business on the canal for some months past, owing in a great measure to the belligerent operations on the Potomac, the means of the Company are inadequate to the proper repairs and maintenance of the navigation of the canal . . ." As a result of this resolution the canal company would only accept cash for tolls.

[190] John T. O'Byrne, Supervisor, Sandy Hook, to Alfred Spates, President, 6 November 1861  
(Flood-November 1861, Harper's Ferry-Sustainability)

A small freshet? It sure sounds like one.

"My division is not injured to any great extent. I have but one Break that is at the Harpers Ferry bridge butment It washed part of the stone wall in the canal on tow path side and undermined a portion of the high wall, on birm side which I am fearfull will fall in. I have several heavy bars to remove before navagation is opened again A portion of the tow path is wash some The reports is that the canal is broken very badly above"

[190] R. H. Jones, Supervisor, Georgetown, to the President and Directors, 11 November 1861  
(Flood-November 1861)

Jones indicates there has been "no serious damage . . . by the late freshet" on the Monocacy Division.

[182] Board of Directors Meeting, 12 November 1861 (Flood Damage Prevention-Financing)

On the advice of the Canal Company's attorney, the board rescinded its policy of 1 October 1861 of only accepting cash tolls. However, in its stead the company instituted a policy to encourage prompt payment of tolls.

[190] L. Murray, Supervisor, Hancock, to "Dear Sir," 14 November 1861 (Flood-November 1861)

"With regard to the damages on Canal, Kasacamp is done with his repairs, M Laughlin has not done anything at his, Bootman is done or very nearly so may have some small bars to take out. My division is verry repaired. I think to have the water put on the four mile or feeder level this week. The breach at the Cement Mill will detain us, material being so unready [?]"

## 1862

[190] James Fitzpatrick, Former President, Cumberland, to W. S. Ringgold, Clerk, 28 January 1862  
(Flood-Summer 1860)

Responding to the claims for damages of Brown and Simms, contractors for rebuilding the unfinished portion of masonry dam at Dam No. 4, Fitzpatrick wrote, "The summer of 1860 . . . was indeed remarkable for heavy rains and high waters, scarcely a month passed without a rise of water, causing serious interference with the progress of the work under contract, and affecting

the crib dams so much so, that they needed constant attention to replace the metal carried away by the high waters. It being a matter of necessity to maintain the navigation, in order to be put in receipt of revenue. we were compelled to expand from 4 to 5 thousand dollars at Dam No 4 and about 2800 dollars at 5."

"The swollen waters were generally sudden the damages done to the canal were equally so, and in our efforts to restore the navigation as speedily as possible, I often called on Brown to furnish us with men & tools to repair the Breakes . . ."

[182] Board of Directors Meeting, 10 April 1862 (Flood Damage Prevention-Financing, Flood Damage Prevention-Ordered)

"On motion is was,  
Resolved, That the operations of the resolution of the 12th of Nov. last, requiring the several mining Companies to execute new bonds for the payment of their tolls on coal monthly, be suspended until the next meeting of the Board, and that until otherwise ordered, the Collector of Tolls at Geotown Cumb, &c be authorized & directed to collect such tolls monthly, as heretofore, from such parties as have paid their tolls at the end of each month

Resolved, That the Supt. of the Antietam Division be authorized to purchase four horses under the directions of Mr. Martin [?] director, to be used in gradually raising and improving the guard bank at Dam No 4."

[190] Geo W. Spates, Superintendent, Edwards Ferry, to W. S. Ringgold, Clerk, 20 April 1862 (Flood-April 1862)

"there is a Breach on the nine mile level about 4 miles above Eds Ferry of about 30 feet cut and the river is rising slowly which I fear will get into the canal by sun set today . . ."

[190] Thomas Hasselt, Superintendent, Four Locks, to W. S. Ringgold, Clerk, 25 April 1862 (Flood-April 1862)

"My Division is all right Except a few washes on the levels above Hancock. Which will be done in a day or two. And from what I Can learn their is nothing rong from this place to Willam Sport."

[190] Charles Embry and Son, Williamsport, to H. W. Dellinger, Director, 26 April 1862 (Flood-April 1862, Flood Damage-Lack of Diligence)

"we have just witnessed, another highwater, and with it the usual Report of Damage at Dam No 4 this If I mistake not is the 7th high water within the last 18 months every high water, we have had the unwelcome and astonishing news that the Plank at the Stop Lock Dam No 4 had either not been put in or if put in had gone out. Invariably has this been the case for the last 18 months or two years"

"the last high water proves that with all the Sad Experience for that length of time with a cost of not less than \$50,000 to the Canal be no Improvement has been made, for the report is now that several of the Plank gave way, and the Rushing water has done its usual work of in some place filling up and other sweeping away the Embankment."

[190] A. C. Greene, Agent, Borden Mines, Frostburg, Md., to W. S. Ringgold, Clerk, 26 April 1862 (Flood-April 1862)

". . . no boats have arrived at Cumb. lately, we fear that some damage has been done to the Canal by the late freshet. In fact there is a rumor to that effect in Cumb. growing out of a letter from a Boatman. I heartily wish that the Supts of the most exposed divisions were instructed to report any damage to the Canal instantly, to the Collector at Cumb. It would be satisfactory, too, for them to report, after every extraordinary freshet, that no damage was done, if such should happen to be the case. It would relieve us of great anxiety, and enable ourselves to conduct our operations accordingly."

[190] Alfred Spates, President, Sandy Hook, to W. S. Ringgold, Clerk, 2 May 1862 (Flood-April 1862, Sustainability-Dams)

Spates indicates that repairs to the canal are proceeding despite the rain and will be completed by May 8, except at that perpetual trouble spot--Dam No. 4.

[190] Lloyd Lowe, Superintendent, Cumberland, to Alfred Spates, President, 3 May 1862 (Sustainability-Dams)

"It is vary important to have this brake in the Bank below the dam [4?] repaired & every high watter takes down some of it. a few more will brake through. I have a plan and estimate for Cribbing which can be done in any stage of water and I will stake my reputation on its being perminent. Stone wall would be better, but no estimate of the cost can be made I think the crib will cost a fifth a fifth of the amount masonry would. My estimate for the crib and embankment is one thousand dollars."

"We ought to have the mud machine at work the deposit near the Locks at Cumberland give a grate deal of trouble to boats geting out of the Lock."

[182] Board of Directors Meeting, 5 May 1862 (Flood Damage Prevention-Ordered, Sustainability-Dams)

"A letter from Jacob B. Masters Supt. of the Wmsport Division, dated the 8th of April was read stating that the condition of Dam No 5 was precarious and required early attention by the preparation of materials to repair it when the water may be low enough, and after explanations thereon it was, Resolved, That the President be authorized and requested to borrow on behalf of the Company a sum not exceeding \$2000 to be applied to the repairs of Dam No 5 . . . Resolved, That the President be requested forthwith to take such steps as may be requisite to collect such materials as may be necessary for the repairs, to be in readiness when the water of the river shall be sufficiently low to permit the same being applied to the repairs required."

"From Chs Embry & Son dated the 26th of April complaining of the frequent interruption of the navigation of the Canal by damages at Dam No 4, and asking that the Board take measures to remedy the same as early as practicable."

[182] Board of Directors Meeting, 29 May 1862 (Flood Damage Prevention-Ordered, Sustainability-Dams)

"The President stated to the Board that in compliance with the resolution of the Board of the 8th inst. he had visited Dam No 5 and had provided timber &c for repairs of the Dam, but that it required more extensive repairs than was supposed requisite to render it efficient, and that he deemed it necessary for its security that the abutment on the Virginia side of the river should be rebuilt."

"A letter from A K Stake & Wm Simms dated this day was read, proposing 'to construct in a workmanlike manner, and to furnish all the materials, for an abutment on the Virginia side of Dam No 5, also a culvert of sixteen feet span to convey the water to Mrs Coletons mill, & 1560 perches of masonry or thereabouts and to put in a breakwater or crib, so as to increase the navigation of the canal during the season at that point, and to finish the same on or before the 1st of Sept 1862, and to do all the embankments requisite to be done, to the satisfaction of the President & directors for the amount of \$12,000, they having the right and privilege of using 650 perches of rubble stone lying in the quarries near the Dam without charge'. after consideration, on motion is was, Resolved, That the proposal of A K Stake & Wm Simms for the construction of the abutment of Dam No 5 be accepted, and that a contract be executed in conformity there to, provided, that said parties agree to receive in part payment of their contract, all timber and other material, collected by the Company for repairing the Dam at the rates paid therefor."

[190] A. K. Stake, William Simms, and B Y William Brown, Washington City, to the President and Directors, 29 May 1862 (Flood Damage Prevention-Ordered, Sustainability-Dams)

"We propose to construct in a workman like manner and to furnish all the materials an abutment on the Virginia side of Dam No. 5 . . . and to put in a Breakwater or crib so as to ensure the navigation of the the canal during the season."

[LIB-PHP] Thirty-Fourth Annual Report of the President and Directors of the Chesapeake & Ohio Canal Company to the Stockholders, June 2nd, 1862 (Washington, D.C.: R. A. Waters, 1862)  
(Flood-April 1861)

Alfred Spates, the President of the Company, reported (p 3):

"The Canal was opened for navigation about the 15th of March, 1861, with an active business for one month, which was then interrupted by a freshet in the river, causing considerable injury to the Canal and the suspension of the navigation for a month, which time was required to complete the repairs. When the navigation was again restored, active hostilities had commenced, and there was comparatively no business on the Canal before September. Between this and the close of navigation in December, there were occasional interruptions by breaches in the Canal."

"The diminished revenues of the Company have prevented any improvements on the Canal, and indeed have been altogether insufficient to keep it in proper condition . . ."

Spates proved critical of the canal management reorganization that occurred under President Fitzpatrick (p. 5). "Two years ago, a change was made in the supervision of the line of the Canal, by the appointment of eighteen supervisors and a paymaster, in place of six superintendents of divisions as had previously existed (with occasional change in number,) since the Canal was opened for navigation. It was then supposed that this would be more efficient and less expensive than the former system. After a brief trial it was found otherwise, and that a divided responsibility, want of regularity for payments made, rendered the change not only less efficient and satisfactory, but more expensive. The present Board have therefore restored the former system of management by the appointment of six experienced and efficient superintendents of divisions, who will make disbursements on the line of the Canal under proper regulations, and thus dispense with the paymaster."

Spates did not find the prospects for 1862 promising (p. 6). "The frequent and heavy rains for some months past have kept the river very high and several breaches in the banks of the Canal have caused interruptions to the navigation, which have, however, been repaired as soon as

circumstances would admit, and the Canal may now be deemed in fair navigable condition, but for the want of adequate means to make more durable repairs at Dam No. 5; the guard bank at Dam No. 4, and some other points requiring considerable expenditures, we cannot be assured of uninterrupted navigation."

[190] Jacob B. Masters, Superintendent, Williamsport, to W. S. Ringgold, Clerk, 5 June 1862 (Flood-June 1862)

"We have had another freshet that will interrupt navigation on my Division about 10 days."

[190] George W. Spates, Superintendent, Poolesville, to W. S. Ringgold, Clerk, 7 June 1862 (Flood-June 1862)

"I am happy to Inform you that my Division of the canal has not suffered but very little from this late freshet the river being higher than it has been since 1852. I have Several Small breaches on the 8&9 mile levels but I shall be able to have them all right in a few days I am now working my force on the 9 mile level as it has suffered most. I have examined and heard from the entire Division & find the Damage not near so great as I feared it would be as the river was 4 feet over the towpath in many places."

[190] Horace Benton, Superintendent, Georgetown Division, to W. S. Ringgold, Clerk, 7 June 1862 (Flood-June 1862)

"I have just Been over my devesean & was Glad to see thate is nou mor Damage done than there is the water was over nearly half of my devesion & it had not made one Breach it has Rag [?] the towing on severall of the Levells considerably but most [illegible] much but what I can Keepe the Levells full nearly I may have to take the water off to tak what has bee wash in but it will not take over four or five days to do it with about twenty men. I had to cut the George Town Levell near the quarry [?] to prevent it from braking over those high Bank near Town But I have nearly got it mended . . ."

[190] Thomas Hasselt, Superintendent, Four Locks, to W. S. Ringgold, Clerk, 8 June 1862 (Flood-June 1862)

"there is But little damage done My division and by Thursday or friday next I will be able to pass boats."

[190] L. Benton, Superintendent, Sharpsburg, 9 June 1862, to W. S. Ringgold, Clerk, 9 June 1862 (Flood-June 1862)

Benton reports, ". . . it will take two weeks to get [my Division] in order perhaps longer"

[190] L. Benton, Superintendent, Sharpsburg, 9 June 1862, to W. S. Ringgold, Clerk, 11 June 1862 (Flood-June 1862)

"I think the late freshet has done this Devisioun moore damage than any we have had since fity two"

[190] Thomas Hasselt, Superintendent, Four Locks, to W. S. Ringgold, Clerk, 12 June 1862 (Flood-June 1862)

"My Division all right, But boats Cannot pass on to the Williamsport division for Several days yet from what I can understand."

[190] A. C. Greene, Frostburg, to W. S. Ringgold, Clerk, 12 June 1862 (Flood-June 1862)

"I learn this morning from Cumb. that the damages on Benton's division are very heavy and that it will take 'two or three weeks to repair it'."

[190] George W. Spates, Superintendent, Poolesville, to W. S. Ringgold, Clerk, 17 June 1862 (Flood-June 1862)

"I find the canal washed in many place, and a severe Leak at the Calico Rocks Just blow Point Rocks which has given much trouble heretofore but I expect to have it done to day and the water on tomorrow morning."

[182] Board of Directors Meeting, 26 June 1862 (Flood Damage Prevention-Financing)

"Resolved, That in view if the depressed business of the canal during the past and present years, and the large indebtedness incurred by the Company beyond their revenues, it is the opinion of the Boards that all revenues accruing during the present season of navigation will be indispensable to the maintenance of the Canal, and cannot be diverted from that purpose without serious detriment . . ." In consequence, the board, while affirming the validity of the debt inherent in the toll certificates determined that all tolls paid to the Canal Company, only one-fourth could be in canal certificates.

[190] L. Benton, Superintendent, Sharpsburg, to W. S. Ringgold, Clerk, 2 July 1862 (Flood-June 1862, Flood Damage-Localized)

"We had a very heavy rain hear on Sunday might last that washed a greabar of Sand back into the Canal at Dam No 4 wich had been wheled out had it not of been for this rain we should of finished cleaning ou on Monday eavening"

[190] Alfred Spates, President, Dam No. 5, to W. S. Ringgold, Clerk, 24 July 1862 (Flood-June 1862)

"Thos Hasselt has finished the Brake above Hancock the Canal is now navigable throughout."

[182] Board of Directors Meeting, 31 July 1862 (Flood Damage-Financing)

"Resolved, That the President be authorized and requested to borrow on behalf of the Company a sum not exceeding \$2000 to be applied to the contract for repairing Dam No 5 . . ."

[190] Alfred Spates, President, Cumberland, to W. S. Ringgold, Clerk, 28 August 1862 (Flood Damage Prevention-Accomplished)

"The work at the Dam at this place is getting along very well. Mr. Low is putting in a Crib and doing good work, which will Secure the Bank against all time I think."

[190] R. C. Bamford, U.S. Army Captain, Point of Rocks, to the President and Directors, 28 August 1862 (Flood-June 1862)

"The Condition of the Monocacy Division of the Canal, Say from Dam No. 2, to Dam No. 3 is as follows, as near as can be ascertained by men that have a knowledge of Canal operation. The out side of feeder Lock at Dam No. 3, is filled with Sediment from previous high water, in the River, So much so that the inside of the Said feeder Lock in the Canal is continually filling up with said Sediments which Causes delay with heavy loaded Boats, Descending the Canal & Every week or So the feeder Level at Dam No. 3, has to be drawn off the remove the Same, & to Show you the bad Management of the present incumbent Mr. Spates [George Spates, Superintendent of the Monocacy Division]. If those Sediments or Sand Bars as the Case may be properly, had have been removed, from the out side of the feeder or Guard Lock after the late high waters of the River, All that Difficulty would have been arrested long ago, & would have been the means of preventing further trouble. Also the Locks, on the Canal on Said Division are generally in bad Condition, bad working order, Also the weist weirs are in like Condition. Most of them, not fit for use In case they were needed to pass water from the different levels of the Canal on account of High water in the River." Bamford also finds the bridges in poor condition. However, the towing path particularly bothered him. He commented, "there are many place, along the line that if the water was to get 2 or 3 Inches higher than the regular water surface that . . . a break [would] occur, [in] particular a place Near the Callico Rocks." Bamford was also critical of Spates employing men of his division with Southern sympathies.

### 1863

[190] Jacob B. Masters, Superintendent, Williamsport, to the President and Directors, 2 April 1863 (Flood Damage Prevention-Accomplished, Sustainability-Towpath)

"Some boats were detained near Big Slackwater on account of the water being too high on the towpath at some of the points. I will as soon as possible raise the towpath at the points and do some other repairs so that unless the water is very high the Boats need not be detained. . . . We are improving the tow path along my whole division rendered necessary by the freshets of 1862. If we can have 3 or 4 months without a freshet or other serious interruption I will have my Division in very good order."

[182] Board of Directors Meeting, 10 April 1863 (Flood Damage-Financing)

"Resolved, That in consequence of the interruption of trade and of injuries received by the canal within the two years last past [both from floods and the activities of the Union and Confederate armies], it is absolutely necessary to make a temporary increase in the rates of toll on canal." The increase rate was to take affect in May 1863 and last until November.

[190] Jacob B. Masters, Superintendent, Williamsport, to "Dr Sir," 21 April 1863 (Flood-April 1863, Sustainability-Culverts)

"A portion of Williams' Culvert a mile below this town washed out this morning. I cannot tell the exact amount of Damage until the water runs off. It will take at least a week to repair it."

[194] W. S. Ringgold, Clerk, Washington, D.C., to Alfred Spates, President, Cumberland, 30 April 1863 (Flood-April 1863, Sustainability-Culverts)

"We have no positive information as to the repairs of the Culvert near Williamsport, but suppose it may have been done by this time. There has been no other injury to the Canal from the late rains that I have heard of."

[190] Jacob B. Masters, Superintendent, Williamsport, to the President and Directors, 2 May 1863 (Flood-April 1863, Sustainability-Culverts)

"I have to report that on Tuesday the 21st of April a part of Williams' Culvert one mile east of this town washed out carrying out about 110 feet of Bank in breadth & 15 feet below bottom of Canal, and leaving one half of the Bottom of the canal standing in good order on the Berm side. The river being high at the time and not knowing when we might be able to get a foundation for stone work, I concluded to put in a wooden crib around the breach and widen the Berm bank sufficient for Boats to pass until the Culvert could be rebuilt. We immediately went to work and but for the rain of Thursday and Friday we would have completed the work by Saturday evening, as it was we did not get done until Monday evening making 7 days. The Crib is 142 feet long & 8 feet wide filled with stone, sheet piled with 2 inch plank arose 2 feet in the bottom & puddled on the water side 2 to 3 feet up the plank. So far it has done very well, it is very strong and might last a long time, but I would recommend the rebuilding of the Culvert . . ."

[194] W. S. Ringgold, Clerk, Washington, D.C., to Horace Benton, Superintendent, Georgetown, 8 May 1863 (Maintenance-Dredging)

"The Board direct that you have a channel made in Rock Creek basin so as to enable the boats to pass into the river."

[190] Stake & Simms, Contractors, to the President and Directors, 25 May 1863 (Flood Damage Prevention-Accomplished)

Stake and Simms are appealing to Board for more money for "our outlay and expenses in filling up and Securing the temporary Cribs in November last [during a period of high water], and for work done this spring . . ." at Dam No. 5. At present they are quarrying stone because the water is too high to work on the dam.

[LIB-PHP] Thirty-Fifth Annual Report of the President and Directors of the Chesapeake & Ohio Canal Company to the Stockholders, June 1st, 1863 (Washington, D.C.: R. A. Waters, 1863) (Maintenance-Cutbacks)

Alfred Spates, President of the Company, did not present a rosy picture of the canal (p. 3). "The causes which prostrated the business of the Canal for the preceding year have occurred in like manner during the past; frequent interruptions from military incursions, low water in the river, and occasional breaches in the Canal, and although the latter have been comparatively inconsiderable in duration, or in cost of repairs, yet the insecurity of boating, from these occurrences have reduced the general business of the canal, even lower than that of the preceding year."

The poor prospects for business had serious implications for the maintenance of the canal (p. 4). "The Company have again been greatly restricted in making repairs on the Canal by their limited revenues, and have been obliged to confine them to such as were indispensably requisite to maintain the navigation, leaving others of greater magnitude, where it could be safely done, to be effected when their means or credit will be more ample."

[190] Jacob B. Masters, Superintendent, Williamsport, to W. S. Ringgold, 14 July 1863 (Flood-July 1863)

"I find the damage on this division by the Rebels, together with the late heavy rains to be very serious. It will require some 3 weeks to put the Canal in Boating order."

[190] George W. Spates, Superintendent, to the President and Directors, 31 July 1863 (Flood-July 1863)

"the Monocacy Division is now in good boating order though the recent rains having washed the banks Somewhat from the levels overflowing from the adjacent hills on Some of the levels."

[190] George W. Spates, Superintendent, to the President and Directors, 31 August 1863 (Flood-July 1863)

"The Monocacy Division is in Boating order Boats passing each way though from recent rains there has been some few Sand bars found on the 8&9 mile levels, though Boats are not detained by them as I have directed all the levels to be kept up to high water marks So that Boats are not detained . . ."

[182] Board of Directors Meeting, 24 September 1863 (Flood Damage Prevention-Accomplished)

"Resolved, That the contractor for the abutment at Dam No 5 be required to resume the work at said place, on or before the 1st of Oct. next, and diligently to prosecute the same to completion, and on failure to do so, that said contract be declared abandoned; and in such event, that the President be authorized to take such measures as he may deem requisite for the interest of the Company, to have said work completed as early as practicable." [Note: in the minutes of 10 Sept. 1863, one of the contractors, William Brown has been imprisoned by the federal government, as has the C&O Canal President, Alfred Spates.]

[190] George W. Spates, Superintendent, to the President and Directors, 30 September 1863 (Flood-July 1863, Sustainability-Culverts)

"Boats are now passing over the Monocacy Division both loaded and light freely without any detention though the late heavy rains causing some sand bars on the upper end of the Division causing some detention the sand bars very speedily removed navigation was again resumed and is



now in full operation I find since the heavy rains 2 small culverts have suffered some what by the foundation very partially washed out. one is just below Berlin the other lower down the level I have now my masons at work making the necessary repairs at the Culverts"

[190] Jacob B. Masters, Superintendent, Williamsport, to the President and Directors, 5 October 1863 (Flood-April 1863, Sustainability-Culverts)

"The masonry work on the Culvert washed out last Spring which I am rebuilding is nearly completed."

[182] Board of Directors Meeting, 29 October 1863 (Flood Damage Prevention-Accomplished)

The Board learned from Division Superintendent Jacob B. Masters, in a letter dated 27 October 1863, "that there was then very little work being done at Dam No 5 owing as was alleged to high water." They also a letter from Wm Simms (one of the contractors), dated 30 September, indicating that he would resume work on the abutment of Dam No. 5. The board directed the interim president of the Canal Company, L. J. Brengle to travel up to Dam No. 5 and ascertain the situation there and declare the contract for the abutment abandoned and contract with other parties for its completion, if necessary.

[190] L. J. Brengle, Interim President, Dam No. 5, to W. S. Ringgold, Clerk, 3 November 1863 (Flood Damage Prevention-Accomplished)

"I am pleased to say the work is progressing quite satisfactory, the coffer dam is in, & is now pumping out the water, which is nearly completed. Will commence laying stone this evening, and should nothing occur will have it out of danger of high water by next week this time."

[190] George W. Spates, Superintendent, Poolesville, to the President and Directors, 19 December 1863 (Flood-December 1863)

"The river is verry into the canal on the Eight and nine mile levels, at this time I have had to cut the tow path in Several places, in order to Save the weaker places, waste ways, &c I do not think we will suffer much from this rise in the river the river is now falling slowly"

[190] Alfred Spates, President, Cumberland, to W. S. Ringgold, Clerk, 24 December 1863 (Flood-December 1863)

"The damage to the Canal by the late high water is very Slight, that being on the Monocacy Division."

#### 1864

[190] Jacob B. Masters, Superintendent, Williamsport, to the President and Directors, 1 January 1864 (Flood-December 1863, Sustainability-Dams)

"I am sorry to say that the late freshet done some damage to the stone work lately done by Mr. Brown [at Dam No. 4 or 5?]. Mr. Brown having used the sheeting upon the cribs, and also some stone out of the tops of the cribs. I consider the work in some danger should we have an ice freshet. I have not seen Mr Brown to know whether he intends to secure the work or not."

[190] Jacob B. Masters, Superintendent, Williamsport, to L. J. Brengle, Interim President, 3 January 1864 (Flood-December 1863, Sustainability-Dams)

"I have selected Mr. Jas. H Farrow to meet Mr. Hassett at the dam [no. 4 or 5?] to morrow (Monday) and if Mr. Brown is not there or has given no instructions about the work they will determine what is best to be done and commence immediately. We have secured lumber to sheet the cribs;"

[190] A. K. Stake, Contractor, near Hagerstown, to L. J. Brengle, Interim President, 5 January 1864 (Flood-December 1863, Sustainability-Dams)

Stake reports he has been unable to do any work on Dam No. 5, because of high water. He adds, "The late freshet did no damage to the permanent masonry, thus proving its Capacity to withstand a freshet, a Small portion of the stone work that had not been grouted was displaced which can Soon be replaced, and grouted"

[190] Jacob B. Masters, Superintendent, Williamsport, to L. J. Brengle, Interim President, 8 February 1864 (Flood-December 1863, Sustainability-Dams)

"During this Month we rebuilt, filled up, and sheeted the cribbing on the Virginia Side, at Dam No. 5. I consider the cribbing safe from ordinary freshet."

[182] Board of Directors Meeting, 18 February 1864 (Flood Damage-Financing)

For the first time in a while: "3d The Treasurers payment of interest on certificates of debt for repairs &c prior to 1845 . . . to the 1st of March 1862 . . . \$17.60."

[190] L. Benton, Superintendent, Sharpsburg, to "Der Sir," 11 April 1864 (April-May)

"P. S. the water has been very high it has been partly over the canal thar is one Breake in my Division and Som bars washed in the water is Two high yet to tell to what extent the damage tho I dont think it much"

[190] Jacob B. Masters, Superintendent, to W. S. Ringgold, 11 April 1864 (Flood-April/May 1864)

"the levels of the Wmsport Division here under water since yesterday at one oclock."

[190] Thomas Hasselt, Superintendent, 4 Locks, to W. S. Ringgold, 12 April 1864 (Flood-April/May 1864)

"I am glad to inform you that the High water has not done the Hancock Division of Canall aney Damage and so far as I can lern the Cumerland Division is all right I think thear is very litel Damage on the williamsport Division"

[190] Jacob B. Masters, Superintendent, to W. S. Ringgold, 13 April 1864 (Flood-April/May 1864)

"the Williamsport Division will be in order by Thursday evening to pass loaded Boats off of it, The only damage was some bars washed in. They are now out, and we are filling up"

"The water has been on the towpath for 15 days around Slackwater something never before known"

[190] George W. Spates, Superintendent, Poolesville, to "Sir," 16 April 1864 (Flood-April/May 1864)

"I have a heavy slide of earth and large rock at the Marble quarry on the nine mile level during the recent heavy rains I have had the Level drawn off shall have to blast the rock with powder and remove the earth with wheelbarrows. . . . My division has little or no damage from the late freshett save the above matter the river being over the tow path for miles on the eight and nine mile levels. the tow path in some places, have been washed some but not to stop navigation in a very [few] days my division will be in good boating order"

[190] George W. Spates, Poolesville, Superintendent, to "Sir," 19 April 1864 (Flood-April/May 1864)

"I have just arrived home from a thorough examination of my division and find it has suffered very little from the late Freshet in the river."

[190] Lloyd Lowe, Superintendent, Cumberland, to W. S. Ringgold, 25 April 1864 (Flood-April/May 1864)

"This division is at present in good order. having received no damage by the freshet."

[190] George W. Spates, Superintendent, to President and Directors, 30 April 1864 (Flood-April/May 1864)

"the Monocacy Division of which I have charge has suffered very little damage from the late freshet in the river though the waste being over the tow path in many places. [illegible] are three feet deep it escaped and is now in good boating order boats are now passing freely each way . . ."

[190] Jacob B. Masters, Superintendent, Williamsport, to President and Directors, 2 May 1864 (Flood-April/May 1864)

"from the first to the seventeenth of April--navigation was at times suspended on account of the water being too high for Boats to pass safely around the two slackwaters, On the 10th the water was so high as to cover the upper portion of the three levels of this division, Fortunately the damage was not so much as to interfere with navigation after the water fell,"

"My force has since the freshets been actively engaged repairing the damage to the tow path &c."

[190] L. Benton, Superintendent, Sharpsburg, to Unknown, 4 May 1864 (Flood-April/May 1864)

"Their has been but little detention on my Division after the freshet. The boats was detained about 8 hours from a breach in the Level below Lock No 40. I have been working Extra forces hands Horses & Carts raising the tow path on slack water in the portion of my division. We escaped very well from the freshet."

Note: the river seems to have risen again in May.

[190] Jacob B. Masters, Superintendent, to W. S. Ringgold, Clerk, 16 May 1864 (Flood-April/May 1864)

1864)

"the river is again, very high, by my mark here the water is very near running over the tow path of the 4 mile level, The river is not rising over 6 inches to the hour and the ballance may escape"

[190] Jacob B. Masters, Superintendent, Williamsport, to "Dear Sir," 17 May 1864  
(Flood-April/May 1864)

"I have been over the Division. The water was again over the levels. The damage will require two days labor after to day. By Saturday I can pass loaded Boats."

[190] L. Benton, Superintendent, Sharpsburg, to "Sir," 18 May 1864 (Flood-April/May 1864)

"very little damage to my division I am ready for Boting brake on masters Divisi[o]n"

[190] George W. Spates, Superintendent, Monocacy Division, to W. S. Ringgold, 20 May 1864  
(Flood-April/May 1864)

"my division of canal has suffered somewhat from the late fresett in the river but not to any extent I have had several large washes, but no breaches of any acct"

"I am haveing the nesary repairs speedily made and will have everything right again in a few days boats are passing each way"

[190] Lloyd Lowe, Superintendent, Cumberland, to W. S. Ringgold, 24 May 1864 (Flood-April/May 1864)

"This Division received no damage from the late freshet, and nothing has occured to interrump navigation on it."

[190] George W. Spates, Superintendent, Monocacy Division, to President and Directors, 31 May 1864 (Flood-April/May 1864)

"The Monocacy Division I am happy to state to you has suffered very little from the late fresetts in the river save and except some washes where the river was over the tow path and in some place, over the berm side I have had all those washes repaired and repairs made in several locks waste ways fooms &c. the division is now in good boating order"

[LIB-PHP] Thirty-Sixth Annual Report of the President and Directors of the Chesapeake & Ohio Canal Company to the Stockholders, June 6th, 1864 (Washington, D.C.: R. A. Waters, 1864)  
(Sustainability-General)

Prospects appeared better for the canal company in 1864, with business up despite the war. The President, Alfred Spates, reported (p. 5), "Durable repairs have been made to the Canal during the past year, and it is now believed to be in better navigable condition and less liable to interruption from casualties of the river, than for some years past. It has withstood some heavy freshets in the river during the past season without material injury or suspense of business, and every effort will be made for the maintenance of the navigation throughout the season."

[190] Jacob B. Masters, Superintendent, Williamsport, to President and Directors, 1 June 1864  
(Flood-April/May 1864)

"I have to report that from the 1st to the 10th of April there was no interruption to Navigation on my Division, On the night of the 10th the river became too high for boats to pass around slack water. On the 11th the water came over the towpath on all three levels of this division. The damage was one small breach on the Four mile level, and a number of bars on the various levels. By the time the river was low enough to pass Boats around Slackwater, I nearly had the damage repaired. The loss of Navigation was from the night of the 10th until the morning of the 16th about Six days. Since that time there has been no interruption and we are again strengthening the Bank &c."

[182] Board of Directors Meeting, 2 June 1864 (Flood Damage-Financing)

"Ordered, That the interest due to the Corporations of Washington & Georgetown, and to sundry banks for loans for repairs of the Canal, and also on the Certificates of debt for repairs &c prior to 1845; heretofore suspended, be paid to the 30th of June ensuing, so soon as the revenues of the Company will admit thereof."

[190] Jacob B. Masters, Superintendent, Williamsport, to President and Directors, 1 June 1864  
(Flood Damage Prevention-Proposed)

"I find upon examination that the end of the Hollman Dam [No. 5] toward the Virginia side has given way since last Season. We can when the water gets lower repair it & fill it up with stone so as [illegible] temporarily. While we are tightening the crib work on the Virginia side, it would be a favorable time to complete the Abutment."

[182] Board of Directors Meeting, 28 July 1864 (Maintenance-Aqueducts)

"Letters were read from the several Superintendents of the Canal reporting the state of their respective divisions &c, damages by the rebel invasion &c . . . Ordered, That John Cameron Supt.

of the Georgetown Division be directed to proceed as early as practicable . . . to the Antietam Aqueduct, to superintend and direct the requisite repairs on the work."

[190] George W. Spates, Superintendent, Monocacy Division, to President and Directors, 30 August 1864 (Flood Damage-Localized)

"I have my division again in order and am haveing it filled up with water as fast as possible I have been very much annoyed by the late rains washing in sand bars of which I have had all removed"

[182] Board of Directors Meeting, 8 September 1864 (Flood Damage-Financing)

"The President stated to the Board that he had authorized, the advance of \$1500 by the Cumberland City Bank on the checks of the Company, for payment of repairs on the canal, in anticipation of the revenues of the Company."

[190] Jacob B. Masters, Superintendent, Williamsport, to President and Directors, 1 November 1864 (Sustainability-Towpath)

"The weather was very favorable during the month, and I raised the towpath at the low places & strengthened it at the weak places, in order to prevent if possible any danger from a freshet."

[182] Board of Directors Meeting, 9 December 1864 (Flood Damage-Financing)

"Ordered, That the interest due to the several Banks and the Corporations of Washington & Georgetown on loans for repairs, and also on the Certificates of debt issued for repairs &c, be paid to the 31st of December ensuing if the resources of the Company will admit thereof, consistent with a proper reservation for repairs and improvement of the canal, during the suspension of business."

## 1865

[CF] The Hagerstown Herald, 24 February 1865, 2 (Warnings-Flood Vulnerabilty)

"The Chesapeake and Ohio Canal." Describes the fears of flooding arisen by an ice jam on the river.

[190] Jacob B. Masters, Superintendent, Williamsport, to President and Directors, 2 March 1865 (Flood-March 1865)

"The ice has passed off, of dam No 5, and from above; some damage was done to the cribs on the Virginia side, which if nothing more happens will not interfere with navigation until it can be repaired, only the top logs was carried off, and as the crib was something higher than the stone dam, will still be sufficient to hold water enough to fill the Canal; There is still a great deal of snow in this region and we may still have a serious freshet."

[190] Jacob B. Masters, Superintendent, Williamsport, to W. S. Ringgold, 3 March 1865 (Flood-March 1865, Sustainability-Culverts)

"I, have learned, that a culvert on the 4 mile has given away to some extent,"

[190] L. Benton, Superintendent, Sharpsburg, to W. S. Ringgold, Clerk, 6 March 1865 (Flood-March 1865)

"My Division has escaped very well from the recent high water, I have one or two small breaks & some bars washed in. I can repair these in a short time"

[190] Jacob B. Masters, Superintendent, Williamsport, to W. S. Ringgold, Clerk, 6 March 1865 (Flood-March 1865, Sustainability-Aqueducts)

"There has been so much bad Luck in this division that I delayed writing to you until the river commenced to fall for fear there would be more, On Sunday morning just before daylight all of the upper or North side of the Williamsport Aqueduct fell into the creek, except the two corners repaired in 1863. There has been a crack in it for the last 6 or 8 years, and I suppose the blasting by the Rebels, and the severe freezing weather this winter caused it to give away; The River came into two of the levels but done very little damage, for the absence of other instructions I will proceed at once to put in a wooden trunk, The space is 95 feet and with what is shatters will take 124 feet in length of trunk."

[194] W. S. Ringgold, Clerk, Washington, D.C., to Thomas Hassett, Superintendent, Clear Spring,

6 March 1865 (Flood-March 1865, Sustainability-Dams)

"I have received your letter of the 2nd inst and regret to learn the injury done to Dam No. 5. I hope it may not be greater than you represent and that it will not materially interrupt the navigation."

[190] George W. Spates, Superintendent, Sandy Hook, to W. S. Ringgold, Clerk, 8 March 1865 (Flood-March 1865)

"I have examined my entire division of Canal and find the river has overflowed the Canal in many places, though not doing much damage only on the 9 mile level where I have 3 small Breaches and one heavy Sand bar all of which I shall have repaired and removed by the 15th of this month. . . . the fresett has given me some additional cleaning out at the feeder at Dam No. 3"

[190] Jacob B. Masters, Superintendent, Williamsport, to W. S. Ringgold, Clerk, 12 March 1865 (Flood-March 1865, Sustainability-Aqueducts)

"we are getting along very well at the Aquaduct, I still think we will be ready by the 20th to the 25th. very bad weather may disappoint me."

[194] Alfred Spates, President, Washington, D.C., to the Speaker of the House of Delegates of Maryland, 13 March 1865 (Sustainability-General)

". . . the condition of the canal during the past year has been better than for many years previously; that the transportation upon it has been more regular and less interrupted until the invasion of the enemy in July last; when serious damages were sustained, and the navigation suspended for three months of the most active and profitable portion of the year. It is estimated that the revenue of the Company were diminished from this Casualty to the extent of \$200,000. When the canal was repaired and again ready for business it continued active until the close of navigation by ice. The great severity of the winter prevented the usual repairs at this season as early as contemplated and the recent ice freshet in the river has added [?] considerable damage, which however it is believed can be repaired and the navigation of the canal resumed for the active business on or before the first of April ensuing."

"It will still require considerable expenditure to place the work in thorough and permanent order, make it reliable for uninterrupted navigation and afford proper facilities to the greatly increased trade upon it. This it is proposed to do during the present summer as far as the revenue of the Company will admit consistent with the indispensable obligations."

[190] Jacob B. Masters, Superintendent, Williamsport, to W. S. Ringgold, Clerk, 17 March 1865 (Flood-March 1865, Sustainability-Aqueducts)

"at 12 oclock to day we finished the aquaduct. It is now undergoing a severe test both ways. the river and creek are very high. The river at this time 5 P.M. is over all the levels of this division what damage it may do I do not know. . . . I would have been ready by Saturday evening to put the water on for regular navigation. It appears that the fates are against us, at this point."

[190] George W. Spates, Superintendent, Poolesville, to W. S. Ringgold, Clerk, 20 March 1865 (Flood-March 1865, Sustainability-Aqueducts)

"the river has again over flowed the canal doing considerable damage." Spates was unsure yet of the extent of the damage, as the water had not yet fallen, but "Six Boats loaded with wheat and flour passed over the division on Saturday the 18th on their way to Geo town giving evidence that no serious damage has been done from Harpersferry to Seneca the length of my Division the river was not so high as the last freshett by one foot"

[190] Jacob B. Masters, Superintendent, Williamsport, to W. S. Ringgold, Clerk, 20 March 1865 (Flood-March 1865, Sustainability-Dams)

"The freshet did not do us any serious damge; Some of the banks got pretty well washed, but will not interfere with navigation after a dew days work. I have engaged some logs for cribbing at No. 5, and will want about \$500 the last of the week."

"I will put the water in on Tuesday evening. The aqueduct is all right."

[190] Thomas Hasselt, Superintendent, 4 Locks, to "Dear Sir," 20 March 1865 (Flood-March 1865)

"I am Ready to put the water on my division This evenin and by the last of the week I think boats will be able to pass."

[190] L. Benton, Superintendent, Sharpsburg, to "Dear Sir," 21 March 1865 (D) (Flood-March 1865)

"The last freshet we had laset Saturday & Sunday was the hiest we have had this Spring I have no Breakes much but a grio deal of Sand his washed in the Canal I expect to get the water in the last of this weake"

[190] George W. Spates, Superintendent, Dam No. 3, to W. S. Ringgold, Clerk, 23 March 1865  
(Flood-March 1865)

"yesterday I drew the Water from Such portions of the Canal as I Supposed would receive damge from the late fresett and find considerable work to do with nine mile level as I feared I have 2 large Washes almost Breches and 2 heavy Sand bars and at the feeder at Dam No. 3 a large bar has again formed in the Channel the above named places--I had Just cleaned out well before the late fresett" Indicates he hopes to resume navigation on the 27th and that he has several new lock gates he hopes to put in.

[190] Jacob B. Masters, Superintendent, Williamsport, to W. S. Ringgold, Clerk, 24 March 1865  
(Flood-March 1865)

Masters eports, "Boats are now leaving for Cumberland, &c"

[190] Lloyd Lowe, Superintendent, Cumberland, to W. S. Ringgold, Clerk, 24 March 1865  
(Flood-March 1865)

"The grate rain of Thursday last prevented me from having this division ready for the water untel this morning. it is now being filled and will take three or four days to have it ready for navigation"

"The rain was so heavy that it washed in bars from the hill side in many places at Cumb."

[190] George W. Spates, Superintendent, Sandy Hook, to W. S. Ringgold, Clerk, 26 March 1865  
(Flood-March 1865)

"I am happy to inform you that I have again removed a very large bar at the feeder as also several small bars in the Division this evening and will have Division filled as soon as posible"

[190] Jacob B. Masters, Superintendent, Williamsport, to W. S. Ringgold, Clerk, 28 March 1865  
(Flood-March 1865, Sustainability-Aqueducts)

"I send you the following description with the accompanying sketch of the aqueduct at Williamsport [note: the sketch is not with this letter] The length of the opening is 115 feet, it also shattered 15 to 20 feet on each side, so that we had to make the entire work 155 feet long.

In the opening we laid down 16 sills 7 1/2 feet apart, 25 feet long 10 by 12 in size, level with the old floor, and filled with small stone and grouted, using 48 Barrels of cement. The side is built up with logs sawed in two so as to show a six inch face, Bolted up and soun with from 16 to 20 inch Bolts, and also Bolted through the side into the upright posts with 12 inch bolts, the whole length of the inside is sheeted, so as to prevent leaking, also a new tight floor on the bottm, The work is strong and will last a long time with a little repair."

[190] George W. Spates, Superintendent, to President and Directors, 1 April 1865 (Flood-March 1865)

"After many portion of the Monocacy division being overflowed a second time this season and being much damaged by severe washes, and heavy sand bars, I have succeeded in placing the division in good Boating order." Reports navigation restored to his division.

[190] Jacob B. Masters, Superintendent, Williamsport, to President and Directors, 3 April 1865  
(Flood-March 1865, Sustainability-Dams)

"I have to report that early in the month [March], the ice gave away in the river and done considerable damage to the cribbing on the Virginia side at No. 5 The whole of the cribbing is damaged, but not fortunately quite to the bottom, It will take considerable work to put them in order and make them tight, owing to the shattered condition they are in. . . . The last freshet we had also, carried away a small crib that had put at, the end of the Hollman dam [No. 5] for its protection, The end of the Hollman Dam from appearances is giving away. The whole dam except the stone work is in bad order and needs to be rebuilt with stone, or in some other substantial manner, as all our experience proves that no reliance can be placed in cribs. On the 5th of March a large portion of the Berm side of the aqueduct at this place fell out into the creek, The opening is 115 feet beside being shattered from 15 to 20 feet on each side of the opening, I immediately went to work and put up a wooden structure . . . that will answer every purpose for navigation. There is also, room enough in my opinion to put up the stone work if necessary. During the month the water was twice over the tow path of the levels on this Division. The top of the banks were considerably damaged, but nothing very serious. . . . We managed to be ready for navigation in time for the other Divisions,"

[182] Board of Directors Meeting, 12 April 1865 (Flood Damage Prevention-Ordered)

"Resolved, That the President be requested to advertise to receive proposals until the 8th of May next for the completion of Dam No 5, extending from the Maryland Shore to connect with the masonry dam already built from the Virginia shore, to be constructed of cement & masonry in the most durably substantial manner, and to be completed in the present year."

[190] Thomas Hasselt, Superintendent, 4 Locks, to "Gentlemen" 8 May 1865 (Flood Damage Prevention-Proposed)

"I think there Should be Ice guard on dam No 6" to prevent damage to the dam from ice freshets.

[182] Board of Directors Meeting, 10 May 1865 (Flood Damage Prevention-Ordered)

The board rejected all proposals for the completion of Dam No. 5 submitted to the Company under the resolution of the previous meeting.

[190] Jacob B. Masters, Superintendent, Williamsport, to President and Directors, 23 May 1865 (Flood-May 1865)

"We have had another freshet in the river--the highest by a few inches we had this year. The Williamsport Division received no serious damage, some few bars and the towpath washed in several places. The water will be off for a few days to take care of the bars."

[190] Thomas Hasselt, Superintendent, 4 Locks, to "Dear Sir" 28 May 1865 (D) (Flood-May 1865)

"We have had Some Very heavy Rains Which have washed Several Bars. I have drawn the water and taken them out and will put the water in again on Wednesday next But if there going to be no boating. I would like to have the water off again about 2 weeks The 4 mile level above hancock from the freshet of 1852, fill up about 12 inches in places and has never been taken out since and if there is nothing doing I would like to take it out"

[190] L. Benton, Superintendent, Sharpsburg, to President and Directors, 31 May 1865 (Flood-May 1865)

Benton reports, "High Water on the 22nd covered nearly half of my Division which raised a breach and bats, past loaded boats on the 28th. Have been using the mud machine since the boats stopped running, between Stop Lock & Guard Lock No 4. "

[190] Jacob B. Masters, Superintendent, Williamsport, to President and Directors, 2 June 1865 (Flood-May 1865)

"for the Month of May I have to report that until the 19th the Canal was in good order, at that time we had a very heavy rain that caused a freshet in the river. We had to water out 5 or 6 days in order to take out bars &c. The heavy rain caused a number of leaks to be very troublesome but so far no serious damage."

[190] Thomas Hasselt, Superintendent, 4 Locks, to W. S. Ringgold, Clerk, 5 June 1865 (Flood-May 1865)

"The boats passed Over my Division last Saturday"

[320] Annual Report of the President and Directors, 5 June 1865 (Flood-March 1865)

"The great severity of the winter precluded the contemplated repairs as soon as was desirable, and the breaking up of the ice in March accompanied with considerable rain, caused a great freshet in the river, and resulted in considerable damage, which however, was remedied as soon as practicable, and the Canal was ready for navigation about the 20th of March, but business was not actively resumed until April . . ."

"The Canal is now in good navigable condition, but to put it in thorough and permanent order, make it reliable for uninterrupted navigation, and afford proper facilities to the largely increasing trade upon it, considerable expenditures will still be required. It is proposed to do this during the present season as far as the revenues of the Company will admit consistent with other indispensable obligations."

[190] George W. Spates, Superintendent, to W. S. Ringgold, Clerk, 10 June 1865 (Flood-May 1865)

Spates reports he will pass lightly loaded boats over the Monocacy division tonight and heavy boats the following night.

[190] Jacob B. Masters, Superintendent, Williamsport, to W. S. Ringgold, Clerk, 13 June 1865 (Flood-May 1865)

Masters reports, "the Canal is all right, & Boats are passing up & down freely"

[182] Board of Directors Meeting, 13 July 1865 (Flood Damage Prevention-Ordered)

"Resolved, That the Prest. be authorized & requested to adopt such measures as may be necessary, as early as practicable, for the completion of the abutment at Dam No 5 and the security and efficiency of said Dam."

[182] Board of Directors Meeting, 9 August 1865 (Flood Damage Prevention-Accomplished)

"On motion it was Resolved, That the contract heretofore entered into with A. K. Stake & Wm Simms on the 24th of

June 1862, and such modifications or alterations as may from time to time have been made, not having been fulfilled by the contractors agreeably to its stipulations, be and it is hereby declared to be abandoned and annulled."

[190] Jacob B. Masters, Superintendent,, Williamsport, to W. S. Ringgold, Clerk, 10 August 1865 (Flood Damage Prevention-Accomplished)

Masters reports he is a work on Dam No. 5, but that high water is too high "to work to advantage; but we will be ready as soon as it fall to put in the balance of the foundation."

[182] Board of Directors Meeting, 14 September 1865 (Flood Damage-Financing, Flood Damage Prevention-Study)

"2d The Treasurers payments of interest on Certificates of debt for repairs &c prior to 1845 . . . from the 1st of Jany to the 30th of June 1865 . . . amounting to \$2300.23."

"Resolved, That Charles P. Manning C Engineers, be and he is hereby appointed for, and requested to make, a thorough examination of the canal and its works, to suggest such repairs and improvements as may be required to render it permanent and efficient, whether immediate or gradual . . ."

[182] Board of Directors Meeting, 10 October 1865 (Flood Damage Prevention-Ordered, Sustainability-Dams)

"Ordered, That the Supt. of the Williamsport Division be directed to have the abutment of Dam No 5 properly backed with suitable material."

"Ordered, That the President be authorized and requested to have stone quarried, and suitably prepared, for continuing the construction of Dam No 5."

[194] W. S. Ringgold, Clerk, Washington, D.C., to Jacob B. Masters, Superintendent, Williamsport, 20 October 1865 (Flood Damage Prevention-Ordered, Sustainability-Dams)

"The Board direct, that the abutment at dam No, 5 be backed up with suitable material and the President is authorized to have stone quarried and suitably prepared for continuing the construction of the dam . . ."

[190] Jacob B. Masters, Superintendent,, Williamsport, to the President and Directors, 1 November 1865 (Flood Damage Prevention-Accomplished)

Masters reported, "The Masonry of the Abutment of Dam No 5 was completed on the 13th, and we have since been backing the work with such material as is necessary. . . . Our ordinary laborers are employed in raising and improving the Towpath at low places &c."

## 1866

[190] Charles P. Manning, Engineer and General Superintendent, Cumberland, to the President and Directors, 1 February 1866 (Maintenance-General)

Manning asserted that "efficient maintenance" was essential to the smooth operation of the canal. In this mind, it meant attracting good lock keepers, which meant higher wages and better lock houses.

[182] Board of Directors Meeting, 8 February 1866 (Flood Damage-Financing, Flood Damage Prevention-Proposed)

"2d The Treasurers payments of interest on Certificates of debt for repairs &c prior to 1845 . . . from the 1st of July to the 31st of Dec. 1865 . . . amounting to \$2305.80."

"A report from Chs P. Manning Engr & Gen Supt dated the 1st inst was read relative to the condition of the canal and proposing various improvements &c"

[182] Board of Directors Meeting, 12 April 1866 (Flood Damage Prevention-Proposed)

"A report from Chs P. Manning Engr & Gen Supt. dated this day was read, stating that navigation had been resumed upon the canal, that it was in a more reliable state of repair than it for several years, but that much yet remains to be done to restore it to good preservation &c; that preparation for repairing [?] and completing Dam No 5 are being made as rapidly as possible;"

[190] Charles P. Manning, Engineer and General Superintendent, Cumberland, to the President and Directors, 12 April 1866 (Flood Damage Prevention-Proposed, Maintenance-Dredging)

Manning's report also proved highly critical of the sale of water from the canal for



manufacturing purposes. Manning wrote, "Assuming the Chesapeake and Ohio Canal was projected for, and intended to be used as a commercial highway only, it is specially urged that, any diversions of its waters from the simple requirements of navigation must entail more, or less obstructions its legitimate public uses, and, consequently, that diversion must be regarded as detrimental to the interest of both the commercial public and the Canal Company."

[190] Charles P. Manning, Engineer and General Superintendent, Cumberland, to the President and Directors, 31 May 1866 (Flood Damage Prevention-Proposed, Maintenance-Dredging, Sustainability-Dams)

Manning in an extensive report on the canal told the Board, "It is unnecessary for me to remind the Board that for several seasons previous to the last period of suspended navigation, no repairs beyond those of absolute necessity were either attempted or accomplished; nor, that, consequently, the need of repairs during the past winter, & prospectively, for the current season of navigation had been, and still is excessive."

One of the biggest problems Manning saw the gradual build up of sediment in the canal (and the sudden buildup during floods), which made it difficult or impossible to move heavier loads on the canal. He recommended the constant use of dredging boats to remove this sediment from the canal bottom.

Not surprisingly, the Dams were a major topic of Manning's report. "In relation to the Dams I have to say that the 'Little Falls' and 'Seneca' (Nos. 1&2) are in a somewhat dilapidated and inefficient state; and that the one at Harpers Ferry (No. 3) commonly known as 'The Government Dam' is in ordinarily good Condition. The two first named of these structures are composed of brush-wood and loose stones, and the last named of wooden crib-work, filled with loose stones and sheathed with timber & planks. Dam No. 4 is not only in sound condition but being exclusively a structure of stone, is regarded as thoroughly permanent, if not quite imperishable."

"Two thirds of Dam No. 5 are new, and made exclusively of stone, the remaining third being composed, partly of temporary crib work filled with loose stone, but mainly of the original structure, which was built after the fashion of the one at Harpers Ferry."

"Dam No. 6 is in general good condition, and regarded as a permanent structure, though formed of crib-work, filled with loose stones and sheathed with timber and planks, similar in most respects to Dam No. 3, but of better form and more substantial construction."

"The remaining Dam (at the terminus of the Canal, in Cumberland) is exclusively of stone, and in perfect order."

Manning believed the focus of effort that summer should be in completing the masonry dam at Dam No. 5, although he also recommended some heavy expenditures at Dams No. 1 and 2.

[182] Board of Directors Meeting, 1 June 1866 (Flood Damage Prevention-Proposed, Maintenance-Dredging, Sustainability-Dams)

"A report from Chs P. Manning Engr & Gen Supt. dated 31st of May was read, as to the condition of the canal, improvements required &c &c."

[320] Annual Report of the President and Directors, 4 June 1866 (Flood Damage Prevention-Proposed, Sustainability-Dams, Harper's Ferry-Sustainability)

". . . the following months of the year till the close of the navigation by ice early in December, were comparatively active, with occasional interruptions during the months of September and October, by inconsiderable breaches in the Canal."

". . . the navigation was closed on the 15th of December to remove obstructions from the Canal and to make such repairs and improvements as could be effected during the winter months. These were much restricted by the unfavorable weather of the season, but it is believed that the Canal has been greatly strengthened and improved; that many impediments have been removed, and that it is now more reliable for navigation and better protected from the incursions of the river than it has ever been."

"The cost of maintenance of the line of the Canal during the past year was unusually large, in part from the greater amount of work done than heretofore for several years past, but far the greater part from the enhanced rates paid for labor and materials. Preparation has been made to some extent for the completion of the masonry Dam No. 5 during the present season, if practicable. This dam has been finished from the abutment on the Virginia shore about 400 feet, and there yet remains about 300 feet to complete it to the Maryland shore; when this is accomplished, it is believed that with very little additional expense it will be durable and effective for many years and greatly tend to the permanence of navigation."

"Dams Nos. 4, 6 and 8 are in good condition and will require very little expenditure to keep them effective and reliable. Dam No. 1 at the little falls of the Potomac 1750 feet in length, and Dam No. 2 at Seneca falls, 2500 feet in length, are both dilapidated and ineffective for a full

supply of water when the river is low. They are both low dams, four or five feet above the river surface, founded on rock, built originally of stone laid dry; the interior of the dams filled with rubble stone, closely packed, with a cross section in the form of an arch. This arch has for the greater part given way, and the gaps have been filled in with brush, stone and gravel, forming 'brush dams'. They will both require to be renewed to a great extent."

"Dam No. 3 at Harper's Ferry falls, was built and kept in repair by the United States. Prior to the war a new stone dam was commenced and built about one-half the width of the river, and unless continued to completion, or if abandoned by the United States, it may in time become necessary for the Company to finish it."

[320] Appendix (A), Charles P. Manning, Engineer and General Superintendent, Cumberland to the President and Directors, Washington, D.C., 31 May 1866 (Flood Damage Prevention-Proposed, Sustainability-Dams, Sustainability-Aqueducts)

". . . for several seasons previous to the last period of suspended navigation, no repairs beyond those of absolute necessity were either attempted or accomplished; nor that, consequently, the need of repairs during the past winter, and prospectively, for the current season of navigation has been, and still is excessive."

"Although the past winter was singularly unfavorable to the accomplishment of such work, a large amount of sediment was removed from the channel of the canal, some necessary repairs of masonry were executed and many lock gates were renewed, in addition to the ordinary repairs of lock gates wasteweirs and other perishable structures upon the entire line of works."

". . . no noteworthy interruption to navigation from defects in the Canal, except for a short period of five days, between the 22d and 27th instant, (which temporary suspension was caused by a breach in the tow-path embankment of the "Four Mile Level" immediately west of the Dam No. 4), and the stable condition of the works, generally, is such as to forbid any apprehension of serious interruptions to navigation from other than extraordinary causes, such as unusual storms and accompanying floods, during the present year."

"Though I feel confident that free navigation can and will be maintained . . . I fear that the ordinary gradual deposits of sediment added to the large amount which has already accumulated to an extent sufficient, in many places, to reduce the channel of the Canal to an area much less than is required for the passage of two loaded boats, will, at no far distant period, cause an entire suspension of navigation . . . a whole year, in order that the original proper dimensions of the trough may be thoroughly restored."

"In general the trough of the Canal is free from dangerous, or even injurious leaks; but that portion of it which traverses the cavernous lime-stone district lying between South and North mountains, has always been, and still is subject to very dangerous leaks and consequent breaches, for which there appears to be no effectual remedy, short of the elevation of the entire body of the Canal . . . to a height of two feet or more above its present levels, wherever the most obstinate and dangerous of these leaks are known to exist . . ."

"In general the masonry of the aqueducts, culverts and Locks is both substantial and in good repair, the only exception requiring special remark being the aqueduct that spans the Conococheague River, which fine structure was wantonly and most seriously injured by rebel soldiers during the late rebellion. At present the navigation is maintained over this dilapidated aqueduct by means of a substantial wooden trunk which is supported upon the original arches of the masonry and quite secure from the damaging effects of ordinary floods."

"Generally speaking the lock gates are in excellent condition; but there are many that should be taken out and replace by new ones . . . These perishable appendages of the Canal are liable to great abuse at the hands of reckless boatmen . . ."

"In relation to the Dams, I have to say, that the 'Little Falls' and 'Seneca' (No. 1 & 2) are in a somewhat dilapidated and inefficient state; and that the one at Harper's Ferry (No. 3) commonly known as 'The Government Dam', is in ordinarily good condition. The two first named of these structures are composed of brush wood and loose stones, and the last named of wooden crib-work, filled with loose stones and sheathed with timber and planks. Dam No. 4 is not only in sound condition, but being exclusively a structure of stone, is regarded as thoroughly permanent, if not quite imperishable."

"Two thirds of Dam No. 5 are new, and made exclusively of stone, the remaining third being composed partly of temporary crib work filled with loose stone, but mainly of the original structure, which was built after the fashion of the one at Harper's Ferry."

"Dam No. 6, is in general good condition, and regarded as a permanent structure, though formed of crib-work, filled with loose stones and sheathed with timber and planks, similar in most respects to Dam No. 3, but of better form and more substantial construction. The remaining Dam (at the terminus of the Canal in Cumberland) is exclusively of stone, and in perfect order."

"Of these Dams Nos. 1 and 2 need unusual repairs, requiring altogether an expenditure of perhaps, no less than twenty-five thousand, in order to restore them to thorough usefulness"

"Dam No. 5 should be completed without delay, and preparations have been made and are now in progress to accomplish the major part, if not all of the unfinished stone-work during the coming

summer and autumn. To complete this work an expenditure of about sixty thousand dollars will be required."

"Of the remaining Dams, No. 3 needs only ordinary repairs. No. 4 a little back-filling of loose stones or gravel, and the one at Cumberland substantially nothing."

"Owing to the great draught of water from Dam No. 1, chiefly requisite for milling, rather than the legitimate purposes of the Canal, the time is rapidly approaching, if it has not already arrived, when the construction of a new and larger feeder-canal, in lieu of, and entirely apart from the existing narrow and unsubstantial one at this Dam, should be commenced and diligently prosecuted to an early completion."

"At present the consumption of water for milling purposes in Georgetown exceeds four million of gallons per hour, or enough to furnish lockage to tidewater for *forty loaded boats* and a like number of *empty ones back again*."

"The cost of constructing the proposed new feeder will probably be less than, but will not exceed twenty five thousand dollars."

[182] Board of Directors Meeting, 15 June 1866 (Flood Damage-Financing, Flood Damage Prevention-Ordered)

"Resolved, That the Engr & Gen Supt of the canal be directed to cause the work at Dam No 5 to be prosecuted with all possible dispatch, that all available for requisite, be employed; all materials be prepared for its early completion and that funds for such purposes be furnished as required."

"Ordered, That the loans heretofore negotiated with sundry Banks & Corporations for repairs of the canal in the years 1847, 1852 and 1857 be paid A soon as soon as the revenues of the Company will admit thereof consistent with a proper reservation for expenses and improvements of the canal, said loans to be paid in regular succession of their respective dates."

[182] Board of Directors Meeting, 5 September 1866 (Flood Damage Prevention-Ordered, Sustainability-Dams)

"A report of Chs. P. Manning Engr & Gen Supt dated the 3d inst was read, stating the present condition of the canal, repairs required and recommending that the sheathing required at Dam No. 6 be attended to as early as practicable, whereupon  
On motion is was,  
Ordered, That the Supt. of the Hancock Division be directed to give early attention to sheathing said dam."

[190] Jacob B. Masters, Superintendent, Williamsport, to the President and Directors, 1 October 1866 (Flood Damage Prevention-Accomplished)

"At Dam No. 5 the first section of 60 feet is now nearly ready for the strong pieces of sheeting. We expect by the 1st of next week to be ready; providing we receive bolts and timber."

[190] George W. Spates, Superintendent, Edwards Ferry, to W. S. Ringgold, Clerk, 14 October 1866 (Flood-October 1866)

"I am happy to Inform you that boats are now passing over my division of Canal from Seneca or Dam No. 2 up I have no breaches though many places badly washed. I have several heavy sand bars I had several miles of Canal entirely covered by the river the river is now falling . . ."

[190] A. K. Stake, Hagerstown, to W. S. Ringgold, Clerk, 16 October 1866 (Flood-October 1866)

"no damge of consequence tp the Canal between Harpesferry and Cumberland. We fear for the Canal below that point from which we hav heard nothig save a dispatch from Darby which says '60 feet of towpath and some of birm carried away at Watts branch"

"When I say no damage when I mean none to affect navigation the coffer dam at No 5 and a portion of the work done; has been carried away, the effect of which will be to delay the completion of that work, but does not at present effect the navigation."

[190] Jacob B. Masters, Superintendent, Williamsport, to W. S. Ringgold, Clerk, 16 October 1866 (Flood-October 1866)

"The late freshet washed away the new masonry at Dam No 5, We had a new coffer dam in that washed down the rive but caught, all the material was saved except perhaps one derrick [?] that washed done to the Island"

"The division was not sp badly damaged some few bars and wastes that will take this week to repair"

[190] Denton Jacques, Superintendent, 4 Locks, to W. S. Ringgold, Clerk, 16 October 1866 (Flood-October 1866)

"I have just returned Home, from having the repairs completed on My Division. I had no break but

the top of the bank on the Hancock level washed off for Near 100 yds two feet deep"

[190] George W. Spates, Superintendent, Lock 26, to W. S. Ringgold, Clerk, 18 October 1866  
(Flood-October 1866)

"on the 16th, I drew off the nine mile level to remove Some heavy Sand bars caused by the late rains I shall have them removed and will put the water on to day at 2 oclock P M. I shall then pass all loaded boats 12 in number to the lower end of the division I have no breaches but many severe Washes on tow path the division was covered by the river in some places for 4 miles the 8&9 mile levels suffered most by tomorrow night I shall have the entire division ready for Boats . . ."

[190] L. Benton, Superintendent, Sharpsburg, to W. S. Ringgold, Clerk, 18 October 1866  
(Flood-October 1866)

"I past Eleven loaded Boats over my division yesterday."

[190] George W. Spates, Superintendent, Poolesville, to W. S. Ringgold, Clerk, 19 October 1866  
(Flood-October 1866)

". . . I have a large force removing sand bars repairing Severa Washes in towpath &c"

[190] Lloyd Lowe, Superintendent, Cumberland, to W. S. Ringgold, Clerk, 26 October 1866  
(Flood-October 1866)

"The high water done no harm to stop navigation on the Cumb. Division Some of the stone was washed out of the Cribs protecting the Guard Bank below Dam at Cumb. & will cost about three hundred dollars to restore it."

[190] George W. Spates, Superintendent, to President and Directors, 1 November 1866  
(Flood-October 1866)

"The monacacy division is again in good boating order boats are passing freely each way the division sustained no Serious damage by the late freshett though many miles of Canal were entirely covered by the river some four feet in depth Some portions of of the tow path was Washed very much and many heavy Sand bars all of which had been attended to and navigation again restored a few days after the river left the Canal"

[190] L. Benton, Superintendent, Sharpsburg, to President and Directors, 1 November 1866  
(Flood-October 1866)

"I have had no interruption of navigation only during the days of the highest water the River was at its highest on Saturday the 13th at least one half of my Division was covered with the high water we watched night & day, light boats past up the Gard lock Sunday and monday the 14th & 15th could not pass over the Slack water until the 16th the loaded Boats past over My Division on Tuesday 17th"

[190] Denton Jacques, Superintendent, Hancock Division, 4 Locks, to W. S. Ringgold, Clerk, 1 November 1866 (Flood-October 1866)

Jacques reports, "My Division is in good order."

[190] Jacob B. Masters, Superintendent, Williamsport, to President and Directors, 2 November 1866 (Flood-October 1866, Flood Damage Prevention-Accomplished)

". . . up to the 10th of the Month, work progressed favorably at Dam No. 5. We had the new masonry ready for the timbers, bolts &c. The sheeting could not have been put on as the work stood, in time to prevent damage form the freshett, We also had the coffer dam for the next action almost ready for the pump. The freshet washed the stone work entirely from its place, and will be a total loss. The coffer dam was also washed from its place, but caught and saved below. All the material such as lumber cement, tools, and engine was saved. The loss in that way will be but a trifle; . . . The masonry seemed to be well done, and my opinion is, that it would have washed away even if it had been sheeted, unless the work would have been backed up between it, and the crib work, in the rear, owing to the water being confined it was powerful; The backing of the work could not have been done until the other was finished enough to be out of the way of the laborers."

"One the Division, the water was over all the levels on an average 40 to 48 hours, and the damage was considerable; such as washing off the top of the towpath, and the slope of the bank, making bars &c, We have made the Canal passable; but their ought to be time allowed, before opening of navigation next spring to make it more perfect, A great many of the old leaks and some new ones have been opened by the freshet."

[190] John Cameron, Georgetown to C. Abert, 7 November 1866 (Flood-October 1866)

"I give you a statement of the damage done to, the canal by the late high water; the Cabin John level, had one brake in the towpath, of 32 feet; 4 feet below bottom; 4 cuts from 12 to 15 feet; about half way through the towpath; two brakes in the burm of twenty and thirty feet in length. I had to put a bank across the Government; canal; three heavy barrs washed in the canal. The towpath was very much torn, also the Level below Cabin John; the level immediately above the

Great Falls was cut very badly; and towpath very much torn, also bars thrown in. Watts branch level was badly torn; we had one brake on the towpath of 90 feet in length; it was 8 feet below bottom of canal; and two thirds of bottom of canal went out with it. The burm had two breaks making about 90 feet; 4 feet below bottom; and all the made bank above. The Culvert; of the burm side was very much torn."

"It will take sometime to get the banks on the same order they were."

[190] Issac A. Mans, Superintendent, Georgetown Division, to President and Directors, 1 December 1866 (Flood-October 1866)

"I found the towpath in a very bad condition Above the Great falls in some place not over four feet on with Caused by the freshet in the 12 of October below the falls to Georgetown in a passall Condition"

"Lock No 23 Requires new timbers and flouring"

"Gard Lock at Same place need one pair of new Gates"

"Lock No 15 also Requires new flooring and Timbers"

"Lock No 8 requires Considerable Repairs"

"Gard Lock at Dam No 1 Requires new Gates"

"Locks No 1234 require 4 New gates and also other Repairs"

"Outlet Lock at Rock Creek is worthless"

[190] Jacob B. Masters, Superintendent, Williamsport, to President and Directors, 3 December 1866 (Flood-October 1866)

". . . for the Month of November . . . the Williamsport Division was in good navigable order. . . Our ordinary force have been engaged in repairing the tow path&c injured by the Oct. freshet; and otherwise strengthening the Banks,"

#### 1867

[190] J. Snively, Hancock, to W. S. Ringgold, Clerk, 6 February 1867 (Flood-February 1867)

"I am happy to inform you that the recent ice freshet, has done the Canal no damage, as far as I have heard, both No 5 & 6 dams are uninjured. I was very fearful of dam No 5 from the fact of the ice being heavier than for years. Much of the ice was 24 inches thick."

[190] George W. Spates, Superintendent, Harper's Ferry, to W. S. Ringgold, Clerk, 8 February 1867 (Flood-February 1867)

"I am happy to Inform you that I have Sustained no damage from the late Ice Freshett I am pushing forward my repairs and hope to be ready to resume navigation as early as practicable"

"I have heard from Dam No. 4 and 5 and the report is they have sustained little or no damage which is very good news to all interested on the Canal"

[182] Board of Directors Meeting, 14 February 1867 (Flood Damage-Financing)

"2d The Treasurers payments of interest on certificates of debt for repairs &c prior to 1845 . . . from the 1st of July to the 31st of Dec 1866 . . . amounting to \$979.93."

[190] George W. Spates, Superintendent, to the President and Directors, 29 February 1867 (Flood-February 1867, Sustainability-Dams)

"The Monocacy division is now in good navigable order boats are passing each way freely I have had during the present month a large force employed at Dam No 3 The dam is now furnishing a Sufficient Supply of Water to the division during the coming Season I find many portions of the dam has been carried away by the Ice last February and it is very important those breaches Should be rebuilt during the Coming month If left another Season the length would be double I Suppose the breaches in all Would make about one hundred yards The dam is built with heavy timbers in front bolted together and anchored back with heavy bar Iron and backed with heavy stone. I therefore suggest the rebuilding of those breaches but Shall await your instructions in the matter"

[190] Jacob B. Masters, Superintendent, Williamsport, to the President and Directors, 4 March 1867 (Flood-February 1867, Sustainability-Dams)

"The water has been so high since my last report, that I cannot give you any thing particular about the Condition of Dam No. 5. From appearances the front of the cribbing known as the "Hassett Cribs" are somewhat injured. Should it be so it will not interfere with navigation until low water, and then it can be soon repaired."

[190] Jacob B. Masters, Superintendent, Williamsport, to the President and Directors, 4 May 1867

(Flood-February 1867, Flood Damage Prevention-Accomplished, Sustainability-Dams)

"At dam No 5 we have been making preparations to repair the cribs. I have put in the anchor cribs, and made other preparations to repair the broken cribs as soon as the water will permit. We have had several little rises in the river, that made it unnecessary and dangerous to do any more than I have done. Nearly all the work I am doing will also be necessary for to go on with the work on the stone dam. The anchor cribs will answer for derrick cribs, and the cribbing that I will have to put around on the Hassett cribs, will also be service to keep the water out of the way when they work at the stone dam."

[190] Issac A. Mans, Superintendent, Georgetown Division, to President and Directors, 8 May 1867 (Flood-February 1867, Sustainability-Dams)

"I had Some forse at work on Dam No. 2 at seneca before the present rise in the river, the Ice freshet in the Spring tore it Verry much it is Very nessary it Should be repard before the low warter in the Sumer . . . the Dam at lille falls wants considerable repais it is also leveled very much by the Ice freshet it will nead a great deal attention the Carpenters are at this time building a pare of Feader gates for feder no one they are in a Very dangerous condition I alson have had the mud moshean at work in the bason that filed up Very much . . . the Chanel in [Illegible] is filed up very much by the freshit . . ."

[182] Board of Directors Meeting, 9 May 1867 (Flood-February 1867, Sustainability-Dams)

"A letter from Henry W Brewer C E dated the 8 inst. was read relative to the repairs required to render available the outlet lock and repairs required at the dam at the mouth of Rock creek forming plans and alternates therefor, whereupon after consideration, on motion it was, Ordered, That the Clerk & Treasurer be directed to advertise for proposals to contract for said work to be submitted to the Board at there next meeting."

[182] Board of Directors Meeting, 30 May 1867 (Flood-February 1867, Sustainability-Dams)

The Board accepted the M. Deter and A. M. Maynard for the repairs of the outlet lock and the dam at Rock, they being the low bidders.

[182] Board of Directors Meeting, 27 June 1867 (Flood Damage Prevention-Ordered)

"The Board then considered the subject of rebuilding Dam No 5, and after full conference and discussion, Mr. Brengle submitted the following preamble and resolution."

"Whereas it is very important and absolutely necessary for the security of the navigation that Dam No 5 be at once commenced, therefor, Resolved, that Lewis G. Stanhope or some other competent person be employed as superintendent for building said dam, and that he be paid a compensation for his services of \$[?] per month."

"Resolved, That the work be at once commenced and prosecuted with all the force that can be employed for its rapid completion."

"Resolved, That the President be requested to visit the work as often as practicable, and if in his judgment it does not progress satisfactorily, and the Supt does not give proper attention to it that he be authorized to discharge the Supt and employ some competent person to continue it, till the next meeting of the Board."

"Mr. Stake proposed as a substitute, the following resolution:"

"Resolved, That a contract for rebuilding Dam No 5 be awarded to Lewis G. Stanhope upon the terms and conditions of his former contract for work done on the part completed; with the addition of fifty per cent to former prices as ascertained by reference to the modified contract on file in the office, and that compensation be made to the Company for all materials now on hand and fit to be used in the construction of the dam, and also any tolls implements or other property at a fair estimate of value, to be made by disinterested parties to be appointed by each respectively, and that said contract shall provide that the space intervening between the finished masonry dam and the Hollman dam be completed on or before the first day of November next."

On a 4 to 3 vote, the Stake resolution was adopted and A. K. Stake was "requested to give his personal attention to the construction of said work . . ."

[190] Jacob B. Masters, Superintendent, Williamsport, to the President and Directors, 6 July 1867 (Flood Damage Prevention-Accomplished)

Masters reports the temporary cribbing on Dam No. 5 completed.

[182] Board of Directors Meeting, 16 July 1867 (Flood Damage Prevention-Ordered)

"A report from A. K. Stake dated this day was read relative to the condition of, and work required to be done at Dam No 5, stating that to construct the masonry dam to the Maryland shore, connecting with the finished dam, will require a length of 308 feet; that 130 to 150 feet will

reach the Holman dam and render the dam efficient and secure; that the contractor required some modification of the terms of the contract prepared, which differed from his understanding of its, viz that the coffer dams be built at the expense of the Company under his direction, without profit to him &c &c also furnishing an estimate of the entire cost of the dam when completed to the Maryland shore. which after making full allowances, he thinks will not exceed \$50,000; whereupon after consideration it was, Resolved, That the contract be so modified that the cement required for the dam shall be selected by an officer of the Company and furnished at the cost of the contractor, and that it is further agreed that the Company is not to be at any expense for coffer dams on said work to amount to exceed the sum of \$5000, a strict account of which shall be kept by the superintendent of said work; and it is further agreed, that any sum over said \$5000 is to borne by said Lewis G. Stanhope as a part of the Contract."

Note: the strategy here was to construct the new dam out to the Hollman Dam and then to complete it out to the Maryland shore. Part of the Hollman dam was missing or in poor condition.

[182] Board of Directors Meeting, 8 August 1867 (Flood Damage Prevention-Ordered, Flood Damage Prevention-Proposed)

"A letter from Geo W Spates Supt. of the Monocacy Div. dated the 29th of July was read . . . [stating] that Dam NO 3 still required further repairs to make it effective . . ."

"Ordered, That on the report A K Stake that for the full security of the dam as it progreses, that the same be properly backed under his direction, and as no provision has been made therefor in the contract, that the contractor be allowed therefor \$1.95 per perch . . ."

[190] Jacob B. Masters, Superintendent, Williamsport, to W. S. Ringgold, 22 August 1867 (Flood Damage-Localized)

"A heavy rain last night washed in several bars in the feeder level. I have drawn the water off, to repair;"

[190] Jacob B. Masters, Superintendent, Williamsport, to the President and Directors, 2 September 1867 (Flood Damage-Localized, Sustainability-Culverts)

"On the night of the 21st [of August] we had a very heavy rain, that washed large bars into the feeder level at Grubers Culvert and a point called Old Warehouse. The water was drawn off for two days, and the bars taken out. . . . The late heavy rains in this vicinity, have made the leaks that are caused by Springs running underneath the Canal very troublesome . . ."

[182] Board of Directors Meeting, 25 & 27 September 1867 (Flood Damage Prevention-Financing)

Virginia is starting to make moves to settle the issue of the accrued, but unpaid interest of the 1849 repair bonds.

[190] Denton Jacques, Superintendent, Hancock Division, to the President and Directors, 20 October 1867 (Flood Damage Prevention-Accomplished)

"Since I have been Superintendent of the Hancock Division, Sept 5th 1866. The first order I received was to sheet dam No 6. I commenced it as soon as I could procure timber, but did not get it finished till the first of Aug last, nearly all the range [?] timber had to be replaced it was 12 inches square, the sheeting 6 in thick and 25 feet long, the Dam is now in complete order."

[190] A. K. Stake, Contractor, near Hagerstown, to W. S. Ringgold, Clerk, 2 November 1867 (Flood-October/November 1867, Sustainability-Dams)

"Knowing your anxiety in regard to Dam No. 5, I should have written Sooner, but waited until a More definite idea could be formed of the full extent of the late disaster and now write for your information and that of any parties interested making enquiries at the office."

"The first Section put up remains intact, the second one is Safe so far as we had it backed in which was up to the Square. The last one was taken away to the extent of six Courses which leaves four Courses still standing; all Would have gone but for the backing, and so far as we had it backed in all remains; a week at the outside would have backed it all up and made it perfectly safe, even against one of the Most powerful rain Storms I have ever seen upon the river. We Worked in all the storms of Monday. Monday night and tuesday to back up all we could and did not leave it until driven away by the flood of water. The entire Stone dam of one hundred and fifty feet was finished and Sheeted, and I had prepared my final estimate upon that portion. The connecting crib between the new and Hollman dams finished and the backing going in as rapidly as possible; but unfortunately, we were cut short by a few days. of course, under the Circumstances . . . I have taken responsibility in the absence of the President to order cribs to be prepared to replace those carried away so as to render navigation safe and Secure"

[182] Board of Directors Meeting, 14 November 1867 (Flood Damage Prevention-Accomplished)

"A final estimate of L. G. Stanhope contractor at Dam No 5 was presented, also an account for crib work constructed at Dam No 5 to secure the navigation and protect the dam . . . "

1868

[190] Jacob B. Masters, Superintendent, Williamsport, to Benjamin Fawcett, Clerk, 14 May 1868 (Flood-May 1868)

"we have had a very heavy freshet, All of the levels on the Wmsport Division are under water since Morning, The water is now on a stand, and I expect will be down enough by to morrow evening (Friday) for me to ascertain the damage. . ."

[190] Jacob B. Masters, Superintendent, Williamsport, to Benjamin Fawcett, Clerk and Treasurer, 16 May 1868 (Flood-May 1868)

"the damage by the last freshet will not interrupt navigation more than 2 or 3 days on the Wm port Division,"

[190] George W. Spates, Superintendent, Sandy Hook, to Benjamin Fawcett, Clerk and Treasurer, 17 May 1868 (Flood-May 1868)

"the monocacy division has sustained very little damage from the late freshett no breaches some small washes which have been repaired everything is on good working order a large number of loaded boats is now passing over the division"

[194] Benjamin Fawcett, Secretary, Washington, D.C., to Alfred Spates, President, 25 May 1868 (Flood-May 1868)

"Am sorry to learn of the break in the Canal but hope all things will now be in working order."

[190] George W. Spates, Superintendent, Sandy Hook, to Benjamin Fawcett, Clerk and Treasurer, 27 May 1868 (Flood-May 1868)

". . . I have had two heavy leakes and one heavy breach in this month thereby causing"

[LIB-PHP] Fortieth Annual Report of the President and Directors of the Chesapeake & Ohio Canal Company to the Stockholders, June 1st, 1868 (Washington, D.C.: Samuel Polkinhorn, 1868) (Flood Damage Prevention-Accomplished)

The President, Alfred Spates, reported (pp. 4-5), "Owing to the severity and long duration of the past winter, all the repairs and contemplated, could not be done at the proper time, much, however, was accomplished in the way of repairing and renewing old and dilapidated Lock-gates, and water weirs, and in the preparation of material for use, when the weather would permit."

"The opening of navigation was delayed for a few days in order to remove the deposits from the bed of the Canal, which had at some points been accumulating for years and had become a serious obstruction to free navigation. These have all been removed, the canal restored to its original depth, and was opened its entire length about the first day of April."

"In the last annual report it was stated that a portion of Dam No. 5 had been completed during the year 1866, and that \$29,317 73 had been expended thereon but that a heavy flood in October of that year year had swept it away. In June 1867 a contract was made by the former Board with Lewis G. Stanhope for its completion, the space intervening between the finished masonry dam, and the Holman dam to be completed when another flood in the river slightly damaged it. The sum of \$33,503 85 was expended under this contract including backing for coffer dam that it will cost about \$30,000 to complete it. This is it is hoped, can be done during the present season." Spates also mentioned that Dam No. 1 had been tightened to satisfy long standing complaints about insufficient water on the Georgetown level.

(p. 7) "The Canal was opened its entire length, for navigation, this season about the 1st of April, the trade, particularly in coal, commenced and continued uninterruptedly until about the 15th of May, when on account of a sudden rise in the river, overflowing the canal in some for a great distance, damaging culverts and tow-path in many places, to such an extent, as to delay navigation for eight or ten days, the damage done having been repaired, the Canal is now fully restored."

(p. 8) "On the first day of June, 1866, a former Board entered into a contract with H. H. Dodge and his assigns, proposing to grant him without consideration in fact, the right to raise and rebuild the dam at Little Falls, enlarge the feeder, and to deepen and widen the canal, raise the banks and contract such basins or lakes, and other works as may be necessary to increase the water-power at Georgetown; and to have and use for his own benefit, and without compensation to the Company, the increased water-power thus obtained, as well as the adjacent unoccupied land of the Company between the said Falls and Georgetown, together with the right of condemning other lands and materials for the proposed improvements. This Board, considering there was no grant in the Charter of the Company, authorizing the Board of Directors to make such contracts, and considering the supposed contract highly prejudicial, if not absolutely destructive of the Canal for navigable purposes, felt constrained to relieve the Company from the consequences of the supposed agreement, whereupon it was on the 14th day of November, 1867, Resolved, That the Board concurring in the opinions of their legal advisors, (J. H. Bradley, Sr. and J. Philip Roman), that the contract with H. H. Dodge is void, do hereby declare the same to be null and void; and a



copy of said resolution was delivered to H. H. Dodge."

[190] Jacob B. Masters, Superintendent, Williamsport, to President and Directors, 2 July 1868 (Flood-May 1868)

"The laborers here been mainly engaged in repairing the damage done the towpath &c by the freshet in May."

"We have also worked the mud machine in cleaning out mud at the out let Lock No. 41, and are now engaged in cleaning out the cut at Dam No. 5, so that if the water gets low Boats can pass along."

[190] I. R. Mans, Superintendent, to President and Directors, 11 July 1868 (Flood-Winter 1868)

"Dam No. 1 will be completed in a few days; it was damaged very much by the ice freshet Dam No 2 is completed: one half was intirely torn away."

[190] Denton Jacques, Superintendent, to President and Directors, 1 September 1869 (Sustainability-Culverts)

"I am hapey to inform you that My Division is in Good order, with the exceptin of the culvert west of this Place. It is dificult to keep it Safe as the banks are So high I have the Arch nearly Stript."

[190] Jacob B. Masters, Superintendent, Williamsport, to President and Directors, 2 September 1868 (Flood Damage Prevention-Accomplished, Sustainability-Dams, Sustainability-Embankments)

"The laborers here have been employed in repairing & improving the banks of the Canal where most needed and in tightening the cribbing and the Hollman part of Dam No 5 . . ."

[190] George W. Spates, Superintendent, to President and Directors, 29 September 1868 (Flood-Winter 1868, Flood Damage Prevention-Accomplished, Sustainability-Dams, Sustainability-Towpath)

"I have a large force employed the present month in finishing up the Seneca dam and Scowing stone and riprapping the towpath on upper end of the eight mile level the Bank next to the river was damaged very much by the Ice last winter similar to the bank at Weverton on the Monocacy Division"

[190] I. R. Mans, Superintendent, to President and Directors, 4 November 1868 (Flood-October 1868)

"the freshet some four weaks agon damaged the Dam so that it required some repairs"

[182] Board of Directors Meeting, 3 December 1868 (Flood Damage Prevention-Ordered, Maintenance-General, Renovation-1869-75, Widewater-Sustainability)

"On motion it was ordered that the Supt of Georgetown Division be directed to repair Lock House No 8, the repairs to consist in putting one story on the House & building a Kitchen for the same, to be done in a workman like manner, also to make the necessary repairs on the Bridges above and below the Market House in Georgetown, and also to repair or rebuild the Bridge on Log Wall Level."

"On motion it was ordered that Supt of Seneca Division be directed to make the repairs mentioned in his report of this date."

"On motion it was ordered that the Supt of Monocacy Division be directed to repair Waste Weirs and feeder level at Harpers Ferry."

"On motion it was ordered that the Supt of Antietam Division be directed to make the necessary repairs to Lock Houses, Culverts & Waste Weirs on his Division."

"On motion it was ordered that the Supt of Williamsport Division be directed to repair Lock No 41, Lock gates, Bridges & Culverts on his Division."

"On motion it was ordered that the Supt of Hancock Division be directed to repair the Acqueduct at Yeat's, and also Lock Gates, Culverts, Bridges, &c on his division."

"On motion it was ordered that the Supt of Cumberland Division be directed to repair the Trussell work at the Tunnell also Lock Houses, Locks & Lock gates & Bridges on his Division."

"On motion the following resolution was adopted. Resolved, That in addition to the foregoing repairs, the General Supt. cause all such other repairs to be done, as may be found to be

necessary and proper to put the Canal from Washington City to Cumberland in good and permanent navigable order for the ensuing year, and to pay the cost thereof, the sum of One hundred thousand (\$100,000) be, and the same is hereby appropriated, to be paid from time to time as may be specially ordered by the Board upon the report of repairs as made by the several Superintendents, and approved by the General Superintendent, and by the Board."

1869

[LIB-PHP] Forty-First Annual Report of the President and Directors of the Chesapeake & Ohio Canal Company to the Stockholders, June 7th, 1869 (Georgetown, D.C.: Courier Print, 1869) (Flood Damage Prevention-Ordered, Maintenance-General)

The President, Alfred Spates, reported (pp. 4-5), "During the past ten years little or nothing had been done towards repairing and improving lock-houses, bridges, culverts, aqueducts, locks, lock-gates, and waste-weirs of the Company; many of them had become entirely unfit for use and were becoming worthless, rendering it absolutely essential to the requirements of the Company to have them repaired. This the Board have done, and, although at heavy cost, they now present a comfortable and substantial condition, and the fact may now be confidently stated that the condition of the canal in all its departments is such as to justify a largely decreased expenditure during the coming year, unless overtaken by unforeseen and unexpected disaster."

"Dam No. 5 may now be considered in a safe condition. But the completion of the entire stone structure is deemed advisable, which will insure us against all further trouble at that point. This work, without casualties, may be done at a cost not exceeding twenty-five thousand dollars, thus completing the Dam No. 5 at a cost of nearly or quite one hundred thousand dollars less than the cost of Dam No. 4, which work was constructed when labor, materials, &c., were much below what they are now."

[182] Board of Directors Meeting, 1 July 1869 (Flood Damage Prevention-Financing)

"On motion the following preamble and resolution was adapted, Whereas, the Bank of the Old Dominion has this first day of July 1869, demanded payment of the interest due upon Bonds Nos 84, 85, 113, 118, 120, 124, 125, 172, 174, 175, 176, 182, 192, 193, 194, 195, 196, 197, & 201, held by said Bank, and issued by the Chesapeake & Ohio Canal Company, known as repair Bonds, guaranteed by the State of Virginia; And Whereas a Suit is now pending in the Circuit Court for Baltimore City, for the purpose of determining the right of all of the holders of said repair Bonds to priority of payments over other creditors of said Canal Company."

"Wherefore, Resolved That the said Canal Company cannot now pay the interest on said Bonds."

"The clerk laid before the Board a statement from A K Stake in relation to the condition of the work at Dam No 5, and also his resignation as superintendent of the same, which was accepted."

"On motion it was ordered that the President, with Messrs. Grove, Gorman & Thompson examine Dam No 5, and employ an Engineer if found necessary, to measure the works, and that the estimate now made, be not paid unless upon the recommendation of the above committee."

[182] Board of Directors Meeting, 6 July 1869 (Flood Damage Prevention-Accomplished)

"Lewis G Stanhope, the contractor for rebuilding Dam No 5 appeared before the Board and represented that he could not comply with contract, unless the Company will agree to provide for the building of such portions of the Coffor dams as are required for the balance of the work. It was, after consideration, on motion of Mr Coudy,"

"Resolved, That the necessary Coffor dams be constructed by the said Contractor under the direction of the Engineer of the Co. the actual cost of the portions hereafter to be done, to be paid by the Company, as ascertained by the said Engineer, whose decisions in all matters pertaining to the same be final."

"On motion it was Ordered that the President appoint a suitable Engineer to Superintend the Construction of Dam No 5. The President thereupon appointed William R Hutton to act in said capacity."

"On motion it was Resolved that the President be authorized to obtain from the Engineer, for the next monthly meeting of the Board, a report from inspection, of the actual condition of the Dams, Locks, Aqueducts, Bridges and other parts of the Canal."

"The President appointed Messrs Coudy, Grove & Gorman to visit and supervise the construction of Dam No 5, also to take charge of and procure materials for repair of the Acqueduct at Williamsport."

[182] Board of Directors Meeting, 26 July 1869 (Flood Damage Prevention-Financing)

"Whereas, the State of Virginia as Endorsee and guarantor of the Repair Bonds of this Company to the amount of \$200,000 . . . Resolved, That the President, Secretary, and committee on accounts be and they are hereby authorized to adjust and settle the claim of the State of Virginia for reimbursement of the sums so paid by her, with interest, and to report the results to the next meeting of the Board."

[182] Board of Directors Meeting, 10 August 1869 (Flood Damage Prevention-Financing)

"Upon her liability for the repair Bonds issued under her [Virginia's] act of March 15th 1847 [1849?]; She also appears to have paid all the the Coupons that were presented, as long as the condition of her Treasury enabled her to do so."

Note: at this meeting the State of Virginia also made a settlement offer (not specified) on their suit against the canal on the issue of the repair bonds and other debt of the Canal Company the state had guaranteed.

[190] William Devemon, Superintendent, to the President and Board, 4 October 1869  
(Maintenance-General)

Devemon reports on the state of the division he has just taken over and repairs needed; not flood related as such.

[182] Board of Directors Meeting, 8 December 1869 (Flood Damage Prevention-Financing)

The minutes of this board meeting contain a transcript of the settlement between the Canal Company and the State of Virginia over the unpaid interest on the bonds of the company guaranteed by Virginia.

### 1870

[182] Board of Directors Meeting, 12 January 1870 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Mr. Gorman submitted the following resolution which was read & adopted."

"Resolved That the Committee on the Condition of the Canal, be and are hereby instructed in conjunction with the Engineer of this Co., to ascertain the necessity of constructing a permanent masonry dam at Dam No 1 and the probable cost of the same, and report as soon as practicable."

[190] John Shay, Superintendent, Sharpsburg, to the President and Directors, 18 January 1870  
(Flood Damage-Localized)

"The river raised suddenly last night more than half bank full, and in consequence of the rise has washed nearly all the towpath away at the dam below Shepherdstown at the Cement Mills which required immediate attention."

[182] Board of Directors Meeting, 24 March 1870 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Mr Gorman offered the following order which was adopted, Ordered that the Committee on the State of the Canal, with the Engineer, be and they are hereby authorized and directed to report at the next meeting of the Board, what repairs are necessary at Dam No 1 and the Feeder leading into the Canal at said Dam, to secure the proper supply of water on the Georgetown level, and the probable cost of such work."

[190] Jacob B. Masters, Superintendent, Williamsport, to Benjamin Fawcett, Clerk and Treasurer, 29 March 1870 (Flood Damage-Localized)

"The high water done no serious injury to the Williamsport Division, several bars washed on the Feeder level which we expect to get out tomorrow the 30th and put the water on again by night."

[182] Board of Directors Meeting, 5 & 6 May 1870 (Flood Damage Prevention-Accomplished)

Final estimates were presented at this meeting for the repairs and improvements made by Lewis G. Stanhope on Dam No. 5. This indicates that he had completed his work there. However, he must not of completed all the work because at the 6 May meeting, "Resolved that Lewis G. Stanhope Contractor at Dam No 5 be required to complete the filling & gravelling at said Dam at the contract price of \$1.95 per perch."

Also at this meeting, "Resolved that the Engineer be authorized to invite proposals for the cleaning out of the Georgetown level of the Canal, and for the improvement of the Feeder, to such extent as he may consider necessary to maintain uninterrupted navigation."

[LIB-PHP] Forty-Second Annual Report of the President and Directors of the Chesapeake & Ohio Canal Company to the Stockholders, June 6th, 1870 (Annapolis, Md.: George Colton & Sons, Printer, 1870) (Renovation-1869-75, Sustainability-Embankments)

This report contains a long and very detailed description of the state of the canal and repairs completed and still needed, written by William R. Hutton, the Engineer (pp. 21-37). Hutton started off on an optimistic note. He stated (p. 21), "The navigation during the last season will compare favorably with of any one preceding, having been free to a great extent from the damaging suspensions and delays which have so frequently occurred." While the canal was in a navigable condition, Hutton found it in need of much repair and improvement. Most interesting was his assessment of the points on the canal most vulnerable to flooding (pp. 24-25). Hutton

wrote, "The abrasion of the river banks at places where they approach the Canal, caused by high waters and ice freshets has been a source of well founded alarm. The points where danger was most imminent have been secured in part before the appointment o[f] the present Board, but more work remains to be done."

"The most dangerous point at Weverton (where the force of the current is turned against the bank of the Canal, by the Weverton Company's dam,) has been protected by a heavy stone rip rap. and is not now in immediate danger. The Weverton Company, only lately reorganized, has been notified to repair its works so as to protect the Canal. In case of their failure, it would be proper for the Canal Company, exercising the right secured to it by agreement, to remove the dam which is the cause of the injury, and thus restore the current to its original course."

"At Coxe's bend, above Sheppardstown, and a point between Falling Water and Williamsport, the banks are now secure. The guard bank of dam No. 4 is very narrow and made of light materials, It has already has already been injured at several points, and needs to be made safe with rip rap or slope wall."

"In January last, the high waters cut away the river bank and tow path for a distance of sixty yards, at the end of the Potomac Cement Company's dam near Sheppardstown. The dam terminated at the Maryland end against the rip rapped bank without any abutment. The Cement Company was notified to complete their work in a proper manner, and were understood to promise to comply at once. Pending their action however, the accident occurred. It was repaired before the season of navigation, at a cost of about \$5,000."

"A sustaining wall 52 feet high, near the Great Falls, has yielded to the pressure against it, and is considerably out of line. It is said to have stood in this condition for 12 or 15 years, although the evidences of having moved are apparent. As its failure would cause a long interruption to navigation, and loss of revenue to the Company, I recommend that it be protected by an exterior revetment at its foot, and for at least one-third of its height."

Another problem spot was the Georgetown level, the Rock Creek Basin, the extension the City Canal, and the City Canal itself. Both the Georgetown level and Rock Creek basin were silted up, both by gradual erosion and flooding over the years. The City Canal was in a "wretched condition" and "unnavigable."

[182] Board of Directors Meeting, 3 June 1870 (Flood Damage Prevention-Accomplished)

"The Engineer presented an estimate for work done by Lewis G. Stanhope, filling behind the abutment at Dam No 5 . . ." There was disagreement between the committee of accounts about whether Stanhope had adequately accounted for all his expenditures. The majority took the position he had not. In any case the minority report indicates his work on the dam lasted beyond July 1869.

"Whereas L G Stanhope Contractor at Dam No 5 did in July 1869 decline to continue the work upon said Dam under his then Contract, unless the same should be so modified as to require the Company to construct the Cofferdams, and pay him in full for all work done to that date including the reserve of 20 per cent. And Whereas, this Board after mature deliberation, deemed it for the best interest of the Company to make said Concessions . . ."

[190] Jacob B. Masters, Superintendent, Williamsport, to President and Directors, 13 June 1870 (Warnings-Flood Vulnerability)

Masters saw his division, which ran from Dam No. 4 to Dam No. 5, as particularly vulnerable to flood damage. He wrote, "On account of the Division being located very low, and running through a limestone country, the whole way it is subject to overflow, and leaks slides &c After a freshet that overflows the banks, it takes the ordinary force, months, to put the towpath &c, in nice order again. Also after high water the leaks are more Troublesome, and require time, and attention to prevent damage."

[182] Board of Directors Meeting, 13 July 1870 (Flood Damage Prevention-Proposed, Harper's Ferry-Sustainability)

"The President presented to the Board the following communication, and report of the Engineer which were read and laid over until the next meeting of the Board."

[Dated 12 July 1870, Addressed to the Directors]

"I herewith submit a Report of the Chief Engineer, showing the amount of money which will be required to put the canal in good condition. This report is the result of a personal inspection by the Engineer, in which I accompanied him. This estimate is the result of actual measurement of masonry, lumber, &c &c. And the approximate estimate for cleaning out the bottom of the Canal. A considerable amount of this estimate must be expended during the present summer. The repairs of Dams have been commenced at Little Falls, Seneca and Harpers Ferry. The raising of towing path is also being done. Preparations are being made to rebuild the Aqueduct at Williamsport. It will be necessary to commence the riprapping and protection crib at Weverton at as early a day as practicable, also riprap the guard bank at Dam No 4 in order to guard against highwater."

[The following is a report of William R. Hutton, the Engineer, to the President, dated 11 July 1870]

"The following estimate of amounts required to place the Canal in good condition, is respectfully submitted."

"Georgetown Division, Isaac R Mans, Supt.		
Repair of Dam No 1, damaged by freshets	\$700	
Repairs of Feeder		2000
New Hollow quions for Lock No 8		720
Repairs of Locks from No 8, to No 20		1240
Lock 21, resetting Coping & part of Chamber Wall	150	
Watts Branch Culvert, reset loose Coping		25
Repair & rebuild High Wall near Gt Falls (50)		8000
Towpath to be repaired & raised, three miles		2184
Bottoming Canal, principally on GeoTlevel	<u>6000</u>	
		\$21,019"

"Seneca Division, John L. Fletchall, Supt.		
Repairs of Lock House at Guard Lock		\$250
Securing abutment at Whites Ferry Bridge	50	
Riprap required on Riverbank below End Ferry	750	
Filling & gravelling Seneca Dam (no 2)	300	
Excavation of Channel to feeder (outside)	500	
Repairs of Culverts		250
Move Waste Weir on 9 Mile level & restore bank	150	
Cleaning & repair of Outlet Lock Edwards Ferry	350	
50 ft of new Slope Wall, Lock 26	100	
Repair of Coping Lock 26		300
Raise & repair four miles of towpath		<u>2912</u>
		\$5912"

"Monocacy Division, Amos Thomas, Supt.		
Lock 27, repairs of upper wings		\$200
Locks 28, 29, & 33 repairs of masonry	240	
Repairs of Culverts		800
Protection at Weverton, taking down old dam	750	
Additional riprap required		1500
Crib work in Site of Guard Lock		5400
Completion of Lock House at Berlin		500
Repairs of towpath, 5 miles		<u>3640</u>
		\$15,350"

"Antietam Division, John Shay, Supt.		
Riprap of Guard bank No 4	\$3000	
Lock 37, repair leak		50
Lock 38, repair leak, concrete & flooring	490	
Riprap below Shepherdstown		360
Repair & raise 3 miles of towpath	2184	
Large Scow (400) Small Scow (100)	500	
Cleaning out drain at Willow Spring		130
Repairs at broken Culvert on 4 mile level	350	
Bottoming Canal		800
Repairs to Antietam Aqdt. timbers & concrete	<u>300</u>	
		\$8064"

"Williamsport Division, J B Masters, Supt.		
Filling abut of Dam No 5, restoring towpath &c	\$1000	
Rebuilding dry wall		800
Repair River Slope Walls		180
Slope Wall in Canal, below guard bank	1600	
Riprap on berm at Charles Culvert	100	
Flume around Guard Lock No 5		2500
Repairs to Williamsport Aqueduct	10,000	
Scow \$400, Small do \$100		500
Outlet lock (no 4) Concrete & plank flooring, including pumping & baling		800
Bottoming Canal		<u>600</u>
		\$18,080"

"Hancock Division, Denton Jacques, Supt.		
Dam No 6, Timber for Ice guards on abutments	200	
Locks 54 & 55, repairs to masonry	75	
Paving of two Culverts, damaged by floods	240	
Clearing & pointing, Little Tonoloway Culvert	200	
Road Culvert at Hancock, new planking and stopping leaks		125
Lock 51, Restore Coping (Stone on hand)	75	
Cross Walls to Waste Weir below Little Pool, on berm	75	
Bottoming Canal		1000

Two Miles of towpath to be made up	1456	
Scow		<u>400</u>
		\$3646

(Error in addition \$200)"

"Cumberland Division, Ewd Mulvany, Supt.		
White wash Bridges at Wileys ford & Oldtown	40	
Paint Bridges at Patterson's Creek & South Branch	120	
Rebuild pair of Waste at Kerkendalls		300
Repair of Lock House at no 73 (50) & S Branch (20)	50	
Renew flumes of 3 Locks at Oldtown		180
Cribs at lower wings of 4 Comp. Locks	480	
Rebuild 3 peirs in flumes of Tunnel Locks	250	
Clear Nolands Culvert of boulders &c		75
Locks 60 & 61, Cribs at lower wings (80)		
new guard Log & repairs of masonry (45)	125	
House at Lock no 63 1/3		1300
Cleaning out Higgins Culvert		25
Three miles of towpath to be raised & ripd	2184	
Bottoming Canal		<u>400</u>
		\$5549"

"Recapitulation	
Georgetown Division	\$21,019
Seneca Division	5,912
Monocacy Division	15,350
Antietam Division	8,064
Williamsport Division	18,080
Hancock Division	3,646 [should be \$3846]
Cumberland Division	<u>5,549</u>
	\$77,620"

[182] Board of Directors Meeting, 27 July 1870 (Flood Damage Prevention-Financing, Flood Damage Prevention-Ordered)

The Board resumes interest payments on the 1849 repair bonds.

"The report submitted by the President at the last meeting of the Board, with the report of the Engineers, of the repairs required to be done on the Canal was taken up and adopted . . ."

"On motion of Col Berret the following order was adopted. Ordered, That the President be and he is hereby instructed to cause so much of the work to be done in accordance with the Engineer's report, as he may deem for best interests of the Canal."

[190] Note: from weekly reports for the week of Dec. 31, 1870, it is apparent that work of some type was being done on the Guard Lock at Dam No. 5 and on the Williamsport Aqueduct.

[190] William R. Hutton, Engineer, to James C. Clarke, President, 11 August 1870 (Flood Damage Prevention-Proposed)

". . . the dry wall & sheet piling in the Rock Creek side of the mole lots in Georgetown were partly destroyed last fall, and have not been entirely rebuilt, nor the bank replaced where washed. To restore these they were would not be a complete safeguard to the lots, without an embankment with riprap or wall protection to a greater height, and the extension of the wall or docking 100 ft further up stream."

"The work was left in its incomplete condition with a view to the adoption of some general plan for the improvement of the navigation of Rock Creek, or its entire abandonment."

[190] William R. Hutton, Engineer, to James C. Clarke, President, 12 August 1870 (Flood Damage Prevention-Proposed)

"The guard bank above Dam No. 4 needs some protection by rip rap or slope wall. . . . The guard bank needs some protection for a great part of its length but I have estimated as most pressing about 1000 ft for a height of 10 feet."

[190] James C. Clarke, President, to the Directors, 15 August 1870 (Flood Damage-Localized, Sustainability-Culverts)

"On Friday August 5th a Break occurred on the Canal near 29th lock. Caused by heavy rain, a large Culvert was partly carried out." Clarke recommended that all the culverts between Georgetown and Cumberland be cleared out.

[190] James C. Clarke, President, to Benjamin Fawcett, Clerk, 3 October 1870 (Flood-September 1870, Harper's Ferry-Sustainability)

"Our Canal is badly damaged nearly the whole tow path between Sandy Hook and Harper's Ferry is gone washed out around lock 32 to its foundation only the lock chamber walls standing no

damage of any consequence on Shays, Jacques, & Mulvaneys Division I have not heard from Mans Division or from low end of Thomas. I have two Hundred men at work here [where?] this morning."

[190] William Weber, Collector, Cumberland, to James C. Clarke, President, 10 October 1870 (Flood-September 1870)

"I was gratified to learn that, notwithstanding the magnitude of the recent breaks, so early a resumption of navigation is calculated upon. Every thing appears to be going on right at this end of the line The channel which had been deepened at the mouth of the Cumberland lock a few days before the freshet was filled up by the current with sand and gravel, and Mr. Mulvaney has again got the dredging machine at work to remove it."

[190] James C. Clarke, President, to Captain N. Owing, 10 October 1870 (Flood-September 1870)

"Navigation has been Suspended caused by the flood from 30th Sept to 11 Oct"

[182] Board of Directors Meeting, 12 October 1870 (Flood-September 1870, Flood Damage Prevention-Financing, Flood Damage Prevention-Ordered, Sustainability-Waste Weirs)

"Also a Report of the damage by the late freshet and the probable cost to restore navigation and asking for an appropriation of \$12,500 for immediate use, which was accepted & ordered to be paid. Mr Brown offered the following Preamble Resolution which was read & adopted"

"Whereas, It was resolved at the meeting of the Directors held on the 20th September, that the Financial Agents of the Company be directed to pay on the 10th day of October, 25% of the principal of the Repair Bonds with interest, but previous to that date a Freshet occurred, seriously damaging the Canal, and the President telegraphed to the Chairman of the Finance Committee requesting him to have the payment suspended until the extent of damages could be fully ascertained, which payment was suspended by order of Court. But payment can be made without detriment to interests of the Canal."

"Resolved, That the Financial Agents be requested to carry out the order of the Board, and make payment . . ."

"Ordered that the President be authorized to have cut, a waste weir around the Guard Lock at Dam No 5."

[190] Jacob B. Masters, Superintendent, Williamsport, to James C. Clarke, President, 24 October 1870 (Flood-September 1870)

"We except to put up the Derrick crib &c to Boat stone from Near the Guard Lock, above Dam no 4."

## 1871

[182] Board of Directors Meeting, 11 January 1871 (Flood-September 1870)

"The outlay properly chargeable to Repairs of Canal Caused by the freshet in October 1870 to 1st January 1871 amounts to \$22,520.42. There is considerable yet to be done under the head of Extraordinary Repairs to put the Banks of the Canal in as good order as they were prior to the freshet."

[LIB-PHP] Forty-Third Annual Report of the President and Directors of the Chesapeake & Ohio Canal Company to the Stockholders, June 5th, 1871 (Hagerstown, Md.: A. G. & M. W. Boyd, Printers, 1871) (Flood-September 1870, Flood Damage Prevention-Accomplished, Harper's Ferry-Sustainability)

The President, James C. Clarke, reported (p. 8):

"The President has acted as General Superintendent and Paymaster, which salaried offices have been abolished by the present Board."

On p. 9, there is a statement that shows the navigation on the canal was suspended in October 1870 for sixteen days, because of the "Great Freshet in the Shenandoah." There was also a two day suspension in May 1871 because of "High Water."

(p. 10) "On the 10th of June, 1870, when entering upon the duties of the office of President and Directors, to which we were called by your election, the President directed the Engineer to make a thorough examination of the condition of the Canal and its works, from Georgetown to Cumberland."

"On the 11th of July, the Engineer submitted his report, showing it would require the sum of \$77,620 to put the Canal and its works in good condition. On the 27th of July a resolution was adopted by the Board, authorizing the President to cause so much of the repairs required by the report as in his judgment was necessary. Much has been done during the past year to put the line in order to carry its increasing trade, and we feel assured we can now say, the entire Canal and its appurtenances are in at least as good condition as at any period of its former history."

[182] Board of Directors Meeting, 12 September 1871 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"On the 22d, a Flume broke out on the Georgetown Division. This caused navigation to be suspended one and a half days. . . . The cost of Repairs to Flume on Georgetown Division, and dredging in Rock Creek, was \$600.00."

"The Dam No. 1, five miles above Georgetown, which furnishes water for the Georgetown level and the Alexandria Canal, is a rubble dam of loose stone and a very imperfect structure. Of the Canal Company could use its Revenues for that purpose, it ought to construct a better dam at this point."

"The same is the case at Seneca, and two miles above Harpers Ferry, but the necessities are not so great at Seneca & Harpers Ferry, as at Dam No. 1. The feeder at Dam No. 1, is a poorly constructed piece of work and leaks badly. I have given orders to remedy this as far as practicable. To do so at this time, it will probably cost six to eight thousand dollars, to put this Feeder in good condition. I have also directed the Superintendent of Georgetown Division, to try and tighten Dam No. 1 as much as possible. I think the Canal Company is in duty bound to use every reasonable effort to furnish water to keep the mills at Georgetown running . . ."

[182] Board of Directors Meeting, 11 October 1871 (Easements-Flood Implications)

"The President laid before the Board a communication, of some length, from S. R. Seibert, Civil Engineer, in which he proposes improved connection of Canal between Georgetown & Washington."

[A letter of the President, James C. Clarke, Frederick,, to the Governor & Board of Public Works of the District of Columbia, 8 November 1871]

"Sewers constructed by yourselves and the authorities who preceeded you, discharge into our Canal, and into Rock Creek which forms a part of it, considerable quantities of solid material, which fills up the Channel and obstructs navigation. The extension of Virginia Avenue and I Street upon and over lands of this Company reduces considerably the high water channel of Rock Creek, and thereby exposes to serious injury from floods the mole between the Creek and the river."

[182] Board of Directors Meeting, 10 November 1871 (Sustainability-Dams)

[Report of the Committee of Construction & Repairs, dated 10 November 1871, Baltimore, Md.]

"That at the request of the President, they have visited the Canal from Dam No. 1 to Rock Creek Lock. They have found the feeder at the Dam to be in very leaky condition, and the Dam itself to be full of water vents & in bad order. It is recommended that the President be authorized to take such measures as will repair the feeder first during the coming winter. This they regard as of greatest urgency and of first importance; In view of keeping supplied with the Mills at Georgetown."

[182] Board of Directors Meeting, 7 December 1871 (Flood Damage Prevention-Accomplished, Harper's Ferry-Sustainability)

The Engineer for the Canal, William R. Hutton, submitted a report on the extraordinary repairs necessary to made on the canal, dated 6 December 1871, Frederick, Md.]

He closed the report by saying:

"At the close of 1869, the Canal was in need of very great improvement."

"Years of enforced neglect under the straitened resources of the Company had resulted in delapidation of structures, washing in of the banks, and the accumulation of deposits in the channel. During the succeeding winter which was remarkably favorable for the purpose, a considerable sum was expended for repairs, which being concentrated upon the points most in need of them produced large results in facilities to navigation."

"The winter of 1870-71 was, on the contrary, extremely unfavorable for work, nevertheless the Canal was much improved in condition, and several important and expensive structures were completed. Among them I refer to the restoration of Williamsport Aqueduct, and the construction of much needed flume at Dam No. 5, together with a large amount of bottoming on the Georgetown level."

"In July, 1870, an estimate was reported, of the sums needed to put the Canal in good condition, the total of which was 77,620, dollars. Of this amount about one half has been expended on the specific works enumerated, as far as, can be determined, for much larger sums have been paid out for repairs, particularly of towing path, to compensate for the continuous and rapid



deterioration."

"Estimate of repairs &c to be made during the winter of 1871-72, beyond those made by the regular repair force."

"Georgetown Division		
Locks Nos. 1 to 4		\$200
Bridges at Market & Potomac Streets		2600
Repairs of the retaining wall, & sheet piling	120	
Repairs of Culverts on Georgetown level	450	
Repairs of feeder		6500
Deepening Canal above Lock 8 and securing culvert		150
Repairs of locks 12, 15, & 17 with slight repairs to others		2400
Cleaning out Georgetown level		2000
Materials, ordered, not paid for	<u>980</u>	
		\$15,800"
"Monocacy Division		
Repairs of lock Nos. 24 to 35		\$975
Extra labor, bottoming, removing rocks &c	300	
Materials		<u>210</u>
		\$1485"
"Antietam Division		
Repairs of lock 40		\$300
Extra labor, cleaning, bottoming, & repairing leaks		900
Riprap on Guard bank of No. 4		<u>300</u>
		\$1500"
"Hancock Division		
Lock 41, repairs of Mitre sills & masonry	\$2500	
Lock 43, 51, & 53 Masonry		160
Repair waste weir on 14 mile level (uncertain until water withdrawn probably)	250	
Repair leaks of Road culvert, Hancock	40	
Extra labor on bottom and bars &c		<u>1000</u>
		\$3950"
"Cumberland Division		
Repairs of Aqueduct at Little Orleans	580	
Cleaning & bottoming, including outlet to Shriver basin		<u>1500</u>
		\$2180"
[Grand Total]		"\$24,915"

[LIB-PHP] Report of the President to the Stockholders and Board of Directors of the Chesapeake and Ohio Canal Co. December 13, 1871 (Baltimore, Md.: Kelly, Piet, and Company, 1871) (Flood Damage Prevention-Accomplished)

This publication contains a report from the Engineer, William R. Hutton, dated 6 December 1871, briefly outlining the condition of the canal and some repairs made or proposed. On p. 27, Hutton states, "In July 1870, an estimate was reported of the sums needed to put the Canal in good condition, the total of which was 77,620 dollars. Of this amount more than half has been expended on the specific works enumerated, as far as can be determined, and much larger sums have been paid out for repairs, particularly for towing-path, to compensate for the continuous rapid deterioration."

#### 1872

[CF] [190] William R. Hutton, Engineer, Washington, D.C., to James C. Clarke, President, 27 January 1872 (Flood Damage Prevention-Proposed)

Hutton suggests modifications to the Little Falls feeder to improve its performance during floods. There is a drawing of the second side of the letter. [Original in Folder "Jan.-Oct. 1872" in Box #54 in #190]

[182] Board of Directors Meeting, 8 February 1872 (Flood Damage Prevention-Accomplished, Harper's Ferry-Sustainability)

Report of the President, James C. Clarke to Board, Frederick, 8 February 1872

"The amount of work being done the present winter, in the repairs of 1870 & 1871. A large amount of new paddles and frame and many new gates have been put in the Locks during the last month: extensive repairs, and replacing flooring in locks, has been done. The Composite Locks, on the Cumberland Division, have been extensively repaired; and are now in good condition. A large amount of cleaning out of bottom of Canal has been done on the Hancock Division, as well as repairs to Locks, Flumes, and Waste Weirs. The Antietam Division, which is the most difficult

one to maintain and keep in safe condition, owing to the porous limestone formation through which it is located; is being extensively repaired in digging out, concreting and puddling the bottom of Canal in the limestone localities. The Monocacy Division is being improved for navigation, by cleaning out the bottom of the Canal and by cutting down the rock bottom at several points; so as to admit of six feet of water on the highest portion of the bottom: several new Flumes and waste weirs are being constructed and considerable masonry being done at Locks 25, 26, 27, 28, 29, 30, 31, 32, 33, 35 and 36."

"I think I can safely say to the Directors, that the Canal will be in perfect condition, on the opening of navigation to meet all the demands of the trade. In making repairs the policy has been whenever practicable, to make them permanently. While this policy has been more expensive, than that heretofore pursued, in the end it will be found more economical."

[CF] [182] Board of Directors Meeting, 14 March 1872 (Flood Damage Prevention-Accomplished)

For this meeting there are extensive and detailed reports (running from pp. 533-69) from the President of the canal and the division superintendents of the repairs made the Canal over the 1871-72 winter.

[LIB-PHP] Forty-Fourth Annual Report of the President and Directors of the Chesapeake & Ohio Canal Company to the Stockholders, June 5th, 1872 (Frederick, Md.: Charles Cole, Printer, 1872) (Flood Damage Prevention-Accomplished)

The President, James C. Clarke (pp. 16-17), presented short snippets of the more lengthy reports of the division superintendents on the good condition of the canal, and the repairs and improvements completed (see the Superintendents reports of 14 March 1872, in the Proceedings of the President and Directors, 1828-90).

[182] Board of Directors Meeting, 17 June 1872 (Flood Damage Prevention-Study)

"On motion of Mr. Bannon, Resolved, That the President be, and his hereby authorized to employ a competent Engineer to accompany him over the line of the Canal to make a minute inspection of the work, and to report at the next meeting the condition of same, and what repairs, if any are necessary, to keep it in proper navigable condition during the season."

"The following amendment, to this resolution, was offered by Genl Meredith and accepted, Ordered, That James C. Clarke, late President, be requested to accompany President Gorman of the Canal Co., and the Engineer so appointed, to examine the line of the Canal and its present condition."

[182] Board of Directors Meeting, 29 June 1872 (Flood Damage Prevention-Study)

"In reference to the order, passed at the last meeting, authorizing the President to select a competent Engineer to accompany him over the line of the Canal, examine the same and report the condition of said Canal; The President stated that the examination had not been completed, and that, therefore, he was not prepared to make the required report; but expressed the belief that he would be able to do so at the next meeting of the Board."

[182] Board of Directors Meeting, 11 July 1872 (Flood Damage Prevention-Study)

[Report of the President, A. P. Gorman, Baltimore, 11 July 1872, to the Directors]

"In conformity with the resolution of the Board, I with the Hon. J. C. Clarke late President and Mr. W. R. Hutton Engineer, made a thorough inspection of the entire line of Canal, and will submit a report of said Engineer, as to the condition of the Canal, at an early day."

[190] John Shay, Superintendent, Sharpsburg, to A. P. Gorman, President, 11 July 1872 (Flood Damage-Localized)

"We have had a very heavy rain in our neighborhood on yesterday evening and the berm bank of the culvert at Bull Hollow was washed off I stopped the feed at 9 Oclock last night and commenced feeding at 11 Oclock to day the culvert is all right at six this evening. On the five mile level a heavy bar washed in at Grove's warehouse. The boats were stopped there until this afternoon when I got feed on & raised the level and by hooking up six to eight boat teams to each boat I hauled them all over until the evening. I have sent for the mud machine and will cut the bar out tomorrow when everything will be in order."

[191] A. J. Whitney, Resident Engineer, Pennsylvania Canal Company, Harrisburg, Pa., to A. P. Gorman, President, 13 July 1872 (Flood Damage Prevention-Study, Sustainability-Waste Weirs)

"Herewith please find a Photo-Litho of my improved waste way gates for canals, to which I wish to call your attention. These gates have been in general use in the Penna Canal for several [?] and

prove to be much the best gate for the purpose in every respect, they are and in the waste ways, in the aqueducts and in the feeder around locks."

"I should like to have a trial made of them on your canal, and am certain you would adopt them when you saw the advantages gained by their use in canals."

[Note the photo-litho is not with this letter.]

[190] John Shay, Superintendent, Sandy Hook, to A. P. Gorman, President, 12 August 1872 [Note: this is a telegram] (Flood Damage-Localized)

"The top of Bank on culvert at Bull Hollow washed off heavy bar on six mile level at Sharpsburg landing. Navigation will open tomorrow evening. The stoppage caused from Heavy rain Saturday night."

[190] Amos Thomas, Superintendent, Frederick, to A. P. Gorman, President, 14 August 1872 (Flood Damage-Localized)

"The heavy rains on Thursday wash a bar in two mile level above Point of Rocks which caused a [illegible] river so loaded boats 18 hours we cut out bar with mud machine without drawing of water"

[CF] William R. Hutton, Report of W. R. Hutton, Chief Engineer as to the Condition of the Chesapeake and Ohio Canal, With Estimate of Cost of Extraordinary Repairs Required During the Current Year, August 14, 1872 (Annapolis, Md.: Luther F. Colton and Company, Printers, 1872) (D) (R) (I)

This is a comprehensive report by William R. Hutton, Chief Engineer of the C&O Canal, describing the state of the canal and the repairs required to put it into first-rate condition. Hutton discussed the desilting of the canal prism, which had just been completed; the need to repair and raise an unspecified 20 miles of the canal towpath; the state of each of the dams (he recommended that Dam No. 6 be replaced with a masonry dam, but thought a masonry dam not worth the cost for Dam No. 1); the condition of the locks, culverts, waste weirs, aqueducts, bridges, and other parts of the canal work (specifying the structures that needed work).

Of particular interest is what Hutton has to say about the banks and walls protecting the canal from floods (pp. 22-23). His recommendations are to raise, build up, and riprap these structures the better to protect them from the river.

[190] John Shay, Superintendent, Sharpsburg, to A. P. Gorman, President, 19 August 1872 (Flood Damage Prevention-Accomplished)

"Antietam Division is in excellent order and repairs on tow path progressing rapidly"

[190] I. R. Mans, Superintendent, Georgetown, to A. P. Gorman, President, 30 August 1872 (Flood-August 1872)

"Last night about 10 O'clock, we had a very heavy rain, which caused Rock Creek, to raise very rapidly, and high, in a very short time, and so much so, the five (5) Boats, were carried down over the dam, three (3) of them loaded with stone; (2) Two light. There was also (3) three others carried down, one (1) broken in half loaded with stone: and (2) Two are sunk. We have this day succeeded in getting the Boats off of the dam without damage to either the sam or Boars. I will be obliged to draw off the Creek tomorrow in order to see, what can be done with the sunken Boats, will do all in my power, to the best advantage of the Canal Co, and owners of these Boats. This accident, is altogether unavoidable and unforeseen; as there was no sign of the creek raising up to the time of the heavy rain at night, and the water was low. The rest of my Division is in very good trim."

[182] Board of Directors Meeting, 16 September 1872 (Flood Damage Prevention-Accomplished)

[Report of the President, A. P. Gorman, Baltimore, 14 September 1872, to the Directors]

"The works of a permanent or extraordinary character which has received attention during the month, was riprapping the berm bank at Grove's Culvert, which has been completed."

"Ripraping Guard Bank No. 4. This work is being done as rapidly as possible, but cannot be completed for some days yet."

"The riprapping of tow-path and guard bank below Dam No. 5 as recommended by W. R. Hutton, Engineer, has been commenced."

"The repair of sustaining wall below Lock 17, Great Falls, 120 feet in length and 52 feet high was directed to be made in conformity to suggestion of Mr. Hutton; but when the accumulation of foundation was removed so as to commence a sustaining pier of 50 feet in length & 14 feet wide, it was found that the main wall was in a more precarious condition than it was possible for Mr. Hutton to ascertain. As an accident at this point would suspend navigation for a long time, I directed that an additional sustaining wall be built the entire length, 120 feet, to be carried above high water line. The Engineer, Mr. Patterson, and the Superintendent of Division concur in the opinion that this was a necessary precaution, and a large force if workmen are now engaged

upon the work."

"The work on feeder at Dam No. 1, had been expensive, but if it had been neglected, a sufficient supply for navigation alone would not have been secured on Georgetown Level during exceptionally low state of the River."

"The extension of Wall and other improvements at the feeder above Georgetown made by our immediate predecessors, and the extraordinary work done by your Direction in the past two months had however enabled us to give the Mills a fair supply of water as compared with the past two years."

"To increase the supply on this Division, when the Potomac is as low as at this time will I am satisfied involve the construction of a more permanent dam . . ."

"On motion of Mr. Watkins, Resolved, That the President be instructed to call the attention of the Stockholders to the resolution passed at their late annual meeting requesting this Company to publish a detailed statement of its expenditure in papers of Baltimore, Frederick, Hagerstown, and Cumberland' and a printed quarterly statement for Stockholders, and to request such modifications thereof as in their judgment may be deemed most advisable."

[190] John Shay, Superintendent, Sharpsburg, to A. P. Gorman, President, 17 September 1872 (Flood Damage Prevention-Accomplished)

"I am getting along very well with the riprapping on guard Bank. By there is 500 feet up in length and 4 feet in height"

[190] John Shay, Superintendent, Sharpsburg, to A. P. Gorman, President, 5 November 1872 (Flood Damage Prevention-Accomplished)

"The riprapping at the guard Bank will be completed in about ten days"

[190] John Shay, Superintendent, Sharpsburg, to A. P. Gorman, President, 29 November 1872 (Flood Damage Prevention-Accomplished)

"The riprapping is completed."

#### 1873

[182] Board of Directors Meeting, 7 January 1873 (Easements-Flood Implications)

[Report of the President, A. P. Gorman, Annapolis, 4 January 1873, to the Stockholders]

". . . the large and increasing trade of the canal now demands an additional supply of water on the Georgetown Division and so urgent is the demand that we feel it to be an imperative duty to make provision for the same; The deficient supply has in our opinion, been caused by the non-compliance on the part of the United States with the Company at the time of the construction of the Aqueduct Dam."

Gorman claimed the federal government had violated its promise that in building the dam it would not damage the canal. Since it had damaged the canal, Gorman demanded:

"1st That the feeder at the Great Falls, destroyed by the United States, be restored, or a supply of water be drawn from the conduit or aqueduct."

"2d That the thorough repair or rebuilding of dam No 1 at Little Falls cannot be longer delayed, all of which, as shown, we have a right to expect will be done by the United States."

"3d That the United States should reimburse the Treasury of this Company for amounts expended in repairs of Dams and other works, made necessary by their failure to comply with the Contract."

[191] I. R. Mans, Superintendent, Georgetown, to A. P. Gorman, President, 19 February 1873 (Flood-February 1873)

"Water on the River is very high. I think from what I can see the Ice has damaged the dams such an extent that they will need immediate attention, according to my judgment. It was a difficult matter to fill the Seneca level last week . . ."

[191] John Shay, Superintendent, Sharpsburg, to A. P. Gorman, President, 20 February 1873 (Flood-February 1873)

"The late freshet and ice tore out one of the cribs at the mouth of the guard lock"

[190] A. P. Gorman, President, Annapolis, to the Directors, 10 March 1873 (Flood-February 1873, Sustainability-Dams)

"The heavy ice on the Potomac river passed off without any very serious damage to any of our permanent dams on the river, but it nearly demolished Dams No. 1 & 2 (Georgetown & Seneca) which are merely dikes of loose stone, they will require extensive repairs to enable us to keep up a proper supply of water from Seneca to Georgetown."

[191] E. Mulvany, Superintendent, Cumberland, to A. P. Gorman, President, 28 March 1873 (Flood-February 1873)

"I have been working the Mud Machine this week cleaning out sand Bars that washed in the Channel at the Mouth of Wills Creek during the Winter."

[190] T. L. Patterson, Engineer, Cumberland, to A. P. Gorman, President, 7 May 1873 (Flood Damage Prevention-Proposed)

Note: Patterson made the following suggested improvements to the canal, but unfortunately, the sketches that originally went with it are not in the folder.

"I send herewith a Sketch of the Wash at Weverton. The water enters from the Main Channel of the river at A.H., and is discharged at NO and G.M.;--principally at the former point."

"When the Weverton Dam was constructed, the fast land Extended from the Canal to the bank of the river from G to A,- according to the best information I have; but the surface must be several feet lower near the foot of the towpath than it was next to the river. To prevent overflow by freshets, a guard lock was built from P to the Lock."

"It is probable that the Water which passed through the Culvert, at the head of the Lock, and the wastewear, found its way to the river somewhere between H and A. I understand that this guard-bank remained uninjured until about two years ago, when a small breach was made in it by a freshet, which has gone on increasing until now, perhaps, a half million cubic yards of Earth have been washed away inside of the old Shore line, and so close to the towpath as to endanger the Canal."

"The means of checking this wash which first suggests itself, is by closing the gap at, or near AH, and excluding the water of the river."

"To do so effectually, either a bank, protected by riprap would have to be constructed, raised at least as high as the highest part of the island, and another bank from A to Lock 31 to prevent high freshets from breaking over that point;--or else, a bank across from the island to the Lock (from P to Lock) about where the old guard bank was located." The opening at N.O. would likewise have to be closed or the Water would flow in there during freshets, and out at G M."

"Another plan, which I preferred, was to construct a bank from L to K, raising the towpath from L to the Lock, so as to Exclude a freshet as high as that of Oct, 1870 [Sept. 1870?] from the Canal. This plan would allow the water to pass in at A.H and out at WA, but would Serve to protect the land lying between the Canal and the river below L from further abrasion"

"On this plan the bank from B to L would be riprapped to secure the ground lying between the Canal and the wash from further injury."

"From a Careful Examination I believe that the Most economical plan will be to protect the whole face of the bank from B to F with riprap, first trimming the Earth face to a regular Shape"

"About a quarter miles of the bank, from C to E has had more or less riprapping thrown over, but very unevenly, and without any regard to regularity of Countours.""

"It is evident however, that wherever it has been applied it has served to Some extent as a protection to the bank."

"To protect the bank from B to F properly Will require 3500 perches of Stone measured in riprap which would be worth about as Many dollars"

"The first plan mentioned, will require from twenty to twenty-five thousand cub. yds of Embankment, and So large a quantity of Material would be difficult and Costly to procure and place where it would be required"

"The second plan would not require nearly so much material, but would only be a protection so far as the land below the Cross bank is concerned, except for the protection of the bank above the rip rap."

"I have no hesitation in Expressing my preference for the third plan above Mentioned: and in doing So, of course, throwout of Consideration the isolation of the Dam and adjacent property which would result from its adoption"

[191] W. W. Blunt, Georgetown, A. P. Gorman, President, 9 May 1873 [telegram] (Flood-May 1873)

"All right in this division to far the river is raising here twelve inches per hour"

[191] D. T. Lakin, Superintendent, Sandy Hook, to A. P. Gorman, President, 9 May 1873 [telegram] (Flood-May 1873, Harper's Ferry-Sustainability)

"River high coming in at Lift Lock below Harper Ferry still rising Monocacy very high"

[191] I. R. Mans, Superintendent, Great Falls, to A. P. Gorman, President, 10 May 1873 (Flood-May 1873)

"the River was over top of Tow Path at nine oclock this morning, done no damage to canal, It comenced falling at noon to day"

[191] A. C. Blackman, Collector, Hancock, to A. P. Gorman, President, 10 May 1873 [telegram] (Flood-May 1873)

"Have heard of no damage River falling fast"

[191] J. J. Moore, Superintendent, Sandy Hook, to A. P. Gorman, President, 10 May 1873 [telegram] (Flood-May 1873)

"no damage yet River high"

[191] John Shay, Superintendent, Sharpsburg, to A. P. Gorman, President, 10 May 1873 (Flood-May 1873)

"I would report the river very full But Now falling off I left the Canal last Night at 7 oclock no damage done the river falling of this of this morning the division all in good order"

[191] J. J. Moore, Superintendent, Sandy Hook, to A. P. Gorman, President, 10 May 1873 [telegram] (Flood-May 1873)

"All right here boatmen report navigation all right below River falling since one oclock"

[191] A. C. Blackman, Collector, Hancock, Benjamin Fawcett, Clerk, 12 May 1873 (Flood-May 1873)

"I am glad to inform you that the present freshet in the River is passing off with out doing any damage to the Canell along here"

[191] Denton Jacques, Superintendent, 4 Locks, to A. P. Gorman, President, 12 May 1873 (Flood-May 1873)

"my division has not bin damaged By the recent rains the river is high that water did not get over the banks of the canal"

[191] I. R. Mans, Superintendent, Georgetown, to Benjamin Fawcett, Clerk, 12 May 1873 (Flood-May 1873)

"the River taken Second Rase last Eavening It is now falling no damage to my Division"

[182] Board of Directors Meeting, 13 May 1873 (Flood-May 1873)

[Report of the President, A. P. Gorman, Annapolis, 13 May 1873, to the Directors]

"The high water in the Potomac River the past few days passed off without doing any serious damage to the Canal. But navigation has been interrupted at Slackwater and at Dams No 4 & 5, and a portion if the repairs recently made Dams No. 2 & 3 were destroyed."

"The repairs to these Dams will be pushed forward as rapidly as possible."

[191] John Shay, Superintendent, Sharpsburg, to A. P. Gorman, President, 19 May 1873 (Flood-May 1873)

"I have the bar at J. C. Groves cut out and also the one at the feeder . . ."

[LIB-PHP] Forty-Fifth Annual Report of the President and Directors of the Chesapeake & Ohio Canal Company to the Stockholders, June 2nd, 1873 (Annapolis, Md.: L. F. Colton & Co., Steam Printers, 1873) (Flood Damage Prevention-Accomplished, Sustainability-Dams, Harper's Ferry-Sustainability)

The President, A. P. Gorman, reported (p. 9), "On entering upon the discharge of the duties to which we were called in June last, a thorough inspection of the condition of the Canal, and its works, was made by the order of the Board, by Wm. R. Hutton, late Chief Engineer of this Company, whose report has heretofore been submitted to you."

"The principal repairs recommended by him, together with much additional work which was found necessary to be done on permanent structures have been completed. Notably:

The riprapping of Guard Bank No. 4, cost . . .	\$1,600 00
Building protection wall at the Great Falls,	
3,127 perches stone . . . . .	7,123 44
Repairs of bridges . . . . .	1,050 00
' culverts . . . . .	2,867 42
Slope Wall Dam No. 5 . . . . .	187 21
Repair of Locks . . . . .	9,220 18
' aqueducts . . . . .	980 26
Wooden trunks for aqueducts . . . . .	1,390 00
Cleaning out prism of Canal . . . . .	9,781 14
Repairs of Dams Nos. 1, 2 and 3 . . . . .	<u>3,728 81</u>

The Engineer, Thomas L. Patterson, in his report, dated 31 May 1873 (pp. 28-31) discussed the ordinary repairs of the locks, culverts, and aqueducts, and dredging material out of the canal; particularly at the Rock Creek Basin, where it (p. 30) "is liable to be more or less filled up with gravel and sand by every rain which is sufficient to raise that stream." Patterson reported that Dams 4, 5, 6, 8 were in good condition, and that the vertical sheathing on Dam 6 had been replaced over the winter. Of more concern was Dams 1 and 2. Patterson wrote (p. 29), "Dams No. 1 and 2 were originally built of stone thrown together and covered by a rough stone arch laid dry. Owing to some defect in the plan or workmanship, these dams began to fail soon after their completion, and now there is hardly a trace of either left. They have been replaced by dykes of stone and brush, which have required an expenditure of large amounts annually to repair the damage from ice and freshets. Both of these dams were broken down throughout by the ice freshets last February since which time a large force has been engaged in their repair, whenever the high water has not prevented it."

"It is of the utmost importance that these dykes be replaced by permanent dams of mortared masonry, especially the dam at the 'Little Falls.' This dam is required to supply water to the Georgetown level, not only for keeping up the navigation, but to fulfill the contracts made with parties owning water leases, and also, for the supply of the Alexandria Canal. The quantity required for all these purposes is so large, that is is with the greatest difficulty and expense that the present leaky structure can supply it; and with all this expenditure of money, in times of drought, the quantity that can be introduced into the Canal is insufficient."

"Dam No. 3, near Harper's Ferry, is also in an insecure condition, and like those just spoken of, requires patching up every year, to preserve a sufficient height of water in the feeder level for the passage of loaded boats."

"In 1858 the U.S. Government contracted for the construction of a masonry dam at this point, to supply water-power to the armory, and replace the old dam. Under this contract the new dam was finished for half its length across the river from the the Maryland side. Congress having failed to make an appropriation for its completion, and the civil war having broken out, it has remained as it was, with little other damage than by the decay of the timber covering. This dam is low, and it would not cost a very large amount to complete it."

"The tow-path protection wall below Lock No. 15, commonly called the 'High Wall,' having shown signs of failure, it was deemed a proper measure of precaution to secure it by building against it a strong supporting wall. This was considered necessary, as a breach in the towpath at that point, where the bank is about sixty feet above the river, would have entailed a very heavy loss upon the Company, both in the cost of its repair and the consequent suspension of navigation. This additional wall, containing nearly three thousand perches, has been built in the most substantial manner, and has added greatly to the security of that part of the Canal."

[191] John Shay, Superintendent, Sharpsburg, to A. P. Gorman, President, 29 June 1873  
(Flood-June/July 1873)

"We had a very heavy rain here last night The heaviest we have had for a long time, A bar was washed in the Canal just above lock 39 in consequence of which navigation has been suspended, I have sent for the mud machine which will be here to night & by to morrow (Monday) evening I will pass the loaded boats"

[191] John Shay, Superintendent, Sharpsburg, to A. P. Gorman, President, 3 July 1873  
(Flood-June/July 1873)

"I finished cutting out the bar above lock 29 This evening and all is right on antietam Division again"

[191] John Shay, Superintendent, Sharpsburg, to A. P. Gorman, President, 26 July 1873  
(Flood-July 1873)

"We have had a very heavy rain here last evening and washed a number of bars in the Canal the largest one is at the burnt warehouse on the feeder it is 67 yds long and filed about 4 1/2 feet deep all over the canal There are two large bars on the five miles level on at J. C. Groves warehouse and one Just above Lock 29, and one on the six mile at Blackfords. These bars are large and will have to be wheeled out. navigation will be suspended for the present."

[191] John Shay, Superintendent, Sharpsburg, to A. P. Gorman, President, 31 July 1873  
(Flood-July 1873)

"It took forty eight hours to fill the division all is right again and boats are passing down rapidly"

[CF] The Evening Star (Washington, D.C.), 9 September 1873, 2 (Maintenance-Lack of Diligence)

"The Chesapeake and Ohio Canal" Editorial addressing complaints about repairs and maintenance of the canal under President Arthur P. Gorman.

[190] A. P. Gorman, President, Annapolis, to the Directors, 10 September 1873 (Flood-August 1873)

"As you are aware the Canal under your charge, in common with other works of internal improvement in the State has been seriously damaged by the extraordinary storms of the past month. The damage to the work was more extensive than it has sustained since 1852, and but for the substantial manner in which it was constructed possibly its navigation would not be resumed; unlike all previous injury from high water this was caused from the small mountain streams which are conducted under the Canal by Culverts, which have heretofore been sufficient to convey water, but on this occasion the Streams were converted into such torrents that they proved inadequate."

"The most serious damage sustained was on the Antietam and Monocacy Divisions, on the former in addition to the damage by flood two breaches were made in the bank of the Canal caused by leaks, which the Board are aware have existed in the Limestone region, since the construction of the Canal, and which have heretofore given similar trouble and which it seems impossible to provide against."

"Within a few hours after the damage several hundred additional men were employed upon the repairs, and notwithstanding there was rain for fourteen consecutive days by extraordinary exertions of the Officers of the Company and men employed the damage was so far repaired as to pass boats on the 26th."

"Notwithstanding the great damage to Canal and consequent largely increased expenses, I have continued the permanent improvements heretofore directed by the Board, and should no further interruptions to navigation occur I am confident that the increased trade of the remainder of the season will produce sufficient revenue to repair all damage & pay for the proposed permanent improvements without diminishing the payment on account of Bonded Debt."

[LIB-PHP] Report of the President and Directors to the Stockholders of the Chesapeake & Ohio Canal Company for Quarter Ending Nov. 30th, 1873. Submitted December 16th, 1873 (Annapolis, Md.: L. F. Colton & Co., Steam Printers, 1873) (Flood-June/July 1873, Flood-July 1873, Flood-August 1873)

The President, A. P. Gorman, reported (pp. 5-6), ". . . from June 1st, 1872, to November 30th, 1873, (eighteen months,) during which time the trade of the Canal has been seriously embarrassed by causes unusual and unavoidable. In addition to those referred to in last Annual Report, (low water, epidemic among the horses and mules, and early close of navigation by ice on December 1st, 1872,) . . . We have to report that the great storms of July and August last, caused more serious damage to the work than has occurred since 1852, by which, one month, in the midst of the busy shipping season, was lost; following close upon that disaster came the financial troubles, which necessitated the suspension of many manufacturing establishments, which consumed large quantities of coal that passes on your canal."

[190] I. R. Mans, Superintendent, Georgetown, to the President and Directors, 27 December 1873 (Maintenance-General, Sustainability-Dams)

This letter is a very detailed year end report on Mans' activities as Superintendent of the Georgetown division. His repairs included replacing and repairing lock doors, rebuilding lock abutments, slope walls, and Dams No. 1 and No. 2. The dams had both been nearly destroyed by an ice freshet in the winter of 1872-73 [?] according to Mans.

[191] E. Mulvany, Superintendent, Cumberland, to the President and Directors, 31 December 1873 (Maintenance-General)

"The Water way is generally in good condition, although several Bars washed in the Canal from the newly ploughed Feilds on the Hill sides by rain storms during the Spring. Consequently many places need Excavating this winter with Mudmachine during the summer at the Mouth of Wills Creek and the Channel leading to the Shriver Basin."

Like Mans, This letter is a very detailed year end report on Mulvany's activities as Superintendent of the Cumberland division, the condition of the division, and routine repairs required.

#### 1874

[191] D. T. Lakin, Superintendent, Lander, to A. P. Gorman, President, 10 January 1874 (Flood-January 1874, Sustainability-Waste Weirs)

Another example of the importance of waste weirs. Fortunately for the canal this case was but a close call:

"Have just returned from Seneca. We will have the Berme side of the aqueduct down to the water table this evening. The work is progressing as fast as could be expected the late rains interrupted the work some. We will be delayed in getting our [illegible] in unless the water falls quickly. at the lowest stage of water during the winter there was two feet of water on the first offset on the abutment upon which we must rest centres [?] The water was very high yesterday and it was with the greatest difficulty that we prevented the overflow of the work. The water came in at the outlet Lock at the head of the level and if the river had raised one foot higher it would have overflowed everything, there being no waste-weir on that level we cannot relieve it, its importance I have frequently urged."

Lakin also indicated he would have to remove the deposits in the canal from the August 1873 flood



during the suspension of navigation over the winter months.

[190] A. P. Gorman, President, Annapolis, to the Directors, 15 March 1874 (Flood-January 1874) see also [182] Board of Directors Meeting, 15 April 1874 where the letter is abstracted.

"The Canal is now in good condition throughout its Entire length. During the past break the heavy rains caused a rise in the Potomac River than had occurred in many years. The water Entirely Submerged the Canal below Dam No 4 and 5 and various points on the Monocacy Division. It later passed off without doing any Serious damage. It delayed navigation [illegible] for Several days and will somewhat increase the Expenses for repairs."

[190] A. P. Gorman, President, Annapolis, to the Directors, 16 March 1874 (Flood Damage Prevention-Accomplished, Sustainability-Aqueducts) see also [182] Board of Directors Meeting, 17 March 1874 where the letter is abstracted.

"The very favorable weather during the suspension of Navigation had Enabled us to make more extensive repairs to the Canal than has been made during the past three years, and I am confident greater results have been obtained for the same Expenditure than ever before, of the repairs, The Seneca Aqueduct has been rebuilt and is now in perfect condition"

"The berm parapet wall of the Big Tonoloway Aqueduct was taken down, the arch stripped and thoroughly grouted with Round Top & Portland Cement, and a substantial trunk put in, The arch of this Aqueduct, owing to the bad quality of the Stone formerly used will require either to be lined or a greater portion of it taken down and rebuilt during the present season,"

"The other Aqueducts have received proper attention but no Extensive repairs were necessary,"

"All of the Masonry Locks have been thoroughly overhauled, two of them been taken down and rebuilt, with the removal of the large deposits in the water way of the Canal, which had been accumulated for years, will greatly facilitate its navigation"

"These repairs together with the renewal of Lock gates, repair of Bridges, Waste Weirs & other work, has so improved the Canal that it is now in better Condition than it has been for years past."

[191] Samuel McGraw, Superintendent, Sharpsburg, to A. P. Gorman, President, 12 April 1874 (Flood-April 1874)

"On Friday night at 10 1/2 oclock the river rose over the Tow path on the feeder level, to the depth of 2 1/2 ft. It commenced falling at 6 1/2 oclock Saturday morning, & at this time, 6 P.M. Sunday, the Division is all right, & we expect to pass loaded boats tomorrow evening"

[191] Lewis G. Stanhope, Superintendent, Hagerstown, to A. P. Gorman, President, 12 April 1874 (Flood-April 1874)

"The River in the Last Dais Came in the Canal at Dam No 5 and in tow or three Plases on that Level all So in on 4 mile Level below Chaneys Lock but the Damage did not amount to much as I did not draw of any of the Level the Boats ar now Runing they was stoped at Littl Slack water on Friday did not start until Sunday morning about the Same time at Big Slackwater"

[191] Samuel McGraw, Superintendent, Sharpsburg, to A. P. Gorman, President, 27 April 1874 (Flood-April 1874)

"There has been no boats passed slack water since 2 oclock Saturday night If nothing further occurs we expect to pass the boats over the division Tuesday. The river commenced falling last night at 12 oclock at stop lock. I left the feeder at 3 oclock this morning, & the Div was all right as far as could be ascertained"

[191] Samuel McGraw, Sharpsburg, Superintendent, to A. P. Gorman, President, 1 May 1874 (Flood-April 1874)

"There has been no boats passed slack water since yesterday at 10 a.m. on acct of the rise in the river, they will however pass in the morning"

[190] A. P. Gorman, President, Annapolis, to the Directors, 11 May 1874 (Flood-April 1874) [see also [182] Board of Directors Meeting, 11 May 1874 where the letter is abstracted.]

"During the greater portion of the past month the Potomac River was so swollen from the heavy rains as to overflow some portions of the Canal, but so solid have become the banks, and so permanent are the repairs, that but little damage has been done the works. While the effect of the repairs made during the past winter and the dredging now being done has so improved navigation, that the carrying capacity of the boats, from the opening of navigation to the finish of the month, has been increased from an average of 111 1/2 tons in 1873 to 113 1/2 tons, an increase of two for each trip."

[LIB-PHP] Forty-Sixth Annual Report of the President and Directors of the Chesapeake & Ohio Canal Company to the Stockholders, June 2nd, 1874 (Annapolis, Md.: L. F. Colton & Co., Steam Printers, 1874) (Flood-August 1873, Flood Damage Prevention-Accomplished, Sustainability-Aqueducts, Sustainability-Culverts)

The President, A. P. Gorman reported (pp. 11-12):

"During the past year the Canal sustained greater damage than it has in any one year since 1852, while it is true that the improvements made in past years has strengthened the work, and its banks have become more solid and less liable to damage from high water in the river; no foresight would provide against the occurrence of the past year."

"Culverts that were constructed to pass small streams under the Canal, and that have always heretofore proved adequate, were totally insufficient to pass the streams, swollen into torrents by the succession of storms during July and August last, many breaks therefore necessarily occurred, while in many places the Canal was filled for several hundred yards in length. The repairs were completed under the most trying circumstances, the labor days being completely destroyed by sudden storms, but by the untiring energy of the Superintendents and officers of the Company, we were enabled to resume navigation within a month from the date of the first break."

"It is true, the loss of trade, and of course of revenue, added to the expenses, makes the total loss to the Company great, but it is one of those contingencies which all works of this kind are subject to, though seldom occurring."

"Notwithstanding the loss thus occasioned, the President and Directors determined to continue the system of improvements suggested in the last Annual Report, viz: Of applying a portion of the increased revenues derived from the increase of tolls on coal, to improving navigation of the Canal, in addition to the usual expenditures."

"Not only was all of the damaged portion of the Canal completely repaired, but all of the culverts were thoroughly examined, and, when necessary, repaired. The berme-wall and part of the arch of Seneca Aqueduct, was taken down and rebuilt in the most substantial manner."

"The berme-wall of Tonoloway Aqueduct was taken down, stripped and a wooden trunk put in and the work put in condition to complete the repairs during the present season."

"All the masonry and composite locks that required repairs were overhauled during the past winter; and as the weather during the suspension of navigation was more favorable than for years past, a largely increased force was put to work in removing bars and other obstructions from the prism or water-way of the Canal."

"The result is, that the Spring freshets have passed off without damaging the work, and its navigation has been more reliable during the present season than ever before."

In addition to which the construction of a Steam Dredge, at a cost of about \$10,000, has enabled us to thoroughly dredge the greater portion of the Georgetown level . . . [and the Rock Creek Basin]"

[191] E. Mulvany, Superintendent, Cumberland, to A. P. Gorman, President, 25 August 1874 (Flood Damage-Localized)

"The late rains having washed several sand bars in the Canal on the Tunnel level I intend to draw the water off it tomorrow for the purpose of removing them."

[191] E. Mulvany, Superintendent, Cumberland, to A. P. Gorman, President, 29 August 1874 (Flood Damage-Localized)

"The sand Bars were removed from the Tunnel level and navigation fully resumed this morning"

#### 1875

[191] Samuel McGraw, Superintendent, Sharpsburg, to A. P. Gorman, President, 14 March 1875 (Flood-March 1875)

"I was compelled to day to fill the Feeder level on account of the rise in the river. It commenced filling at 4 oclock this afternoon then wanting 11 inches of carrying over the Tow Path. Owing to the heavy stran a number of bars have been washed in on my division, to what extent I am at present unable to say."

[191] E. Mulvany, Superintendent, Cumberland, to A. P. Gorman, President, 5 April 1875 (Flood-March 1875)

"In consequence of the swift current in Wills Creek and the Channel across its mouth been somewhat filled in with sand Bars . . . There is a heavy deposit accumulates around the Bridge Peirs at this point at every rise in the Creek and the only remedy to remove it is to Dredge it out with the Machine which I am now doing as rapidly as possible. I am also working a force repairing the Towpath to the Potomac Wharf"

[191] E. Mulvany, Superintendent, Cumberland, to A. P. Gorman, President, 10 April 1875  
(Flood-March 1875)

"The sand Bars that formed at the mouth of wills Creek during the late rise has been removed."

[320] Annual Report of the President and Directors, 7 June 1875 (Flood-July/August 1875,  
Maintenance-Dredging, Maintenance-General)

"In addition to the usual repairs to the Canal and structures, the work of dredging the prism of the Canal with Stream Dredge had been pushed forward, and with good results."

"The number of yards of earth removed from Rock Creek and the Georgetown level, being 25,685 cubic yards, at a cost of 24 cents per yard, a reduction as compared with work heretofore done by hand during the winter, of 23 cents per yard. Not only has the cost per yard been reduced, but navigation has been maintained through Rock Creek, which could only have been done by the use of a Steam Dredge, the importance of which was fully demonstrated during the year. A serious break occurring in the Alexandria Canal entirely suspending navigation over it for six weeks, all the trade destined for Alexandria was passed through the creek and thence by river to that point. Without this improvement, a large portion of the trade would have been lost. We are satisfied that the increased revenue derived, because of these improvements, will exceed \$50,000. The work of removing the deposits on the main Canal must be continued until it is restored to its original width and depth. To this end, another Steam Dredge should be built as soon as the revenues of the Company will admit of it."

"We have, during the past year, taken possession of one of the fine granite quarries and commenced quarrying stone with a view to discontinue the use of the softer stone, and thus reduce the cost of repairs."

"A stone crusher was purchased so that crushed stone could be put on the tow-path at places like the Monocacy Division which was composed of clay and in wet weather became almost impassable."

"Material for lock-gates and other wooden structures was purchased during the year, so that at the opening of navigation, nearly all the locks were supplied with new gates . . ."

Gorman writes on the condition of the canal:

"Because of the improvements heretofore referred to, the condition of the Canal during the past year, was greatly improved; there being no detentions on account of breaks, and but slight interruptions on account of damage to lock-gates, so that the navigation was more uniform and reliable than heretofore, which enabled shippers to calculate with as great certainty upon the delivery of coal by Canal as that forwarded by rail."

"The improved condition of the prism of Canal, by dredging and cleaning out the bars, has increased the carrying capacity of the boats one and a-half tons (1 1/2) each trip."

Gorman writes on contemplated improvements on the canal with flood prevention implications:

"To restore gradually the water-way of the Canal to its original dimensions, so that with the present locks, the tonnage of boats should be increased from 109 to 120 tons . . ."

"Enlarge the locks of the Canal so as to increase the capacity of the boats to two hundred and fifty (250) tons."

". . . to lengthen the chamber of the locks by removing the breast walls and by using a drop-gate at the upper end of the lock, a boat ten feet longer than those now i use can be passed . . ."

[190] A. P. Gorman, President, Annapolis, to the Directors, 14 September 1875  
(Flood-July/August 1875) see also [182] Board of Directors Meeting, 14 September 1875 where the letter is abstracted.

"As indicated by the expense account the Canal was considerably damaged by the Continuous rains of July and August. No serious breach occurred by which navigation was suspended on the main line, but considerable damage has been done by the wash of the banks filling the Canal. A portion of the Dam at the mouth of Rock Creek was destroyed and one boat loaded with coal carried [illegible] sunk in the Potomac River. The dam was reconstructed & by the Steam Dredge on the Georgetown Division, we were enabled to keep up navigation with Comparatively light delay. All repairs rendered necessary by the floods have not been completed but will be without interrupting navigation. While the extra expense we have incurred will be considerable it is a matter of Congratulation that no greater loss was sustained by the unprecedented rains of July and August."

[CF] [190] W. E. Merrill, U.S. Engineer Office, Cincinnati, Ohio, to A. P. Gorman, President, 24 September 1875 (Flood Damage Prevention-Proposed, Sustainability-Dams, Sustainability-Locks, Sustainability-Spillways, Sustainability-Waste Weirs, Sustainability-Water Erosion) [Original in Box 57 of #190]

Note: the following is a very extensive report by the federal government on the C&O Canal.

"Having lately had the advantage of a careful inspection of the Chesapeake and Ohio Canal from Harper's Ferry to Cumberland on the Company's boat, I feel that the best acknowledgement which I can make of your kindness is to give you in return my professional opinion on whatever points struck me as noteworthy. In so doing I shall doubtless mention many things that have already been noted by yourself, but as I have not had the pleasure of a personal discussion with you on these matters, it seems the safest course to write fully on everything that I observed, trusting that any new matter that I may bring up will compensate for dwelling on matters well known to you."

"I have just received from Mr. Hutton several of his reports on the canal, and on reading them I find that he has dwelt on many points that I had noticed and as might be expected on many that did not occur to me. I shall, therefore, as far as possible confine my remarks to points not mentioned in the reports which Mr. Hutton forwarded. In so doing I do not wish it to be supposed that these are points which your Engineer has overlooked, for they may be mentioned in reports of his which I have not seen, or he may have considered it best to postpone consideration of these items until other and more pressing necessities have been met. His reports and recommendations agree fully with my own views on all subjects to which they refer."

"Dams" [all underlined passages, are so in the original]

"In my opinion the dangerous and vital members of the combination of structures that go to make up the Chesapeake and Ohio Canal are the dams across the Potomac. The destruction of these by floods, or other causes, would at once destroy the water supply on long sections of the canal, and the damage could not well be repaired until the ensuing low water season. I therefore regard your dams as the most important structures on your work, and hence I speak of them first."

"I have examined dams in all parts of the country, particularly in alluvial regions where the free action of the water is not hindered by rocks slides or bottom, and where consequently its natural tendencies can be seen to the greatest advantage. My conclusion is that, as a rule, dams are destroyed, not be weakness of cross section, but by the horizontal and vertical reactions or eddies that are generated in the water after it had passed the dam."

"The horizontal reactions or eddies are found at each bank just below the abutments. The power of these eddies is very great, and unless their actions is checked by natural rock or artificial paving, they eventually work up behind the abutment and thus destroy the dam. That this action is not unknown to the canal authorities is shown by the careful paving and heavy riprap to be found on the outside of the canal bank below each dam that I saw. I suppose that similar protection has been made on the Virginia shore; on this point I am uncertain, as I did not cross the river; I can only add that unless the natural bank is of rock, the same amount of protection is needed below each abutment. To appreciate fully the effect of these horizontal reactions, let me advise you to visit the state dam at the mouth of the Muskingum, the dam across the Little Kanawha above Parkersburg, and six dams on the Monongahela, especially Nos. 5 & 6."

"The vertical reactions or eddies have a horizontal axis, and act on the river bed immediately below the dam. The power of these forces depends on the height of the dam and the depth of the overflow. Their effect is to excavate, even in rock, a deep chasm extending up-stream under the dam, and eventually to cause its destruction by removing the base on which it rests. A dam that breaks from this cause is popularly supposed to have had a deficient cross-section, but as a rule the action that takes place is undermining."

"The remedy for this action is to give the dam a very long and gentle down-stream slope, so as to carry the undermining as far away as possible from the body of the dam; or to make the down-stream slope in steps or platforms, so as to kill the shock of the overfall before it reaches the natural bottom; or make a pool filled with heavy riprap, so that the shock of the water and of the ice may be taken on the riprap. In the latter case a second rough crib dam should be built below the main dam so as to form the required pool, and at the same time retain the riprap. The latter should be made of the heaviest blocks that can be handled."

"None of these methods are used in connection with the Potomac dams as far as I could see, and therefore I consider them all as theoretically defective. If they are built on the natural rock, it is probable that they are in no immediate danger, but the cause is always in action, and the effect should always be looked for in the near or remote future. For myself I do not think that I would trust a dam with a vertical fall except on granite or its kindred rocks. I certainly would not trust it on limestone or sandstone. I would at least insist on careful inspections during every low water season, so that should danger threaten it may be warded off in time. I have observed so many cases of failure of dams that I am probably over particular, but if so, I err on the side of safety."

"For examples of this danger I would refer to the dam at the mouth of the Muskingum which has several times been broken, and the dams on the Monongahela. The action is fully illustrated at all natural waterfalls, which is well known have deep pools just below them. For further facts on the failure of dams by undermining I would refer to Trantwine's Engineer's Pocket Book p. 583 et seq."

"Locks"

"All the locks that I saw were very defective. This may seem a severe condemnation, but as every lock that I saw had jets of water issuing from its walls, I think the statement justified by the facts. It is certainly bad workmanship to build walls that cannot hold water, and to state that tight walls cannot be built is absurd and untrue, though it must be acknowledged that American engineers, from some cause or other, have often failed in this particular. With our present increased knowledge of cements, and how to use them, there is no excuse for failure."

"It appears to me that your locks have failed as often from any other cause. The use of nothing but plank for lock bottoms is a very common but fatal error. Where there is no natural rock, locks should be built on concrete, and the use of wood is only admissable as a covering to protect masonry or concrete from surface scour."

"Another defect is the use of balanced valves. It is impossible to make these tight, and they should be replaced as soon as possible by slide valves, the only kind used in France."

"If the details are properly worked out, and slide valves only used I think that the drop gate is much better for the head of the lock than mitre gates, but all gates, drop or mitre, should have their axes of rotation eccentric to the hollow quoin in which they revolve. This makes them work easier and diminishes the wear if the two surfaces."

"I would strongly recommend that whenever your Company finds heavy repairs needed on one of the wooden or composition locks, that, instead of repairing the lock, a new lock on the most approved plan be built by the side of the present lock where the spill way is now. By his method you would secure a pair of locks, and gain the inestimable advantage of being able to build your new locks during warm weather. It is impossible to build first class masonry during winter."

"If you should decide to follow this plan I would like to have an opportunity of making some recommendations as to details. I have lately secured some very valuable practical information as to the methods of lock building followed in France, the leader of the world in canals, and I should like very much to see it carried out into practice. One first-class tight locks on your canal would be of incalculable advantage as a model."

#### "Water-supply"

"the best modern French practice is decidedly in favor of tightening the trunk of the canal to make it hold water, instead of spending money on additional reservoirs to supply a leaky trunk. To show you how little water is really needed for a canal, I enclose a copy of a table which I have compiled from French sources and which represents their best practice as exemplified on the Marne-Rhine canal (Paris to Strasbourg). The losses by evaporation, leakage, &c are given in the amount per lineal foot of canal. This is a natural method as the quantities in question depend directly on the length of the canal under consideration."

"It should be added that the calculations for the summit level presuppose a slope each way from this level. Your canal has an upper level that feed both ways. In the column 'Summit-level' the fraction for your canal should be  $\frac{en}{L}$  instead  $\frac{2en}{L}$ ."

"Water Supply" or "Table No. 1" [Original in Box 57 of #190]

"The practice on the Erie canal is to estimate on 100 cubic feet per mile per minute as the loss due to evaporation, leakage, &c. To compare this with French practice as shown in Table No. 1 I have prepared Table No. 2 in which the amount of losses is expressed in various ways."

"Table No. 2" [Original in Box 57 of #190]

"This table shows the very great gain in economizing water supply that may be obtained by tightening the trunk of the canal. The money that would be required to build reservoirs and feeders is spent on the canal itself, and makes additional supplies unnecessary. Table No. 1 may be trusted with absolute certainty, as it is the result of elaborate and careful experiments, and is in no wise theoretical."

#### "Drainage gates"

"I think that these structures should be of masonry. The gates themselves may be made of horizontal beams superposed, or may be shutters to be lifted. The most permanent arrangement would be to have large iron pipes embedded in masonry with heavy valves opened by rack and pinion. The gates for admitting water to the government works at Harper's Ferry would be an excellent model."

#### "Waste weirs"

"The better practice would be to make these of masonry, although they undoubtedly may be made safe by lowering a portion of the tow path and paving it with good street paving with special protection for the outer slopes. What appears to be the chief defect in your present arrangement is that you permit the mules to travel on the surface of the waste weir. I would recommend that small peirs of brick or stone be just long enough to permit the use of timbers without trussing."

"The drainage gates and the waste weirs might readily be combined in one structure, as is the practice on the Erie canal."

#### "Spills at locks"

"I think that these are all too narrow at the head. The weir over which the water spills should be so long as to prevent a greater oscillation in the upper level than two inches. After the water had fallen over the weir the channel by which it is passed into the level below may be of any size to suit the locality."

#### "Entrance of feeders"

"Feeders that take from the Potomac should have strong masonry dams across their heads, and feed water should be admitted through large iron pipes with heavy iron valves such as are used on mains in large cities, or as may seen the old arsenal at Harper's Ferry. This arrangement would

entirely obviate danger from floods. If boats ever required admittance this pool, I would lock them down from the level above."

"Slope wall"

"Whenever funds permitted I would replace the earthen slope of the canal by dry stone walls carefully laid. These walls would keep the tow path from wearing down so rapidly."

"Leasing water privileges"

"One of the radical mistakes in American canal engineering is the habit of leasing surplus water. A canal has no right to have any surplus water. If surplus water comes in it is due to defective arrangements at the head of feeders, and the matter should be remedied. Surplus water creates unnecessary currents, washing the banks, increasing deposits, and retarding up-stream navigation. The worst feature however is the creation of a powerful antagonistic interest that is naturally opposed to the best interests of the canal, and is constantly seeking privileges that are injurious to navigation. The result is that the canal becomes a head race for furnishing water power, and only secondly a canal for commerce."

"If weirs were arranged at each power so that mill owners could get only get what ran over each weir (keeping their tops at the normal level of the canal) then the level could not be drawn down, and the mills would only get the water that was really surplus. It is a great error to permit the use of channels leading to mills whose bottoms are lower than the normal level of the pool, as it gives interested parties the power to steal water to the injury of navigation."

"I would recommend that weirs be built as suggested to control the use of water under existing leases (wherever the lease is for surplus only), and that it be made an unchangeable law of the company to grant no more leases for canal water under any circumstances whatever."

"Tunnel"

"The remarks which I intended to make on the tunnel have been anticipated by Mr. Hutton. The best thing to be done at present is to take out the solid support of the tow path and sustain it on pillars, so as to lessen the heavy traction. This should be done on any event, whether the difficulties at this place are obviated by a new tunnel or by a slackwater."

"In conclusion I trust that you will find some of above suggestions useful and that you will not think that I am passing outside my legitimate sphere in offering them."

1876

[191] Samuel McGraw, Superintendent, Sharpsburg, to A. P. Gorman, President, 1 April 1876 (Flood Damage-Localized)

"On account of the rise in the river navigation was suspended for 49 hours commencing 29 inst at 7 AM until 31 inst 8 AM"

[LIB-PHP] Forty-Eighth Annual Report of the President and Directors of the Chesapeake & Ohio Canal Company to the Stockholders, June 5th, 1876 (Annapolis, Md.: L. F. Colton & Co., Steam Printers, 1876) (Maintenance-General)

The President, A. P. Gorman, reported:

"The condition of the Canal during the entire year was excellent. Not a break or serious interruption from any cause occurred to delay navigation."

[191] J. T. Fletchall, Superintendent, Georgetown, to A. P. Gorman, President, 12 June 1876 (Flood Damage-Localized)

"I respectfully report, that on Saturday evening there was a very heavy rain. Washed in some four heavy sand bars So that loaded Boats could not pass Mr Latchford started the Dredge clearing out the bars. Will have them cleared out sufficient to morrow (Tuesday) to enable Boats to pass"

[CF] [191] William R. Hutton, Engineer, Cumberland, to A. P. Gorman, President, 18 September 1876 (Flood-September 1876)

"I have just returned from the break above Evitt's Creek. It is about 35 ft wide in the bottom, probably 70 ft at top, and 7 or 8 ft below Canal bottom. The bottom of canal is hard slate so that it has not cut out much. The bottom of the break is on a hard clay puddle upon which the bank was built, the bank itself being of very light loamy material. The earth to be had for repair is the same. I have therefore told Mulvany to haul from below the Aqueduct some good clay to form a puddled wall through the bank."

"Hands are at work today. It ought to be finished in less than a week, although I have said ten days to others."

"There are one or two other little washes which can be soon repaired."

[Original in Box 3 of #191, Folder #1876/77 #1704-1799]

[191] William R. Hutton, Engineer, Cumberland, to A. P. Gorman, President, 18 September 1876 (Flood-September 1876)

"The is every facility here for prompt & safe repair: except that the material for the bulk of the bank is light and loamy, but I have told Mulvany to haul clay from below the Aqueduct to form a puddled connection through the middle."

[191] Samuel McGraw, Superintendent, Hagerstown, to A. P. Gorman, President, 18 September 1876 [telegram] (Flood-September 1876)

"The River came over at the dam at three oclock September eighteenth and still raising fifteen inches to the hour"

[191] E. Mulvany, Superintendent, Cumberland, to A. P. Gorman, President, 19 September 1876 (Flood-September 1876)

"I have started a force to repair the Break it is in a very difficult place to get Material about 4 miles below Cumb. Navigation will probably be resumed next week."

[191] E. Mulvany, Superintendent, Sharpsburg, to A. P. Gorman, President, 20 September 1876 (Flood-September 1876)

"Last night the river was over the Tow Path in feeder level to the depth of 5 ft. & left this afternoon at 3 oclock. The Tow path is washed very badly but no breaks up to this evening."

[191] Lewis G. Stanhope, Superintendent, Hagerstown, to A. P. Gorman, President, 20 September 1876 (Flood-September 1876)

"The tow path on Several of the Levels on my Division is washed considerable and will take Som work to Get it in Good Condition again the Dry wall on the west end of the Wmport aqueduct on the Tow path side has falling down"

[191] Lewis G. Stanhope, Superintendent, Hagerstown, to A. P. Gorman, President, 25 September 1876 (Flood-September 1876)

"A portion of the crib at No 6 has bin Carried away by the Raise in the River unless Somthing don it will all Go it will cost to by Logs & Put it up again in the neighborhood of \$1000.00 It might Stand with out Crib but the Ice Freshet will be very hard and might do Greatdeal of Damage"

[190] E. Mulvany, Superintendent, Cumberland, to A. P. Gorman, President, 30 September 1876 (Flood-September 1876)

"The Freshett in the Potomac River and Wills Creek on the 18th inst. caused the Water to rise ten feet on the Dam at this point during the rain the Water poured very rapid into the canal from the Town through the Mill race which washed in a great deal of deposit and formed a bar across the canal within two and a half feet of the Water surface and causing the Water in the level to rise very high so that it became necessary to close the Gates in the stop Lock in order to Keep the Water in the Basin but in Closing the Gates one of them sprung over the Mitre Sill and broke out which let the level get very full. The River being very high at a point known as the high Bank between Thistles Ferry and Evitt Creek it washed the outer Bank so as to undermine it when it gave way and Sliped out which weakened it so that it broke from the inside making a breach in the Towpath sixty five feet long and fifteen feet below bottom half Way across the Canal As soon as the Water run off I commenced preparations to repair it by working a force night and day . . . [and] in order to protect it and make it safe by ripraping and filling in there is also a great deal of Stone Washed out of the Crib below the Dam that will have to be replaced at once . . ."

[190] E. Mulvany, Superintendent, Cumberland, to A. P. Gorman, President, 5 October 1876 (Flood-September 1876, Flood Damage Prevention-Proposed)

"In consequence of so Much deposit being washed into the Canal and a bar been formed at the Mouth of Wills Creek by the recent freshett it will be necessary to work the dredge for some time in Order to remove it The rock having been washed out of the cribb work below the Dam and the cribbs having gave way it will require considerable work to repair it so as to the secure the Towpath at that point. There will also be required a great deal of filling or Rip Raping on the Out side of the Bank close to where the Break was in order to secure it against damage in case of an Ice Freshett"

[190] A. P. Gorman, President, Annapolis, to the Directors, 9 October 1876 (D) see also [182] Board of Directors Meeting, 10 October 1876 where the letter is abstracted.

"During the past month great damage was done to the work by the floods in the Potomac River, causing the suspension of navigation for ten days. In addition to the extensive break on the Cumberland Division, much damage was done at other points, notably on the Hancock, Antietam, & Monacacy Divisions, which while interrupting navigation, will require time and considerable expenditure of money to put the canal in proper condition. No accurate estimate of the cost can be made, but the reports of the Superintendents are herewith submitted for the information of the Board."

Note: the letters from the Division Superintendents are not abstracted in the Board minutes.

[191] E. Mulvany, Superintendent, Cumberland, to A. P. Gorman, President, 14 October 1876 (Flood-September 1876)

"I am working an Extra force of eight men repairing the Cribb work at the Dam and Rip Rapping at

places washed by the freshett. Things are all getting very good shape."

1877

[191] J. J. Moore, Superintendent, Weverton, to A. P. Gorman, President, 22 January 1876  
(Flood-January 1877)

"The ice on Dam No. 4 broke about eight O'clock on Sunday night the 21st inst. The water reached about top of Towpth at Dam No 4."

"We put water on that division viz--on the Antietam division As a matter of precaution."

"There has been no damage done On Division No. 2 except the breaking of a lock beam at the outlet Lock at Edwards Ferry"

[191] J. J. Moore, Superintendent, Weverton, to A. P. Gorman, President, 3 February 1876  
(Flood-January 1877)

"I returned yesterday from Slackwater, and will give you some accounting of the condition of things as I found them. The ice around Slackwater I found slacked up about ten feet high on the towpath, and the floating crib or guards at the guard lock is to a considerable extent damaged, the repairs of this, however, will be a matter of small importance. There is also a considerable leak in the bottom of this lock, but at the present stage of water in the river, I could not ascertain whether the water came through the wall of the lock, or through the bottom, by reason of broken plank near the mitre sill. The stop plank ay the stop lock at Dam No. 4. are rotten, and will have to be renewed so soon as the water is put in as it is important that this be strong in case of high water." Moore also reports on other frost damage on his division to bridges, lock houses, walls, etc.

[191] J. J. Moore, Superintendent, Weverton, to A. P. Gorman, President, 3 February 1876  
(Flood-January 1877, Flood Damage Prevention-Proposed)

Indicates he has requested that lumber be left "at Dam. No. 4 . . . for stop plank, so that we may have them in case of high water." Further indicates, "the towpath around Slackwater has been very much damaged by ice."

[LIB-PHP] Forty-Ninth Annual Report of the President and Directors of the Chesapeake and Ohio Canal Company to the Stockholders, June 4th, 1877 (Annapolis, Md.: Maryland Republican Steam Press, 1877) (Flood Damage Prevention-Accomplished)

The President, A. P. Gorman, reported (p. 9):

"During the year, extensive improvements were made on the Georgetown Level, by the construction of retaining walls, rendered absolutely necessary for the safety of the work, which, together with the rebuilding and lengthening of locks Nos. 5, 6 and 7, and the extra amount of dredging and repairing of other important works, added largely to our expenses, but none of these expenditures could have been dispensed without great risk to the Canal and probable serious interruptions to the trade."

[191] J. T. Fletchall, Superintendent, Georgetown, to A. P. Gorman, President, 2 October 1877  
(Flood Damage Prevention-Proposed)

Suggests the towpath be repaired at 7 Locks as soon as the telegraph poles have been finished. On the reverse side, a summary notation suggests the repairs involved raising the towpath.

[191] J. T. Fletchall, Superintendent, Great Falls, to A. P. Gorman, President, 2 October 1877  
(Flood Damage-Localized)

"There was a perfect deluge of rain Yesterday Thursday, flooded the Tow path on nearly all the levels of the Division the only damage of any note was washing a Crib in on the three mile level and forming a heavy bar at that point the water had to be draw to clean the bar out I do not think there is any bars to Stop Boats on the other levels as Several Boats passed to day without trouble the Banks was washed in Several places. Rock Creek is too high to day to ascertain the damage there. I am fearful it has filled up badly."

[191] C. V. Hammond, Cumberland, to A. P. Gorman, President, 25 November 1877 (Flood-November 1877)

"We have had a terrible flood from the rains of Thursday and Friday occasioning great destruction of property along the River bottoms & also in the city. The oldest citizens say that the water was higher than it ever has been since 1810. There is a break in the Canal three miles below Cumberland, near where the break ocured little more than a year ago. Mr. Willison estimates the damages to Canal on this level between three & four thousand dollars. The Towpath gave away near Brenglis store. Mr Willison & myself were on the spot, & we got a force of hands & secured it. We cant hear anything from down the Canal, as all communication by Rail and Telegraph is cut off."

[CF] Baltimore Sun, 29 November 1877, 1 (Flood-November 1877)



"Damage by the Freshets: Chesapeake and Ohio Canal." Good description of the damage along the line of the canal from the November 1877 freshet.

[190] Benjamin Fawcett, Secretary, to President and Directors, undated [c. early December 1877] (Flood-November 1877, Widewater-Sustainability)

"Under instructions from the President, I have examined the extent of damages to the Canal, caused by the late freshet from Georgetown, to Seneca Aquaduct, a distance about twenty three miles. . . . I found the Georgetown level seriously damaged. One break of [illegible] feet about half way between the outlet Lock & the chain Bridge, one other break of [illegible] feet just below the Bridge. The tow path all the way from these breaks to Lock No 5 is very considerably damaged as is also, a large portion of the feeder banks leading from the Dam to the canal. I estimate the cost of repairing this level at Seven thousand Dollars."

"The Carpenter Shop on this level, with all the lumber, iron castings & material of every description is a total loss. Estimate at Two thousand Dollars"

"Lock No 5 is badly damaged, particularly the berm side, the wing wall & entrance to the Flume being washed out, the Collectors Office Books, papers, & furniture entirely destroyed. I will take at least one thousand Dollars to put this Lock in its former condition"

"The level above Lock No 5 is about five hundred yards long & is washed & damaged to extent of Five hundred Dollars. At Lock No 6 there is a break on the towpath just above the Lock Sixty feet long & five feet deep. On the berm bank at the entrance of the Flume a break of thirty feet long & four feet deep, entirely filling the upper end of the Flume. The backing of the Lock on the towpath side is considerably washed out. no apparent damage to Lock walls, or gates. Extent of damages about One thousand five hundred dollars The level above Lock No 6 one & one half miles long is comparatively good but there are three or four bars from two to four feet deep which will cost at least Five hundred dollars to remove."

"Just above Lock No 7 there is a break, Forty feet long & five feet deep. A very bad bar of stone & gravel extends across the Canal at this point to an average depth of four feet, the tow path for Five hundred yards above this Lock is considerably injured. I estimate the cost here, including the tow path at One thousand five hundred Dollars The tow path for the balance of this level (Say one & one half miles) is not much damaged except just below and around Lock No 8 which I estimate at Five hundred Dollars."

"From Lock No 8 to Logwall, about four miles there is no damage."

"At Logwall, about three hundred yards above the entrance to the wide water, there is a break One hundred & ninety two feet long & twelve feet deep. On the tow path bank from this break to the lower end of wide water, the embankment indicates serious trouble, & to all appearances seems to be slipping down, into the deep water I am not prepared to say whether this slipping will continue, but it has an ugly look, owing to the difficulty of getting material at this point, having to convey it down a high bank in a chute, I estimate the damage here exclusive of the slip above mentioned at Three thousand five hundred Dollars"

"At Lock No 15 at the head of Logwall level the Flume crib made of wood is nearly all washed out. The tow path just along & below the Lock is considerably injured, Some of the stone of the lower Lock abutment is displaced & one the upper gates partly but not seriously broken. estimate the damage to this Lock & Flume at Five hundred Dollars."

"At Lock No 16 the backing on the tow path side of the Lock is badly washed and the & tow path from Lock No 15 to No 16 is more or less injured. I estimate damages here at Five hundred Dollars"

"From Lock No 16 to Lock No 20, head of the Falls, the tow path & backing to Locks is considerably injured. the Lock shanty at Lock 17 is entirely destroyed. Estimate loss at Locks 17, 18, 19, and 20 One thousand Five hundred Dollars Just above the Falls over the conduit there is a break Fifty feet long & Fifteen feet deep. The U S Government had already commenced repairing at this point, & it is said they intend to take all responsibility of this break. Estimate for this break, One thousand five hundred Dollars"

"The tow path from Lock No 20 to No 21 (2 miles) is badly damaged, and there is a Small break above the tow path wall of Lock No 21. Estimate cost of repairing tow path & break. One thousand Five hundred dollars The tow path at the bend below Lock No 22 is damaged to the extent Two hundred Dollars No other part of this level appears to be injured From Lock No 22 to within one mile of the Seneca Feeder there is no damage. At the bend in the canal about one mile below the feeder is found the most serious & difficult break on this part of the Canal. This break is from two hundred & fifty to three hundred yards long, the stone wall between the River & Canal for this distance is washed out to the bottom, & the Canal bed filled with stone & other material, for two hundred yards in length, & average depth of four feet. The earth embankment of tow path along the River wall for nearly a mile is washed out. Owing to great difficulty of access to suitable material, unless that in bed of the canal can be used, It is very hard to estimate the cost of repairs here, but I think it is safe to estimate for this work Five Thousand Dollars"

"The guard bank below Dam No 2 (Seneca) & the Feeder Gates are uninjured and bridge over the Feeder slightly damaged. At Lock No 23 (Feeder Lock) on the tow path side of the upper end of Lock there is a wash to bottom of the Canal & nearly half way down the Lock carrying away the

wing wall, the lower part on this side being saved by the Feeder wall. On the berm side there is a break extending from the upper wall of the Lock 200 feet up the Canal & 10 feet deep, & down the side of Lock to its bottom 30 feet wide carrying away the entire wing wall & cutting a Canal between the Lock and Lock House. The Masonry of the upper part of the Lock wall requires resetting. The water from the upper part of this break swept to the north & east of Lock house washing out from 2 to 10 feet for a width of about 40 feet & taking off the upper porch of the house. As the Company has an abundance of good material within 200 yards of this point, I estimate the earth work at Twenty five hundred Dollars & the Masonry work at Five hundred Dollars"

"From Lock No 23 to Seneca Aquaduct there is one Small wash on berm bank and tow path slightly damaged, have included this in last mentioned estimate. Ricketts Company Boat was entirely destroyed, but all the furniture was Saved except the Cooking Stove."

"There was no damage to the Companys Shop at Great Falls nor was there any loss of Lumber or other material."

Fawcett estimated the cost of restoring the canal to its original condition from Georgetown to Seneca, at \$32,000.

[191] D. Lynn, Cumberland, to A. P. Gorman, President, 11 December 1877 (Flood-November 1877)

"The recent flood washed out two sections of the wharf which ought to be repaired before we have any more bad weather. As a hard rain or a slight rise in the river would seriously damage the wharf at that point."

[190] A. P. Gorman, President, Annapolis, to the Directors, 12 December 1877 (Flood-November 1877, Harper's Ferry-Sustainability) see also [182] Board of Directors Meeting, 12 December 1877 where the letter is abstracted.

"On the 24th instant [ultimo? this happened in November] Navigation was suspended caused by the most disastrous flood which has ever occurred in the Potomac River, by which the work under your charge has sustained very great damage. After the flood of 1852, when the water was said to be six feet higher than it had been known in a period of one hundred years previously."

"The canal and works were placed in a condition to protect it from similar occurrences, but on the 26th waters of the Potomac rose 6 feet higher at the junction of south and north Branches, From Harpers Ferry to Georgetown it was nearly two feet higher than in 1852. Of course no provision had been made to protect the work from such Exceptional floods."

"Since the damage was sustained I have visited the principal points, with the various Superintendents, and they have made as full and detailed reports of the damage sustained as tome would permit."

"On the Division extending from Cumberland to Lock 41, head of, 96 miles there are 14 breaks, many washes and some of the short levels are filled up from 12 inches to three feet in depth. Both the abutments of Dam No 6 was slightly damaged, while at Dam No 5 there is considerable damage to both the Maryland and Virginia Abutments."

"The Estimate of Superintendent Stanhope for Cost of repairs on his Division is \$38,850.00"

"The Seneca Division, J J Moore Superintendent Extends from the upper or west end of Big Slack water to the feeder Lock at Seneca, a distance of 67 miles. On this division greater damage was done than on all the balance of the Canal. At the upper End of this division is located Dam No 4, supposed to have been one of the most substantial Masonry dams in the Country. It is 720 feet between the abutment and twenty two feet high, the pool of this dam for a distance of nearly four miles is used as Canal, the whole supply of water for the canal from this point to Harpers Ferry is also obtained by this dam. On Saturday 24th inst, about 3 PM, and before the water had reached an Extraordinary height about 200 feet in length of the dam near the center gave way, and at this time the entire flow of the Potomac is passing the aperture. It is impossible to account for this as the dam was thoroughly sheathed and backed. On the following day 25th, the water rose rapidly and swept over the Guard bank above the dam and over the whole guard bank which is 1 1/4 miles long and 19 feet high, damaging it to a very great extent. At the lower or East end it carried away that portion of the bank between the stop lock and the abutment of the dam. The damage at this point is great."

"From this point to dam no 3, Harpers Ferry, the towpath and retaining walls is badly damaged, canal filled up and with a few comparatively small breaks."

"At Dam No 3, above Harpers Ferry, the guard bank and stone wall was swept away with the towpath of the Canal. As this is the feeder level the bottom of the Canal is seven (7) feet lower than the River, when at its usual height, of course a great portion of the flow of the river passes down this portion of the canal to this Lock below where it again washed the towpath and passed out, the destruction here is very extensive."

"Immediately at Harpers Ferry, the Masonry of Lock, except lock Walls, and the heavy retaining walls to the lock below, is greatly injured. From Sandy Hook to Seneca the damage was considerable and is set forth in Supt Moore's report who Estimates the cost of repairs on the 67 miles of Canal (Exclusive of Dam No 4) at \$92,518--"

"The lower or Georgetown Division Extends from Seneca Dam to Georgetown, a distance of 22 miles."

The report and Estimate of damage on this division has been made by Secretary Fawcett after an inspection of the line. The damage to lift Lock No 23 is very great, wing wall carried away and the main walls greatly damaged. This level is seriously injured, not only to towpath and berm bank, but the canal is filled in some places for long distances and retaining walls destroyed. From this point to Lock No 5 there was a great number of breaks, Masonry damaged and towpath torn."

"The wing walls of Lock No 5 Considerably injured, guard bank Below the Lock as far down as the chain Bridge the towpath was washed Considerably, below the Bridge there is a large break. Above Edes Mill, by my direction, the towpath was cut so as to prevent a more serious break and probable very great loss at Georgetown, the water passing out carried with it a large portion of the towpath and pudling of the Canal."

"The estimated cost of of repairs of this Division is \$32,000--"

"In addition to this Estimate, the loss to the Company of Lumber, tools, Company Houses, Lock Houses and Lock gates is very great, but fortunately Enough gates were saved for present use."

"I recapitulate the Estimate of loss viz,

Division	No 1	\$32,000--	
" "	No 2	92,518--	
" "	No 3	<u>38,850--</u>	
			\$163,368
To which must be added Dam No 4-say,		<u>37,000</u>	
			\$200,368"

"On the 26th I visited Georgetown and immediately gave instructions to commence repairs on the Georgetown level so as to furnish a supply of water to the Georgetown Mills. W S Gambrilo, Paymaster was placed in charge of the repairs and has a large number of hands Employed The work has been pushed as rapidly as could be done and we hope to have the water on that level by Saturday next."

"Supt Fletchall has charge of the repairs from Lock No 5 to Seneca and is at work with a large force is restoring that portion of the work."

"Supt Moore was instructed to Employ 200 laborers and as many stone Masons and horses and carts as could be economically used in repairs as Guard bank and at Dams No 4 so as to make permanent repairs and to prevent further damage."

"Supt Stanhope, who has had great Experience in building dams, was placed in charge of Dam No 4 and of the portion of the Canal from Slack Water to Dam No 6. He has a large number of men now Employed getting logs to construct cribs for the dam and if we are favored with good weather I hope to get them in before any further damage to the dam can occur. In addition to the force on the dam he was authorized to Employ sixty men on the repairs to Dam No 5 & 6."

"W A Willison was placed in charge of canal from Dam No 6 to Cumberland and has Employed a hundred men to make repairs. With the present force now Employed I believe the work can be placed in condition to prevent any further damage by unusual high water and at the same time make such progress as will soon place the work in condition for navigation."

"I also gave Each of the Superintendents instructions to relieve from duty all Lockkeepers, collectors, and all other officers on the line, Except those that could be of service in making repairs."

"The Board will now be called upon to take action in regard to raising means to complete the repairs already begun, so that they may be pressed with vigor and the line placed in good navigable condition by the Early Spring."

[191] A. Willison, Cumberland, to A. P. Gorman, President, 25 December 1877 (Flood-November 1877)

"I have Pushed forward The Work on This level & finished on last Wednesday Put The Water on & started Kelley with his House Boat to South Branch level. Humbird & me went down over The Entire line or division, We find The Tow Path Washed of Badly for Miles & The Channel filled up very much," Willison is also having problems boarding and paying his men.

1878

[182] Board of Directors Meeting, 10 January 1878 (Flood-November 1877)

"The President submitted a verbal statement of the progress of the Repairs along the line of [the] Canal and stated that the fine weather of the past month had enabled the Superintendent to push the work with more vigor and success than had been anticipated, and that the Canal was expected to be open for navigation on or about the 12th of April next."

"The President laid before the Board the expenses so far incurred for repairs from 24th November 1877 to December 31st 1877 amounting to \$42,046.60."

[191] Lewis G. Stanhope, Superintendent, Dam No. 4, to A. P. Gorman, President, 16 January 1878

(Flood-November 1877)

"the River has bin pretty high the Ice, is gon of No 4 but we ar all Right--with the Cribs the Crib on Virginia Side to the brake in the Stone dam which was 175 ft to the Shoar was filed and Sheeted they Stood [illegible] the Cribs in the River between the two Shoots that was not filed the top may of Gon off Say the top Logs as it had neither Stone in it or Sheating on it I am satisfied ther is not more than two Logs Gon from the top if that we far had Good Luck in Getting in the Cribs and I had hoped to get don this month but now I cannot Say when"

[191] J. J. Moore, Superintendent, Weverton, to A. P. Gorman, President, 25 January 1878  
(Flood-November 1877, Flood Damage Prevention-Proposed)

"I returned from Dam No. 4 to day, McGraw will finish Guard Bank on Monday next; he will then repair the small break at Delany's Lock which will require about two days work,"

"I will then put him and Jacob McGraw on repairs of break at Mountain Lock I will leave H. C. Burgan on his own section with sufficient force for the repairs of his section. By this arrangement I think things will work better. With fair weather we will finish the big break above Lock 32 next week. Will then send Elgin & Boteler back on their own sections."

"Please determine, as soon as convenient whether you will have the River Guard Bank at "Two Locks" raised higher or not, as we have the coping now ready to go on the guard wall, but will not put on the coping at present if you determine to raise the guard bank. The slope wall from Greenwall's Lock to Outlet Lock at Harper's Ferry Bridge will be all completed by the 5th of February, I mean the inside slope wall, We were compelled to renew it all from the foundation as, what was not entirely removed was so damaged as to require its removal and rebuilding."

[182] Board of Directors Meeting, 21 February 1878 (Flood-November 1877)

"The President presented a verbal statement that the work of repair was progressing with great satisfaction and that Messrs. Hamill, Humbird, Directors, had visited and inspected the work on various points of the line from Cumberland to Harpers Ferry. He had no doubt but that the whole line would be open for navigation by the time heretofore named."

[191] J. J. Moore, Superintendent, Weverton, to A. P. Gorman, President, 22 February 1878  
(Flood-November 1877, Flood Damage Prevention-Accomplished)

"We have all the Breaks finished between Edwards Ferry and Dam No. 4, except about two days carting on Harpers Ferry level which we have done nothing at since I saw you at Annapolis, owing to the bad condition of the roads at Sandy Hook, and the fact that we had other work that we could do to advantage. The two McGraws are carting up the wash on Towpath below Grove's warehouse and in the one mile level above Sheperdstown. So soon as they are done this which be within ten days, the weather being favorable, will send Riley and his men up to put an inside slope wall at the weaker points, as the towpath there is very narrow and had frequently been injured by the water."

"I have just returned from Dam No. 4 and find Burgan doing as well as could be expected, as he has a great deal of water to contend with. If the weather had been favorable this week and next Elgin would have finished all washes on 8 mile level. We have done a good deal of wheeling out bottom, but have a great deal yet to do, all over the line."

"We will put in the waste weir above Hardy's Lock as soon as we receive the lumber which we expect the first of next week. There is scarcely any of the Dam, left above Harpers Ferry."

"This Division will be ready in time for you."

[182] Board of Directors Meeting, 14 March 1878 (Flood-November 1877)

"The President verbally stated that the repairs were progressing in a satisfactory manner, excepting the crib work at Dam No. 4 which had been repeatedly delayed by high water, but that all material was on hand ready for use at the first available moment."

"The President also stated that it had been ascertained that there was considerably more cleaning from the bottom the canal than had been anticipated and that he had found it necessary to considerably increase [?] at different points along the line to ensure its completion by the time designated."

[191] J. J. Moore, Superintendent, Weverton, to A. P. Gorman, President, 27 March 1878  
(Flood-November 1877)

"After the water subsided sufficiently to permit us to examine little Monocacy culvert, we found that 50 ft of foundation on lower side of culvert was gone, and 20 ft on opposite side, The pavement of this culvert is washed out. We have the walls all up and are putting in centres today for the arch which we expect to complete by tomorrow night."

[182] Board of Directors Meeting, 10 April 1878 (Flood-November 1877, Flood Damage-Financing)

"The President reported that the whole line of canal was substantially completed and that the water was being let in at different points on the line, and that notice had been given that

navigation would be fully resumed on the 15th inst."

". . . the entire cost of repairs from 24th November 1877 to 31st March 1878 amounting to \$147,219.35."

"On Motion of Mr. Mumbird the following Resolutions was read considered and adopted, Resolved, That the President be authorized to make temporary loans for Repair Expenses and to Execute the obligation of the Company for the same, until such time as the Repairs Bonds, under the Act of 1878 [of Maryland], Chapter 59, are ready for execution."

The Maryland General Assembly had authorized the issuance of repair bonds to pay for damage on the canal caused by the November 1877 freshet. At this meeting, the Board authorized the President to familiarize the stockholders with the provisions of this act at their next general meeting. The Board also authorized the issuance of "four hundred bonds of five hundred each, and three hundred bonds of one thousand dollars be issued."

[190] A. P. Gorman, President, Annapolis, to the Directors, 15 May 1878 (Flood-November 1877, Flood Damage-Financing) see also [182] Board of Directors Meeting, 15 May 1878 where the letter is abstracted.

"I have the honor to report that the damage to the Canal was so far repaired as to admit of the water being put on and navigation opened from Cumberland to Georgetown on the 15th day of April. The prism or water way of the Canal is now in as good or better condition than it has been for many years past and I do not apprehend any trouble from ordinary causes which can delay navigation during the present season; of course the Embankments and Masonry while in fair condition are not as substantial as they were prior to the flood, much remains to be done to strengthen and complete the work but it can be more economically done during the current year with the regular and a few extra repair hands. At Dam No 4 the Cribs were successfully placed in by Lewis G. Stanhope and with some slight strengthening will Enable us to Keep navigation until such time as the masonry can be restored. Having passed over the Entire line since navigation I do not hesitate to say that it is absolutely wonderful what an amount of work was accomplished and to how well and cheaply done by the officers in charge thereof and I am sure the Board will convey with me in the suggestion that each of the officers in charge of the repairs of the work would receive from the Board, some work of commendation for their Extraordinary Exertions in restoring the work and if the treasury were in Condition I would suggest some substantial recognition for their Extra labors"

The following is from the abstracted version in #182, Proceedings of the President and Directors, 1828-90:

"The amount of advances or money borrowed was as follows, Viz:

Feb 14	Maryland Coal Company, Subscription to Bonds	\$10,000.00
" 22	Second National Bank, Loan at 90 Days	10,000.00
" 23	American Coal Company, Subscription to Bonds	10,000.00
March 30	Consolidated Coal Company "	10,000.00
" 25	Alexander Brown & Sons, Loan at 90 Days	25,000.00
April 23	Farmers & Merchants Nat Bank, Balto Loan 90 days	25,000.00
" 16	Borden Mining Company, Subscription to Bonds	10,000.00
" 30	Farmers National Bank, Loan 60 days	10,000.00
" 30	A P Gorman " "	<u>5,000.00</u>
		\$115,000.00"

According to the minutes of this Board meeting the aggregate bond issue amounted to \$500,000, secured by a mortgage on the assets of the canal company. The bond issue was authorized by a special meeting of the stockholders on 30 April 1878.

[191] I. R. Mans, Superintendent, to A. P. Gorman, President, Annapolis, 20 May 1878 (Sustainability-General)

"I passed over the Division [which one?] on 15 & 16 with Mr Moore. I found the Towpath in a very bad condition. The water running over in many places. . . . The River is too high to work on dam. I found some Culverts in a bad condition"

[191] Lewis G. Stanhope, Superintendent, Hagerstown, to A. P. Gorman, President, Annapolis, 20 May 1878 (Flood-November 1877, Sustainability-Dams)

"The Freset Last fall I think washed Gooddeal of the Filling from the back of Dam No 6 and it is Leaking by badly. I hav however Got Small forse thare at work with Moores forse which I think in

few days will have it all Right."

[LIB-PHP] Fiftieth Annual Report of the President and Directors of the Chesapeake and Ohio Canal Company to the Stockholders, June 3rd, 1878 (Annapolis, Md.: Maryland Republican Steam Press, 1879) (Flood-November 1877, Flood Damage-Financing)

The President, A. P. Gorman, reported (pp. 9-11):

"On the 24th and 25th of November, the great flood in the valley of the Potomac, which was more destructive than any that had preceded it, damaged the Canal at various points throughout its entire length, carrying away a portion of Dam No. 4, a splendid masonry structure. Some idea may be formed of this flood by the fact that the water rose about two feet higher than it was in 1852; at Great Falls it ran over the high guard bank, the top of which is about seventy (70) feet above usual low water in the Potomac River. Of course no ordinary precaution nor any reasonable expenditure of money could prevent damage to the work from such exceptional floods. Immediately after the waters of the Potomac had subsided sufficiently to enable us to ascertain the character and extent of the damage which the work had sustained, we commenced preparations for its thorough repair."

"On December 1st, all collectors, lock-keepers and other officers, not engaged on repairs, were relieved of duty, so that expenditures were restricted to actual cost of repairs and office expenses."

"At the time the damage occurred the Canal was divided in three divisions; the first division extended from Georgetown to and including the dam at Seneca, Jno. T. Fletchall, superintendent; so great was the damage to this, as well as to other divisions, it became necessary to sub-divide them. Division No. 1 was divided as follows: Stephen Gambrill, the paymaster of the Company, was placed in charge of the repairs from Georgetown to Lock No. 6; John T. Fletchall from Lock No. 6 to Seneca, with J. R. Mans, assistant superintendent, on the work near Seneca. Division No. 2 extended from Seneca to the upper end of slack water at Dam No. 4, J. J. Moore, superintendent. Sam'l Magraw was appointed as assistant superintendent. The Third Division, extending from the head of slack water to Cumberland, L. G. Stanhope, superintendent, was divided, Stanhope retaining that portion from slack water to Dam No. 6, in addition to which, owing to his great experience in the construction of dams, he was placed in charge of the repairs at Dam No. 4, which is on the Second Division. A. Willison, the collector at Cumberland, was placed in charge of that portion of the line from Dam No. 6 to Cumberland. To these officers, the bosses and the men under them, we are largely indebted for the early opening of navigation this season. Too much cannot be said in their praise, but for their energy and skill, favored by good weather, the Canal would not have been in navigable condition before the present time."

"The estimated cost of repairs so as to restore navigation, exclusive of the cost of repairing Dams Nos. 1, 2, 3, and 4, was one hundred and sixty-nine thousand two hundred and twenty-nine dollars and eighty-eight cents (\$169,229 88,) and the whole cost, including dams, estimated at two hundred and twenty-five to two hundred and fifty thousand dollars."

"The repairs to the Canal proper were pushed forward so rapidly that on the 15th day of April the entire line was open for navigation; of course much work remains to be done to strengthen the embankments and improve the tow-path."

"Of the repairs to the Dams Nos. 1, 2, and 3, which are simple rubble structures, the cost will probably not exceed ten thousand (\$10,000) dollars. The repairs to the masonry of Dam N. 4 cannot be commenced until the stone is quarried; the splendid cribbing put in by Lewis G. Stanhope, will, however, answer every purpose for the present."

"The aperture in the dam is 180 feet in length, through which the whole flow of the river passed. To successfully place the cribs during the most inclement season of the year, was no ordinary undertaking; that they were constructed under these circumstances without accident or loss of material, is evidence of the energy and skill of the superintendent in charge of the work."

"The expenditures of the repairs to the Canal from December 1st, '77, to April 30th, '78, were--"

"December, 1877 . . . . .	\$31,468 31	
January, 1878 . . . . .	27,154 76	
February, 1878 . . . . .	27,839 99	
March, 1878 . . . . .	42,145 07	
April, 1878 . . . . .	<u>25,315 57</u>	
		\$153,923 70"

"To meet these expenditures the Company borrowed from--"

"Coal Companies . . . . .	\$40,000 00	
From Banks . . . . .	70,000 00	
'    Individuals . . . . .	<u>5,000 00</u>	
		\$115,000 00"

[191] Lewis G. Stanhope, Superintendent, Hagerstown, to A. P. Gorman, President, Annapolis, 23 June 1878 (Flood-November 1877, Sustainability-Dams)

"I wrote you Som day back that I Had Small forse at Dam No 6 and that I would be able to Leve

there in few days I have Since Examined the Dam and the Frisheet Last Winter I think has don it Gradel of harm I think all the filing that was behind the Dam is washed out thir does not seam to be any thing but Stone at the back of the dam whare thir used to be mud now the River Raised Some few days back and as soon as it fall I will Examin it, a Gain Som of the men say that thir is not only Stones in the Dam that Som plases was all washed out if that is the case It will Requir Goodeal of Man I am satisfied the filling Back of the Dam is all washed out W Coudy sais it was in the Same Condition after the 52 fresit The abutment on Virginia of No 5 is washed Some and I think it ought to have Som work before the fall Freshets Begin"

[191] W. E. Porter, Superintendent, Georgetown, to A. P. Gorman, President, Annapolis, 12 August 1878 (Flood Damage-Localized)

"The paving, and some of the side Walls of Frizzles Culvert, are badly washed out, caused by last Saturday's rain. The men were engaged repairing it at the tome. We are working at it now, day and night, and expect to have it done by tomorrow night."

[190] William R. Hutton, Consulting Engineer, Baltimore, to A. P. Gorman, President, 11 October 1878 (Sustainability-Culverts)

"You have heretofore proposed to build culverts at the stream below Frizzels, and other points on Georgetown level: and iron pipes have been suggested. I have made sketches & estimates for iron and masonry."

"Brick and stone masonry will be considerably cheaper, and can be made quite safe, as iron. I estimate a circular 4 ft. culvert below Frizzels, to cost something less than \$1200. Substantially built, A pipe 3 1/2 ft. diameter only, will cost, with masonry end & cross walls, not less than \$1600." "A culvert at 'Redgate' (just below old slope lock) is not practicable and safe, unless at considerable expense."

[190] P. Harriell and John Humbird, Baltimore, to the President and Directors, 12 December 1878 (Flood-November 1877, Harper's Ferry-Sustainability) see also [182] Board of Directors Meeting, 12 December 1878 where the letter is abstracted.

"The undersigned being a special Committee appointed immediately after the disastrous flood of Nov 1877 to take charge of and look after the repairs of the Canal beg leave to report that . . . .  
Owing to the mild winter we were enabled to do much work economically and with great facility and while at the onset we regarded the task with some apprehension yet owing to the fact of the Exceedingly favorable winter we were Enabled with very great additional force to do the repairs in a most substantial and satisfactory manner."

"The greatest damge done at any given point was at Dam No 4 by the destruction of that Dam by washing out the centre of the Dam a distance of two hundred feet down to the foundation which was temporarily repaired by the construction of crib work which has effectually answered the purpose and enabled the Company to Keep up Navigation uninterrupted during the entire season."

"The next point of greatest damage was at Harpers Ferry where for a distance of more than two thousand feet the Entire guard wall at the inlet lock at the Shenendoah was swept away and the canal filled with the wash from the Potomac all of which had to be Excavated and the guard wall replaced."

"At several points the towpath had been swept away for a long distance and the prism of the Canal filled up with debris amounting almost to the re-construction or rebuilding of the Canal for a long distance."

"At the South Branch and below there was large and Expensive damage to the Canal between there and Cumberland. Several Expensive breaks also occurred."

"At many points the Canal had not only to be re-dug and the debris removed but the towpath had to be rebuilt. Near Cumberland at the guard lock the towpath was injured and the Channel filled up. In fact the entire Canal between Cumberland and Harpers Ferry was more or less damaged and many of the lock gates swept out or injured."

"At many points along the towpath the water had overflowed to a depth of from six to fifteen feet. All the towpath bridges were carried away and had to be rebuilt."

"Many locks were damaged and will have to be re-constructed but were made to serve during the present season."

"While it is true that much remains to be done to place the work in a condition to protect it against future extraordinary freshets the fact is, the Canal is today in better condition for navigation than it has been at any period within the last ten years."

The committee indicates that the President and Directors used their own personal credit to push forward repairs, raising the money from the Second National Bank of Cumberland; four coal companies (American, Maryland, Consolidation, and Borden) also advanced \$10,000. The Maryland legislature passed repair bonds to finance the repairs at its 1878 session.

#### 1879

[196] A. P. Gorman, President, to J. J. Moore, Engineer, 20 January 1879 (Flood-November 1877,

Flood-January 1879, Sustainability-Dams)

"Your favor of the 14th giving account of the damage to the Crib at Dam No 4 is at hand. Mr Stanhope was here at the last meeting of the Board and informed me that he had been there with you. I trust you will be able to get in the additional crib and have it filled with stone before the ice passes off the river."

[182] Board of Directors Meeting, 19 February 1879 (Flood-November 1877, Flood-January 1879, Sustainability-Dams)

"On motion of Col Berret the following Resolution was considered and adopted, Resolved that the President be and is hereby instructed to commence the permanent repair of Dam No 4, by replacing the masonry, and to that end he is authorized to have all the debris, backing, and coffer damming to be done by day work, and is further authorized to contract for the masonry to be laid in the best hydraulic cement, including stone, not to exceed eight dollars per perch."

[180] William R. Hutton, Consulting Engineer, Baltimore, to A. P. Gorman, President, 18 March 1879 (Flood-November 1877, Flood-January 1879, Sustainability-Dams)

"I send specification of the manner of repairing Dam No. 4 with following explanation." [The following is the explanation rather than the specifications.]

"The first object of the Company is to have the work thoroughly well done. The second that it shall be done at the lowest cost not incompatible with the primary object."

"The great element of uncertainty in a preliminary estimate of cost is due to the magnitude and uncertain periods of the floods in the river, which cannot be foreseen. They affect chiefly the coffer dams, and pumping. A contractor, in making a proposal for such work, must fix a high price to cover possible or probable contingencies, and then he may either fail in consequence of extraordinary circumstances, or may make excessive profits in a favorable season."

"It is therefore most economical for the company to bear these risks and pay the actual expenses of the work affected by them, furnishing the material and having the labor performed by its own men under its own experienced superintendents."

What follows is a most fascinating treatise of principles of when and how to most effectively let contracts for repairs and when the company should do them with its own employees.

[196] A. P. Gorman, President, to J. J. Moore, Engineer, 14 May 1879 (Flood-November 1877, Flood Damage Prevention-Accomplished, Harper's Ferry-Sustainability)

"I wish you would make a report relating to the construction of the Wall from the Lock above the Harpers Ferry Bridge to Bull Ring Lock giving the length, height and width of same. The number of perches of stone contained in it and the number of yards of masonry put up at the Lock in cement and the height to which you raised the wall above the old wall and figure out as well as you can the cost of the Entire improvement, including wall, bridge, and filling up and making towpath between the two locks."

[LIB-PHP] Fifty-First Annual Report of the President and Directors of the Chesapeake and Ohio Canal Company to the Stockholders, June 2nd, 1879 (Annapolis, Md.: Maryland Republican Steam Press, 1879) (Flood-November 1877, Flood Damage Prevention-Accomplished, Harper's Ferry-Sustainability)

The President, A. P. Gorman, reported (pp. 8-9):

"The canal from Georgetown to Cumberland is now in very good condition, all parts that were damaged by the flood have been thoroughly repaired except the breach in Dam No. 4. Not only has the work been placed in as good condition as it was prior to the damage, but, at several points where the greatest damage was done, notably at Harper's Ferry, extensive improvements have been made by raising the tow-path and constructing high retaining walls so as to prevent damage from like freshets hereafter."

"The amount expended on repairs of damage	
in November and December, 1877 was . . .	\$ 37,437 67
The amount expended during 1878 was . . . . .	161,752 79
Making total expenditures on account of damage	
to the canal from date of to December 31st, 1878	_____
	\$191,190 46"

"Of the work yet remaining to be done we are now engaged in preparing to restore the permanent masonry at Dam No. 4, and we hope, if we are favored with low water in the Potomac, to complete that work during the present season."

"The estimate of the engineers, who examined the work immediately after the damage, reported that it would cost to place the Canal in condition for navigation, exclusive of the cost of repairing Dams Nos. 1, 2, 3, and 4, \$169,229.88, and including the dams, from \$225,000 to the \$250,000; as heretofore stated our expenditures on these accounts to January 1st has been \$199,190.46, which amount includes expenditures on Dams Nos. 1, 2, and 3 and the cribbing at Dam No. 4 and betterments made at Harper's Ferry and other points on the line of Canal. Deducting the



expenditures made on these accounts, it appears that the actual cost of placing the Canal in good navigable condition was within the estimate made by the engineers."

"Not only was the work cheaply, but it was well done, no portion of the new embankments shows any signs of weakness or has given the slightest trouble during the entire season of navigation."

[190] John Humbird, B. B. Crawford, P. Hamill, Directors, Annapolis, to President, A. P. Gorman, 27 September 1879 (Flood-November 1877, Flood Damage Prevention-Accomplished, Sustainability-Dams) see also [182] Board of Directors Meeting, 26 November 1879 where the letter is abstracted.

"Dam No 4"

"Your committee, as instructed, made a thorough inspection and examination of the repairs of the work, now near completion in company with Mr G W Smith the Engineer of the Company, as well as Mr Stanhope, the Contractor. The low stage of the water in the Potomac afforded the best possible facilities for the examination of the work. One hundred and ninety two (192) feet of the center or breast of the dam has been rebuilt from its foundation."

"This work was commenced on the 16th of July last and will be completed by the 10th of October next. Some time will be required in filling in the barcking to the dam, securing its permanence against future occurrences by floods or ice freshets. The new work has been built in the most permanent manner of the best material. The stones used are of very large size, squared and carefully laid in the best character of cement. We witnessed the laying of some of the stones. The entire repairs to the dam, in the judgment of your committee, is in all respects well done, and reflects much credit on the Company's Engineer Mr Smith as well as the Contractor Mr Stanhope."

#### 1880

[LIB-PHP] Report of the Joint Standing Committee Appointed Under Article 3, Section 24, of the Maryland Constitution, in the Chesapeake and Ohio Canal Investigation (Annapolis, Md.: W. T. Iglehalt and Company, State Printers, 1880)

[Testimony of W. J. Booth, General Superintendent of the American Coal Company, 2 March 1880, pp. 55-56] (Flood-November 1877, Harper's Ferry-Sustainability)

"Q. Will you be good enough to let us know whether you have any knowledge of the extent of the damage done by the flood of November, 1877, if so, state what the damage was?"

"A. I only know of the damage done about Harper's Ferry, below and above, passing over the railroad in various places. Of course I did not visit the breaks at the various places. I was at Dam No. 4 but for a few moments. I know nothing of the damage there; the water was still up."

"Q. Can you give us any knowledge of the extent or the character of that breakage?"

"A. At Harper's Ferry I could. It was really very bad there. I was there directly after the water had fallen, and it looked to me as if the canal was gone forever."

"Q. Washed away?"

"A. Yes sir."

"Q.. Now, was the damage done by that flood promptly and thoroughly repaired."

"A. It was beyond question. There never was so great a break. I have been connected with this business, as I said before, and with the canal for about twenty-nine years, and I know there never was so large a break as that or anything like it."

[Testimony of Frederick Mertens, Boat Builder in Cumberland, 4 March 1880, pp. 93-94] (Flood-November 1877, Harper's Ferry-Sustainability)

"Q. Could you from [form?] any idea of what the difference in the damage to the canal was in 1852, and what it was in 1877?"

"A. It could not have been but one-half. I do not know what it cost to repair it at that time. I do not think it could have been more than one-third then. It was not then like this time. I cannot recollect, however, very distinctly about it, for you know it was 25 years afterward."

"Q. When you say one-third, do you mean to say that its damage to the canal in 1852 was not more than one-third equal to what it was in 1877?"

"A. Yes sir, I believe that. I went down with the boat, and the water had been very high. There were some boats way up in the top trees; hanging there."

"Q. Haw [How?] were the repairs made in 1852 with reference to promptness, and the time in

which the canal was gotten in running order again, in comparison with which such repairs were made in 1877?"

"A. That is more than I can answer. I was young at that time, and my mind was altogether in the yard. I did not then think so much of the canal. I know it took some time, but I do not know exactly how much."

"Q. As a practical man, as I take you to be, as I believe you came to Cumberland almost with nothing, about 1852, (and your successful career since is well-known;) as a practical man, did you, in your opinion, think it possible that that canal could be put in order for boats to be run upon it in the time it was done in 1877?"

"A. I thought it could be done if funds could be provided, but I did not think they could be furnished, and therefore I feared that was the end of the canal."

"Q. Even if the money could be provided, was it your opinion, as a practical business man, that that work could be put in operation in the time it was?"

"A. I must say it was done quicker than I expected it to be done. It was done quicker than I had any idea it could be done. I did not think it was possible to have it ready for navigation in the spring. I thought it would take at least until May."

"Q. Was it well done when it was completed?"

"A. Yes sir, from all I saw."

"Q. No breaks have occurred where these washes were to any account."

"A. No sir, only some little things."

"Q. Now, you said something about that improvement; that the canal was better at Harper's Ferry than it was before. Tell me, please, in what respect it was improved at Harper's Ferry?"

"A. At Harper's Ferry the Potomac River courses right up to the bank. They put in a nice stone dam right along: a nice wall. It looks as if it was built well. I walked along there just last week."

"Q. It is raised higher than the old wall too, isn't it?"

"A. Yes, sir, I believe it is."

[Testimony of Gilmor Meredith, Coal Shipper in Baltimore, 11 March 1880, p. 116] (Flood Damage Prevention-Telephone)

"Q. Do you regard the use of the telephone along the canal as adding materially to its facilities for transportation?"

"A. Yes sir, I consider that a very great improvement. There are certain points on the canal that could not be reached except by driving or riding on horseback on the tow-path, and now they can be reached by this telephone in almost a moment; and the breaks that occur can be located and repair parties hastened to the different points where they are needed."

"Q. What should you say in regard to the expenditure then for the purpose of erecting a telephone?"

"A. I should say it was a very judicious expenditure."

[Testimony of John MacArthur, Carpenter and Boatman in Harper's Ferry, 11 March 1880, pp. 124-25] (Flood-November 1877)

"Q. When the freshet [of November 1877] occurred, what have you to say as to the promptness with which the breaks were repaired?"

"A. I think they were repaired as promptly as they could have been. Every person they could get was put to work, and the teams and wagons, carts and wheel-barrows were provided, and I always thought they were very prompt in fixing it. They worked night and day, as a general thing, and did not mind the rain or snow, or anything else."

"Q. Were they not more prompt in making the repairs than was the case in former years?"

"A. I believe they were."

"Q. Why were they?"

"A. Because they worked night and day."

"Q. Has not the canal company some modern improvements in use that enable it to repair a break quicker, and send men quicker to a given point for that purpose?"

"A. They appear always to have stock of material on hand ready for any emergency; formerly they did not."

"Q. They did not have telegraphs or telephones?"

"A. No sir, they did not."

"Q. Have they got them now?"

"A. They have it part of the way now. I do not know whether they have all the way or not. They have it on the part of the canal where I live."

[Testimony of W. J. Knott, Boatman in Jefferson County, W.Va., 11 March 1880, p. 140]  
(Flood-November 1877, Harper's Ferry-Sustainability)

"Q. Did you see the freshet of 1877?"

"A. I was at Harper's Ferry and saw it there."

"Q. Did you see where that large place was washed out?"

"A. Yes sir."

"Q. What did you think, when that occurred, as to the future of the canal?"

"A. It looked pretty rough. It did not look very encouraging, and a good many people felt like giving it all up, but I told them they would certainly not throw away what they had in the canal, and not risk some more on it. Some of the people thought they never could fix it, but I told them I thought they could."

"Q. Were the repairs done well or badly."

"A. They were done very well, I considered."

"Q. Did they do it quickly, or were they a long time about it."

"A. They did it as quick as they could. I don't believe they could have done it any better."

"Q. How does its condition at that point compare with what it was before the freshet?"

"A. It is in a better condition now than it was before. They have put up a right smart of banks and walls to fend off the water, which was not there before."

"Q. So that it is less liable to break again."

"A. Yes sir, that would be the intention of it, and it would have that effect. I think if they would spend a little more money there, it would be to some advantage."

[Testimony of Henry Clay Winship, Coal Shipper and Commission Merchant in Georgetown, 16 March 1880, pp. 158-59] (Flood-November 1877)

"Q. Can you tell us anything about that freshet [November 1877], and did you see the damage done?"

"A. I did not see it at the time when it was done, but I know what damage was done, and where it came near ruining me and other people in Georgetown along the line of the Canal."

"Q. Did you know of the great break, and did you see that?"

"A. I went up to the break above Georgetown. There were a half a dozen breaks. Two of these were big breaks."

"Q. What did you think when you saw them as to the probable restoration of it?"

"A. I think that my impression was that the canal was just about gone up. I came away very much discouraged, sir, but by the time business opened in the spring the canal was repaired. I think there was a delay of about 15 or 20 days in the spring, and that was all. We commenced shipping that year about the first of May, when we generally commenced about the first of April. I think it was the first of May. I suppose the delay caused by that break really did not exceed a month."

"Q. What have you to say about the manner in which it was repaired, and the time?"

"A. I looked upon the restoration as to the time taken as a wonderful feat. The canal was repaired very much quicker and very much better than I ever dreamed it was possible to be done. I have always regarded it as something that any management might be proud of. I do think that."

[Testimony of Isaac R. Mans, Former Division Superintendent of the Canal in Georgetown, 16 March 1880, pp. 178-87] (Flood-November 1877, Flood Damage Prevention-Telephone, Maintenance-General)

"By Mr. Williams:"

"Q. You were there when the great freshet [of November 1877] occurred?"

"A. I repaired some of those breaks. I was not there when the freshet occurred."

"Q. But you were in office?"

"A. No."

"Q. In the employ of the canal company at the time?"

"A. No. I went there on the 19th of July--I think to mend some of those large breaks, off Seneca."

"Q. That was after the freshet?"

"A. Yes."

"Q. Can you tell us how soon it was repaired?"

"A. Well, the canal was repaired a great deal quicker than I thought it could be done. The water was turned in almost as quickly as usual."

"Q. What have you to say about the skill with which it was done?"

"A. I think it was done very skillfully. It has all stood remarkably well."

"Q. What about the cost at which it was done?"

"A. I do not know the cost of it, only the portion that I mended."

"Q. Was it extravagant, I mean?"

"A. No, it was done very cheaply, very cheaply."

"Q. Your part of it embraced Montgomery County?"

"A. Yes, most of it, a portion of Montgomery county?"

"Q. During the time when you have been there it has been alleged that the canal company participated in politics. Do you know anything about that?"

"A. I have never had any one in authority to say any thing to me about politics."

"Q. Were you upon the canal at the time of the controversy between Mr. Peter and Mr. Prettyman?"

"A. I was."

"Q. What side did the canal company take in that controversy?"

"A. I cannot say. Some were for Peter and some for Prettyman."

"Q. I mean the company as a company, did it interfere?"

"A. No."

"Q. Though its officials were for one, some of them and some for the other?"

"A. Yes sir, some I heard were for Prettyman and some for Peter."

"Q. Were the official voters there?"

"A. Yes."

"By Mr. Lancaster:"

"Q. Were the laborers or hands voters there?"

"A. Most of them."

"Q. No political influence that you were aware of was used over these laborers or hands?"

"A. No sir."

"Q. No hands were employed or discharged because they would vote one way or the other."

"A. No sir."

"By Mr. Williams:"

"Q. Do you know whether any outside laborers were brought on there for any purpose connected with the controversy."

"A. No sir. Just before the primary meeting there was a very large culvert up the Little Monocacy that was under me. It was in very bad condition, and it had to be done very quickly on account of the freshet, and we employed a good many hands from Montgomery Co. and Virginia and Frederick Co., any where we could get them, but the principal portion of them were discharged the 17th day of August, and all the extra men were discharged before the primary meeting took place."

"Q. It has been stated positively that for some purpose or another, extra hands were brought there and employed on the canal."

"A. Not to my knowledge for any political purpose."

"Q. Could such a purpose have been carried out and such a number of hands been there without your knowledge?"

"A. No sir."

"Q. Who employed those hands?"

"A. I did."

"Q. What instructions did the company give you as to the politics."

"A. None in the world whatever."

"Q. What orders were given to the men themselves in reference to this?"

"A. None that I am aware of at all."

"Q. What part did they take in it."

"A. Well, there was none of the men that voted that I know of, because they were all discharged before the primary meeting."

"Q. When discharged did they remain on the canal or go away."

"A. No, go away to Virginia or Frederick County wherever they belonged."

"Q. Then what have you to say about that charge?"

"A. That I know that charge is not correct. So far as I am interested in it so far as I know; as I suppose that is the intention to have me testify about that matter of the men employed up at the culvert--the charge made."

"Q. Could it have occurred and you been ignorant of it? That is the question."

"A. No sir."

"By Mr. Lancaster:"

"Q. You say you did not exercise any political influence directly or indirectly, merely employed them as laborers?"

"A. Yes sir."

"Q. Was Mr. Gorman brought into direct communication with those men?"

"A. No sir. I do not know that Mr. Gorman was up there at that time. I know he was not."

"Q. Then so far as you know these men who were engaged on the canal had nothing to do but perform their labor?"

"A. Yes."

"Q. They were employed by you?"

"A. We had republicans and we had democrats; we made no difference in regard to politics; we hired any person we could. The work had to be done quick on account of that freshet."

"Q. How do you know that any of them were republicans?"

"A. I know that some of them were republicans, because I think there were several darkies there; they hardly ever vote the democratic ticket."

"Q. That is the only reasons that you had to suppose they were republicans?"

"A. I suppose others were there too; we did not ask about their politics, whether democrats or republicans. We employed every person that came along until we had the quantity of hands we wanted."

"By Mr. Williams"

"Q. And as soon as the culvert was done?"

"A. We discharged all but the regular hands."

"Q. And that was some days before the primary meeting?"

"A. Most of them were discharged on the 17th day of August. I think that there were ten kept until about the 30th, and they were discharged on the 30th and the primary election was on the 31st."

"Q. Did the regular people go to the primaries?"

"A. Suppose they did. I do not vote in that portion of the county."

"Q. Do you know how the regular people voted?"

"A. No sir, I do not. I suppose some of them voted one way and some another. I did not see them vote."

"Q. Did you ever hear them discuss it among themselves, so as to ascertain in that way?"

"A. I heard some of them say they would vote for Pete, and some say they would vote for Mr. Prettyman, and I have no doubt they did."

"Q. Can you give us some idea of the extent of those large breaks at the time of the freshet, and how many of them there were?"

"A. I could not tell you how many, but a great many."

"Q. Particularly the one at Seneca?"

"A. There were two very large breaks, one at Seneca great lock and another about 1/2 to 3/4 of a mile below that. They were both very extensive breaks. One I judge was about 350 yards long, and the canal was filled up with gravel, sand and stones up to its level, and the tow path was washed right out, and the gravel and sand left in its place. You see when the water came in it washed it in, and then when the water was falling it went out and had covered the whole thing over."

"Q. When you saw it what did you think?"

"A. I thought it was a pretty ugly place."

"Q. Did you expect to see the canal restored again?"

"A. Well, I thought it was a hard looking show."

"Q. Since this restoration what do you think?"

"A. I think it is in very good condition; had less trouble on the canal last summer than I ever knew of, their being on the canal so far as transportation was concerned, boating."

"Q. Was that restoration a credible one to the company or what?"

"A. I think it was a great credit to the company."

"Q. As you have been in the canal employment under all these administrations, how does the present administration contrast with that of former ones?"

"A. As well as any that I ever knew, and I think better sir."

"Q. In whose interests do you think the canal has been run since 1872?"

"A. In the canal company's interests, the bondholders, and the interest of the State."

"Q. Have you any decided opinion about the economy with which that restoration was accomplished?"

"A. I have sir."

"Q. Can you tell us what it is?"

"A. It was done as economically I think as it could have been. Men worked early and late, and mended it under considerable disadvantage. The material had to be hauled a considerable distance, and at the place where the lower break was there was nothing but rocks, everything had to be hauled a considerable distance, I believe not less than about three-quarters of a mile for any carts. I commenced--well, I suppose I did not commence doing anything at the breaks of any kind

for a week after the 19th of July, and on the 20th day of March we turned the water in at the great lock."

"Q. Did it cost at the end more or less than you supposed?"

"A. It cost less than I supposed it would have cost. Besides that we had to build a wall a considerable distance, and had to quarry the stone for it."

"Q. During all this time did the officials of the company visit the work to see how it was getting along?"

"A. Yes sir. Mr. Gorman himself was there. I saw him there and I have seen others there."

"Q. Other officials of the canal company? They supervised it you mean?"

"A. They would come and look at it. The engineer was there looking at it examining the work."

"Q. All that time?"

"A. No, not all that time. There were so many breaks, he could not be at one place all the time. There were a great many breaks."

"Q. What instructions did the president of the company give you as the employment of men, the prices of wages?"

"A. He gave me prices, told me what to pay men for laboring, and what to pay for horses and carts."

"Q. And how many to employ. Did he impose any restrictions upon you?"

"A. Yes, he did, but I went beyond it a little sometimes."

"Q. What were the restrictions?"

"A. Not to employ any more hands than were really necessary. I do not exactly remember the number, but he stated some number at each break."

"Q. What other restrictions?"

"A. I don't remember now."

"Q. Did he restrict you as to prices?"

"A. Yes. One dollar a day, and two dollars for carts and horses, a cart and driver."

"Q. Under these restrictions you selected the workmen?"

"A. I did sir. They said the canal having a scarcity of funds and greatly damaged it had to be done economically."

"Q. Did the engineer give you assistance."

"A. I do not know that he did."

"Q. Or instructions."

"A. The engineer would come and look at the work and talk about it."

"Q. Who gave the instructions as to how it was to be done, the constructive part of it I mean?"

"A. The engineer would come and look at it, and see how it was progressing and pronounce it good, done right--said the work was done right."

"Q. You yourself knew what was to be done?"

"A. Yes sir, I did."

"Q. And you did it accordingly, and the engineer accepted of it as you might go along."

"A. Yes."

"Q. Could men have been got for less wages, also carts?"

"A. I think they earned their money, all they got. It was a very open winter, and they had very heavy hauling to do. Starting in the morning on level ground by 12 o'clock some of the axles would drag in the mud and catch it, so we had to corduroy the roads that we hauled over."

"Q. The restoration was made under difficulties."

"A. Yes it was."

"Q. Do you think it was done as well and as economically as it could be."

"A. I think so. I do not think it could have been done more economically."

"Q. What is the depth of water now in the canal as compared with former years."

"A. I do not hear any complaint. I think two boats had on 30 tons, other 19 tons, 18 tons, &c."

"Q. Could they have had that on in former years?"

"A. Well, I do not know. I have not heard the boatmen complain, and if there is anything wrong they are very apt to complain."

"Q. Then the transportation on the canal is as good as it has ever been?"

"A. I think so."

"Q. What improvements could there be?"

"A. I do not know that there could be any improvements. They have good facilities for cleaning out a large bar--a mud machine, and everything of that kind. Large sand bars wash in. I should think the machine took it out very fast. They always have gates, so that when a gate gets broken out they have one to put in its place, but when I was there it was not so--formerly."

"Q. You were a superintendent under Mr. Clarke [the canal president before Gorman]?"

"A. I was."

"Q. Do you know what amount of material was purchased under this administration to be kept in readiness for all this?"

"A. Sometimes they were very scarce."

"Q. Has it been similarly scarce since Mr. Gorman's administration?"

"A. We always have had plenty--always had gates ready."

"Q. Did Mr. Clarke have gates ready?"

"A. Well, I have known a gate to be broken, and he would have to go to the woods and cut a big tree and hew a heel post for a gate."

"Q. About the purchase of material, which administration bought the more for this purpose?"

"A. Of course, Mr. Gorman's must have bought the more. I suppose so."

"Q. How would you contrast the two administrations?"

"A. I contrast Mr. Gorman's equal to any I ever knew, and the canal is better."

"By Mr. Lancaster:"

"Q. You mean to say Mr. Clarke did not anticipate accidents, or did not prepare for them generally."

"A. Mr. Clarke left that for somebody else, to buy the materials, and they would neglect to do it sometimes. I know that he would have to go up and down the canal to find old paddles that had been used to put it when a paddle was broken--that was under Mr. Clarke's administration. He always kept us pretty close in materials for the repair of the canal."

"Q. He was very economical?"

"A. Yes, he was very economical in that way."

"Q. Do you think that economy was excessive, and not to the interests of the canal?"

"A. I think it was not to the interest of the canal; because if you have got to go to the woods to cut down timber to make a gate, while navigation is stopped, it is a great loss to the canal; but if you have the materials, even when you have not got them ready, it would not stop the canal so long; but we always had then ready to put in a gate at any place."

"Q. That is now?"

"A. Yes. When I left the canal."

"Q. You keep seasoned timber on hand now?"

"A. Yes. They have sawed timber on hand."

"By Mr. Williams:"

"Q. What have you to say about the use of the telephone?"



"A. I think it is a great thing. I will tell you why: For instance, you want to send a message, you have got a man on horseback to send 15 or 20 miles, but all you have to do is talk on the telephone, and you have it that quick. It saves that man and horse and time, and if anything wrong you are notified immediately."

"By Mr. Lancaster:"

"Q. You think the cost of the telephone is comparatively nothing, when compared with its usefulness to the canal interest?"

"A. I think not, sir. I think it is a very useful thing."

"By Mr. Snowden:"

"Q. Is it a protection in case of a rise of the river?"

"A. In case of rise of the water they can telephone now, and you can make all preparations."

[Testimony of William H. Kenney, Merchant Miller in Georgetown, 17 March 1880, pp. 189-90]  
(Flood Damage Prevention-Accomplished)

"Q. Have they built a wall along the canal?"

"A. Now, that you call my attention to it, yes. They made a most excellent wall from the aqueduct bridge crossing to Alexandria, down to a considerable distance, passing my mill, and Welch's mill some distance."

"Q. What effect did that have upon the width and depth of the canal?"

"A. It did not affect the width and depth. There was very little room there to widen it at that particular place. I think my mill is not the width of this room from the canal, so they could not widen it."

"Q. What was the necessity for the erection of the wall if it did not widen it?"

"A. The old wall was very defective. There is a very high bank, and I think there would be danger of breaking through, and we always felt an apprehension about my mill. It did break through before I bought that mill. I bought it 10 years ago, and my mill is just within a hundred yards, or less, of the Alexandria aqueduct, of the front towards Washington, and at one freshet, the canal broke through there and carried away a small portion of the mill, and the canal company paid damages, and we were always apprehensive of a break there, a descent, I suppose, of 20 or 30 feet. The embankment to the canal prevents the canal from breaking through."

[Testimony of Edward Mulvaney, Canal Shipping Agent in Cumberland, and a former (and future) Division Superintendent, 18 March 1880, pp. 212-17, 223-26] (Flood-November 1877, Maintenance-General, Harper's Ferry-Sustainability)

(pp. 212-17)

"Q. Can you give us an account of the amount of supplies or material along the line of the canal during these different administrations, commencing with Mr. Gordon's administration?"

"A. At those times the officers were very strict all the time, and were urging me to economize, and not to have anything more on the canal than what was really necessary. I had but a very limited supply, but I always managed to have enough on hand for whatever emergencies might occur."

"Q. Have these supplies diminished as a rule, or increased?"

"A. President Gorman's instructions were to keep sufficient supplies so distributed along the line of the canal as to remedy anything that might occur to obstruct navigation. Mr. Gorman urged all the time that a full supply should be kept on hand."

"Q. In the event of ordinary breaks are they repaired with as much efficiency and promptness as before?"

"A. Yes sir, and with a great deal more promptness than before."

"Q. Can you give us any details in regard to that matter?"

"A. Formerly, whenever an obstruction to the canal occurred, the hands were notified to go there with tools, carts, &c., which were always in readiness for that purpose. They were all put on the scows and transported to the point where they were needed, and the work commenced immediately, to repair the damage."

"Q. How were tidings sent to you where repairs were needed at that time?"

"A. It was done as best it could be by messenger on horseback; or we could get information from

parties coming along the canal, or in whatever way we could. My instructions always were to give notice as possible, and sometimes we could send a force there on the railroad where it was convenient. There was a telegraph office at Dam No. 12 [?], and if parties could get to that place they could send us word where the men were needed."

"Q. How do you attend to that matter now?"

"A. Now that is all done by telephone. You can be in constant communication with all parts of the canal instantly now."

"Q. With this liberal supply of material, and this telephone, how does the condition of things now compare with what it was under President Clarke and Gordon?"

"A. At several times there was an obstruction of the canal, that delayed navigation for the want of knowledge of it. There was a delay of twenty-four hours sometimes, from the fact that the damage was not known. In several cases the navigation was delayed for a day, for want of knowledge of what was wrong. Now, whenever anything occurs, we are notified immediately of it by telephone, and in this way there is no possibility of the navigation of the canal being interrupted or delayed, because the superintendents have knowledge of it at once, and can send a force to the point immediately. In former times, when repairs were needed the reports were frequently incorrect as to the actual work to be done. Perhaps a lock gate would break out, and it would be represented as being a very serious damage to the canal, and we would make our preparations accordingly on a large scale to repair the damage, and we would get to the point we would find but very little to be remedied, and the expense of preparation was all for nothing. All this has been remedied by the use of the telephone. You can make these particular inquiries in regard to the matter and go to the place prepared to remedy whatever damage has been done."

"Q. State if it is of use in regulating the supply of water, in preventing an over-supply or under-supply of water?"

"A. By the use of the telephone, the water can be regulated on the levels by the feeder at the upper end of the division. At Cumberland, there is a feeder which feeds 50 miles of the canal, and there are telephone stations at regular distances along the canal, and they regulate the supply by sending word through this telephone as to the amount of water to be let in from this feeder. and therefore, they need not let more on than is necessary. If the water is let on too much after a rain, it is likely to overflow some of the levels and thereby cause a breach in the canal. But if the levels are overflowed now they can be notified immediately by telephone and the water let off, and it will recede immediately. In case there is not sufficient water on the levels, they can be notified and the flow can be increased at once. If there is a leak on the canal, by giving immediate notice by the telephone, you may get men, there who understand it, who will stop the leak, when, if it was neglected, it might cause a break in the canal. The water as it washes through the leak, cuts its way and gets larger and larger, and of course, the water in the level commences to fall off, and the party at the upper end of the level not knowing what is wrong, as was the case formerly, and seeing the level falling off, would generally turn more water on from the feeder in order to keep his level up. He was not aware that it was caused by the water going through the break, because it may be 10 or 14 miles below him, and he continues to feed water into the level to keep the level up, and that makes it so much the worse. It is like putting more fuel on the fire. This, of course, was from want of knowledge of what was wrong."

"Q. So that time in all these cases is all important?"

"A. Yes sir, most certainly it is."

"Q. When one break occurs, the time saved by the use of the telephone in sending a force there to make the repairs, might save the cost of the telephone?"

"A. Yes sir. I have known breaks in the canal to occur from a want of knowledge, where, if the telephone had been in use, it would have saved enough money to have paid for the whole thing. I have assisted in repairing breaks under the direction of Mr. Gorman, and I think the amount that was saved would pay for the putting up of the telephone."

"Q. the cost of the telephone might be saved in the case of repairing one single break?"

"A. Yes, sir, Mr. Gorman has a system of concentrating all the force at the different points quickly by the use of the telephone, which was never done before. In one case, I was sent to Antietam to repair a break where there was a great deal of damage done to the canal, and Mr. Gorman stayed there personally, and by his direction we all went to work, and I think that the amount saved to the canal company by the promptness with which the work was done, would entirely cover the cost of the putting up of the telephone."

"Q. Explain the benefits arising from the concentration of regular hands at points where repairs are necessary?"

"A. In a great many cases where breaks were attempted to be repaired by inexperienced hands, they found that as soon as the water was let in, that in place of remedying the break, they had only made it worse--that they hadn't made it sufficiently strong to hold the water, and it would wash out again. This was because inexperienced men were employed.. And one of the advantages of the use of the telephone is in having experienced hands ready to start out and to do the work in a proper manner, so that it will not give out. There is a system of repairing breaks, which ought to be thoroughly understood in order to make the work of any advantage. The banks must be properly sloped, so that when the ground settles, instead of opening and cracking, it will close

up. If the banks are all straight, when they settle it cracks away through the new earth and the water will run through it and wash it all out."

"Q. You are able then not only able to concentrate labor but to concentrate skilled labor."

"A. Yes sir, that is it. That occurred at the break I have spoken of, and not only at that but at several other breaks. In repairing a break it is important to have the most skillful men you can get, so that when it is finished it will hold the water. It requires skill to put in the new material so that it will hold water. The telephone will enable you to concentrate the best force you have to repair it."

"Q. The benefits arising from the employment of skilled labor in such cases would amount to sufficient to pay for the use of the telephone, would it not?"

"A. The proper repairing of a leak and the preventing of a break might save enough to pay for the cost of the telephone."

"Q. How many superintendents were employed on the canal in 1869 and 1870."

"A. At one time there seven, and then they were reduced to five. In 1869 or 1870 there were about seven superintendents employed."

"Q. How many are there now?"

"A. Only two."

"Q. How has the canal company been able to reduce the number from seven to two; explain that?"

"A. The telephone enables us to hear from all parts of the canal so quickly that they can get along with the reduced number. They have less trouble now in knowing the condition of the whole canal than they formerly did in ascertaining the condition of even 10 miles of it, because the superintendents can communicate from their own houses or from the different points where they may be traveling along, and can be informed of the condition of the whole length of the canal."

"Q. Then the telephone has enabled the company to reduce the number of officers and superintendents employed?"

"A. Yes sir; it can get along with fewer of them now. Before, it never had had less than five superintendents, and they had had as many as seven, but now they have only two."

"Q. Has it enabled the company to also reduce the number of the employees and gangs of men necessary to keep the canal in repair, had it diminished or increased them?"

"A. The gangs have been regulated and put under a system, so that they have been diminished in number. They have been kept energetically at work, but whether the telephone has caused that or not I could not say."

"Q. Has not the use of the telephone by enabling the company to concentrate its laborers, diminished the necessity for extra labor and brought the force more quickly and certainly under control?"

"A. Yes sir, it has done that. You can concentrate the regular laborers at given points, and you can notify other regular laborers at other points, and concentrate them at one place whenever it is necessary. In former times if you wished for a large force of men suddenly you would be obliged to employ extra labor."

(pp. 223-26)

"Q. Do you know anything of the great freshet that occurred in 1877?"

"A. I was in the employ of the New Central Coal Company at the time, and I had instructions from the company immediately after the water receded to travel over the canal and ascertain the condition of their boats and coal. In that way, in company with two other gentlemen, I road from Cumberland to Harper's Ferry on horseback. I think we were about the first that went along that way after the waters had receded. The canal was washed and broken into almost every conceivable shape that you could conceive a canal to be in. I think there were between twenty-five and thirty large breaks where it washed down to the bottom of the canal and they were probably between sixty and one hundred feet wide, and were washed deep between those points. In addition to that there were miles of the tow-path washed down a foot or two in different places where the water washed in from the canal, and washed a foot or two in different places from the top of the canal, and filled up the bed of the canal. There was also a great deal of stuff washed in from the river. In one place, for about a mile and a half, the canal was filled up level, and you could hardly know that there was a canal there. It was filled up with stuff washed from the guard-bank at Dam No. 4 into the canal. The guard-banks and the banks generally were washed. The boats were all washed in all directions out of the canal--some in the river, and some lying broken on the tow-path, and some in the fields, and generally washed about as they would be from a freshet of that kind. I saw a large breach in Dam No. 4 that I passed by, and I saw that the canal, the outside walls, and so on, was generally washed and damaged to very great extent."

"About Harper's Ferry, there at the feeder, the guard-bank, or a greater portion of it, was entirely washed away, and the guard-lock and the outlet to the river entirely filled up. The

protection-walls were all washed down, and the walls of the locks were caved in and the stone fallen into the canal, and it was a perfect wreck generally."

"Q. What was your opinion of about it at that time; did you ever expect to see it a canal again?"

"A. Well, I was surprised to think that it was repaired so quickly. My opinion of it was that it would take at least a year, with the best management that could happen under the circumstances, to restore it. I was very much surprised at the prompt manner in which it was repaired. During the time of the repairs I was along the canal attending to the New Central Coal Company's interests and to their coal, which was scattered about at different points in the boats, and I had a chance to observe the manner in which the repairs were going on, and I thought there was great diligence used by everybody I saw connected with it, and that the repairs were going on better than I ever expected to see them."

"Q. Did you see the canal when it was entirely finished?"

"A. Yes sir, I did."

"Q. What did you think of it as a job?"

"A. I thought it was a good one. I am positive it was a good job, and much better than I expected to see. I expected to hear of some the breaks giving out again and some of the work giving way, but I never have heard of its giving way; it has stood from that day to this."

"Q. Do you know anything about its cost?"

"A. No sir, I do not."

"Q. You cannot say whether it cost more or less than it ought to?"

"A. No sir, I cannot say. I was not employed by the canal company at the time, and I do not know."

"Q. What have you to say about the expensiveness of that kind of work, and especially where it was done in a hurry?"

"A. At the time I saw the men working, I knew from the manner in which they had to work, that in order to do quick work and get in done in the winter, they had to work at some disadvantage. It was done under the disadvantage, of course, of having to be done in the winter season."

"Q. Working under such disadvantage, and working quickly and in a hurry, and working well, of course increased the cost over the cost of doing such work in a more leisurely way?"

"A. Yes sir. If they could have taken advantage of the weather, and have worked only in fine weather, they could in some cases have done the work at one-half the expense it would cost to do it in bad, wet weather. Where you have to do such work as that in the mud, and in some cases work at night, you cannot work the men to much advantage; and in some cases it would cost twice as much as it would if you could take advantage of fine weather, and do it at your leisure."

"Q. Do you know of cases where advantage was taken of the canal company by laborers because of the pressing necessities requiring immediate attention?"

"A. Of course the laborers took all advantage they possibly could by charging a high rate per day."

"Q. By reason of the canal company being in such straits?"

"A. Yes sir, knowing that the company were compelled by the condition of things to employ them."

"Q. What was your report which you made to the coal company who employed you on that occasion?"

"A. My report to the coal company was that the canal was washed in a bad condition, and I could not form an estimate of when it would be repaired, but in all probability I thought it would not be repaired during the succeeding summer. In fact, we had doubts, understanding the condition of the canal pecuniarily, as to the probability of raising funds to repair the canal, and whether they would attempt to repair it. We knew it would cost an immense sum, and we supposed that the finances of the canal were such as would have to wait until they could raise the necessary means, and we were surprised to think they undertook to repair it as they did. There was nobody who thought for a moment that they would undertake to repair the canal immediately, and to repair the enormous amount of damage that was done."

[Testimony of Theodore Embrey, Coal Merchant from Williamsport, 25 March 1880, pp. 294-95]  
(Flood-November 1877)

*By Mr. Williams:*

"Q. Were you on the canal at the time of this great freshet [November 1877]?"

"A. I was."

"Q. Did you see the damage done at the great break?"

"A. I saw a great deal of damage done."

"Q. At which of those breaks."

"A. I saw them on our division--the Harper's Ferry division and the Cumberland division."

"Q. What did you think when you saw them?"

"A. I considered the canal was very badly damaged.."

"Q. Did you ever expect to see it restored again."

"A. Well, I had my doubts about it at the time, and so stated, I believe, on several occasions."

"Q. Did you see the men at work upon it?"

"A. Oh, yes sir."

"Q. Did you see it after it was restored?"

"A. Yes sir."

"Q. Was it well done and properly done or badly done?"

"A. I think it was very well done sir, and very well managed."

"Q. Have you seen it since?"

"A. Yes sir."

"Q. How does the work stand?"

"A. Excellently."

"Q. What have you to say as to the time it took to do it?"

"A. I think it was done as promptly as it could be under the circumstances. I do not think it could be done better or quicker. There was some delay before the work was commenced, but it was in the winter time when it was not necessary; the canal was not needed."

"Q. Of course you know nothing about the economy with which it was done--the cost of it?"

"A. No sir; I cannot say that I do. All that came under my notice I thought was managed as well as it could be. The hands appeared to do a full days work and the work appeared to be done with as much economy as possible under the circumstances."

*"By the Chairman:"*

"Q. You used to be a boss on the canal, did you not."

"A. I did."

"Q. For how many years?"

"A. About two years I think."

"Q. During whose administration?"

"A. Mr. Holman and Mr. Stanhope were the superintendents."

"Q. I mean who was the president of the canal?"

"A. I do not remember."

"Q. What years was it?"

"A. Either 1856, '57 or '58. It was during the building of dam No. 4."

"Q. Is the canal managed as well now as it was then?"

"A. Yes sir, I think the repairs are made more promptly now than then. In the event of a stoppage of the canal then, the bosses were required to notify the superintendent, and he notified the general superintendent, and he notified the president, and then there was a meeting of the board of directors called before there was any action taken about making repairs. They have done away with that now."

"Q. Did you see these great breaks during the freshet?"

"A. Yes sir. I saw the biggest break I reckon on the canal, and that was at Seneca, 20 miles the other side of Georgetown. I think it was the largest break I ever saw on this canal."

"Q. What was your opinion when you saw it?"

"A. My opinion was that it looked a good deal like [t]here would not be much boating done. But I think the canal was repaired about as quick as it could have been done, and managed about as well as it could have been managed."

"Q. Did you ever expect to see it put together again as a canal?"

"A. I thought it could be put together, but not as quick as it was."

"Q. "It has stood since?"

"A. Yes sir. I left Annapolis here and went up over [t]hat break twice while they were working at it."

"By the Chairman:"

"Q. That was during the session of the Legislature in 1878?"

"A. Yes sir, it was during that session."

[Testimony of Albert C. Greene, Agent of the Borden Mining Company and Former Canal Director from Frostburg, Md., 25 March 1880, pp. 369-70] (Sustainability-Water Erosion)

"Q. Do you know anything of the Georgetown terminus of the canal; have you been there?"

"A. Oh! yes sir. We own that wharf there at the aqueduct."

"Q. Do you know anything about this outlet-lock?"

"A. Yes sir, I have seen it."

"Q. Do you know anything of the necessities that caused its purchases--I mean business necessities?"

"A. It has been a matter of complaint for several years--the inadequacy of the outlet-lock at Rock creek--and various measures have been talked of, both by the coal companies, and at the time when I was a director of the canal, to remedy that by the construction of an outlet-lock above the aqueduct. It never was done, owing, I suppose, to the financial condition of the company. But we have never regarded the Rock creek outlet on the canal as being capable of doing the business that it ought to. It opened into this Rock creek, which was stream liable to be fouled by thunderstorms in the summer season. Indeed, an ordinary thunder-shower would obstruct the opening of the gates by sifting earth into them. During the war, and while I was a director of the canal, the government found a great deal of fault with the canal company on account of the condition of that outlet-mouth; and I believe the government itself invested some money by its own engineers in an endeavor to improve it, but without any permanent success. The conditions were opposed to it; and I have always supposed that the outlet should be found above the aqueduct."

[Testimony of Asael Willson, Canal Collector and Basin Wharf Manager from Cumberland, 31 March 1880, pp. 397-98] (Flood-November 1877)

"Q. What other duties did you perform at special times other than attending to that wharf?"

"A. I attended to the Collector's office up to the freshet in 1877; then we were all dismissed after the freshet. Mr. Gorman then employed me to take charge and do the repairs, 50 miles down. I took charge and stayed there until the 10th of April, when the water was turned in on the canal at the head of navigation, but previous to this he had placed the wharf in my charge. The wharf was first to repair, and the Basin wharf was put under my control, and I repaired the damages to Dam No. 6, and put it in order."

"Q. How many men did you have under you during that time?"

"A. I judge 150 or 200 men."

"Q. During that time did you use them politically in any way?"

"A. I had no time to talk politics while the repairs were on hand. I did not think politics hardly. It was business. I never spoke to a man on the line about politics."

[Testimony of Alfred Spates, Former Company President from Cumberland, 1 April 1880, pp. 493-95] (Sustainability-Water Erosion)

"Q. If you know anything in regard to what the advantages of an outlet-lock at Georgetown would be, or otherwise, please state?"

"A. Well sir, the Chesapeake and Ohio Canal at its terminal point at Georgetown terminated in Rock creek, a stream that rises in Montgomery county and is fed partly by Paint branch in the southern part of the county, and when this canal empties into it it is then continued as a canal to the outlet-lock at Georgetown. In a freshet of the slightest character, a freshet that will rise Rock Creek, and the streams that come into it, it fills it full of sand, and that portion of the canal becomes useless, and it was a continual annoyance. The outlet at Georgetown was built upon piles. It was built by piles being driven down solidly together, and a stone wall put upon the top of that."

"Q. That was the outlet through the creek?"

"A. Yes sir. Into the creek the tide ebbs and flows about that lock, and this is a wooden bottom and accumulates sand, and the wear and tear would make a hole in that bottom. It was utterly impossible to prevent it, and the only way to build a second floor in sections and let it down from the top, and I have put two new floors in that lock by putting in sections, fitting and letting it down, and in that way stopped those holes. The idea that we had was that this Rock creek portion of it could be divided, leaving the outside to receive the freshet and this sand that comes down Rock creek. With a view, however, to the greater facility of the trade, because it was a long lockage, a difficult matter to get out in this creek, and then began the trouble making these short turns. The president and directors of the Chesapeake and Ohio Canal in 1863 invited the Board of Public Works of Maryland, Edw. Schriver, Henry R. Reyman, Fred. Fickey, Jr., and they visited New York for a consultation with the coal companies in regard to building an outlet-lock, based upon an inclined plane similar to the inclined plan built upon the Morris and Essex Canal at Trenton, New Jersey. The canal company was not able to build that lock, but they entertained the idea . . . and it was impossible to keep Rock Creek clean. I suppose there has been a million bushels of sand fished out of Rock creek, and sold a cent a bushel. I gave people the privilege of taking it, and I see them now taking it out and drying it and selling it. It is good, but you cannot keep it clean with the facilities we had to do it with."

[UMCP] Testimony for the Complainants, Cumberland, Md., Daniel K. Stewart v. The Chesapeake and Ohio Canal Company.

[Testimony of George E. Little, Canal Boat Captain from Cumberland, 13 April 1880]  
(Flood-November 1877, Sustainability-Water Erosion)

"Q. 11. Please explain the condition of the canal on the berme bank side from here to Georgetown, compared with what it was six or eight years ago. A. It has been bad for six or eight years."

"Q. 12. Is it any worse now than it was six years ago? A. Yes, sir."

"Q. 13. Is it any more shallow than it was six years ago? A. Yes, sir."

"Q. 14. Is it more difficult to find a tying up place on the berme bank now than it was six years ago? A. Yes, sir, it is."

"Q. 15. What is the cause of the present condition of the berme bank side of the canal as compared with what it was six or eight years ago? A. It keeps filling in."

"Q. 16. Is it shallower, or deeper now, than it was six years ago?"

"Witness. Is the canal shallower?"

"Counsel. The berme bank side? A. Yes."

"Witness. Yes, sir, there is more slope to them. They cannot get close to the bank."

"Q. 17. Is there any more difficulty in finding a place to tie up on the berme bank side now than there was six years ago. A. Yes, sir."

"Q. 18. To what extent was that shallowness caused by the freshet of 1877? A. It washed some then, but there was a great deal there before the freshet."

"Q. 19. Are there portions of the canal which the freshet of 1877 did not affect? A. Well, yes, sir, there is some. From Cumberland here to the Stop lock. The water was not in the canal; and around by the tunnel."

"Q. 20. Was the water in from Harper's Ferry to the mouth of the Seneca? A. Yes, sir, I believe it was. I was not down there at the time."

"Q. 21. What is the condition of the canal on the towpath side as compared with what it was six years ago. Is it shallower, or as deep? A. There is some slope to the bank. You cannot get as close to the towpath to change the stock; the mules from the stable to the banks."

"Q. 37. What is the condition of the towpath from the Point of Rocks to Georgetown? A. In some places it is very bad. At what is called the Haunted Hose on the nine mile level The mules have to wade in the water all the way. You cannot force a team. They will go in the canal, the banks being so low, and worn down."

Note: the cross-examination of Little involves a long series a very detailed questions about

where Little can or cannot dock his boat because of the deposits in the canal narrowing the channel, and the condition of the towpath. This seems to be the theme of the testimony of 13 April 1880--establishing the canal was no longer as wide and as deep as it once was (or in as good condition generally), and that the practices of the canal company under A. P. Gorman were somehow to blame.

[Testimony of John McIntyre, Canal Boat Captain from Cumberland, 13 April 1880] (Flood-November 1877, Sustainability-Water Erosion)

"Q. 20. What effect had the freshet of 1877 upon the filling up of this berme bank slope, and the towpath slope? A. It had a great deal."

"Q. 21. Has the filling up been created by any other causes besides the freshet of 1877? A. Oh, yes, sir, in naturally fills up every year from rains, and so forth."

"Q. 22. Have those slopes been cleaned out by the canal with the past five or six years? A. Not to my knowledge."

"R. X. Q. 103. You said you didn't know of any part of the canal being cleaned out within the last two or three years, except after the flood. Didn't you work on it some yourself? A. Yes, sir."

"R. X. Q. 104. Where was that? A. Down on this division. That was at the time of the flood."

"R. X. Q. 105. Didn't you clean out the basin down here where it was filled in since the flood? A. No, sir."

"R. X. Q. 106. Before the flood? A. Yes, sir; some I did before that."

"R. X. Q. 107. When they cleaned out on account of the flood, was not there a great deal of washing in that had washed in from the berme bank, and the towpath, cleaned out along the slopes? A. Not a great deal along the slopes. The principal work that was done then, was taking out the bars and stuff that was washed in by the freshet."

[Testimony of David Lynn, Former Assistant Collector in Cumberland, 13 April 1880] (Flood-November 1877)

"X. Q. 73. Were any repairs done in 1877 while you were there? A. I think there were."

"X. Q. 74. Are you certain, or not? A. I am pretty certain of it."

"X. Q. 75. How could he [A. Willison, the Collector] dictate the repairs, if you are not certain whether there was any done, or not? A. I think there was. I was not there in 1878. The repairs must have been done in 1877."

"X. Q. 76. What were the repairs. A. My recollection is that the place was damaged by high water."

"X. Q. 77. In 1877, before the flood? A. Yes, sir, I think it was."

"X. Q. 78. What repairs were done? A. I cannot designate specifically. There were some new timbers put in."

"X. Q. 79. What kind of new timbers? A. Tresseling."

"X. Q. 80. Don't you know that Mr. Tilghman, who proceeded your father, had those repairs done before your father went there? A. Yes, sir, but it needs repairs every year."

"X. Q. 81. What Tresseling was done while your father was there?"

"Witness. Do you mean the particular tresseling?"

"Z Counsel. Yes? A. Under the wharf there."

"X. Q. 82. Who did it? A. I overseed a part of it myself. I followed Mr. Willison's instructions."

"X. Q. 83. You just now said you were not certain whether you did any repairs? A. No, sir, I did not say so. I said it must have been in 1877."

"X. Q. 84. Didn't you say just now when I asked you, that you thought there were some, but you could not be certain? A. I am certain."

"X. Q. 85. Didn't you say awhile ago you were not certain. A. No, sir."

"X. Q. 86. You swear you did not? A. No, sir."

"X. Q. 87. What were the repairs then--tresseling? A. I have told you all I know about the repairs."



"X. Q. 88. I want to find out something more as to who performed the labor of the tresseling; names of the hands? A. I cannot call the names of the hands. I know Coleman was there."

"X. Q. 89. Was Coleman a carpenter? A. He was a good hand at repairing wharves."

"X. Q. 90. Did he do the repairs at the tresseling? A. Some of them. I think Kenny was there too."

"X. Q. 91. Did Mr. Willison tell Coleman what repairs to make, in your presence? A. No, sir, he told me."

"X. Q. 92. What did he tell you to do? A. What to do, and how to do it. He came over there and consulted about the thing, and told me what to do."

"X. Q. 93. What did he tell you to do? A. To repair the wharf."

"X. Q. 94. In what respect? A. God, I cannot tell you anything about that now."

"X. Q. 95. That is all you can say about that- ? A. Yes, sir, that is all I can say, and all I know."

"X. Q. 96. What else did he do there then except dictate the number of hands? A. That is about all that I know that he did."

[UMCP] Testimony for the Respondents, Cumberland, Md., Daniel K. Stewart v. The Chesapeake and Ohio Canal Company.

[Testimony of A. P. Gorman, Canal Company President from Howard County, Md., 31 May 1880]  
(Flood-November 1877, Harper's Ferry-Sustainability)

"Q. 62. Allusion had been made in the course of these proceedings, to a flood, by which the works of the canal were much injured in November, 1877. Will you be good enough to state whether or not that it is the time when the flood, to which I have referred, occurred? If so, state what was its character, and extent, and what were its consequences? A. Yes, sir. The one to which you refer occurred in November, 1877, and was the greatest ever known in the Potomac river. It damaged, I may say, every mile of the canal from Cumberland to Georgetown. Large portions of it were completely swept away, and others filled up as completely, as if the canal had never been excavated. The damage was very great. As a matter of course it suspended all use of the canal until the following year, by which time the damage was repaired."

"Q. 63. How long was it before the damage was sufficiently repaired for the canal to resume operations? A. I think we had the canal in a condition sufficient for navigation, about the 15th of April following. It happened so that we had a very extraordinary winter. There were only a few days--some fifteen or twenty days, when we could not work on account of freezing, or wet weather."

"By the energy of the superintendent, and engineers who had charge of the immediate work, favored by this good weather, and the large number of hands we employed, we were enabled to put it in a condition for navigation, I think, on the 15th of April, following."

"Q. 64. How far did that go towards the entire restoration of the canal to the condition in which it was before the flood took place? A. Very far from completing the repairs of the damage that had occurred. We had only completed on the work itself, the damage at the end of 1878. I think in December, 1878, we had nearly completed all of the repairs. There may have been some slight matters left over, but the repairs of Dam No. 4, were only completed in November of 1879. There are some abutments that were absolutely necessary; that is some walls for the protection of the canal that have not been yet entirely completed."

"Q. 65. In what condition did that catastrophe find the finances of the Canal Company? A. If you will refer to the report of 1877, you will find the balance in the banks on the first day of January, 1878, I think our balance was only about \$7,000. So that we were in that condition that with this immense damage, estimated to cost \$225,000, or more to repair, we had only \$7,000 on hand to do it with."

"Q. 66. By whom was that estimate made of what it would cost? A. We had two or three engineers. Mr. Hutton had the general charge of their reports. Mr. Smith, I think, was one of the principal ones."

"Q. 67. What did the repairs actually cost? Had the estimate been overdrawn? A. Slightly. That is to say, we found it necessary after their report, to construct one or two additional improvements, notably so at Harpers Ferry, that were not in the original estimate; but taking the work that they estimated upon, we constructed for a little less than their estimate."

Q. 68. How were the means procured by the Company to make these repairs, and how far have they been paid for? A. Immediately after the damage to the canal, under the general authority that we supposed we had to issue repair bonds, we attempted to make negotiation based upon those bonds, and waited upon Messrs. Alexander Brown and Sons, who were familiar with the affairs of the Company, and upon others, and we found that it was impossible to negotiate the bonds that were then authorized to issue at anything like fair rates, and we were compelled to resort to a temporary arrangement, the President and contractors endorsing the Company's note itself, and then afterwards with getting from four of the coal companies, forty thousand dollars. We had

then come to the conclusion, it was useless to attempt to negotiate the ordinary repair bonds, and we assured the coal companies when they made this loan to us, that we would try to secure from the State, at the coming session of the Legislature, the Act of 1878. On the faith of that assurance, they loaned us ten thousand dollars each, agreeing to take the bonds when issued, on certain conditions. The balance of the money we borrowed, as best we could, until the bonds issued under the Act of 1878, were prepared, from various banks. I, myself, endorsing the notes, and some of the Directors, doing the same thing. The balance of it was running along on the open account. Finally, we made sale of, I think, 87 bonds issued under the Act of 1878--repair bonds of a thousand dollars each. The balance of the money now due on account of the damage occasioned by the flood, is due to three banks and to various contractors and individuals."

[Testimony of A. P. Gorman, Canal Company President from Howard County, Md., 3 June 1880]  
(Flood-November 1877, Maintenance-General, Sustainability-Dams)

"X. Q. 14 Please explain what is the working organization on the line of the canal with regard to the employees from the superintendents down? A. The canal is divided into divisions. When I took charge in 1872, there were five superintendents from Cumberland to Georgetown. Under each superintendent, there were various officers known as bosses who had gangs of laborers under their charge for the ordinary repairs of the canal. There were lock keepers for the locking and closing of gates, collectors and assistants at Cumberland, at Hancock, Williamsport, Sheppardstown, part of the time at Harpers Ferry, and at Georgetown."

"X. Q. 15 The head of the organization was the division of the canal into superintendents? A. A Superintendent has entire charge of all matters on his division."

"X. Q. 16 How many of those superintendents are there? A. There are now but two."

"X. Q. 47 When were they reduced? A. I think two only since January. Immediately after the completion of the telephone, as soon as we could make the arrangement, the reduction was made."

"X. Q. 48 How many superintendents were there in the year 1879? A. In the year 1879, I think, six."

"X. Q. 49 How many were there in 1878? In 1878, owing to the damage of the canal by the flood of 1877, and during part of 1878, I suppose we had seven."

"X. Q. 50 How many were there in 1877? A. In 1877, five."

"X. Q. 51 Was Mr. L. C. Stanhope one of the superintendents of the canal in 1877? A. He was."

"X. Q. 52 Did Mr. Stanhope have the superintendence of any portion of the repairs of the canal, caused by the freshet of November, 1877? A. He did."

"X. Q. 53 What part of the work did he supervise? A. Mr. Stanhope was the superintendent of that portion of the canal from Cumberland to the head of the Slack water to Dam No. 4."

"X. Q. 54 That would be above Dam No. 4? A. Yes, sir. When the dam was damaged in November, 1877, and it became necessary, for the preservation of the balance of the structure to repair the damage, Mr. Stanhope was assigned the special duty of putting in temporary cribs at Dam No. 4, which was not on his division, he being the most capable man we knew of in the State for the work, and possibly the only one connected with the Company who had sufficient experience to do that work."

"X. Q. 55 Had he had experience before that in building dams, and repairing those sort of damages? A. A life long experience. He commenced on the C. and O. Canal as a boy driving a cart, and has been connected with it from that time, except some slight intermission, until now, and has had more experience in the construction of dams on the Potomac than any other man living."

"X. Q. 56 At what time did he complete the work of putting the temporary crib in dam No. 4? A. I cannot give you the date. It was sometime during the winter of 1878. That is, if the flood occurred in November, 1877. He was there, I think, nearly the greater portion of the year."

"X. Q. 57 He was employed by the Canal Company then in superintending the temporary repairs, and putting in the crib in dam No. 4? He was."

"X. Q. 58 How was the dam subsequently built? A. The dam was subsequently built by contracting with Mr. Stanhope at so much for each yard of masonry, and so much for each perch of stone for backing; so much for removing the temporary cribs, and was employed by the Canal Company to superintend that portion of the work which it did, to wit, the construction of the coffer-dams."

"X. Q. 59 The coffer-dams in the construction of dam No. 4? A. Yes, sir."

"X. Q. 60 Was he in the pay of the Canal Company as superintendent while he was contracting to do the work for the Company? A. He was paid for the superintendence of that portion of the work which I have just indicated the Canal Company did."

"X. Q. 61 And at the same time he had a contract with the Canal Company? A. He had."

"X. Q. 62 And on the terms you indicated? A. We employed Mr. Stanhope at his usual

compensation to do that work for the Canal Company because his services could be had as cheap as those of anybody else who was competent to discharge that work, and it was his interest as contractor, to see that it was well done, and cheaply done, both for himself, and the Canal Company."

"X. Q. 63 Was the contract with Mr. Stanhope with regard to the building of dam No. 4, in writing? A. It was not. The Board agreed upon the prices, and Mr. Stanhope was instructed to go on, in writing so far as communications from me as President of the Company were concerned, stating that he was authorized to do the work at a certain price."

"X. Q. 64 What arrangement was made about paying him? A. He was to paid on estimates at such times as the Canal Company was in a condition to pay it."

"X. Q. 65 Did you provide for times at which the measurements should be made? A. As a matter of course we had an engineer in charge of the work who made thorough measurements of all the work; cross sections, showing the extent of the damage, and the number of perches of stone that would be required."

"X. Q. 66 Who was the engineer? A. Mr. William Smith was the active engineer in the measurements. Mr. Hutton also, was the consulting engineer of the Company."

"X. Q. 67 Who made the actual measurements to estimate the amount of damage done? A. Mr. Smith."

"X. Q. 68 Did he make the drawing and cross sections? A. He did."

"X. Q. 69 Did he make the estimates of the work done by Mr. Smith [?] as it progressed? A. Yes, sir."

"X. Q. 70 Mr. Stanhope was paid on those estimates? A. Yes, sir."

"X. Q. 71 Was there any arrangement made by which any drawbacks were held from estimates? A. Certainly. We did not require him to give a bond, but held in our hands a sufficient amount to cover all damages, and owing to the embarrassment of the Company, and failure to negotiate the bonds provided for by the Act of 1878, known as the repair bonds, we have not been able to pay him, to this day, in full."

"X. Q. 72 What percentage was it that was retained in the hands of the Company? A. We retained more than one half as it turned out."

"X. Q. 73 What was the contract? A. Twenty per cent was the understanding."

"X. Q. 74 The usual contract for building and contracting? A. Yes, sir."

"X. Q. 75 Was there any advertisement made to the public for this work, inviting bids for the doing of it? A. None whatever, for the reason that the damage to the work was of such a character, and the risk was so great, and the necessity for having it put in proper form was such, that it was determined by the Board that it could be best done by employing an agent of Mr. Stanhope's experience and ability, and the rate was fixed after consultation with gentlemen who are familiar with that class of work, as well as with a member of the Board, who, himself, was one of the largest contractors in the country. I mean Mr. Humbird, who had, himself, constructed a portion of the dam No. 4, and without any advertisement."

[LIB-PHP] Fifty-Second Annual Report of the President and Directors of the Chesapeake and Ohio Canal Company to the Stockholders, June 7th, 1880 (Annapolis, Md.: Maryland Republican Steam Press, 1880) (Flood Damage-Financing, Flood Damage Prevention-Telephone)

The President, A. P. Gorman, reported (pp. 10-11):

"The Canal from Cumberland to Georgetown is now unquestionably in better condition that it has been at any time since 1860. Every part of it which was damaged by the flood of November, 1877, has been thoroughly repaired and strengthened, and its navigation is now more reliable than it has been at any time since it was constructed."

"During the year 1879 the telephone line was completed from Georgetown to Cumberland--184 miles--which, together with the branches to the different houses of the officers and shippers, makes the line in all, 200 miles. The number of telephones in use on the line is 48, which makes it the longest line of telephone in the world."

"The great advantage of having speedy communications with various points facilitates the repair of damage and enables us to concentrate our regular workmen, who are skilled in repairs, and will, we are confident, reduce the cost of labor and superintendents at least twelve thousand (12,000) dollars per annum. Since its construction, we find we can manage affairs along the line with two superintendents, equally as well as it has been heretofore with five or six."

"The Canal, therefore, has been divided into two divisions, the first extending from Georgetown to Lock No. 39, being the first lock east of Dam No. 4, about 84 miles, with J. J. Moore, as superintendent; the second from Lock No. 39 to Cumberland, 100 miles, with L. G. Stanhope as superintendent."

"The telephone stations are so situated that these superintendents can have information at any moment, of every five miles of the Canal under their charge, the ordinary saving, therefore, would pay for the cost of the construction of the line in less than two years, and would, in many cases we believe, where lock gates are carried out, save the entire cost in one year."

The President, A. P. Gorman, also reported (p. 10):

"The President and Directors, immediately after the submission of the last annual report, determined, and had fully expected to have been able to negotiate in 1879, at par, a sufficient number of the Repair Bonds to pay the entire amount of debt created for the repairs of the Canal, and shortly after we gave directions to our financial agent to make the sale of them; and when he had thus sold ten thousand dollars of them, it became known that it was in contemplation by Mr. Stewart to file a bill in the Circuit Court of the United States for the District of Maryland, in equity, against the Chesapeake and Ohio Canal Company, and others, asking for the appointment of a Receiver, and alleging as one of the grounds of the proceeding, the illegality of the issue of the Repair Bonds. This necessarily prevented the sale of the bonds at anything like their face value, and has left us with a floating debt of \$109,463.96, which must necessarily be paid out of the current receipts of the year if a sufficient number of the Repair Bonds cannot be sold to liquidate it."

[UMCP] Testimony for the Respondents, Cumberland, Md., Daniel K. Stewart v. The Chesapeake and Ohio Canal Company.

[Testimony of John J. Bell, Corn Miller from Georgetown, 10 June 1880] (Flood-November 1877)

"153. Q. Did you have occasion to see any portion of the canal after the great flood of 1877, and before the repairs began? A. I saw that portion of it lying in the vicinity of Georgetown, on what was known as the Georgetown level, and the level above that, I think I visited it on one or two, occasions."

"154. Q. What was its condition immediately after the flood? A. The canal, as a canal, had been washed out, or rather the banks of the canal had been entirely washed out for a very great distance. The river and the canal were practically one, as long as high water lasted; and there was no evidence of the canal on the river side. It had to be practically rebuilt."

"155. Q. State whether the repairs of the canal were made with dispatch and efficiency? A. I think they were. I think there was a wonderful amount of energy, and good judgment shown in the repair of the canal, upon the Georgetown end of it, at least."

"156. Q. And that is as far as you knowledge extended? A. Yes, sir. The work was done promptly, and was well done."

"157. Q. Do you remember how early navigation was opened in the following spring? A. I think we commenced receiving coal about the first of May. I do not give it as a positive date, but that is my impression. I think that is my impression. I think the business of the canal was put back only about fifteen or twenty days. The freshet occurred in the previous fall, you know. It seems to me it was the latter part of November."

[Testimony of James Mulligan, Stone Mason, 6 July 1880] (Flood-November 1877, Sustainability-Dams)

"9. Q. Were you employed by Mr. Stanhope in the rebuilding of dam No. 4, after the flood of 1877, as foreman? A. Yes, sir."

"10. Q. Please state in what condition the work was when you commenced operations there? A. Well, sir, it was in very bad condition."

"11. Q. In what way? A. We found nothing there in regard to the work, as work ought to be done. We found it all loose sand, and loose cement; bad stone. We took them all out, and replaced them with the best of material, both stone, cement, and sand."

"12. Q. What was the character of the material which you used in rebuilding the dam? A. Of the very best character; there could be no better got. We had three different cements, and tested the cements, and took the best one."

"13. Q. How was the work done itself--the masonry. Was it good work or not?"

"Witness. The last work that was done."

"Counsel. Yes, the work you did for Mr. Stanhope? A. I do not suppose it could have been done better. We had good workmen, and had good material, and we took the best of time to do it in."

"14. Q. What would you say of the dam as it is now reconstructed by Mr. Stanhope? A. I say, to the best of my opinion, that if it goes out, it will go in a body."

"15. Q. Is it a good job, or not? A. It is a good job."

"16. Q. Was anything omitted to be done which ought to have been done to make it a first class job? A. No, sir. The instructions I got from Mr. Stanhope were to use the best material. He

didn't care if he never made a cent, and lost his farm by it; that he instructed me to do it with the best material, and I done so."

"17. Q. Is it as strongly constructed as is possible to construct such a work? A. I do not see how it could be made any better. We used the best of material, and we had good workmen on it. We kept no bad workmen there."

"18. Q. Do you know how much per perch Mr. Stanhope received for the work? A. No, sir, I never asked him the question."

"19. Q. I suppose he received eight dollars a perch for the new work, and five dollars a perch for taking out the old material, which was necessary to be taken out before the work was reconstructed. What would you say as to the reasonableness of those prices? A. I would say, by good luck he might do it at that figure, but suppose he had had bad luck, a freshet, I should think he would be the sufferer."

"20. Q. What would you consider that price; a high one, or a low one, for the work done, and considering the character of the work done, and the risk attending it? A. As I say, he could do it, if he had a streak of good luck; no accidents, and everything was there suitable for the work. We had the best material of every description, and also the tools. We had every convenience to get good material. There was no lack of anything that was needed for the work, so we could not help but make a good job of it. Had a good quarry; good stone, and we used it."

"By Mr. Gordon."

"21. Q. Then you think that eight dollars, and five dollars for that work was not an unreasonable price, taking into consideration the chances of an accident, and high water, and other things that might occur? A. No, sir, I would not like to have it at the price offered, unless I had a streak of good luck, as it happened in this case. I have seen the richest of contractors broke with such work as that?"

"22. Q. Is not the risk very considerable in building dams on the Potomac River in that way? A. Yes, sir."

"23. Q. Liable to freshet at any time? A. Yes, sir."

"24. Q. Which will come and sweep out your work, or fill up your trenches that you have prepared for work? A. Yes, sir. Suppose we had one hundred feet out, and hadn't it graded, we would have to do it all over, which I have seen in the old countries."

"25. Q. And if a freshet comes when the work is soft; before completely hardened, is there danger of washing out before the cement sets completely? A. Yes, sir, there is the danger."

[Testimony of W. A. Jones, Laborer, 6 July 1880] (IFlood-November 1877, Sustainability-Towpath)

"1. Q. Your name has been mentioned by Mr. John Resley as one of the men who was employed in the year 1877 to work on the towpath between the canal office [in Cumberland], and Mertens boat yard . . ."

"13. Q. Was that work necessary to be done for the protection of the towpath? A. Yes, sir, I think it was very much in that part of the canal."

"14. Q. Just explain why? A. Because the whole tide of the water comes right against that bank, and makes that that bank solid, and supports it."

"15. Q. If the work you did there had not been done, do you know whether the bank would have been injured by the great flood? A. Yes, sir. I think the water would have all run over, because we raised it that much--about six or eight inches, and the water in the highest part didn't lack more than about three inches coming over."

"16. Q. So that if you had not put in this additional elevation on it before the flood of 1877, when the flood came over it would have gone over, and done what? A. Swept everything right out of the lower end of town, canal and all."

"17. Q. Did you do any rip rapping at the dam? A. I did not, but they did afterwards; some men were working there afterwards."

"18. Q. How long afterwards? A. About the same time. A man named Ryan, some other men were rip rapping while we put on the slate, &c."

"19. Q. Was the rip rapping necessary to be done? A. Yes, sir, very much so, because that is right on the outside, next to the river."

"20. Q. It was to protect the bank from the river? A. Yes, sir."

[196] A. P. Gorman, President, to G. W. Smith, Annapolis, 15 July 1880 (Flood Damage Prevention-Proposed, Harper's Ferry-Sustainability)

"I have . . . rec'd a communication from W R Hutton calling my attention to the fact that it is absolutely necessary to close up the gap at the Shenandoah Outlet Lock at Harpers Ferry by raising the walls as high as the guard wall recently constructed and also suggests that it will be necessary at once to put coping of timbers on the wall . . . "

#### 1881

[182] Board of Directors Meeting, 23 May 1881 (Flood Damage Prevention-Ordered)

"The President presented a report of the unsafe condition of the abutment on the Virginia side of the river at Dam No 5, which was read and on motion of Col Berret Resolved that the President be authorized to take necessary action towards repairing said abutment."

#### 1882

[CF] J. Thomas Scharf, History of Western Maryland (Philadelphia: L. H. Everts, 1882), 2: 1201-02 (Flood-April 1852, Flood-November 1877)

Scharf describes the great floods of April 1852 and November 1877 in Washington County. Source of general background on the floods in that locality and some information on the canal.

#### 1883

[LIB-PHP] Fifty-Fifth Annual Report of the President and Directors of the Chesapeake and Ohio Canal Company to the Stockholders, June 4th, 1883 (Hagerstown, Md.: Adams & Witmer, Publishers, 1883) (Maintenance-Cutbacks, Maintenance-General)

The President, Lewis C. Smith, reported (p. 8):

"Owing to the straitened financial condition of the Company, we were unable to prosecute with vigor the work of lengthening the Locks, and were obliged to content ourselves with an increase of two."

"Other extensive repairs have been made, the heaviest being the rebuilding of two of the Stone Locks, Nos. 40 and 49, which were in a very dilapidated condition, and strengthening of the Basin Wharf at Cumberland."

"Notwithstanding the severity of the past Winter greatly retarded the repairs and improvements, the canal was opened for navigation on the 19th of March."

#### 1884

[LIB-PHP] Fifty-Sixth Annual Report of the President and Directors of the Chesapeake & Ohio Canal Co. to the Stockholders, June 2nd, 1884 (Hagerstown, Md.: News Publishing Company, [1884]) (Easements-Flood Implications, Sustainability-Dams)

The President, Lewis C. Smith, reported (p. 9):

"During the first session of the Forty-seventh Congress there was passed an Act, entitled 'An Act to increase the water supply of the City of Washington, and for other purposes.' By the provisions of this law the Secretary of War was directed to raise the embankment between the Potomac River and the Canal. above the dam at the Great Falls, so as to protect the Canal from the increased flooding which the heightening and lengthening of the dam would cause in times of high water, or to pay the Canal Company, in full satisfaction for all such flooding, the sum of \$12,300 00,"

"Believing that this raising the tow-path could be more satisfactorily done under the supervision of the Company's own Superintendents and employees, who were skilled in this kind of labor, the money was paid, in October last, to the Canal Company, and by the latter made a special deposit, to be used exclusively for the purpose for which it was received. During the Winter and Spring following the work was prosecuted, but, owing to the frequent falls of snow and rain, which greatly retarded operations, is not quite finished. Of this fund there remains in Bank the sum of \$2,712 71, which is in addition to and independent of the sums referred to in previous portions of this Report."

The President, Lewis C. Smith, also reported (pp. 11-12):

"For many years past great difficulty, on account of low water has been experienced at different points on the Canal. The leaky condition of Dam No. 6 not only caused serious loss, at times, because of the stoppage of navigation, but has with each recurring Summer required the constant attention of a large force of hands, whose entire time was taken up with the labor of emptying boat-load upon boat-load of stone and clay into the river, just above the Dam, for the purpose of checking these leaks. A difference of opinion existed as to their character and location. For the purpose of ascertaining the real status of the case, and with a view to remedying the evil when thoroughly understood, a coffer dam was constructed on the Maryland side of the River, and a section of some fifty feet of the Dam exposed to view. The Dam presented more the appearance of a sieve than of anything else it could be compared with. It was fairly honey-combed, the holes varying from the size of a man's fist to that of his body. This portion of the Dam was rebuilt in a most substantial manner. When this was completed, two more larger sections were rebuilt in the same excellent manner, the material selected being the best that could be had. In this way about 200 feet of the old Dam was replaced by an entirely new structure. This work was done

under the direction of the General Superintendent, and under the immediate supervision of Division Superintendent Stanhope. The portion thus rebuilt is a foot higher than was the old Dam. The good effects of this work were immediately felt. as there was little or no detention of boats on account of low water during the entire season, or in fact from any other cause."

"The break, below Williamsport, during the Summer, was decidedly the most serious drawback, in this particular, we had to contend with, as a week was consumed before it was completely mended."

"Superintendent Moore was compelled to increase his force because of the frail character of the Dams on his Division, and of the extreme importance of avoiding delays when the boating is brisk, as it was during the year--each day's detention resulting in a loss of revenue to the Company of from \$1,000 00 to \$1,500 00."

[182] Board of Directors Meeting, 24 July 1884 (Flood-June 1884)

Lewis C. Smith, President, informed the Board of Directors:

"I regret to state, however, that the benefits expected to be derived from the reduction in the force of our employees were not immediately realized Scarcely had the orders been issued when the Company was subjected, to very serious losses occasioned by one of the heaviest freshets, that ever visited Washington County. The upper part of the first division and lower half of the second division sustained heavy damages, and thus we were compelled to make large additions to our forces, instead of diminishing them. So soon as these extraordinary repairs are finished, navigation having already been resumed, the effects of our reductions will be felt."

1885

[LIB-PHP] Fifty-Seventh Annual Report of the President and Directors of the Chesapeake & Ohio Canal Co. to the Stockholders, June 1st, 1885 (n.p., [1885]) (Maintenance-Dredging, Sustainability-Dams)

The President, L. Victor Baughman, reported (pp. 9-10):

"In order to obtain a more thorough insight into the actual workings of the canal, the Superintendents were instructed to make monthly trips over their entire divisions, and to submit in writing to the President all work done or necessary to be done. These reports have been faithfully made, and have proven to be of great service to the Board in lessening the general expenses of the canal. During the past winter the basin at Georgetown received a thorough cleansing and was put in first-class condition. This necessitated a heavy expense, as no special attention had been given to the cleaning of the basin for some years. At Cumberland we also found it necessary to do considerable work. The canal basin at this point was so filled with the washings from the coal wharves and the refuse from the city of Cumberland that navigation was almost impeded. The steam dredge had been employed for some weeks cleaning out the basin and making a channel from the different coal wharves. The entire trestleing over which the loaded cars are obliged to pass was in such a dangerous condition that it necessitated putting down all new lumber and involved a heavy expenditure of money. The locks along the entire line are in fair condition, and it is unfortunate that all cannot be lengthened. The aqueducts and masonry have been repaired wherever necessary, and are not likely to give any trouble during the season. The tow-path, with the exception of some few points, is in good condition, and is now being repaired wherever necessary."

"Work will be continued on the tow-path at the Great Falls, which is to be paid for by money specially appropriated by act of Congress, one thousand dollars of which was handed over by the former President to finish the same. The dams at Little Falls, Seneca, and Harper's Ferry have required a great deal of work, and will in few days be so thoroughly repaired as to afford the necessary water supply during the navigable season of the canal. As you are well aware, these dams are not built of heavy masonry, but are loose or rubble work, and they are often washed away during the winter by the high water or slush ice; consequently they necessitate a heavy expenditure to keep them in repair."

1886

[LIB-PHP] Fifty-Eighth Annual Report of the President and Directors of the Chesapeake & Ohio Canal Co. to the Stockholders, January 7th, 1886 (n.p., [1886]) (Maintenance-General)

Appendix A and B (pp. 13-26) contain reports from the two division superintendents, James P. Biser (Division 1) and E. Mulvany (Division 2), of repair and improvement work done and due to be done on the canal. Much of the work would fall under the category of "ordinary repairs."

[182] Board of Directors Meeting, 22 April 1886 (Flood-March/April 1886, Sustainability-Dams, Harper's Ferry-Sustainability)

"The President stated his object in calling the Board together which was to inform them of the condition of the canal since the late disastrous floods, last week of March & first week of this month, to devise the means for putting the Canal in repair &c."

[Report of G. W. Smith, Engineer, to L. Victor Baughman, President, 17 April 1886]

"By your request, I made an examination of the condition of Dam No 6. The breach, proper, is 175 ft long, 183 ft from the Virginia side, and 117 ft from the Maryland side. Entire length of Dam

is 475 ft."

"The old timber above the water line is entirely gone and the stone only held in place by the sheathing. An entire new dam will be required."

"If rebuilt it should be of sawed white oak (and not hewn as in old dam) and filled with broken stone instead of field stone or stone from the river bottom which have been run smooth by the action of the water, which latter fact was the cause of so much leakage in the dam. From a hasty examination, I estimate it will cost about fifty thousand (\$50,000) dollars to rebuild the dam, though a more thorough inspection at low water, may increase or decrease the aforementioned amount. The estimate of 'Engr. Fisk' [Charles B. Fisk, Chief Engineer from the 1830s to the early 1850s] to build the dam and guard walls was ninety one (\$91,000) dollars. Comparing it with similar work in Kentucky, the abutments would cost double as much as in Licking Creek or about \$28,000. The dam must be rebuilt to insure a supply of water for navigation."

[Report of S. Gambrill, Treasurer and Paymaster, to L. V. Baughman, President, 19 April 1886]

"When we started on our trip over the Canal on the 13th inst. you instructed me to make notes of the principal damages to the Canal, caused by the two great freshets the early part of this month."

"The following is a list thereof."

"On the Georgetown Level two extensive bars near the Chain Bridge which are being removed by George Latchford with Steam Dredge and 12 men. On one mile level above Lock 5 the tow path is badly washed away for a distance of 200 yards and a considerable fill in Canal some distance. Just above Lock 6 there is a break in the tow path 44 ft. long & 12 ft. deep, and the tow-path in this level is badly washed for a distance of 1/2 mile. There are 26 men & 6 carts repairing damage. On the Cabin John level the tumbling waste is half gone, tow path badly damaged. On this we have 14 men making repairs. From there to Great Falls the tow-path is badly torn in many places. On the level above Great Falls there is a large leak at waste weir, and nearly all the tow-path on this level on this level carried away to a depth of five on to three feet, there is also two small breaks extending to bottom of canal in theses Elgin is working 30 men and 9 carts."

"On the three mile level above, there is a break on the tow path, near the culvert, 30 ft long and to bottom of canal, culvert somewhat damaged and the tow-path near the Lock washed away. On these repairs Elgin has Pennifield and 10 men. The tow path below Seneca is considerably damaged. The eight mile level above Seneca badly washed, Collier repairing same."

"From Monocacy to Harpers Ferry, the towpath is considerably damaged in many places. On the 4 mile above Harpers Ferry there are heavy washes on the tow path, two small breaks, and several sand bars. Drenner has 40 men and 16 carts on this. On the Mountain Lock there is a serious break near the tumbling wash about 50 ft long & almost one half of the T. [?] wash is washed out and the Canal for a distance of 120 yds is filled to a depth of 2 feet."

"Just above the Shepherdstown Lock the Canal is filled to a depth of 3 ft for a distance of 150 yds and the tow path on this, the one mile level, is seriously damaged."

"On the 5 mile level there is a break 40 ft long and several feet below the bottom of Canal, a fill 180 ft long & 2 ft deep, also a small brake at foot of Lock 40, face of tow path in this level is badly washed. Manow has 80 men & 32 carts repairing this."

"On the level above lock 40 there is a break near the Lock 40 ft long extending to bottom of Canal. A bar 100 yds being 2 ft deep, and the whole tow path washed to a depth of from 1 to 2 feet. Also in three places the canal is filled to a depth of 3 ft. and 300 yds long each. Burgan has 64 men & 19 carts here."

"On the Cumberland Division there is very little damage until you reach the Tunnel level. That level is badly washed, at 25 mile post there is a heavy land slide on berm side. The Cut below the Tunnel a large slide of Rock. Kelly has 12 men at work. The one mile level below the Tunnel tow path badly washed away and the tow path carried out to a depth of 2 to 4 ft. Seven mile bottom tow path carried away a distance of 1/2 mile to a depth of 2 to 4 ft. On the two mile there is a break at Burns Hollow 3 ft long & 3 feet below bottom of Canal, towpath damaged, and a considerable fill in the Canal."

"On the Orleans level the tow path is greatly injured for a considerable distance."

"Hottenhauser and Young with a force of 50 men and 20 carts are making these repairs."

"On the 4 mile level between Dam 6 and Sir Johns Run the upper portion of the tow path for a distance of one mile is almost entirely washed away and the lower end almost 1/4 mile same condition also balance of tow path badly damaged. The Canal on this level is also filled to an average depth of 2 feet for culvert half its length and the berm band injured in many places. The damage to the tow-path on this level is much more serious than it was in 1877. On the Hancock or 7 mile level the upper portion is filled to a depth of several feet for a considerable distance, tow path very much injured and two breaks close together one of which is over 60 ft long and several feet below bottom of Canal, near the Round Top Cement mill."



"On the 14 mile level below Hancock there is a small break at head of the Little Poole there is a brak 40 ft long and down to bottom of Canal. On there repairs Sterling has 62 men & 22 carts. On the 2 mile level below four Locks, the tow path is very much damaged, and several serious leaks. One the 7 mile or Williamsport level there is a break on the berm side at Creighers [?] Warehouse 30 ft long & three feet below bottom of Canal, tow path badly torn up at Millers bend for a distance of over one mile. Canal filled from 1 to 3 ft and waste weir washed out."

"Masters has 43 men & 18 carts at work here."

"From Williamsport to head of big slack water the tow path on many places considerably damaged, there is also 2 small breaks. Hughes has 22 men and carts in this work."

"Dam No 6. There is 204 feet of the center of this dam carried away, the remaining portion on the Virginia side almost 125 ft is almost a total wreck though standing. On the Maryland side there is, about 150 ft which was partially rebuilt two years ago, remains in tact, but as the lower half of it is old & rotten it would be policy to take it out; in other words. It will require an entire new dam from abutment to abutment, they being in good condition"

[182] Board of Directors Meeting, 27 April 1886 (Flood-March/April 1886, Sustainability-Dams)

"Col. Berret offered the following resolution which was adopted. Resolved that the President be requested to engage Mr. Robert M. Martin, the Water engineer of the City of Baltimore to prepare, as soon as practicable, proper plans, specifications and estimates for the rebuilding of dam no 6 on the Chesapeake & Ohio Canal; and if said plans, specifications, and estimates are satisfactory, the President be authorized to issue proposals for the rebuilding of said dam no 6 after sufficient Bond will be required for the execution of the work to be done and any proposal which may be accepted."

[182] Board of Directors Meeting, 5 August 1886 (Flood-March/April 1886, Sustainability-Dams)

"The President stated that Dam No. 6 was nearly completed and that the cost would be between \$42,000.00 and \$45,000.00 or about \$10,000.00 less than the Engineer's estimate and \$15,000 or \$20,000 less than any proposal received from Contractors."

Repairs on the canal, caused by the 1886 freshet were paid for by the sale of repair bonds authorized under the 1878 Maryland Act. This was possible since the Company had not issued the full \$500,000 authorized by the 1878 act. These bonds were evidently sold at less than par value, an indication of the precarious financial position of the canal company.

1887

[LIB-PHP] Fifty-Ninth Annual Report of the President and Directors of the Chesapeake and Ohio Canal Co. to the Stockholders, January 5th, 1887 (n.p., [1887]) (Flood-March/April 1886, Sustainability-Dams, Harper's Ferry-Sustainability)

The President, L. Victor Baughman, reported (pp. 5-7):

"The immunity from freshets which marked the year eighteen hundred and eighty-five was followed in the succeeding year by three disastrous and destructive floods. In no season during the whole history of the canal has such an amount of injury been done to work as during the freshets of eighty-six."

"Dam No. 6 was utterly swept away by the angry torrent. Great gaps in the bed of the canal were torn open and solid masonry and compact banks were riven asunder and scattered like chaff. The destruction in places was complete. The work of repair became, in fact, a work of rebuilding. A careful examination of the wreck by competent and experienced engineers placed the minimum cost of reconstruction at one hundred and fifty thousand dollars. The prospect was a gloomy one; but energetic and prompt measures were at once resorted to under the personal and continuous supervision of the President and other officers, and the injury was repaired, the dam rebuilt and navigation restored at a cost of nearly eighty-two thousand dollars, a little more than half the amount estimated to be needed."

"Thus this great destruction (one that is without a parallel in the life of the canal) was, at a comparatively small cost, speedily and permanently repaired. This, too, was done whilst the works were groaning under the remnant of a debt for wages due by the former administration, and when the treasury of the Company was practically penniless. To meet the heavy and extraordinary expenses incident to these disasters, the remainder of the repair bonds of 1878 were sold at prices ranging from 86¢ to 76¢ and averaging about 80 cents on the dollar. Under the circumstances this was no easy task, but under the authority entrusted to the President it was finally accomplished and the cost of the repairs were paid. Of course this increase in the bonded debt of the Company has occasioned an increase in the amount of annual interest to be provided for. . . . The annual interest on the repair bonds amounts to thirty thousand dollars."

Baughman, somewhat prophetically stated (p. 8):

"The situation becomes more embarrassing when it is remembered that all of the assets of the Company have been used--that there are no more repair bonds to fall back upon in the event of another flood. A recurrence of these floods is inevitable. The extent of the destruction they may entail cannot be conjectured. With a steady and gradually increasing indebtedness, and without a dollar of means to repair in the event of a disaster--a destruction of any considerable portion of the works (though not so disastrous as that of the past season) will amount to--for it

will essentially produce--a total abandonment of the canal as a water-way carrier."

James P. Biser, Superintendent for Division No. 1, reported (pp. 15-18):

"After putting on the water, March 15, 1886, and regulating the Division for boating, there came, April 1st, a freshet which damaged the canal to the following extent: The tow-path on the Georgetown level was considerably damaged by washing. The Green Spring 'culvert' was injured, requiring repairs. The level filled up necessitating the drawing of the water and a recleaning.

The Outlet Lock also required pumping out and recleaning. On 'Magazine' level a break of 120 feet in length and 7 feet in depth occurred, and the entire length was considerably ragged. On 'Cabin John's' level heavy washes occurred, one (1) of 90 feet in length by 4 feet in depth. On these two levels the use of carts was compelled for the repairing of an extent of three miles, before water could be put on, leaving the remaining repairs to be afterward completed by scows."

"On 'Great Falls' level in consequence of the tow-path having been raised with the increased elevation of the new Government Dam at Great Falls, from 3 to 5 feet in depth of the entire width of the tow-path were washed into the canal, which must necessarily be removed before putting on the water, and in consequence an extraordinary large force of men were required, as the embankment being high, this earth required to be handled several times. On the three-mile level a break of 50 feet long and 8 feet deep occurred, and on the two mile level heavy washes, damaging both levels to an extent requiring the carting of a great deal of material. On the eight and nine-mile levels less serious damage was done, but they were injured to some extent. The 'Outlet Lock' at 'Edwards Ferry' was badly damaged, several gates were broken and several more injured."

"On the two, seven and two-mile levels there was considerable 'top washing' involving a greater expense in repairing because of the greater inconvenience of material. From 'Catoclin' to the 'Two Locks' the damage continued to the end of the Division. On four-mile level the tow-path was badly washed. Washes at several points occurring of from 2 to 4 feet in depth, which required a great amount of carting, and also heavy deposits necessitating the employment of a large force of men. On the six-mile level the 'Tumbling Dam' was considerably 'ragged,' the entire tow-path badly washed and the back damaged so as to require 400 perch of stone to rip-rap and secure it. The 'Outlet Lock' on this level was filled up to a depth of 8 feet, which had to be removed. On the same level, a bar extending from the Lock at Shepherdstown to the 'Outlet Lock' and in depth 18 inches, had to be removed with wheelbarrows. On the one-mile level 500 yards facing on tow-path were destroyed, necessitating in its repair a covering of clay 18 feet wide and 3 feet in depth, for the entire distance, the material for which was obtained at great inconvenience and heavy expense. On the same level a deposit in bottom of Canal 500 yards in length, 25 feet in width and 2 feet in depth was removed by wheelbarrows. The tow-path of the entire level was top-dressed."

"On the five-mile level a break 40 feet long and 18 feet deep; a wash 150 feet by 4 feet; six washes, 30 feet by 3 feet were repaired; also 800 yards of the facing of the tow path as on the one-mile level was repaired; likewise 600 yards of bar, 3 feet in depth, and 25 feet in width was removed. On six-mile level, three breaks, averaging each, about 40 feet in length and 12 feet in depth were repaired. The tow-path was badly washed at many places and in some to a depth of 2 feet, requiring a great amount of carting. Bars amounting to at least a mile in length and 12 inches in depth, the entire width of the bottom of Canal were removed. 3,000 perches of stone were used in securing and riprapping back of tow-path."

"The towpath around 'Slackwater,' as well as at many other places on the Division, was twice repaired, as the result of three rises of the river, following each other in succession."

"All the possible force of men, horses and carts that could be advantageously employed were simultaneously set to work upon the entire Division, with a view to its being placed in readiness for navigation at the earliest possible date, the repairs of which were not fully completed, but the canal placed in such condition as to receive the water on April the 28th, 1886. After filling the Division for the second time, a break occurred on May 17th on Six-mile Level at 'Miller's saw mill,' of 45 yards in length and 25 feet deep. This break, because of its location in 'Limestone' section and its close proximity to a culvert, demanded the greatest precaution in treatment, requiring the use of 'cement' and 300 perches of stone to insure its security."

"The Division again being in condition, the following work was done during the season, a portion of which was still a resultant of the freshet, viz: 19 miles of towpath repaired; 35 miles of berm and tow-path 'trimmed;' 800 perches of stone used in riprapping and securing 'Berme banks.'"

"Nine thousand perches of stone have been quarried and placed upon the three dams, 'Magazine,' 'Seneca,' and 'Harpers Ferry.' Two of these 'dams' were also 'brushed.'"

"A leak at Dam No. 4 necessitated the quarrying and boating of 4,000 perches of stone. A new 'crib' at a ravine on four-mile level, 100 feet long by 12 feet in width was built, and another on the same level was repaired; 15 culverts were cleaned and several 'cribs.'"

"The mud machines have been kept almost constantly going, because of the deposits on the Division, resulting to a great extent from the 'freshets,' at various points, viz.: 'Head of Slackwater,' 'Shepherdstown Outlet,' 'Harpers Ferry feeder,' (at the latter place it was necessary to 'cut out' both in the river and canal,) at the head of the nine-mile level, on the three and two-mile levels, 'Georgetown level,' and 'Rock Creek.' The berme and tow-path are in fair condition."

E. S. Mulvany, Superintendent for Division No. 2, reported (pp. 23-26):

"During the season the navigation was seriously interrupted by breaks and damages caused by the unprecedented spring freshets in the Potomac river. The water was turned on the Division on the 13th day of March and on the 23d the levels were all full and the Division ready for navigation; on the 31st the river raised very high and on April the 1st, the banks were mostly overflowed from the mouth of South Branch to Big Slack Water, a distance of 76 miles, causing the following damage to the banks and dams:"

"The tow-path of the seven-mile level below Lock No. 67 had one foot washed off the top and the material deposited in the Canal for a distance of one mile. The tow-path of the four-mile level below Lock No. 61, had one a-half feet washed off the top, a distance of one and a-half miles and the waste weir entirely washed away."

"The tow-path of the three-mile level, below Lock No. 60, had two feet washed off the top for a distance of two miles and the material deposited in the bed of the Canal."

"The tow-path of the two-mile level, below Lock No. 59, had two feet washed off the top for a distance of half a mile, and a breach in the tow-path sixty feet long, five feet below Canal bottom, at a point known as Burne's Hollow. The tow-path of the five-mile level at Little Orleans had the top washed off a distance of three hundred yards, one foot deep."

"On the four-mile level, below Dam No. 6, the damage was great, the guard bank and tow-path was badly washed for the entire distance, varying from one to three feet deep. At a point known as Hughes' Bend the tow-path was washed into the bed of the Canal so as to form a level surface for a distance of half a mile. There was one small breach in the berme bank and some small washes at the lower end of this level."

"The tow path of the seven-mile level, below Lock No. 53, had from one to three feet deep washed off the top for a distance of two miles and the deposit washed into the Canal bed, and one large breach in the tow-path seventy feet long and five feet below Canal bottom, at a point about three hundred yards above the Hancock Cement Mill. There were also several small washes in the berme bank above the town of Hancock."

"The tow-path of the fourteen-mile level was washed about one foot deep for a distance of a half a mile, and a breach in the tow-path at the lower end of the Little Pool, fifty feet long down to Canal bottom."

"The tow-path on the two-mile level, below the four locks, had the top washed off the entire distance about half a foot deep. The tow-path of Little Slack Water had nearly all the gravel washed off. The tow-path on the seven-mile level, below Dam No. 5, was washed one foot deep for a distance of one mile, and about 800 cubic yards of sand deposited in the Canal, at a point known as Miller's Bend, and a breach in the berme bank forty feet long and six feet below Canal bottom, at a point known as Kreigh's Warehouse."

"The tow-path of the six-mile level, below Williamsport had the top washed off about one foot deep a distance of half a mile."

"The tow-path of the four-mile level, above Big Slackwater, had the top washed off about one foot deep for a distance of half a mile, and 300 cubic yards of sand deposited in Canal, at the lower end of the level."

"As soon as the water receded sufficiently, I organized a force of hands, horses, carts, wagons, &c., and made preparations to repair the damage, and had about commenced work when on April the 5th there came another rise in the river which backed the water through the waste weirs and breaks, and deposited several sand bars in the bed of the Canal at different points."

"When the water from this rise fell sufficient I put a large force of hands and horses and carts to work, and commenced repairs at all the damaged points along the Division and had about completed when another rise came in the river on the 9th of May which overflowed the banks below Dam No. 6, and washed away nearly all the new work that had been done the four and seven-mile levels between Dam No. 6 and Hancock, including the breach above the Cement Mill, and also doing considerable damage to the work on the six and four-mile, below Williamsport. On the 20th of May the repairs below Dam No. 6 were sufficiently done to admit the water, and we closed the feeder at Dam No. 6, and commenced to fill up to Dam No. 5 from the Cumberland Division, and had all full and ready for navigation on the 1st day of June."

"The freshet of April the 1st caused a breach in centre of dam No. 6, about 100 feet wide, and the rise of April the 5th carried away 50 feet more, and the rise of May the 9th carried away enough to widen the gap so that it measured 237 feet, and the parts left standing were very much damaged. It was rebuilt under the immediate supervision of Mr. Samuel D. Young, of Cumberland, whose report is herewith enclosed."

"The abutment on the Virginia side and the protection walls on the Maryland side, below dam No. 5, were also damaged and are in a leaky condition and need considerable repairs."

"The culverts were very much filled up by the freshets with sediment and choked with drift and brush. They have all received the necessary attention by being cleaned out, &c."

Mulvany also discusses the replacement of damaged lock gates, waste weirs, towpath, and making other repairs.

Samuel D. Young, who rebuilt Dam No. 6, reported (pp. 31-32):

"The following is a statement of damages to Dam No. 6, caused by the floods of April and May, 1886, and repaired in June and July following. The dam is 517 feet between abutments; 58 feet wide and 22 1/2 feet high to the crest. It is constructed of timber fastened together with long spike bolts. The space between the timbers being filled with loose stone, and the whole exterior covered with 3-inch and 6-inch sheathing boards. The gap or breach was 237 feet by width of dam, and, in addition to this, it was found necessary to tear out and rebuild the back or upper half of the 150 feet of old work left standing on the West Virginia side on account of its decayed condition. The work was commenced June 9th, and the gap closed and water turned into the Canal July 15; 225 men being employed including mechanics and laborers. It was also found necessary, in order to get a free flow of water into the Canal, to clean out the sediment which had collected in front of the feeder lock, amounting to about 1,000 cubic yards, and to rebuild about 100 feet of wing wall extending up the river from mouth of feeder. This was all done before the water was turned in the Canal. The dam was raised through its entire length two and a-half feet higher than the old dam, which had, no doubt, settled considerable from its original height."

"The work of completing the dam after the water was turned in consisted of building up and sheathing the front or lower side and building about 150 feet of wing cribbing extending down the river from the Maryland abutment. The entire work was completed about the 10th of August. The principal items of material used in repairing the work were 800,000 feet of lumber; 14,000 perches of stone, and 35 tons of iron spike bolts. The blacking above the dam is clay, which was dug from the slopes of the river bank with Company's steam dredge and hauled out on scows. There is about 5,000 yards of this filling, which makes the dam very tight."

[CF] The Evening Star (Washington, D.C.), 6 January 1887, 2 (Flood Damage-Financing)

Editorial arguing for public assistance to keep the C&O Canal in repair and operation, as the company has exhausted its resources.

[CF] The Evening Star (Washington, D.C.), 22 December 1887, 2 (Flood Damage-Financing)

Editorial arguing for public assistance to keep the C&O Canal in repair and operation.

[CF] The Evening Star (Washington, D.C.), 23 December 1887, 2 (Flood Damage-Financing)

Editorial reporting favorably on a meeting in Cumberland arguing for public assistance to keep the C&O Canal in repair and operation.

1888

[LIB-PHP] Sixtieth Annual Report of the President and Directors of the Chesapeake and Ohio Canal Co. to the Stockholders, January 2, 1888 (n.p., [1888]) (Flood-May 1887, Sustainability-Culverts)

James P. Biser, Superintendent for Division No. 1, reported (pp. 20-21):

"On May 8th a break occurred on the towpath at what is known as Little Monocacy, caused by an unprecedented rain in that neighborhood, the extent of which was ninety feet in length and twenty feet below the bottom of the canal, extending entirely across the bottom to the berme side. The river was backed into the break, owing to its 'swelled' condition at the time, which gave a considerable amount of labor to get a start, and notwithstanding the difficulties we encountered, on May 9th all the men we could obtain were employed, the forces organized, and the work pushed forward without intermission until entirely completed."

"The same rain damaged culvert at same point (Little Monocacy), by washing out the entire paving and undermining both sides at several points."

"After repairing break we went promptly to work repairing culvert, the repairs of which consisted of an entire new bottom, which was put in by first building coffer dams at each end, and a trunk one hundred and twenty feet long (the entire length of the culvert), seven feet wide and twenty inches high, with the assistance of a steam pump to control the stream, which is subject to very sudden rises. The side walls and undermining were repaired by good substantial masonry built upon solid foundations. The bottom was made by 'cribbing,' and filled with stone eight feet in depth, one hundred and fifty feet in length and twenty feet in width, the bulk of which was necessary to quarry, and a good, solid and heavy mason and concrete wall built at both ends of the culvert, thereby securing a permanent and substantial construction."

"The same rain, or freshet, deposited bars on seven and nine-mile levels, which were removed; also seriously damaged berme bank on the east side of the Monocacy aqueduct, which was repaired."

E. S. Mulvany, Superintendent for Division No. 2, reported (p. 28):

"On the 26th of July there was a heavy rain-storm on the fourteen-mile level, extending from Millstone Point to the four-locks, which caused the banks to overflow to a depth of two feet and doing great damage to the canal, as follows: One break on the berme side at Cherry Run, eighty feet long and eight feet below canal bottom; one break in the tow-path at the upper end of the big pool, one hundred feet and eight feet below canal bottom; one sink or slide in the tow-path at the lower end of the big pool, four hundred feet long and carrying away two-thirds of the width of the tow-path to a depth of five feet below canal bottom; the banks for the entire

distance of the storm were badly washed and several very heavy sand bars were deposited in the channel of the canal; the bed of the road culvert at McCoy's Ferry was totally washed away and the walls undermined to a depth of six feet; the walls of the drain culvert at the same point were considerably damaged. I at once organized a large force of men and horses and carts, under the following bosses, and commenced repairs: S. Sterling at Cherry Run break, J. E. Hughes at break at upper end of big pool, Peter Kelly at the slide at lower end of big pool, J. H. Anderson at the bars and washes on the levels, and Solomon Troup at the culverts. The repairs were completed and navigation fully restored on the 10th of August."

Note both superintendents' reports also contain a description of more routine repairs made along the canal for the year 1887.

[CF] The Evening Star (Washington, D.C.), 13 January 1888, 3 (Flood Damage-Financing)

"The C. and O. Canal. Col. Baughman Reviews His Administration and Points Out the Necessity of Doing Something To Save the Canal." The Evening Star reports President Baughman's confession that company revenues are insufficient to make routine repairs to the canal, let alone to deal with extraordinary damage.

[CF] The Evening Star (Washington, D.C.), 10 February 1888, 1 (Flood Damage-Financing)

"To Save The Canal: The Plan Proposed by the Maryland Board of Public Works." The Evening Star reports the Maryland Board of Public Works proposes that the state buy the 1878 repair bonds.

1889

[320] Annual Report of the President and Directors, 10 January 1889 (Maintenance-General)

"Condition of Canal"

"We have maintained the canal in good condition throughout its entire length during the season, and will have only such repairs to make this winter as could not be made during navigation, the most of which on Division No. 1 is rebuilding of wall and grouting of Lock No. 2, Georgetown; new machinery at Lock No. 6; renewing floor and part of wall at Lock No. 24; repair of culvert at White's Ferry; building of new trunk over creek below Edward's Ferry; building of two new flumes; stopping leaks and cleaning out. On Division No. 2, repair several bridges; building three new waste weirs; repair several locks, and dredging basin at Cumberland."

"These repairs can be made at comparatively small cost. The material has all been put at the various places and paid for."

[CF] Evening Times (Cumberland), 31 May 1889, 1 (Flood-May/June 1889)

"A Sweeping Cyclone Followed By a Disastrous Flood, Causes Much Loss Of Life, Valuable Buildings and Property Destroyed, Rail Travel Interrupted."

[CF] The Evening Star (Washington, D.C.), 1 June 1889, 1, 5 (Flood-May/June 1889)

"The Great Rain Storm. Damage By the Deluge. Railroad Travel Interrupted. The Flood In The Potomac. Rock Creek and Other Streams Out of Their Bounds."

[CF] Evening Times (Cumberland), 1 June 1889, 1 (Flood-May/June 1889)

"The Flood! A Deluge Worthy of Dore's Description. Our City Cyclone Swept, And Its Chief Streets made into Canals."

[CF] The Evening Star (Washington, D.C.), 3 June 1889, 5 (Flood-May/June 1889)

"The Canal Ruined. The Damage All Along Its Length Said to be Irreparable."

[CF] The Evening Star (Washington, D.C.), 4 June 1889, 5 (Flood-May/June 1889)

"Canal or No Canal." The newspaper reports Georgetown millers begin agitating for the repair of the Georgetown level. Also, a detailed description of the damage to canal on the Georgetown level.

[CF] The Examiner (Frederick), 5 June 1889, 2 (Flood-May/June 1889)

"The Great Flood." A paragraph in The Evening Star reporting on flood damage.

[CF] The Evening Star (Washington, D.C.), 6 June 1889, 5 (Flood-May/June 1889)

"The C. And O. Canal Problem." The Star writes that a former canal director thinks the Georgetown level will be fixed and the rest of the canal turned into a railroad.

[CF] The Evening Star (Washington, D.C.), 8 June 1889, 5 (Flood-May/June 1889)

"Will The Canal Be Repaired?" The Star reports a company treasurer thinks canal can be repaired for a sum not exceeding \$500,000.

[CF] The Evening Star (Washington, D.C.), 10 June 1889, 5 (Flood-May/June 1889)

"Maryland and the Canal." The Star reports on flood damage in Montgomery County.

[CF] Baltimore Sun, 11 June 1889, 1 (Flood-May/June 1889)

"Fate of the C. & O. Canal" The Sun provides good description of the financial problems of restoring the canal and detailed summary of the physical damage to the canal. Damage estimates not as bad as the initial estimates.

[CF] The Evening Star (Washington, D.C.), 11 June 1889, 2 (Flood-May/June 1889)

"The Wrecked Canal. President Gambrill's Estimate of the Damage." Summary from the Star of the physical damage to the canal from Georgetown to Great Falls.

[CF] Evening Times (Cumberland), 11 June 1889, 3 (Flood-May/June 1889)

"Our Wrecked Canal" A good description by the Star of the financial problems of restoring the canal and detailed summary of the physical damage to the canal. Damage estimates not as bad as the initial estimates.

[182] Board of Directors Meeting, 12 June 1889 (Flood-May/June 1889)

"The President, submitted his report, giving detailed account of the damage done to the Canal by the recent flood, which was read and approved and ordered to be presented to the Stockholders at their meeting on the following day June 13th."

"On motion of Mr Dobbin, the President was authorized to call a meeting of all persons interested in the preservation of the Canal, to be held at the Company's office in George Town D.C. on the 19th day of June 1889 to consider the subject of the report of the Directors, and to devise means for the restoration of the Canal."

"On motion of Mr Annan, it was resolved that the President be authorized to make all such repairs on those parts of the Canal, at which water is rented, as power, as he may deem expedient out of the rents now due or to become due from the persons using the water for such power."

[CF] The Examiner (Frederick), 12 June 1889, 2 (Flood-May/June 1889)

"Poor Old Canal." Editorial blames the downfall of the canal on its use for political purposes.

[CF] The Evening Star (Washington, D.C.), 12 June 1889, 5 (Flood-May/June 1889)

"The Canal Problem." Star reports business interests say repair estimate for Georgetown is inflated, and that President Gambrill was insufficiently vigilant in preventing damage to the canal from the flood.

[Brown] The President and Directors to the the Stockholders of the Chesapeake and Ohio Canal, 13 June 1889 (Flood-May/June 1889, Harper's Ferry-Sustainability, Widewater-Sustainability)

"When the President and Directors of the Company submitted their report at your regular meeting on the 3rd. inst. they stated that since the same was written a great freshet had occurred causing extensive damage to the Canal, and at that time the water in the Potomac River was so high that it was impossible to tell how seriously it was damaged, but as soon as possible, would make a thorough inspection and give a detailed report."

"This receiving your approval, you instructed us to have the report for your meeting to day."

"We have now to report that the President and superintendents have made a careful examination of the whole line of the Canal and find the damage to be as follows,"

"Rock Creek Dam washed away, also Steam Dredge. 2 Scows and Buckets. Georgetown or Feeder Level, long, 11 feet below bed of Canal, Culvert damaged, 2 breaks at Little Falls Church 200 feet long, 12 feet below bottom of Canal. Break 1000 ft. below Chain Bridge 600 ft. long 4 ft. below Canal bed, Towpath to Bridge badly washed, Just above Chain Bridge break 100 ft. long 12 ft. deep, from there to Lock No 5 nearly one Mile of towpath badly washed. The Feeder Lock damaged, and guard bank, 800 ft, long partially washed away."

"To make repairs to this level so as to enable Georgetown Millers to get Water supply will cost from \$25,000 to \$30,000."

"Lock No 5. Nearly washed out only Chamber Walls Standing, Flume washed to a depth and width greater than Canal."

"Lock No 6. Coping off. Backing on each side washed out, flume destroyed. Lock House damaged,

and just above the Lock is a break 50 ft. long 3 feet below Canal bed."

"Dam No 1. This is Rubble dam, nearly opposite Lock No. 6. and as far can be judged, owing to the high state of the Water, is very much damaged."

"Lock No 7, Lockhouse. destroyed. Lock & flume nearly destroyed. 200 yards above this Lock, break 100 ft. long. 2 ft. below bottom of Canal, Break near Culvert at Cabin John, and tow path on this level badly damaged."

"Lock No 8 Badly damaged Gates gone and Lock House destroyed. Log Walls Four Mile Level This shaft on elevation 60 feet above river and there are breaks as follows: one 150 feet long 30 feet deep also 920 feet of tow path wall next to Canal 20 feet high destroyed."

"Lock No 15 Nearly destroyed. Gates all out. Flume destroyed. Lock House washed away."

"Lock No 17 Nearly demolished. Lock House carried away. Lock gates gone."

"Lock No 18. Same Condition, The Towpath, on the Short levels between the latter two locks is washed away."

"Great Falls Level, Just above the Lock, there is a break 50 ft. long. 3 ft. below bottom of Canal, a break 250 ft. long 8 ft. deep. and another 500 ft. long 8 ft. deep. and the Tow path for nearly 2 miles is very badly washed."

"At Watt's Branch There is a break 80 ft. long, also small break at Muddy Branch."

"Seneca Lock. (No 23) is badly washed as is No. 24. and near the latter is a break 150 feet long. 4 feet below bottom of Canal."

"At Edwards Ferry The Pivot Bridge, gone and loaded boat lies across the Lock. Bridge over Trunk on same line gone."

"Small break near haunted house. Lock Houses [illegible] Towpaths are but slightly damaged. The Weverton Lock was carried away and there was several heavy bars on 7, 8 and 9 Mile Levels."

"Heese Dredge [?] Badly Damaged."

"The Towpath from Weverton to Sandy Hook is damaged."

"At Sandy Hook the Carpenter Shop, blacksmith shop. lock gates. sheds and Cart House, with a number of Carts, the Company's store house and dwelling house. An important cluster buildings were all carried away with many tools,"

"Between Sandy Hook and Harpers Ferry. Lock 32, is carried away except the Chambers walls, the flume is washed out."

"From this to a point above the Harpers Ferry Bridge, the Towpath, and heavy river walls for the distance of a Mile are nearly destroyed, the river and Canal being one for nearly all the distance."

"The outlet Lock near Harpers Ferry Bridge is totally destroyed,"

"At this point the Company's boarding house, lock keepers house and Store house were carried off."

"Locks 34. 35. and 36 reaching 2 Miles west of Harpers Ferry are badly damaged. and the towpath for the entire distance nearly washed out."

"Feeder Lock, in the same neighborhood is filled with stone and gravel, and the guard banks badly damaged. Above Lock 36 is a break 125 ft. long and 8 ft. below bottom,"

"At Mountain Lock, in Washington Co. a large Culvert is gone. the Lock is filled. and there are numerous washes and sand bars on the level."

"From this point to Shepherdstown, there are many washes and bars, and the face and top of Lock 39 damaged. also a break 50 feet long on the level above,"

"Above Sharpsburg landing. at guard Lock No. 4. the gates are gone. the backing washed out and lock filled Also the new Lock House is washed out."

"on the same level the Company boarding house, and other buildings are gone. There is a break on Feeder level below Dam No 4, 60 ft long 8 ft. below bottom."

"The stop lock and lockhouse here are gone. In the protection banks between stop lock and feeder No 4; there are ten breaks aggregating 1260 ft. in length, 37 ft wide and 11 ft. deep. The gates and lockhouse here are gone."

"In the neighborhood of the Opequon, on four mile level, there is a break 75 ft. long, and the towpath for a distance of a Mile is washed 2 1/2 feet deep, with heavy deposits of sand in the Canal."

"The towpath on nearly all the Williamsport level is badly washed. The bank having a slip on the river 100 ft long, 20 feet deep. carrying away half the slope, the banks being cracked for several hundred feet above the slip."

"The is considerable damage done to the Lock at Dam No 5. At two mile level, below Four Locks, the towpath is washed 1. to 4 feet for a mile and much material is deposited in the bed of the Canal."

"Between Hancock and Four Locks, the towpath is washed for a distance of Several Miles from 1 to 4 feet, a break 100 feet long occurs below Licky [?] Creek Aqueduct."

"There is a break 100 feet long 6 ft below the bottom in the Neighborhood of Fort Frederick, and below Big Pool another break 100 ft. long."

"On the Hancock level the towpath is badly washed for half its length,"

"The Lock at Sir John's Run is badly damaged and lockhouse washed away. The Sheathing is torn from Dam No 6 (old part) for a Considerable distance, and about 100 ft. of the lower Cribs are gone, The lock gates are badly damaged,"

"At Sideling Hill, the towpath is in the Canal."

"There is a break in the towpath 60 ft. long, and a break at Lock No 56 about 50 ft. long."

"At the Little Orleans level the towpath is damaged very much, and there is a break 100 ft. long below."

"Above Little Orleans the towpath is badly washed, and the Canal is filled for 200 yards by Slips from the Mountain Sides."

"A large amount of material will fall when the Canal obstruction is cleared. The land slide brought forest trees into the wreck."

"Below the Tunnell two miles of the towpath is in the Canal."

"One Mile level is in the same condition. There is a break in the tow path at 24 Mile stake, and one at Matthews each 100 ft long"

"The wooden trunk over Culvert at old Town, is gone, a break 60 ft long is made near Kelly's."

"There are two breaks on the Cumberland nine Mile level, but no material damage at Cumberland."

"There were many bridges along the line of Canal, nearly all of them were Carried away, and the Canal in many places along its entire length is filled to a Considerable depth."

"Many of the Culverts are choked up with debris."

"One Telephone line which was considered one of the best in the Country, and which Cost the Company over \$20,000.00 is almost completely destroyed,"

"We consider the total damage much greater than it was 1877, and estimate that the Cost to restore the Canal to the same condition it was in before the freshet will reach fully \$300,000, though to put it in navigable condition the may possibly be done for \$250,000, or less."

[182] Board of Directors Meeting, 19 July 1889 (Flood-May/June 1889, Flood Damage Prevention-Ordered, Flood Damage-Financing)

At this meeting the Board approved a contract with the millers of Georgetown for the repair of the Georgetown level, in order that water power from the canal might be restored to the mills. The millers agreed to pay \$16,000 for the repair of the canal "between Lock No 4 and Lock No 5 including the Feeder Lock & Gate, and the Feeder itself . . . rebuild the guard bank at said Feeder, to its original height & width, rebuild the tow-path, with good material with banks properly sloped on either side and worked up in the bottom, wherever there is men work on said banks, so that a perfect connection may be formed between said men & old work, having along the centre of said bank, wherever made from the bottom of the breaks and washouts to the top of said towpath a core of not less than six feet in width made of good clay: the sides of said towpath next to the water of said Canal to be paved with large flat stones closely laid together wherever the breaks & washes go through the banks of the Canal.

"and the side next to the river to be ripraped with stones wherever the breaks and washes go through the banks of Canal; and generally to restore said part of said Canal to the condition in which it was before the freshets of May & June, 1889, that is to say with sufficient water to float loaded boats to the coal wharves."

"The parties of the first part covenant and agree that wherever it shall be necessary they will rebuild and make watertight, with good cement and stone all culverts along said level."

[CF] The Evening Star (Washington, D.C.), 13 June 1889, 1 (Flood-May/June 1889, Flood



Damage-Financing)

"The Canal Question." Good article in the Star on the financial difficulties of repairing the canal after the 1889 freshet. Stockholders to issue repair bonds under the authority of 1844 Maryland legislation, but there appears to be no market for them because of existing liens on the company's revenues and property.

[CF] The Evening Star (Washington, D.C.), 14 June 1889, 4 (Flood-May/June 1889, Flood Damage-Financing)

Editorial on the financial questions related to the repair of the canal.

[CF] The Evening Star (Washington, D.C.), 17 June 1889, 5 (Flood-May/June 1889, Flood Damage-Financing)

"To Repair The Canal" Star reports on an informal agreement reached between Georgetown business interests to repair the Georgetown level, financing the repairs with advances from water rents.

[CF] The Evening Star (Washington, D.C.), 18 June 1889, 5 (Flood-May/June 1889, Flood Damage-Financing)

Editorial and article on a meeting in Cumberland of citizens interested in the repair of the canal. The meeting adopted a plan to restore the canal. Plan involved issuance of new repair bonds with an equal footing to the bonds of 1878.

[CF] The Evening Star (Washington, D.C.), 19 June 1889, 5 (Flood-May/June 1889, Flood Damage-Financing)

"To Restore The Canal." Star reports on a conference of canal officials and business interests agree to the Cumberland plan of issuing new repair bonds. Formal agreement reached between canal officials and Georgetown interests on repairing the Georgetown level.

[CF] The Evening Star (Washington, D.C.), 20 June 1889, 5 (Flood-May/June 1889)

"Canal Restoration." Star reports a contract for repair of the Georgetown level to be signed that day, but repairs of the rest of the canal still uncertain.

[CF] The Evening Star (Washington, D.C.), 21 June 1889, 5 (Flood-May/June 1889)

"The Georgetown Mills." Star reports repair work on the Georgetown level to begin the following Monday.

[CF] The Evening Star (Washington, D.C.), 24 June 1889, 4, 5 (Flood-May/June 1889, Flood Damage-Financing)

Editorial recommending the repair of the canal, rather than its replacement with a railroad. Attorney General of Maryland authorizes the issue of new repair bonds.

[CF] The Evening Star (Washington, D.C.), 6 July 1889, 12 (Flood-May/June 1889, Flood Damage-Financing)

"Canal In Business Hands." Article indicates 1889 repair bonds are finding no buyers, and claims that the canal company's repair estimates are inflated. It indicates Western Maryland business interest will soon propose a new repair plan to the Maryland Board of Public Works.

[CF] The Evening Star (Washington, D.C.), 20 July 1889, 4 (Flood-May/June 1889)

Editorial lamenting the rejection by the canal company of an offer made by a group of Williamsport businessmen to repair and take over the canal from Williamsport to Cumberland.

[CF] The Evening Star (Washington, D.C.), 22 July 1889, 7 (Flood-May/June 1889, Flood Damage-Financing)

"Situation Getting Serious." According to the Star President Stephen Gambrill admits utter failure to sell repair bonds or get contractors to accept toll certificates for repairs. Canal has only been repaired in Georgetown and 22 miles east from Cumberland to a lumber mill. Gambrill sees receivership as the only alternative, unless some other form of relief appears.

[CF] The Evening Star (Washington, D.C.), 24 July 1889, 4 (Flood-May/June 1889)

The Evening Star summarizes a Baltimore Sun editorial suggesting the repair efforts of the canal company are politically, rather than soundly motivated.

[CF] The Evening Star (Washington, D.C.), 30 July 1889, 5 (Flood-May/June 1889)

"Work On The Canal." Star reports repairs in Georgetown only two-thirds complete. Final completion date dependent on the weather.

[CF] The Evening Star (Washington, D.C.), 19 August 1889, 3 (Flood-May/June 1889)

"The Repairs To The Canal" Star reports the repairs to the Georgetown level are nearly complete.

[CF] The Evening Star (Washington, D.C.), 20 August 1889, 2 (Flood-May/June 1889)

"The Georgetown Level." Star reports on the state of repairs on the Georgetown level.

[CF] The Evening Star (Washington, D.C.), 21 August 1889, 4 (Flood-May/June 1889)

Editorial on the prospects of the repair of the canal.

[CF] The Evening Star (Washington, D.C.), 29 August 1889, 8 (Flood-May/June 1889)

"Water In The Canal. A Sluggish Stream Flows in the Georgetown Level This Morning."

[CF] The Evening Star (Washington, D.C.), 30 August 1889, 2 (Flood-May/June 1889)

"The Georgetown Level." Star reports repairs of the canal on the Georgetown level still incomplete, and full water cannot be turned on until the middle of September.

## 1890

[CF] The Evening Star (Washington, D.C.), 3 October 1890, 4, 7 (Flood-May/June 1889, Flood Damage-Financing)

Editorial and article mentioning the decision by Judge Alvey to allow representatives of the bondholders of 1844 to operate the canal, provided they can repair it by May 1, 1891, and that it be made profitable within four years; otherwise, the canal was to be sold.

[CF] The Evening Star (Washington, D.C.), 1 November 1890, 15 (Flood-May/June 1889, Flood Damage-Financing)

Article mentioning the decision by Judge Cox to allow representatives of the bondholders of 1844 to operate the canal. The terms outlined by Cox were similar to those made by Alvey, foremost among them that the canal had to be repaired by May 1, 1891.

[CF] The Evening Star (Washington, D.C.), 2 December 1890, 3 (Flood-May/June 1889, Flood Damage-Financing)

Star reports the canal in Maryland turned over to the Trustees of the 1844 bondholders and repairs on the still damaged portions of the canal begun in earnest.

[Brown] Report of the District of Columbia Receivers, 21 April 1890 (Flood-May/June 1889)

"Your Receivers report the physical condition of the Chesapeake and Ohio Canal, within the District of Columbia, as follows:--"

"Georgetown level in fair condition for water supply, and now being used both for navigation and supply of water to the Georgetown Mills and others. Rock Creek level much damaged by the freshets of May and June 1889, and requiring more or less dredging to restore navigation. Also the repair of the dam, at the mouth of Rock Creek, and the outlet locks at the same point, also the restoration of the tow-paths and retaining wall along the shore line of Rock Creek, and repairs to the Mole Wharf property, which was partially destroyed by the floods of May and June, 1889, in the Potomac River and Rock Creek. The total cost of the repairs to the Chesapeake and Ohio Canal property, as heretofore mentioned, we estimate at about 15,000 dollars."

[Brown] Report to the Maryland State Board of Public Works, Annapolis, 13 May 1890 (Flood-May/June 1889, Flood Damage-Financing)

Note: this is an ultra-detailed thirty-six page itemized estimate of the quantities and cost of materials to repair the canal. Its estimate for repairing the canal was \$338,748. There was also a shorter, but detailed estimate of the financial feasibility of reopening the canal.

[Brown] President and Directors to the the Stockholders of the Chesapeake and Ohio Canal, 2 June 1890 (Flood-May/June 1889, Flood Damage-Financing)

"On Thursday and Friday 30th and 31st May, 1889 there were unusual rain storms in the Virginias, Pennsylvania and Maryland which caused a great freshet in the Potomac, raising the river much higher than ever before known, on June 1st and 2nd it was six ft, at the mouth of South Branch & five ft. at Georgetown higher than it was at the great flood of 1877. The Canal from Dam No. 4 to Georgetown was, in many places, almost completely destroyed, and the entire line more or less damaged."

"When we reported this disaster to you on June 3rd you instructed us to go at once over the entire line and examine and report the condition of the Canal. This we did and reported to you on 13th June, giving as fully as possible at that time a detailed statement of the damages and our estimate of the cost of restoring the work, which was from \$250,000 to \$300,000. You then instructed us to make every efforts to restore the Canal and for that purpose we were authorized to issue Repair Bonds and Toll Certificates."

"The President and Directors, made every effort in their power to carry out your instructions to raise the funds necessary to repair and restore the Canal and put it in a condition for the resumption of navigation, but with the exception of a partial restoration of a portion of the Georgetown level, with money furnished by Gentlemen interested in the mills near that City, to be deducted from the accruing rents for the use of the water of the Canal, and a partial repair also of a portion of the Canal near Cumberland, their efforts were wholly unsuccessful."

"They were unable to negotiate any of the Repair Bonds, which you authorized them to issue, nor could they find any person or corporations willing to advance money upon any terms [?]."

"They publicly invited bids from contractors to restore and repair the Canal, either in its entirety or sections, but did not receive a single proposal of any kind. This unwillingness on the part of Capitalists and contracts was not to be wondered at, when it is borne in mind, that five successive coupons on the \$500,000 of Repair Bonds issued under the Act of 1878, chapter 78, were overdue and unpaid, and that at any moment the holders of these bonds, might institute proceedings for the appointment of a Receiver and a sale of the Canal and all its works; and that even if the amount necessary to restore the Canal should be advanced upon further issue of Repair Bonds under the general power reserved by the Act of 1844, chapter 281 or upon toll certificates, the earnings of the Company would perhaps continue to be insufficient to do more than meet its current expenses, leaving nothing for the payment of the accrued and accruing interest upon the Repair Bonds of 1878, and accruing interest on the proposed new issue of Repair Bonds."

"Notwithstanding the gloomy outlook and the desperate condition of the Company, the President and Directors, were not without hope that the various classes of persons along the line of Canal vitally interested in its preservation, would be both able and willing to furnish money enough to restore it, and in this hope, application was earnestly made to them to come forward in this crisis, with the funds needed to save the Canal from total extinguishment, and at the same time protect their own substantial interests from the immense losses which the destruction of the Canal would necessarily bring upon them."

"But in this quarter also from which assistance was hoped for no response came, - the security of the proposed new Repair Bonds, or of toll receipts or both was no more acceptable to those classes of persons living along the line of Canal than it proved to be to Capitalists and Contractors, and the melancholy result was therefore that the Board found themselves unable to do anything whatever for the restoration of the Canal. It is no fault of ours that Capitalists and Contractors did not regard a new issue of Repair Bonds or of Toll Certificates a desirable investment or security, none were found who were willing to risk any of their money to repair or restore the Canal. The belief seemed to be universal that even if the Canal was restored it would be impossible for it to earn sufficient revenue to pay current expenses. It was said and it could not be denied that the low rates by Railroad the Canal could compete and earn sufficient to pay current expenses for operating it."

"On the 30th day of December last the Trustees for the Bondholders of 1844, Mess. Geo. S. Brown, C. M. Matthews, John S. Gittings and F. M. Colston made application to the Supreme Court of the District of Columbia, Judge Cox, for the appointment of Receivers for the Canal."

"On the 3rd of January, 1890 they made supplemental application, and at the same time the trustees for the Bonds of 1878, Mess. Sloan, Brown, and Lowndes made similar application. His Honor Judge Cox, had service served on the Canal Co., to which the Company through its Counsel Mess. Poe and Lanahan answered. The District Court fixed the 25th of January for a hearing of the case, and it was on that day tried. Mess. Poe and Lanahan appearing for the Canal Company. Mr. Bernard Carter for the minority Bondholders of 1878 and as a holder of bonds of 1844 opposing the appointment of receivers. Mess. Morris and Hamilton, S. Teackle Wallis [illegible] Mr. Cross in the interest of a majority of the holders of the Bonds of 1878 (The B. & O. R.R.Co.) and Genl. B. T. Johnson for the Trustees for the Bonds of 1844 asking for Receivers. On the 28th of January Judge Cox decided in favor of the Plaintiffs and appointed Mess. Winship and Cushwa as Receivers for the Canal in the District of Columbia."

"Judge Alvey of the Circuit Court for Washington County, Md. fixed the 31st of January for trial Mr. Poe appearing for the Canal Company, Bernard Carter for the minority Bondholders 1878 and 1844 and Attorney General Whyte for the State of Maryland as against the appointment of Receivers and Mess. Cowan and Bond, Counsel of the B. & O. R.R. Co. and S. T. Wallis representing a majority of the bonds of 1878 and B. S. Johnson and B. T. Johnson on part of Trustees of Bonds 1844, asking for Receivers. On March 3rd Judge Alvey rendered decision in favor of plaintiffs and appointed Mess. Johnson, Bridges, and Baker as Receivers."

"On Thursday 30th January we surrendered the office in Georgetown with all the effects thereon contained to the District Receivers. And on Friday 7th of March upon application of the Maryland Receivers the office at Annapolis, together with books, papers &c. was surrendered to them; so that now, under the decree of the Supreme Court for the District of Columbia and of the Circuit Court for Washington County the Receiver appointed by the respective courts have in their possession all the premises, property, books, maps, records &c. of the Canal Co."

[Brown] Report of the Maryland Receivers, 9 June 1890 (Flood-May/June 1889, Harper's Ferry-Sustainability, Widewater-Sustainability)

"For an account of the present physical condition of the Canal we refer the Court to the Report of Messrs. T. L. Patterson, and T. P. Kinsley Civil Engineers, herewith marked 'Exhibit A.'"

"In addition to the examination of the Canal by these competent and highly skillful engineers the

Receivers made a personal and very careful inspection of the Canal, from the basin at Cumberland to the line of the District of Columbia. Whilst noting the breaches and ruin occasioned by the great floods of June 1889, we could not but be deeply impressed by the durable, and massive character of this great historic work. Its tunnel, its aqueducts, dams and embankments are marvels of engineering skill, and elaborate construction, and the durability is amply proved by their resistance to the freshets of the Potomac River for near a half century."

"The following tabulated statement shows in detail the estimated cost of repairing the Canal as given in 'Exhibit A' to which reference already has been made."

"Estimates of Costs of Repairs.

From Cumberland to Dam No 6	\$10,988.00	
Repair of Dam No 6	10,850.00	
From Dam No 6 to Lock No 44 (Williamsport)	6,140.00	
From Lock No 44 to Dam No 4	2,668.00	
From Dam No 4 to Lock 36 (Dam No 3)	37,116.00	
From Lock No 36 to Lock 32 (Harpers Ferry)	22,503.00	
From Lock No 32 to Lock 20 (Great Falls)	9,511.00	
From Lock No 20 to Lock 15 inclusive	8,694.00	
Log Wall Level to Lock 14	37,057.00	
Lock No. 14 to District line	<u>4,638.00</u>	
		\$150,165.00
Add 20 per cent for contingencies	<u>30,033.00</u>	
Amount of 'Exhibit A'		\$180,198.00

To this must be added for cost of lumber, carpenters work, lock houses, repairing locks, flumes, waste weirs, lock gates and other wooden structures  
45,000.00

For necessary repairs to Canal in the District of Columbia,  
as per statement of District Receivers 15,000.00

For Repairs of Wharf at Cumberland 1,000.00

For Repairs of Telephone line 7,500.00

For contingencies and incidental expenses which have and  
would be incurred before completing work 20,000.00  
\$268,698.00"

[Brown] Report of T. L. Patterson and T. P. Kinsley, Civil Engineers, Exhibit "A," to the Maryland Receivers, 9 June 1890 (Flood-May/June 1889, Harper's Ferry-Sustainability, Widewater-Sustainability)

"In accordance with your instructions we have made a careful examination of the Condition of the Canal from Cumberland to the District line, and the extent of the damage to it by the great freshet of May 1889, and have made and return herewith an estimate of the cost of restoring it to a navigable condition as good, if not better than before that flood."

"Of course, it was to be expected that serious injury would be sustained by the Canal and its structures by a freshet so unprecedented, and at various points this has been the case. It is remarkable, however, that so much of the Canal has escaped other injury than slight abrasion of its banks and washes of bars into its bed."

"From Cumberland to Lock No. 67, 22 1/2 miles, the Canal has been sufficiently repaired by Mr. Mertens, who has a large lumbering interest dependent upon the Canal for transportation, to carry the full depth of six feet water. There is still much work to be done on this section in widening and strengthening the towpath, in the repair of the loading wharf, cleaning out the basin, &c. Much of this work can be performed by the ordinary repair hands with the water in the Canal. From Lock No. 67 to Dam No. 6 the principal work required to be done is for the repair of the towpath and the removal of bars, the removal of a slip of rock at the North end of the Tunnel, the repair of Locks and Waste Weirs and the renewal of the trunk at Sideling Hill Creek aqueduct."

"Provision has been made in the estimate for taking down and rebuilding a few courses of the walls of some of the Masonry Locks, which, probably by the action of freezing water, have been inclined inward, so as to give a somewhat less width to the chamber of the Lock than the fifteen feet which they had when first constructed. This is not a recent defect; attention was called to the fact as far back as 1832 by Mr. Thos. F. Purcell, then associate Chief Engineer, and by Mr. Fisk in 1839; Canal boats are built with a full knowledge of this condition."

"At Dam No. 6 the sheathing of the down stream slope for about a hundred and sixty feet out from the Maryland abutment is loose, having been detached from the timbers of the front face of the Dam, part of which have been washed off. The Crib work will have to be rebuilt and refilled with stone and new sheathing put on. This work can be done when the water is low, without interfering with the navigation of the Canal, as the upper slope and iceguards are uninjured, so that the level of the water in the pool of the Dam is not affected nor the full depth of water in the feeder level reduced."

"From Dam No. 6 to Licking Creek aqueduct there has been small damage except the occasional

abrasion of the towpath. The stone Lockhouse at Lock No. 53 has been undermined and destroyed. The water is on the next or Hancock level to a depth of four feet, it having been repaired by citizens interested, for their convenience."

"At Big Tonoloway Creek aqueduct, a mile below Hancock, a wooden trunk was put in some twelve or fourteen years ago; this remains in about the same condition as before the freshet."

"At Licking Creek occurs the first break of any magnitude; here some four thousand cubic yards of embankment have been washed out. There have been several small breaks above this point, but few, if any, as low as bottom of Canal."

"Licking Creek aqueduct, with its cut stone arch of ninety feet span, one of the most beautiful and celebrated engineering structures of this Country, fortunately is almost entirely uninjured by the freshet."

"There is a break on the fourteen mile level at the abutment of a stone waste, about a mile above 'Old Fort Frederick,' and two or three small washes opposite that point; with these exceptions little more damage has been done on this level below Licking Creek than from the surface wash of the top of the tow path. This level has been sustained for the purpose of cutting off a considerable bend of the river at 'Prather's Neck'. The Canal across 'Prather's Neck' and the 'Four Locks', Nos. 50-54, remain as before the freshet."

"From the head of the 46th level, seventy-six miles below Cumberland, to 'Little Slackwater', the principal work to be done is in clearing out bars and repairing the towpath. The towpath around Little Slackwater is a good deal washed and will require walling and leveling."

"Dam No. 5 is uninjured; there is some wash on the top of the abutment, but the damage is slight."

"The Canal from this point to Williamsport to Lock No. 44 has been repaired by citizens interested, and had the water upon it to a depth of five feet. A good deal of work remains to be done upon it in raising and widening the towpath and otherwise strengthening it, especially in the Highrock sections where a breach would be very serious."

"This work can be best done by repair hands while the water is in and without impeding the navigation."

"The work to be done between Williamsport and 'Big Slackwater', eleven miles, is almost entirely for cleaning out bars and dressing up the towpath. A county road bridge across the Canal at 'Falling Waters' has been carried away. The towpath around 'Big Slackwater' is a good deal injured but can easily be made better than it was before the freshet by moving it in towards the bluff."

"We have now reached one of the points of serious damage referred to above."

"Dam No. 4 is a Masonry Dam, built about twenty years ago to supersede the old crib dam originally erected at that point. The Guard Lock through which boats enter the Canal from the pool of the dam is about a mile above the dam. The head walls of this guard lock were raised after the freshet of 1852 so as to be higher than a similar freshet-(the freshet of last year was eight feet and seven inches higher at that point than the freshet of 1852)- This guard lock was connected with the main land by a bank of equal height and with the Dam abutment by a guard bank between the Canal and the river. The abutment of the Dam was connected by a high embankment with a Masonry Stopgate which was connected with the high ground to the East of it by a bank. This guard bank which was about twenty-five feet above the level of the Canal was intended to bar out all water from the Canal below the Dam, especially with the passage at the stoplock closed by stop timbers; but the late freshet overtopped these barriers making a breach in the bank at the guardlock, another through the guard bank above the Dam abutment; it swept away the bank connecting the stopgate with the Dam abutment and carried out some six feet of towpath below the Dam, besides making a large breach through the towpath at 'Bull hollow' about a quarter of a mile below."

"About three miles below Dam No. 4 at what is known as the 'Burnt Warehouse' there is a large break through the towpath. Between the Dam and Lock No. 40 there is a good deal of work to be done in cleaning out bars and repairing the towpath at Lock No. 40, new gates will be required on the 39th and 38th levels, the towpath has been much abraded and bars washed into the Canal. On the 39th level there is a small breach through the towpath."

"Below Lock No. 38, opposite Shepherdstown, a good deal of work is required in cleaning out sand bars and repairing the outlet lock into the Potomac. Antietam aqueduct, a handsome structure of three arches seems to be in as good condition as before the freshet. Above Lock No. 37, a large stream has broken across the Canal and completely washed out a culvert of six feet span: this will have to be replaced by a culvert of larger dimensions. From this point to Lock No. 36 the only work is in cleaning out bars and dressing up the towpath."

"Lock No. 36 is connected with a guard lock of Dam No. 3, above Harper's Ferry, by a guard bank, intended like that at Dam No. 4 to keep out high water from the Canal. The water of the late freshet barely overtopped this bank but it has washed away nearly the whole of it, and also a

guardbank connecting with the guardlock with the Canal below Lock No. 35 and intended to protect the feeder Canal. On the 34th level the face and top of the towpath are very badly washed and a small breach has been made in the towpath above the Lock through which the water, which runs into the Canal at the guard lock, escapes into the river. On the 33d level, above Harper's Ferry there are some washes from the hill to be removed."

"Between Lock No. 33 above the Balt. & Ohio Railroad bridge and Lock No. 32, below, the river has spent its full force upon the outside of the towpath, washing it and its stone protection wall into the bed of the Canal, dismantling the Shenandoah outlet lock, which, so far as we can learn, has not been used for many years, and creating an impression of absolute ruin which is by no means borne out by a closer examination. The Masonry of the Locks has been somewhat injured and Lockhouse at No. 33 swept away."

"The Shenandoah Lock had better be removed and the materials used in the repair of other structures as it is in the way of carrying out a proper plan for the repair of this part of the Canal and there being little probability of any such future use for it as would at all warrant the outlay required to rebuild it."

"From Lock No. 32 to Monocacy aqueduct, a distance of eighteen miles, there is no damage to the Canal except a few bars and towpath abrasions and a very small break at the head of Lock No. 31 at Weverton."

"Monocacy aqueduct is a beautiful structure, built of white sandstone from quarries on Sugarloaf Mountain. It has seven arches and is nearly five hundred feet long. It seems to have been uninjured by the freshet. Just below the aqueduct there is a small breach through the towpath."

"From this point to Seneca aqueduct, 19 miles, there are a few washes and bars and one small break through the towpath."

"The Berm parapet of Seneca aqueduct and part of the arches were taken down and rebuilt fifteen years ago. This aqueduct and Lock, No. 24, connected with it have not been injured by the freshet. Near this point is Dam No. 2, commonly called 'Seneca Dam', this is now a rubble or riprap dam- owing to the height of the water in the river its condition could not be ascertained-It is probably no worse for the freshet. The guard bank and feeder require some repair."

"From this point to Lock No. 20-'Cromelin', at the head of the Great Falls of the Potomac, the repairs will be for removing bars, facing and raising the towpath, mending a breach at Wash branch, another at Beaver dam run and a small break near the Government aqueduct Dam."

"Below Cromelin there is a succession of Locks called 'The Six Locks' numbered from twenty to fifteen. The river here flows over the trap rock formation through which it passes by a succession of cascades. Between these channels are islands of solid rock-the whole presenting a scene of savage grandeur that can hardly be equalled East of the Mississippi. In freshets these channels fill rapidly, notwithstanding the great fall, and the river rises much higher than where it is unobstructed. Care was taken after the freshet of 1852 to make the Canal secure at this point from a freshet of like height by building a stoplock above the level that flood connected with the high ground of the mainland one side and a rocky island on the other by a strong guard bank."

"The failure of the first mentioned part of this bank caused a rush of water past these six locks into what is called the 'log wall level' below them, doing great damage to the towpath and locks and causing the two heavy breaks on the logwall level and injury to its towpath."

"That part of the Logwall level from which it takes its name is a bold piece of engineering. The Canal here occupies a deep rocky gorge, formerly the inside channel of the river. This was cut off from the river by an embankment to the head of an island and another forty feet high from the foot of the Island to the mainland. It is through this latter bank that a breach has been made, not however to its full depth. The towpath lies along the rocky points of the island and was, probably, originally formed on a wharf or wall of logs bolted to the surface or face of the cliff. All trace of these logs has disappeared except the occasional bolt showing where they had been secured. There is a second breach below the junction of the high embankment with the mainland, where the towpath is very high above the ordinary water level of the river opposite it."

"Lock No. 14 at the lower end of this level was above the level of the high water. It is the upper one of a series of locks commonly known as the 'Seven Locks', numbered from fourteen to eight."

"From Lock No. 14 to Lock No. 9 the Canal and locks remain as they were before the freshet. The flood rose over the towpath below Lock No. 9 and continued above it to Georgetown."

"On the 8th level there are required some repairs to the towpath and Lock."

"On the 7th level small repairs to the towpath, the Lock and the Lockhouse."

"On the 6th level cleaning out bars and dressing up the towpath."

"On the 5th level-Repairs required of the Lock and its surroundings; repairing masonry, flume,

embankment, towpath bridge across the feeder and the wall connecting the Lock and the bridge abutment."

"At this point the water is received into the Georgetown towpath has been repaired by the Georgetown Mill owners."

"We have described the condition of the Canal as we found it, and we append an estimate of the cost of putting it in navigable order as good, and we think better than it was in before last year's freshet."

"So far as the earthwork is concerned, the amount estimated will put it in as good condition as it has been in for many years. Its repair has, probably, at all times received more attention than that of other parts of the Canal owing to its having been made by unskilled labor controlled by bosses expert in that kind of work; but it is painful to see how the aqueducts, Locks, Culverts and other structures have been allowed to deteriorate through many years neglect. It will require much time as well as intelligent supervision and skillful workmanship to restore them to their proper condition."

"We have already referred to the narrowing of the Chambers of the Locks; in the case of aqueducts, probably for the same reason, the irresistible force of expansion of freezing water, their berm parapets have been more or less moved outwards, causing in some cases a crack or opening in the arch a few feet in from its upper face. In several of the aqueducts this parapet has been taken down and rebuilt, but the defect still exists to a more or less extent in the others."

"At Tonoloway and Sideling Hill Creek aqueducts, wooden trunks were out in some years ago, with the intention of repairing these structures, which were the most defective, but the work has never been commenced."

"This condition of the Aqueducts does not now interfere with the navigation of the Canal, but there is danger of its becoming worse, and steps should be taken, when it can conveniently be done, to rectify it."

[Brown] Report of the District of Columbia Receivers, 9 August 1890 (D) (R)

"Your Receivers beg leave to submit the following estimate divided into nine sections of the cost of repair of the 'Chesapeake and Ohio Canal; as a water for business operations.

1st Section. From Cumberland to the Tunnel, cost	\$2,603.00
2nd Section. From the Tunnel to Hancock, cost	20,125.00
3rd Section. From Hancock to the 4 Locks, cost	2,440.00
4th Section. From 4 Locks to the 4 Mile Level, cost	2,810.00
5th Section. From 4 Mile Level to Shepherdstown, cost	30,724.00
6th Section. From Shepherdstown to Harper's Ferry, cost	19,968.00
7th Section. From Harper's Ferry to 9 Mile Level, cost	13,415.00
8th Section. From 9 Mile Level to the 6 Locks, cost	7,691.00
9th Section. From 6 Locks to Rock Creek outlet, cost	<u>61,179.00</u>
Total estimated cost of Repairs	\$160,955.00"

"The foregoing estimate of the cost of repairs from Cumberland to the head of the Georgetown Level has been made by an eminent Civil Engineer, who has come over the Canal from Cumberland to Georgetown and made the most careful measurements and estimates of the same, and who has had many years experience in Canal repairs and construction, and we are assured that the estimates are of the most liberal character, and the said repairs ought to be made within the amounts estimated on the several sections and that he has been assured by contractors and others, that they are willing to contract for the work on the basis of said estimates."

"In order to acquire the full equipment of tools, scows and other facilities for the future maintenance of the Canal after repairs, and to repair and replace certain Lock gates and wood work not included in the estimate of our Engineers, and for other contingencies in work of repairs, we estimate it will be necessary to expend about \$39,095.00 Dollars additional."

"We, therefore, estimate a total expenditure of about \$200,000 Dollars for putting the Canal in condition for business operation and transportation, from the City of Cumberland in the State of Maryland, to the outlet through Rock Creek into the Potomac River in the City of Washington, within the District of Columbia, and which estimates your Receivers are convinced are ample to cover all contingent and probable expenditures in the restoration of the Canal as a water way."

#### Abbreviations for Documents at the National Archives at College Park

[180]: Proceedings of the Stockholders, 1828-90, Chesapeake and Ohio Canal Company, Entry 180, Record Group 79, Records of the National Park Service

[182]: Proceedings of the President and Directors, 1828-90, Chesapeake and Ohio Canal Company, Entry 182, Record Group 79, Records of the National Park Service

[190]: Letters Received by the Office of the President and Directors, Chesapeake and Ohio Canal Company, Entry 190, Record Group 79, Records of the National Park Service

[191]: Letters Received, by President and Directors, 1873-80, Chesapeake and Ohio Canal Company, Entry 190, Record Group 79, Records of the National Park Service

[194]: Letters Sent, by the Office of the President & Directors, 1828-70, Chesapeake and Ohio Canal Company, Entry 194, Record Group 79, Records of the National Park Service

[196]: Letters Sent, by President & Directors, 1879-81, Chesapeake and Ohio Canal Company, Entry 196, Record Group 79, Records of the National Park Service

[202]: Correspondence of Office of Trustees, 1913-38, Chesapeake and Ohio Canal Company, Entry 202, Record Group 79, Records of the National Park Service

[207]: Letters Received By The Chief Engineer, 1834-52, Chesapeake and Ohio Canal Company, Entry 207, Record Group 79, Records of the National Park Service

[210]: Drafts of Letters Sent By the Chief Engineer, 1836-38, 1846-52, Chesapeake and Ohio Canal Company, Entry 210, Record Group 79, Records of the National Park Service

[211]: Letter Book of the Resident Engineer of the 1st Residency of the 1st Division, 1828-31, Chesapeake and Ohio Canal Company, Entry 211, Record Group 79, Records of the National Park Service

[214]: Records of Ellwood Morris, Principal Assistant Engineer, 1838-40 Chesapeake and Ohio Canal Company, Entry 214, Record Group 79, Records of the National Park Service

[320]: Printed Materials, 1816-1907, Chesapeake and Ohio Canal Company, Entry 320, Record Group 79, Records of the National Park Service.

[650-03]: National Park Service, Central Classified File, 1933-49, National Capital Parks, 650-03, Record Group 79, Records of the National Park Service.

#### Other Abbreviations

[1460-C&O-5] Administration, Protection and Maintenance File 1460/C&O-5, National Capital Parks, National Park Service, Washington National Records Center, Suitland, Md.

[68A-3048] Administrative Correspondence, 68A-3048, National Capital Region, National Park Service, Washington National Records Center, Suitland, Md.

[Brown] Brown et al. Trustees v. Chesapeake and Ohio Canal Company, Nos. 4191 and 4198 Equity, Circuit Court of Washington County, Hagerstown, Md.

[CF] Clipping File

[LIB-PHP] Library, Park Headquarters

[RF-PHP] Restoration File, Park Headquarters Papers

[UMCP] The Chesapeake and Ohio Canal Company Collection, Archives and Manuscripts Department, McKeldin Library, University of Maryland, College Park.



Note: see the end of the document for the key to abbreviations.

#### 1891

[202] H. D. Whitcomb, Chief Engineer, to Henry C. Winship, General Manager, 21 February 1891 (Flood-May/June 1889, Harper's Ferry-Sustainability)

"In reference to a revised estimate for repairs and construction for reopening the canal after the freshet of 1889, including 'certain improvements, viz: the rebuilding in part of certain locks, which are said to be too narrow, and some additional masonry at Dam No. 4.'"

"We have had careful surveys made of the breaches at Dam No. 4, at Harpers Ferry, at 'Log Walls,' and at Rock Creek."

". . . the measurements show that the former estimate for earthwork was very full, but that more walling and other masonry would be required at Harpers Ferry, than was supposed. From a line of levels run for forty miles west of Williamsport on towing path and in Canal bed, it is found that the estimate for breaches and bars is sufficient, but that the allowance for simple abrasion of towing path, was insufficient, and that many minor repairs are needed which will aggregate a considerable sum."

". . . and have also added the Maryland Receiver's estimate of \$45,000. for lock houses, and carpenter's work, . . . The last item of \$20,000. will probably cover the expense of rebuilding lock walls, etc. . . ."

"The Canal can be opened between Cumberland and Williamsport by May 1st, if we do not widen the locks mentioned; two of the narrow locks being in that part of the canal. The construction of this masonry may delay the opening a month. There can scarcely occur a more suitable time, for doing this work, than now. The locks are gradually becoming narrower, and in a few years must be rebuilt; they are represented as annoying obstructions now. We can not say how much of the walls must be rebuilt; a few courses may suffice, but the estimate is made for rebuilding one wall at each lock, from its base, except in two cases. The number of such locks, so far as I am informed, is seven. There are seventy five lift locks on the canal."

"The continued stage of high water in the river, for more than 30 days, has prevented the closing of the crib at Dam No. 4."

The estimate for repairs, contingencies, lock houses, and enlarging seven locks was \$249,762.

[CF] The Evening Star (Washington, D.C.), 2 April 1891, 3 (Flood-April 1891)

"The Rising Waters"

Description of the rise in the river. A brief mention of damage to the canal at Dams No. 4 and 6, with between \$5,000 and \$10,000 worth of damage.

#### 1896

[1570-35] Congress, House, Committee on Flood Control, Potomac River and Tributaries, Maryland, Virginia, West Virginia, and Pennsylvania, 79th Cong., 2d sess., House Document No. 622, p. 24 (Flood-October 1896)

This source indicates, "Heavy rainfall in October 1896 produced high floods on the Shenandoah River and its tributaries." It mentions the canal.

#### 1897

[CF] The Evening Star (Washington, D.C.), 23 February 1897, 1 (Flood-February 1897)

Article describes the rise in the river. Mentions there has been some damage to the canal, but the exact extent of the damage is unknown.

#### 1901

[CF] The Evening Star (Washington, D.C.), 22 April 1901, 1 (Flood-April 1901)

Article describes the rise in the Potomac. Damage to the canal is unknown, but the flood waters were six feet over the towpath at Sir John's Run.

#### 1902

[CF] The Evening Star (Washington, D.C.), 24 February 1902, 13 (Flood-February 1902)

"Potomac On A High" Article reports high water and ice at all points of the Potomac. It indicates the property of the C&O Canal Company is in serious danger at Cumberland.

[CF] The Evening Star (Washington, D.C.), 27 February 1902, 2 (Flood-February 1902)

"Prospect Of Flood" The Star reports on the rapid rise of the Upper Potomac. It does not mention the canal.

[CF] The Evening Star (Washington, D.C.), 27 February 1902, 1-2 (Flood-February 1902)

"Low Levels Flooded" This article mostly discusses flooding in the vicinity of Washington, D.C. "Just what damage has been done to the Chesapeake and Ohio canal cannot yet be determined. The levels above and below Williamsport are covered with water, and the indications are that the towpath is badly washed in places."

[CF] The Evening Star (Washington, D.C.), 3 March 1902, 11 (Flood-February 1902)

"The Danger Is Over" Article reports of flood damage in general, but devotes significant attention to damage on the canal, which seems scattered up and down the line of the canal.

#### 1903

[CF] Joseph Barry, Strange Story of Harpers Ferry, With Legends of the Surrounding Countryside (Martinsburg, W.Va.: Thompson Brothers, 1903), 14, 35, 36, 151, 169-70 (Flood-January 1832, Flood-February 1832, Flood-April 1832, Flood-November 1832, Flood-April 1852, Flood-September 1870, Flood-November 1877, Flood-March-April 1924, Harper's Ferry-Sustainability)

This book contains snippets on flooding as it affected Harper's Ferry for the years 1748, 1753, 1832, 1852, 1870, 1877, and 1889.

#### 1904

[202] Office of the Engineer, Commissioner of the District of Columbia, to G. L. Nicolson, General Manager, 6 April 1904 (Easements-Receiver)

"I have the honor to acknowledge the receipt of your letter of March 30th, relative to the rebuilding of a retaining wall on the Chesapeake and Ohio Canal and in reply, I would state that this office will do every thing possible to see that the wall is built next Spring. The postponement of the construction until that time is on account of the greater convenience of construction when the canal is empty."

#### 1905

[202] Engineer, Commissioner of the District of Columbia, to G. L. Nicolson, General Manager, 2 February 1905 (Easements-Receiver)

"Replying to your communication of the 25th ult., I have to advise you that the engineer of Bridges will arrange to construct the wall alongside the tow path on the Aqueduct Bridge while the canal is empty at the period which you suggest."

#### 1906

[202] W. M. [?] Biddle, Major, Corps of Engineers, USA., Office of the Engineer, Commissioner of the District of Columbia, to the C&O Canal, 30 January 1906 (D) (R) (Damage Prevention-Receiver)

"Referring to your letter of January 17 complaining of damage done to the tow-path of the canal by water from 33rd street and requesting that sewer trap be placed in the gutter on the west side of said street, I would state that in order to remedy the matter a catch basin would have to be constructed on the west side of 3rd street, discharging into the canal by means of an outlet pipe under the tow path. If you will agree to allow this outlet pipe to be discharged into the canal, the catch basin will be constructed by the District."

[202] D. E. Garges, Acting Chief Clerk, Office of the Engineer, Commissioner of the District of Columbia, to G. L. Nicolson, General Manager, 1 February 1906 (Damage Prevention-Receiver)

"The Engineer Commissioner directs me to acknowledge the receipt of your communication of Jan. 31st, 1906, relative to water flowing into canal from gutter on west side of 33d street, and desiring to know whether District should not supply sewerage for surface water."

[202] A. Y. Laken [?], Chief Clerk, E.D., Office of the Engineer, Commissioner of the District of Columbia, to G. L. Nicolson, General Manager, 26 July 1906 (Damage Prevention-Receiver)

"With reference to your communication of the 15th ultimo, calling attention to the discharge of sewage into the canal, north of Canal and west of 32d street, I am directed by the Engineer Commissioner to inform you that service sewer has been ordered constructed along the west side of Wisconsin avenue between M street and the canal, also in line of alley in square 1199 crossing Wisconsin avenue, and in alley in square 1199, from Wisconsin avenue to a point 118 feet east of the east line of said avenue, which, it is believed, will correct the condition complained of."

#### 1907

[202] Acting Chief Clerk, Office of the Engineer, Commissioner of the District of Columbia, to G. L. Nicolson, General Manager, 12 February 1907 (Damage Prevention-Receiver)

"In reply to your letter of October 27th, complaining of water from down-spouts of certain buildings on the east side of Thirty-second street north of the Chesapeake and Ohio canal, discharging on to tow-path, I would state that a sewer has been ordered constructed on the east side of Wisconsin avenue from the north line of the canal northward 140 feet, which will take care of the drainage from these down-spouts."

#### 1908

[202] Chief Clerk, Office of the Engineer, Commissioner of the District of Columbia, to G. L. Nicolson, General Manager, 26 February 1908 (Damage Prevention-Receiver)

". . . acknowledge receipt of your communication of the 25th instant, calling attention to breaks in the retaining wall on the south side of Canal Road above the Aqueduct Bridge."

[202] Chief Clerk, Office of the Engineer, Commissioner of the District of Columbia, to G. L. Nicolson, General Manager, 2 March 1908 (Damage Prevention-Receiver)

". . . I am directed by the Engineer Commissioner to advise you that the work of repairing the retaining wall on the south side of Canal road above the Aqueduct Bridge has been ordered by the Commissioners and its execution will be undertaken at once."

#### 1910

[CF] The Evening Star (Washington, D.C.), 18 June 1910, 10 (Flood-June 1910)

"River's Level Rising" The Star reports lowlands underwater; canal not mentioned.

[CF] The Evening Star (Washington, D.C.), 19 June 1910, 2 (Flood-June 1910)

"Crest Of Flood Today" The newspaper does not mention the canal.

[202] Clerk of Burgess & Commissioners [on the letterhead of The First National Bank], Hancock, to G. L. Nicolson, General Manager, 21 June 1910 (E)

Concerning the construction of the town water works, they had taken an option on property lying between the canal and river at the foot of Cohills Alley.:

"To save the friction which would be caused by taking the pipe around through the culvert we would like to have authority to take our water pipe under the canal."

[202] Penniman V. Fairley, Engineers, Baltimore, to G. L. Nicolson, General Manager, 22 June 1910 (Easements-Receiver)

This letter contains a blueprint concerning the construction of a water system in the City of Hancock, pumping station between canal and river south of Seminary Ave.:

"We would like to get your permission to lay a pipe in the bed of the canal below bottom of same, and will agree to prevent or cause any interruption to the canal traffic of have the pipe laid in such manner as will obstruct navigation."

#### 1912

[CF] The Evening Star (Washington, D.C.), 25 June 1912, 4 (Flood-July 1912)

"Upper River On Rampage." The Star reports flood waters in the upper Potomac from "excessive rainfall in the mountains." The canal is not mentioned.

[202] Office of the Engineer, Commissioner of the District of Columbia, to G. L. Nicolson, General Manager, 4 September 1912 (Easements-Receiver)

This letter concerns the construction of a sewer through a culvert which passes under the canal at a point 400 feet north of where the New Cut Road joins Canal Road, 12 inches in diameter.

[202] Office of the Engineer, Commissioner of the District of Columbia, to G. L. Nicolson, General Manager, 7 September 1912 (Easements-Receiver)

"I am in receipt of your letter of the 6th inst., enclosing permit for sewer construction through "Frizzles" culvert. I am returning herewith one copy of agreement for your files."

Copy of the Agreement, dated September 1912

"The District of Columbia is hereby granted permission to construct and maintain a sewer across the property of the Chesapeake and Ohio Canal Company from a point on the westerly boundary line of Canal Road approximately one hundred thirty (130) feet, north of the north line of Ashby Place, produced, westerly; thence through the culvert under the Chesapeake and Ohio canal for a distance of two hundred forty (240) feet, more or less, approximately as shown on the plat hereto appended, provided:-"

"That the sewer is to be a pipe sewer 24" or less, in inside diameter, and that the said sewer is to provide an outlet for separate system sewerage for the territory in this vicinity east of the canal, and that sewage is to be carried through said culvert and discharged directly in to the Potomac River until such time as intercepted by the proposed Upper Potomac Interceptor in Canal Road."

Includes drawing of configuration and location.

### 1913

[202] F. R. Stuart, Engineering Department, Baltimore and Ohio Railroad Company, to G. L. Nicholson, General Manager, 18 January 1913 (Easements-Receiver)

"Am enclosing herewith blue print showing reinforcement of a portion of retaining wall west of Point of Rocks Tunnel, which binds on the north side of the Chesapeake & Ohio Canal."

"The plan has been revised in accordance with Mr. Wilson's understanding with you to-day, at your office, viz:- The intersection of footing and neat line of wall to be rounded instead of square and a minimum section of thirty-four feet to be maintained on the bottom line of the canal, and that both ends of new section of wall rounded off to protect boats in passing."

"As the time is short now until traffic will be resumed on the canal, would be glad to have you confirm this understanding and also have your authority to go ahead with the work."

[202] Baltimore and Ohio Railroad Company, Mt. Royal Station, to J. L. Nicolson, General Manager, 4 February 1913 (Easements-Receiver)

"In connection with our work of reinforcing the retaining wall along the canal immediately west of Point of Rocks Tunnel, which work is now fairly well under way, would be glad if you would advise me on what day you contemplate turning water into the canal. We have some bracing and two derricks located in the bed of the canal which will have to be removed and which we contemplate can be taken care of by the end of this week, by which time we will have all the foundation work in and the wall proper, carried above the water line for probably half the distance. We have been doing everything possible to rush this work to completion at the earliest possible moment but have met with some delay during the past few days on account of the inaugural movement."

[202] James H. Harlow, Secretary, Martinsburg Power Company to G. L. Nicolson, General Manager, 12 March 1913 (Study-Floods-C&O Canal Company)

Letter and section sketch of dams # 4 & 5 from the Engineer's Office of the Susquehanna Power Company.

"I have just found an old letter of Mr W. R. Hutton [Chief Engineer and later a consulting engineer of the canal company from the 1870s] under date of Aug. 3, 1900, in which he tells about dams # 4 & 5. and as it may interest you I copy it."

'I do not know that the Potomac has ever been gaged at Dam #4, Canal gagings were limited to the upper river where the supply of water was doubtful and some gagings were made of the principal affluents of the river. I should estimate the minimum discharge at 150 sec ft, ordinary low water at about 225 sec ft. The division supplied from this dam is or was very leaky. I have estimated its requirements at 48 sec.ft. Dam #4, is 810 ft long, 20 ft high from the rock foundation. Dam #5, is 706 ft long, 21 or 22 ft high.'

'Face verticle top 12 ft wide coped with timber, sloping (falling) up stream 1/3. Masonry rubble, grouted, faced with square stones in cement mortar; base nearly the same as height, backed in steps, Both dams of same section. Founded on limestone rock.'

[202] Engineering Department, Baltimore and Ohio Railroad Company, to G. L. Nicolson, Chief Engineer, 14 March 1913 (Easements-Receiver)

"We expect to have the work of reinforcing the canal wall west of Point of Rocks, ready so that you can turn the water into the canal by March 20th, if desired."

[202] Tonoloway Quarries, Tonoloway, Washington County, to G. L. Nicolson, General Manager, 17 March 1913 (Damage Prevention-Receiver)

Letter from the Tonoloway Quarries concerning the accumulation of sand/clay in the canal from this company.

"It is however much more than I intended to allow to accumulate and has come in suddenly owing to the fact that we have been running a good deal this winter while the water is out of the canal. causing the current to set more strongly through the railroad embankment. We built a runway today to admit wheeling this deposit over the canal tow path and will tomorrow put a man to acraping it up and wheeling in over to the river side of the towpath. North of the railroad I have constructed a trough to carry this water off toward the wide water on the north side of the railroad and will not allow it to come through the embankment as it has been doing."

[202] G. L. Nicolson, General Manager, to H. R. Talcott, Engineer of Surveys, Baltimore and Ohio Railroad Company, 8 April 1913 (Easements-Receiver)

This letters concerns a proposed filling in of the river for expansion of the railroad.

"From an examination of the cross sections this morning, it appears that the present minimum area of hydraulic section below the surface of the tow-path is at "BB". . . . owing to the length of contraction, would materially reduce the discharging capacity at this point of the river. The canal is higher at this point than at the point of which I wrote you a few days ago and is not overflowed by the ordinary spring and fall freshets. At the same time, the distance west of this point at which it is submerged is not great, being a little above the mouth of Little Cacapon, so any material raising of the water at the point of filling in will affect the slope of the river and proportionately raise the flood level at a point we are now subject to overflow. Therefore, I think it is only proper to demand that the Railroad Company should excavate on the Maryland side an equivalent area, clearing off the trees, etc., so that the present discharging capacity of the river would not be reduced to the extent of increasing the flood level at a point where we are at present subject to overflow from the usual moderate freshets."

[202] James H. Harlow, Office of the Secretary, Martinsburg Power Company, to G. L. Nicolson, General Manager, 8 May 1913 (Flood Damage Prevention-Proposed, Easements-Receiver, Sustainability-Dams)

"With this letter I am inclosing you a blue print showing our idea for providing 'flash boards' on the top of your dam No. 4 and probably later dam No. 5."

"In the lower left hand of the print is shown a section of the dam as understood from the sketch you loaned me and a letter received from Mr W. R. Hutton dated in 1900. Mr Hutton was employed at one time by the Canal Company as its Engineer."

"I have thought it unwise to put an unsupported pin in a hole near the crest line of the dam, because of the uncertain strength of the masonry so I have provided for a socket made of heavy pipe cemented into the masonry and this in turn held in place by an iron tie passing underneath the ice guard and anchored into the masonry about eight feet back from the crest of the dam."

"The pins against which the boards will rest are to be of mild steel 1 1/4 inch in dia, and 4 feet long. One foot from the lower end there is to be a groove turned to such a diameter that the pin will bend over or be broken off with about one foot of water running over the flash board. The normal depth of water will be two feet, and the high water three feet above the crest line, when the flashboards are in use."

"I think the other details will explain themselves."

"Will you kindly take this matter up with your Trustees and obtain their permission for the construction of the design submitted."

"If possible I would like the permission so it can be acted upon at our next meeting of the Directors, viz, May 22nd. and the work started so as to be in use at the beginning of the low water season."

[202] Engineering Department, Baltimore and Ohio System, to G. L. Nicolson, General Manager, 29 May 1913 (Easements-Receiver)

"Referring to your letter of the 26th; Our plans for the changes just west of Paw Paw are not entirely developed so far. We do not propose to reduce the minimum section very much and the substitution of a concrete wall for the present rough surface of the hillside will to some extent offset the restriction of the waterway, and I am of the opinion that the elevation of high water will not be seriously affected by the construction of our improvements."

[202] James H. Harlow, Secretary's Office, Martinsburg Power Company, to G. L. Nicolson, General Manager, 14 June 14, 1913 (Study-Floods-C&O Canal Company)

"Can you in any way assist us in obtaining daily records of the river above Williamsport Md."

"You will at once see that knowledge of the river conditions will greatly help us in the operation of our plants, and especially after the installation of flash boards."

"Can you give me any information as to the flood heights at dams No. 4 & 5. Above and below the dams."

[202] James H. Harlow, Office of the Secretary, Martinsburg Power Company, to G. L. Nicolson, General Manager, 14 June 1913 (Easements-Receiver, Sustainability-Dams)

"In your letter of May 20 th, 1913, you suggested that we maintain the ice guards, on dam # 4 so long as we maintained the flash boards. This I brought to the attention of our board of directors and they are desirous of knowing something about the probable expense."

"At the last meeting of our directors the whole matter has been placed in my hands to make such arrangements with you and your Trustees as may be to our mutual advantage."

"May I to that end ask that you direct your clerk to look over his books and give me a statement of the annual cost of the maintenance of "Ice guards" on dam # 4, say, for the past five or ten

years. (the longer the better)"

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, Baltimore, 2 July 1913  
(Flood-Spring 1913, Sustainability-Dams)

"The ice guards on Dam No. 5 were pretty badly wrecked by the ice freshet this past spring, necessitating considerable work to be done on the dam, estimated at probably somewhere between 1200 to 2000 ft. to replace the damaged sections. With this in mind I approached the Hagerstown & Frederick Railway people, who are now building a new power station at Dam No. 5, which is occupied under an agreement with the Martinsburg Power Company with the Trustees for Dams Nos. 4 and 5. This contemplated work is estimated to cost somewhere in the neighborhood of \$10,000.00.

I took it up with Mr. Bond and he authorized me to say to them that the Trustees would pay as much as \$3,000.00 towards the work to be done in accordance with the sketch herewith attached and for the privilege of the flash-boards the Hagerstown & Frederick Railway Co., owners of the Martinsburg Power Company, will agree to maintain the surface of the dam."

"It is understood between the contractors and myself that we will loan them such equipment, scow or scows, as we have to spare to aid them in doing the work. This feature and the question of payments did not seem to me necessary to be contained in the contract, only the terms and conditions as to work, responsibility, etc., which is subject to your decision."

[202] Baltimore and Ohio Railroad Company, to G. L. Nicolson, General Manager, 3 July 1913  
(Easements-Receiver, Sustainability-Dams)

"I enclose form of contract with the Martinsburg Power Company for flash boards. I have inserted a provision relieving them in case of extraordinary floods, as their obligation to repair and maintain during the time they keep the flash boards would, otherwise, make them responsible in case there was a flood which might have washed out the coping of the dam under any conditions."

[202] James H. Harlow, Secretary's Office, Martinsburg Power Company, to G. L. Nicolson, General Manager, 20 September 1913 (Easements-Receiver, Sustainability-Dams)

"Wednesday I was in Martinsburg, W.Va. and learned that you were repairing the ice guards of Dam No. 4. I was pleased to hear this as our Company will not attempt to put up flash boards this season. In case you, because of the agreement of July 9, 1913, think this company should replace said ice guards, of Dam No. 4. kindly send the cost of such repair to us making said charge as low as possible. I trust that next season we will put up said flash boards, and thus prolong the low water supply."

[202] James H. Harlow, Secretary's Office, Martinsburg Power Company, to G. L. Nicolson, General Manager, 25 September 1913 (Easements-Receiver)

"I have your favor of the 22nd. The main reason why we shall not place flashboards on dam # 4, this season is that the owners of the land abutting upon the Potomac above said dam, are questioning our right or even the right of the Canal Company and as we do not want to put this burden upon ourselves or you, until we have examined further into this question we will defer said work."

"1st; Does your charter, or any act of the legislature of either State limit your company to any given height of dam?"

"2nd; Having constructed the dams at a certain height, have you surrendered any right you may have had to build higher?"

"3rd; What are the flowage rights of your company, above any given dam?"

"4th; What determined the present location and crest height of the several dams?"

"5th; RE the case near Cumberland, where possession did not run at a given elevation against the Canal Co does a failure to build the crest line of dam, or to such an elevation, prevent you building a higher dam if your Company should so desire?."

[202] Charles R. Webber, Assistant to General Counsel, Law Department, Baltimore and Ohio Railroad Company, to G. L. Nicolson, General Manager, 11 November 1913 (Easements-Receiver)

"Mr. Harlow has been in to see me twice in regard to the raising of one of the dams and the possible flooding of lands adjacent to the Canal. His last question was as to the right of the Canal Company to raise a dam, and, of course, in case of any damage his company would be prepared to indemnify the trustees. It seems to me that you had this question up once before in connection with some other matter. I understand he has talked with you and I am trying to keep him away from Mr. Bond. Will you kindly give me your views."

#### 1914

[202] Lt. Col., Corps of Engineers, United States Engineer Office, War Department, to G. L. Nicolson, General Manager, 8 January 1914 (Damage Prevention-Receiver)

"In reply to your letter of Jan 5, 1914, I have to state that the condition of the tow-path opposite the outlet from waste-weir No. 1 of the Washington Aqueduct was called to our attention some time ago and our overseer was then instructed to do the required work to the entire satisfaction of the canal company before the canal is again filled with water."

[202] Thomas W. Koon, Mayor, Cumberland, to G. L. Nicolson, General Manager, 29 May 1914  
(Easements-Receiver)

Requesting permission to dump soil from street grading on the old canal basin maintaining that it will be of the best quality.

#### 1915

[202] Office of Trustees, to Hugh L. Bond, Jr, Baltimore  
18 January 1915 (Flood Damage-Localized, Sustainability-Culverts)

"In partial explanation of the large deficit, beg to state it was impossible to buy sufficient lumber for repairs from local mills as we have done for a number of years past. In order to get an advantageous price it required a larger order than we are in the habit of placing, in the neighborhood of 160,000 feet, costing \$5,300.00, a large proportion of which is still on hand."

"We began using a wood preservative during 1914, . . ."

"There were three washouts of considerable extent, one taking out an eight foot culvert."

"Lockgate lumber purchased	\$5,300.00	
Wood preservative		982.00
Labor and material account putting in three washouts	4,300.00"	

"Owing to delays, due to washouts, there were 29 working days on which no coal was loaded at Cumberland, . . ."

[202] Engineer, Commissioner of the District of Columbia, to G. L. Nicolson, General Manager, 12 February 1915 (Easements-Receiver)

Letter and blueprint in reference to the extension of College Pond Trunk Sewer, passing under the canal, to discharge into the river.

[CF] The Evening Star (Washington, D.C.), 9 March 1915, 20 (Maintenance-Dredging, Flood Damage Prevention-Accomplished)

"Getting Canal Ready." Article reports "considerable dredging" of the canal, "and at many points the banks have been made heavier to prevent possible washouts if heavy rains come during the boating season."

[202] Alfred M. Quick, Consulting Engineer, Baltimore, to G. L. Nicolson, General Manager, 3 April 1915 (Easements-Receiver)

The letter from Quick is in reference to the construction of a sewer system for Hancock. He is asking permission to lay a pipe in the culvert which goes beneath the Canal at the east end of town. The culvert is lined with flag stones over which is a layer of timbers which according to the description are bowed and collect debris. They plan on removing the timbers for ease of movement of water, take out the necessary stones, place the cast iron pipe, fill around it and replace the stones. According to another letter permission was granted.

[202] Charles R. Webber, Assistant to General Counsel, Law Department, Baltimore and Ohio Railroad Company, to G. L. Nicolson, General Manager, 10 April 1915 (Easements-Receiver)

"Referring to your letter of April 9, I have again taken up with Mr. Hamilton the question of permission to construct the sewer under the Canal property."

[202] Charles R. Webber, Assistant to General Counsel, Law Department, Baltimore and Ohio Railroad Company, to G. L. Nicolson, General Manager, 7 May 1915 (Easements-Receiver)

"Referring to your letter of February 17, I return herewith, duly executed in duplicate, the grant of a right-of-way to the District of Columbia for a sewer under the Canal as requested by the Superintendent of Sewers in his letter of February 12.

"I return also copy of agreement between the Trustees and the Commissioners for similar work at Arizona Avenue and the letter of Superintendent of Sewers referred to herein."

[CF] The Evening Star (Washington, D.C.), 3 June 1915, 2 (Flood-June 1915)

"Potomac Overflows Farms." The article reports the river has overflowed its banks in the vicinity of Cumberland. No mention of the canal.

[CF] The Evening Star (Washington, D.C.), 4 June 1915, 22 (Flood-June 1915)

"Rain Causes Big Rise In The Potomac River" The Star does not mention the canal.

[CF] The Evening Star (Washington, D.C.), 6 June 1915, 15 (Flood-June 1915)

"Flood Damage Serious" Article reports "Upper Potomac and Tributaries Reach Highest Stage in Many Years."

[CF] The Evening Star (Washington, D.C.), 8 August 1915, 7 (Flood-August 1915)

"High Water In Potomac Caused By Heavy Rains" Article reports high water in the Upper Potomac. No mention of the canal.

[CF] The Evening Star (Washington, D.C.), 17 August 1915, 18 (Flood-August 1915)

"Canal Damage Repaired." Reports the repair of a break in the canal near Edwards Ferry caused by the August 1915 flood.

[202] James H. Harlow, Engineer's Office, Susquehanna Power Company [For the Receivers of the Martinsburg Power Company], to G.L. Nicolson, General Manager, 16 September 1915 (Sustainability-Dams)

"...and I can meet you to take up the matter of repairs and possible raising of crest of dam # 4."

[202] J. C. Shriver, Cumberland, to G. L. Nicolson, General Manager, 10 December 1915 (Damage Prevention-Receivers)

"With reference to the suit docketed many year ago against the City of Cumberland, with the object of securing relief from the emptying of sewerage and storm water into the Canal, I should like to know if you are still interested in suppressing the nuisance. If you are I think that you could get a good deal of help from the State Board of Health in requiring the City to build a modern disposal plant. I do not think it would be necessary for you to do anything more than to write the Mayor and City Council giving a history of the case. I think that you have several letters from different Mayors promising to do something toward remedying the condition of affairs, and asking you to with hold court proceedings."

[202] J. C. Shriver, Cumberland, to G. L. Nicolson, General Manager, 10 December 1915 (Damage Prevention-Receivers)

In reply to Nicolson's letters of the 11th and 16th, Shriver recommended that Nicolson, "refer the Mayor and City Council to the fact that case was docketed against the City with the object of stopping the nuisance, and that the same was not pushed on account of promises made to you by the city authorities at various times that the nuisance would be abated. . . . not only has nothing has been done, but the amount of sewerage emptied into the Canal has increased and that you have no evidence that the City has any plans to do anything to remedy the conditions. That if you do not receive within a reasonable time, satisfactory evidence that the City will really go to work and stop the nuisance... you will push the suit against the City..."

"I am quite sure that the State Board of Health will be on your side, also the local Health Board, if not the City authorities themselves."

[202] J. C. Shriver, Cumberland, to G. L. Nicolson, General Manager, 29 December 1915 (Damage Prevention-Receivers)

In reference to the sewerage problem, Nicolson had written to the City and was questioning Shriver about it. Shriver recommended that he contact the State Board of Health.

## 1916

[202] Chief Engineer, State of Maryland, Department of Health, to G. L. Nicolson, General Manager, 5 January 1916 (Damage Prevention-Receivers)

In reference to the construction of a sewerage system and disposal works:

"Not only is the Chesapeake and Ohio Canal, but also Wills Creek and other portions of the waterfront, grossly polluted, and a complete main drainage and sewerage disposal system for the city should be installed. . . . improvements there must be required before long."

[202] District of Columbia, to G. L. Nicolson, General Manager, May 24th 1916 [?]  
(Easements-Receivers)

Concerning the construction of a temporary coffer dam within the canal for "the repair or reconstruction of the retaining wall along the Canal Road where a sewer has recently been put under the Canal west of College Pond,".

[CF] The Evening Star (Washington, D.C.), 16 June 1916, 16 (Flood-June 1916)

"River Is On A 'High.'" Article reports highwater in Potomac around Washington, caused by winds and a high current from upstream. No mention of the canal.



[CF] The Evening Star (Washington, D.C.), 18 June 1916, 11 (Flood-June 1916)

"Flood Level Falling." The Star does not mention the canal.

[202] Engineering Department, Baltimore and Ohio System, to G. L. Nicolson, General Manager, 7 August 1916 (Easements-Receiver)

"Am enclosing, herewith, blue print showing reinforcement of retaining wall west of Point of Rocks Tunnel and west of Catoclin Tunnel, which binds on the north side of the Chesapeake & Ohio Canal. The plan is the same as that shown you at your office by District Engineer Wilson on the 5th instant, and the same that was agreed upon on January 20th, 1913, when a portion of this wall was built west of Point of Rocks Tunnel; a blue print of this portion is also enclosed."

"We are planning to reinforce both of these walls during the period the water is out of the canal this winter, and our plans are to have sufficient material delivered on the site and plant installed, ready to begin operations immediately upon the water being let out of the canal, and having contractor guarantee the work be completed before the water is again let in in the Spring."

[202] Engineering Department, Baltimore and Ohio Railroad Company, to G. L. Nicolson, General Manager, 24 August 1916 (Easements-Receiver)

"Referring to our conversation in regard to dredging in front of the retaining walls West of Point of Rocks and Catoclin Tunnels."

"Have conferred with the officer in charge of the maintenance of these walls, and he does not feel warranted in taking any risk that might effect the stability of this wall until we are ready to go ahead with the concrete work."

"If it can be arranged, it will probably be desirable to have the material moved with the dredge immediately prior to your letting water out of the canal, and just before we begin work of reinforcing the present walls."

[202] Potomac Light and Power Company, Martinsburg, W.Va., to the C&O Canal Company, 13 October 1916 (Maintenance-Dams, Sustainability-Dams)

"This is to confirm our conversation of October 11th in regard to the repairs to Dam No. 4."

"Inasmuch as we are not equipped to do this work, and have not the materials on hand, we would ask that you proceed to make the necessary repairs to the wood-work of Dam No. 4, and bill this Company for the cost of same."

1917

[CF] The Evening Star (Washington, D.C.), 15 March 1917, 15 (Flood-March 1917)

"River Current Strong." The Star reports signs of flooding coming from the Upper Potomac. No mention of the canal."

[202] Engineer, Commissioner of the District of Columbia, to G. L. Nicolson, General Manager, 3 April 1917 (Easements-Receiver)

"I enclose herewith, a blueprint upon which is indicated in red a proposed change in the alignment of the canal wall along Canal Road at a point about 1000 feet west of the Aqueduct Bridge. It is proposed to connect the straight portions of the wall adjacent to this point by a curve, which will move the toe of the wall, opposite the break in the line, about 5 feet south of its present location. The limit of the District property is at the south edge of the foundation of the present wall and to make the change desired would require the permission of your company."

It is requested that this permission be granted. The width of your canal opposite this point is about 13 feet greater than at sections above and below stream so that a narrowing of 5 feet as proposed will not interfere with the operation of canal boats nor reduce the flow of water."

[202] G. L. Nicolson, General Manager, to C. W. Kutz, Engineer, Commissioner of the District of Columbia, April 7, 1917 (Easements-Receiver)

"In reply to yours of April 3rd, beg to advise that I am authorized by the Trustees to permit the District of Columbia to build the wall on the line shown on blue print attached to your letter. If it is necessary to widen the foundation of the retaining wall in its new position, the District must agree that the top of the foundation, or the offset in foundation, beyond the face of the wall must be not less than 7 ft. below the surface of the water."

"Please be kind enough to direct that the top and edge angles be rubbed down smooth in order that the wear on lines will be in minimum for the concrete."

Note: a blueprint is enclosed with this letter.

[202] Resident Engineer and Construction Superintendent, Potomac Light and Power Company, Martinsburg, W.Va., to G. L. Nicolson, General Manager, 23 July 1917 (Easements-Receiver, Sustainability-Dams)

"Referring to our phone conversation, your Mr. Walker visited Dam No. 5 and looked over the proposition of filling up-stream coffer dam with dredge now located on the level about two mile below us. Mr. Walker seemed to be favorably impressed and advised the writer that he would so report to you."

"We have this date started the construction of this up-stream cofferdam, and same should be ready for filling about the first of next week. If possible, we would like to have your permission to verbally give Mr. Walker about two days' notice and secure his services for four or five consecutive working days to fill this crib. The line of our cofferdam falls on the up-stream side of old canal company cribbing which is still in the river. We do not anticipate any trouble in handling muck direct into the cofferdam. Our river soundings show that there is an average of five or six feet of water and two to three feet of soft mud up stream from the line of our proposed cofferdam."

"We would certainly appreciate your favoring us with the use of your dredge outfit, as it is our only possible chance of filling the up-stream cofferdam and becoming dry for foundation work within the next two weeks. We do not feel that we will hold the dredge outfit longer than seven days, and we will lend every assistance and do our utmost to release it sooner."

[202] Sanderson and Porter, Engineers, to the C&O Canal Company, 4 September 1917  
(Easements-Receiver, Sustainability-Dams)

"...we understand that you do not object to our placing a 2 ft. wall on top of the present tail race wall at the Power Station, Dam 4, Potomac river, and we are now making preparations to do this work."

"At Dam 5 we understand that we will be permitted to take such material from the head race excavation of the new Power plant as will be readily moved by a freshet and deposit same below the Dam. Further that any material in the way of large stone may be dumped above the Dam."

[202] Sanderson & Porter, Engineers, New York, C&O Canal Company, 16 October 1917  
(Easements-Receiver, Sustainability-Dams)

"...regarding the cutting of your stone masonry at dam No. 5."

"The emergency which caused us to cut through No. 5 dam was necessitated by dangerous foundation conditions which our excavation had revealed at the West Virginia abutment. The safety of the dam was in no manner endangered and it is our intention to fill the cut which we had made with concrete masonry before the end of this week, leaving, however, a gated opening which would be closed at a later time."

[202] R. V. Rosenbaum, Martinsburg, W.Va., to G. L. Nicolson, General Manager, 16 October 1917  
[Telegram] (Easements-Receiver, Sustainability-Dams)

This letter concerns a hole in dam (#5) and Rosenbaum reports that it would be concreted that night.

[202] J. C. Shriver, Vang Construction Company, Cumberland, to G. L. Nicolson, 1 December 1917  
(Easements-Receiver)

Shriver announces that the sewage system was finally started and that he was building the first two sections. One section located in South Cumberland and "... will cross the Canal below the stop lock about 1000 feet."

"The crossing under the canal is by a 30" cast iron pipe."

#### 1918

[202] J. C. Shriver, Vang Construction Company, Cumberland, to G. L. Nicolson, General Manager, 14 January 1918 (Easements-Receiver)

"We have a contract with the city of Cumberland to build a section of a sewerage system. . . . This section has a temporary outfall into the Potomac River and it is planned to cross the canal between the stop lock and Wolfe's house, about 100' north of Wolfe's house."

"I am writing to ask permission . . . what will be your requirements as to the construction?"

[202] Ralph L. Rizer, City Engineer, Cumberland, to G. L. Nicolson, General Manager, 23 January 1918 (Easements-Receiver)

In reference to a 30" sewer that was going to be installed under the Canal.

From another letter, dated January 19, 1918, and drawing the sewer was to be located on the center line of Elizabeth Street. From still another letter, dated January 26, 1918, there were to be manholes and that the pipe would be of cast iron between them.

[202] J. C. Shriver, Vang Construction Company, Cumberland, to G. L. Nicolson, General Manager, 30 January 1918 (Easements-Receiver)

". . . answer your letter of the 22nd inquiring whether the 30" sewer we are building will intercept the sewage now entering the canal under the B & O R.R. opposite the waste weir."

"The sewer we are building will not carry any sewage but is strictly a storm water sewer."

"The sewage discharged into the canal at the place afore mentioned will be carried by an intercepting sewer which will skirt all of South Cumberland and will cross the canal to a disposal plant where it will be treated on land lying between the Canal and River east of the W.Md. Ry as it crosses the River going into Wilton Tunnel."

[CF] The Evening Star (Washington, D.C.), 14 February 1918, 1-2 (Flood-February 1918)

"Potomac Ice Jam Breaks" Brief report of an ice jam at Dam No. 6, and fear of damage to this feeder of the canal.

[202] Charles Eichelberger, Harper's Ferry, to G. L. Nicolson, General Manager, 18 February 1918 (Flood-February 1918)

"Have about completed floom head #26 Did not use half round in corners of rabbits as it would have left sharp edge instead of round It should have been inside round instead of outside however if you wish it put in please let me know at once so that I can use in others. . . . There is considerable damage at Feeder Dam cannot tell amount at this stage of water"

Eichelberger includes other information about the construction of new gates.

[202] J. C. Shriver, Vang Construction Company, Cumberland, to G. L. Nicolson, General Manager, 11 March 1918 (Easements-Receiver)

"We completed the Canal crossing of the Mary St. sewer last week. We put it in with cast iron and at every joint we enclosed the pipe with concrete collar. Also have a manhole at either end of the cast iron."

[CF] The Evening Star (Washington, D.C.), 12 March 1918, 15 (Flood-February 1918)

"Inspection Of C. & O. Canal Attended By Difficulties" Newspaper account of an inspection trip up the canal by Major John Stewart, in order to evaluate whether the federal government should take over the canal as a war measure. Stewart and his party found it rough conditions in the western part of the canal, no doubt a result of the ice freshet the month before.

[202] Office of the Engineer, Commissioner of the District of Columbia, to G. L. Nicolson, General Manager, 13 March 1918 (Easements-Receiver)

". . . regarding the removal of obstructions along the Canal Wall. A copy of your communication has been sent to Mr. Murray, the Contractor for reconstructing the Canal Wall."

[202] Sanderson and Porter, Engineers, New York, to G. L. Nicolson, General Manager, 22 March 1918 (Easements-Receiver)

"We are sending you under separate cover blue print of our drawing 204-RA-2 revised March 19, 1918. On account of location of rock and other conditions pertaining to old abutment of the dam (No. 5), it has been necessary to revise some of the detail on the construction at head gates and along river wall below the dam."

[202] J. C. Shriver, Vang Construction Company, Cumberland, to G. L. Nicolson, General Manager, 17 April 1918 (Flood Damage Prevention-Proposed)

"This morning I went down the canal with Mr. Metz and Mr. Buley and looked at the slip opposite the Evitts Creek Tower on the B. & O. R.R. The tow path is cracked as per this sketch and seems to have settled about 6" along the crack next to the canal. Along the river side it does not seem to have settled any at all, that is, along the part marked 54'. The river has cut into the foot of the tow path and carried away the rip rap wall so that about 300' is being cut by the river, although the part along the slip would be about 125'. The current is pretty swift along this point and it looks to me like there will be no chance to do any work in the river until the water is pretty low."

"From the top of the tow path to the elevation of the river as it is at present it is about 25'."

"I understand you want our company to figure on a retaining wall to stop the slip in the tow path. I would like to have your ideas of what kind of a wall you want built and the length of it. It seems to me that you will need at least 125' of wall to run past the ends of the present slip, and there is about 300' that requires protection from the scouring of the river. If you figure on a retaining wall, I would say that from the top of the tow path to the bottom of the river is 30', the water seems to be about 5' deep at the present time."

"The canal has been lowered about 18" and some clay has been placed in the canal along the slip. There is very little water coming through the bank at present. It might have been that the water that caused the slip soaked through near the top, as the canal was pretty full, and caused

the settlement. You can run a stick down the crack next to the canal about 3'."

[202] G. L. Nicolson, General Manager, to J. C. Shriver, Secretary and Treasurer, Vang Construction Co., Cumberland, 19 April 1918 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"What I have in mind is to build a retaining wall at toe of the slope around that point for a distance of about 300 feet, more or less, depending upon the requirement. In other words, I want to protect that point of abrasion. I thought that a wall about 5 ft. high 3 1/2 ft. base built at toe of slope at rock bottom, if possible, checked into the rock a few inches, with a charge of rough material, as shown on the sketch, would answer the purpose. Conditions might justify more than five feet in height, but without any further information than I now have, five feet would seem to be amply high."

[202] Hagerstown and Frederick Railway Company, Frederick, to G. L. Nicolson, General Manager, 26 April 1918 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"...regarding the matter of placing a concrete top on Dam #5..."

The Canal Co. approves the 6" increase in the height of the Dam and the flashboards..."

[202] G. L. Nicolson, General Manager, to Hugh L. Bond, Jr., Trustee, 29 April 1918 (Flood-February 1918, Flood Damage Prevention-Proposed, Sustainability-Dams)

Nicolson had previously requested that Sanderson and Porter determine how much it would cost to put concrete top on Dam No. 5.

"(The wood top was very seriously broken by the ice flow in February. ...) It would be most desirable to have this dam top with a reinforced concrete slab as shown on the attached sketch."

Nicolson notes that the Power Company was anxious to raise the dam crest.

[202] G. L. Nicolson, General Manager, to A. C. Polk, Construction Manager, Sanderson and Porter, 24 May 1918 (Flood Damage Prevention-Proposed, Sustainability-Dams)

Nicolson states that the Trustees were reluctant to pay the costs of improving, "tightening and raising", Dam No. 5 because it would benefit the power company more so than the Canal Co. and that there were objections "to increasing the accumulating storage capacity as it more or less produces an intermittent flow in the Potomac to Dam No. 4."

Nicolson indicates that if the Power Company agreed to maintain the improvements, the canal company would contribute \$3,000.00.

[202] Manager, Potomac Light and Power Company, Martinsburg, W.Va., to G. L. Nicolson, General Manager, 8 June 1918 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Dam #4 requires new sheeting, ice guards, and face logs. It is my understanding that in the past the Canal Company has been doing this work and charging it to us. We have on hand a considerable amount of ice guards, no sheeting or face logs. If your company is in a position to handle this work as previously, advise at once as to when and at what price you will do it."

[202] President, Hagerstown & Frederick Railway Company, Frederick, to G. L. Nicolson, General Manager, 26 June 1918 (Flood Damage Prevention-Proposed, Sustainability-Dams)

In reference to renewing the top of Dam #5 and the agreement made between the two companies.

"This drawing indicates briefly that the old wooden sheathing now on the top of the dam shall be removed and a concrete top of the dimensions and cross section shown shall replace it. The crest of the new concrete top shall be built six inches higher than the present crest and provisions made for flashboards, which will raise the level of the water two feet and six inches above the new concrete crest. These flashboards will be designed to collapse whenever a flood of any proportions runs over them."

"The Chesapeake and Ohio Canal Co. will share the expense of this work up to a sum of \$3000. This Company will pay the remainder of the cost of the work and will handle the construction of it with its forces now engaged in building a new power station here."

"In return for the above mentioned flashboard privileges it is understood that we are to maintain this new concrete crest in good condition. Such maintenance however shall not be understood as applying to the repair and stoppage of leaks through the dam or its abutments nor to any break or serious damage that may occur from floods, ice or other causes to any portion of the dam except this new concrete crest."

This letter comes with a copy of agreement between the Canal Company and the Potomac Light and Power Company. States that the flashboards on top of Dam No. 5 will collapse if 2 feet of water passes over them.

[202] Sanderson and Porter, Engineers, New York, to C&O Canal Company, 18 July 1918 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

Photograph showing condition of the pier at Dam No. 5 which Sanderson repaired. In Box 12, File 228, pt. 2.

[202] Resident Engineer & Construction Superintendent, Potomac Light and Power Company, Martinsburg, W.Va., to G. L. Nicolson, General Manager, 18 September 1918 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"In order to get up to the dam with dredge and dump box, also to continue sheathing from the West Virginia side, it was necessary to remove a portion of the old cofferdam, which extended out on to the crest of the masonry dam. To remove this portion of the old cofferdam, it was necessary to clean out thoroughly in front of our head works. This procedure was explained to you by the writer during our recent conference in Washington."

[202] R. V. Rosenbaum, Martinsburg, W.Va., to G.L. Nicolson, General Manager, 13 December 1918 [Telegram] (Flood-December 1918)

"Account high water impossible to work on dam"

[202] TR. V. Rosenbaum, Martinsburg, W.Va., to G.L. Nicolson, General Manager, 20 December 1918 [Telegram] (Flood-December 1918)

"River falling"

#### 1919

[202] Resident Engineer and Construction Superintendent, Potomac Light and Power Company, Martinsburg, W.Va., to G. L. Nicolson, General Manager, 29 January 1919 (Flood-January 1919)

". . . visited Dam No. 5 but on account of high water could make no estimate of work to be done. Mr. Montieth, however, states that a careful estimate was made last Summer and the following information obtained. To be replaced: 350 Ft. of sheathing, 350 Ft. of ice guards and approximately 50 Ft. of breast log."

[202] Manager, Potomac Light and Power Company, Martinsburg, W.Va., to G. L. Nicolson, General Manager, 19 February 1919 (Flood-January 1919)

"Please advise us when it will be suitable to flood the canal and furnish us transportation between Dam No. 5 and Dam No. 4 for the materials which we have at Dam No. 5 and which will be needed to make repairs at Dam No. 4 . . ."

[202] Sanderson and Porter, Engineers, New York, N.Y., to C&O Canal Company, 11 April 1919 (Flood-January 1919)

"We are preparing to start work on the completion of the Dam 5 crest as soon as water conditions permit."

[202] Sanderson and Porter, Engineers, New York, N.Y., to C&O Canal Company, 6 June 1919 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"We are preparing to send a few men to Dam No. 5 within the next week or ten days to complete the dam crest work as reports now indicate that the water has reached a stage where we can accomplish this quickly and easily."

[202] G. L. Nicolson, General Manager, to Emory L. Coblenz, President, Potomac Light and Power Company, Frederick, 26 September 1919 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"In passing over the canal last week, I was told that your Company did not intend to do anything towards replacing the ice guards on Dam No. 4. Will you please advise if this is correct?"

[202] Baltimore and Ohio Railroad Company, Law Department, to Mr. G. L. Nicolson, General Manager, 27 September 1919 (Damage Prevention-Receiver)

"Answering yours of September 23rd, I do not think I can assist you in form of letter beyond saying what I think are the legal rights we have in the matter, which, of course, you know as well as I. The Steel Corporation has no right to reduce the width of the river, and, should the case become one in which we would have to take proceedings against, the only question which would arise would be the question of fact as to whether the dumping would increase the danger from freshet. I understand that they are not actually filling in the river itself. If we can establish the fact that their filling in on the bank does increase the danger from freshet, I think it would make no difference that the filling did not actually occupy the bed of the river in the ordinary stage of water."

"I think the only thing you could say to them would be that you are instructed by the Trustees, if you think they have filled in beyond the line which was agreed upon, to take proceedings to restrain them from any further filling in, and say to them that, unless you can get their assurance that this will not be done, your instructions are to take legal proceedings to stop them."

"A similar letter should be written to the Potomac Lime Stone Company advising it that, unless it will give like assurance that no blasts will be put off which either throw stones into the canal

or possibly make a break, you are instructed to have a bill filed against it. If the Manager is inclined to be arbitrary, I think in this case it would be well to file a bill against his company promptly. I think you might make his letter very plain and tell him that your instructions are to take proceedings unless he at once gives you the required assurance."

[202] G. L. Nicolson, General Manager, to Pittsburgh Lime and Stone Company, Nestle, W.Va. 3 October 1919 (Damage Prevention-Receiver)

Nicolson indicated that if the Pittsburgh Lime and Stone Company continued to dump beyond agreed upon line the C&O Canal Company would take legal action.

[202] N. & G. Taylor Company, Cumberland, to G. L. Nicolson, General Manager, 25 October 1919 (Flood Damage Prevention-Proposed, Sustainability-Waste Weirs)

In reference to drawing water off the canal, the Canal Company was planning on installing a new waste weir but did not mention location.

#### 1920

[202] General Manager, Hagerstown and Frederick Railway Company, Hagerstown to G. L. Nicolson, General Manager, 15 January 1920 (Improvements-Unspecified)

They were ready to start work on Dam No. 4 and needed assistance from the Canal Company to find able men.

[202] Superintendent of Power, Hagerstown and Frederick Railway Company, Hagerstown to George Burgan, Williamsport, 17 January 1920 (Improvements-Unspecified)

In reference to repairs on wood work in Dam 4.

[202] Superintendent of Power, Hagerstown and Frederick Railway Company, Hagerstown, to G. L. Nicolson, General Manager, 24 May 1920 (Improvements-Unspecified, Sustainability-Dams)

"You are probably aware of conditions at Dam No. 4 which are much more serious than they were this time last year.

Unfortunately during the past winter by the time Mr. Burgen was in position to assist in this work the river rose and the ice went out. We got nothing done. We have in mind some temporary repairs which will tide us over the summer and would like to discuss this matter with you."

#### 1921

[202] G. L. Nicolson, General Manager, to Hugh L. Bond, Jr., Trustee, Baltimore, 1 March 1921 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Mr. C. M. Harris, Vice President of the Hagerstown and Frederick Railway Company, advises that he saw you some time ago in regard to the modifications of the contract between the Trustees and the old Martinsburg Power Company, to which they succeeded by purchase at bankrupt sale of the Martinsburg Power Company."

"For your information I am enclosing copies of the original lease and the two supplemental leases, one at Dam No. 4 dated July 9th, 1913, and the other at Dam No. 5, dated Aug. 8, 1918. The Dam No. 5 Agreement was to put a new concrete top on the dam and maintain same against ordinary wear and tear. Under the Dam No. 4 Contract they have never made any repairs but they now have material on hand with which to repair the timber top of the stone dam."

"I suggested to Mr. Harris that he should have set out the Dam No. 4 Contract more specifically, similar to the one for Dam No. 5, but that it was a legal matter and I would submit it to you. Mr. Harris is very anxious to have this closed and in his hands prior to March 15th."

[CF] The Evening Star (Washington, D.C.), 6 May 1921, 10 (Flood-May 1921)

"Upper Potomac Towns Threatened By Floods" Article mentions the threat of floods in the Upper Potomac. It does not mention the canal

[202] Division Engineer, Baltimore and Ohio Railroad Company, to George A. Pearre, Company Counsel, Baltimore and Ohio Railroad Company, Cumberland, 5 April 1921 (Damage Prevention-Receiver)

"Referring to our telephone conversation of even date, in regard to authorizing the City to empty sanitary sewerage into our storm sewer at South Cumberland Shop, which now empties into the Chesapeake and Ohio Canal."

"This matter was first taken up with me by Commissioner Stump, and after I explained to him that the Railroad Company has no authority to permit sewerage to be emptied into our storm sewer, the

matter was dropped."

"Last fall, or about six months after my interview with Commissioner Stump, Commissioner W.E. McDonald, and the Health Officer, called at my office by appointment in regard to the same matter, at which time I took them over the ground in my car and explained to them the objections of emptying sanitary sewerage into the canal. And took them down to a point east of our storm sewer near the Queen City Brick Company plant. where there is a stone arch culvert passing through under our tracks and under the canal, and suggested to them that they carry their sanitary sewer to that point where the same would empty into the river."

"At that meeting, on the ground, I explained that I could not authorize them to connect with our storm sewer, but if they insisted on discharging at that point, outside of our right-of-way line, emptying their sanitary sewerage into the natural ravine at the head of our storm sewer, the point of discharge being off of our property, and that no jurisdiction, but made it clear to them that the Chesapeake and Ohio Canal Company could, and no doubt would raise serious objections."

"At this interview the Health Officer explained that he could secure the necessary permission from the Chesapeake and Ohio Canal Company and also the State Health Department."

"At a later conference I explained to these people that if they did construct their sewer, it must be done in such a way as to leave the ravine or natural water-way free from obstruction otherwise, they would be liable in case of heavy rain account of flooding our property."

"Mr. McDonald explained at the time of our conference that they expected to make this outlet for their sanitary sewer, a temporary one, not having sufficient funds at this time to carry the sewer further east, to the arch culvert referred to, but would follow the matter up and as soon as funds were available they would eliminate this point of discharge and carry their sewer to the river."

"No permission or authority was ever given by this office to empty sanitary sewerage into our storm sewer."

[202] Attorney, Baltimore and Ohio Railroad Company, to William C. Walsh, City Solicitor, Cumberland, 8 April 1921 (Damage Prevention-Receivers)

". . . that the taping of the Railroad Company's sewer and the consequent discharge of the sanitary sewage of the City into the Chesapeake and Ohio Canal, was a deliberate and willful disregard of the rights of the Chesapeake and Ohio Canal Company, and that the City should atonce, repair this wilful wrong by disconnecting its sewer and making arrangements for the discharge of its sanitary sewage, somewhere else."

[202] Superintendent of Power, Hagerstown and Frederick Railway Company, Hagerstown, to G. L. Nicolson, General Manager, 27 April 1921 (Improvements-Unspecified, Sustainability-Dams)

". . . there is a strong probability of the Canal not being opened for traffic for a considerable length of time. In this event it is the Company's intention to go ahead with the repairs at Dam No. 4 as we will probably have a river stage that will enable us to draw the water back so that we can progress readily with this work."

[202] Attorney, City of Cumberland, to George A. Pearre, Company Counsel, Baltimore and Ohio Railroad Company, Cumberland, 10 May 1921 (Damage Prevention-Receivers)

In reference to the dumping of sewage into the canal via the B&O Railroad storm sewer, the city implied that they shouldn't be held responsible for the dumping because they were under the impression that the B&O had given them permission to connect with their storm sewer.

[202] Attorney, C&O Canal Company, to William C. Walsh, City Solicitor, Cumberland, 11 May 1921 (Damage Prevention-Receivers)

In reference to the dumping of sewage into the canal, the city should take responsibility for its actions, that the Engineer for the B&O Railroad had not given them permission to connect to their sewer, that the city had not made any effort to remedy this situation, and that he would advise the Canal Company of their letter, and ask what their position on the situation would be.

[202] Superintendent of Power, Hagerstown and Frederick Railway Company, Hagerstown, to G. L. Nicolson, General Manager, 4 October 1921 (Improvements-Unspecified, Sustainability-Dams)

"Kindly advise what date the Canal will be drained as we are very anxious to go ahead with Dam No. 4, having all materials on hand and being ready to proceed with this work . . ."

[202] G. L. Nicolson, General Manager, to Hugh L. Bond, Jr., Trustee, Baltimore, 19 November 1921 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Yesterday I visited Dam No. 4 with Mr. Harris and the General Manager of the Hagerstown and Frederick Railway Co., also the hydraulic engineer of Sanderson & Porter. The Hagerstown and Frederick people have just completed putting a new wooden top on the dam. They have been at work on it for about three weeks, under the most favorable circumstances. Due to the canal being closed and the low stage of the river they were able to draw the pool above the dam so low that this work was all done above the water level. I think they have made a first-class job in replacing the wooden top."

"I found that my presence was requested on this trip hoping to obtain the participation of the Trustees in the expense of stopping the leakage under and through the dam. The stage of the river is so low below the dam that the leaks coming through the dam were exposed more than I had ever seen them. We went on the lower side of the dam in a boat and examined very carefully the condition of the stone work. Twenty years or more ago we made some repairs in the form of mortaring joints and packing seams of stone that had moved near the base of the dam. These stone, so far as I can see, have not moved a fraction of an inch since as the mortared joints are in perfect condition today. It is probably that the constant passage of water through the joints, or openings, in the stone work is causing them, in a measure, to wear larger, a small percentage of increase from year to year. We sounded in one of the boilers below the dam and were able to get a rod down in a crevasse over 12 ft. below the surface of the water and the water was not more than 3 ft. deep on an average, showing that this leak was coming under the dam at a considerable depth below its foundation but I do not believe endangers the safety of the dam, altho this opening is wearing and growing probably larger from year to year."

"Mr. Harris asked me if I would be willing to recommend a fifty-fifty division of the cost of the work that might be done. I replied that I would not recommend the spending of any money by the Trustees at this time in attempting to stop this leak as there was ample water in the river for our purposes and that I did not consider that the safety of the dam was in danger at the present moment. He then asked if I had any objection to his taking it up with you. I told him that I had none and was perfectly willing to abide your decision, irrespective of my opinion. I asked the engineer of Sanderson & Porter the flat question if he considered the dam unsafe. He evaded the question and finally said that he did not think it was in any immediate danger and might not be for some years to come altho no one could tell how rapidly deterioration would occur from this date forward. In answering this I replied that from my observation the structure was as safe today as it was twenty years ago, altho there might be a slightly increased amount of water passing through and under."

[202] G. L. Nicolson, General Manager, to George A. Pearre, Company Counsel, Baltimore and Ohio Railroad Company, Cumberland, 6 December 1921 (D) (E)

"Some time ago I met Mr. W. Carl Richards in Cumberland and we discussed the question of bridge crossing of canal in South Cumberland and the extension of the B. & O. sewer under the canal through the bottom lands to the river at the head of Dougherty's Wide Water, south of the B. & O. shops. I also explained to Mr. Richards the situation of the City emptying a sewer into the B. & O. storm sewer, which we were protesting and expected to make them divert. In lieu of the expense of extending this sewer, I thought the City would be interested in extending the B. & O. sewer, which now is at the bank of the canal, through under the canal into the river, giving them a permanent outlet for the South Cumberland sewer and also providing an outlet for sewerage from the subdivision now under development. If you can take any steps to bring about the favorable consideration of this it would be very advantageous, in which case the Trustees would be willing to permit the bridge to be put over the canal as requested by Mr. Richards."

[202] George A. Pearre, Company Counsel, Baltimore and Ohio Railroad Company, Cumberland, to G. L. Nicolson, General Manager, 8 December 1921 (Damage Prevention-Receiver)

"I gather from your letter that the plan therein outlined involved the extension of the Storm sewer of The Baltimore and Ohio Railroad Company into the Canal under the River by the City of Cumberland or Mr. Richards, and, of course, the subsequent use of the B. & O. sewer by the City from the point of connection to the River."

[202] George A. Pearre, Company Counsel, Baltimore and Ohio Railroad Company, Cumberland, to G. L. Nicolson, General Manager, 22 December 22, 1921 (Damage Prevention-Receiver)

"I beg to enclose, herewith, a letter which I have just received from Mr. P. Petri, Division Engineer of the Baltimore and Ohio Railroad Company, which speaks for itself."

"You will observe from the third paragraph of Mr. Petri's letter, Mr. Richards is not interested in the draining of his Addition into the storm sewer of the Baltimore and Ohio Railroad Company, an impression to which fact I got from the final sentence of your letter of December 6th to W. Carl Richards, in the file."

"You will observe that Mr. Petri, as the Division Engineer of the Company, will insist that the City sever the present connection of its sanitary sewer with the sixty inch storm water sewer of The Baltimore and Ohio Railroad Company, and which I think is very proper."

"Will you kindly advise me of your further wishes in the matter, after reading Mr. Petri's letter, returning with your reply the enclosed file."

[202] Company Counsel, Law Department, Baltimore and Ohio Railroad Company, Cumberland, to P. Petri, Division Engineer, Baltimore and Ohio Railroad Company, Cumberland, 23 December 1921 (Damage Prevention-Receiver)



"Acknowledging the receipt of your favor of the 20th, and referring to the third paragraph thereof, I beg to say that I received the impression that Mr. Richards contemplated the use of the sewer in question in connection with the development of his property between the Canal and the River, from the letter of Mr. Nicolson, in the file which he sent me."

"I quite well see from your letter, and from the fact that the property of Mr. Richards is between the Canal and the River, that he is not likely to be interested in draining his Addition into our storm sewer, which, I note from your letter, if extended, would pass over Mr. Richards' property between the Canal and the River - and, therefore, his interest."

"Referring to the fourth paragraph of your letter, in which you state that the connection between the City's sewer and our storm sewer was made without our permission, I beg to say that you are doubtless aware of the fact that Mr. Rizer, the City Engineer, still insists that the City received permission from you to make this connection."

"In a conversation with him, after you had assured me that you had given no such permission, of which I informed Mr. Rizer, he still insisted that permission had been given by you."

"I quite agree with you that, without the permission of the Railroad Company, the City had absolutely no right to connect its sanitary sewer with the storm sewer of the Railroad Company, and that the proper solution of this matter is for the City to break the connection of its sanitary sewer with our storm sewer, and extend an independent sewer of its own to Evitts Creek and along the bed of that Creek, under the right of way of the Baltimore and Ohio Railroad and the Chesapeake and Ohio Canal to the River, because, The Mayor and City Council of Cumberland has no right to discharge the sanitary sewage of any part of Cumberland into the Chesapeake and Ohio Canal against the wishes of the Trustees and Officers of that Company, either through the storm sewer of the Baltimore and Ohio Railroad, or by an independent sewer: nor has the Baltimore and Ohio Railroad Company the legal right, against the protest of the Trustees of the Chesapeake and Ohio Canal and their officers and agents, to aid the Mayor and City Council of Cumberland in committing this nuisance against the Canal Company, by allowing the City to discharge its sanitary sewage into the Chesapeake and Ohio Canal, through its storm sewer."

". . . the Railroad Company to insist that the City should disconnect this unauthorized connection of its sanitary sewer with the storm sewer of the Railroad Company."

[202] G. L. Nicolson, General Manager, to George A. Pearre, Company Counsel, Baltimore and Ohio Railroad Company, Cumberland, 27 December 1921 (Damage Prevention-Receiver)

"I have yours of the 22nd with attached correspondence from Mr. Petri, Division Engineer, B.&O. R.R., regarding city drainage into storm sewer at South Cumberland Yard."

"I can well understand Mr. Petri's position in regard to the city sanitary sewer, but I do not think that he had a right to assume that the B.&O. have any right to concentrate the storm waters and washings from the B.&O. into the canal and feel that they are absolved from any responsibility for the injuries suffered by the Trustees due to this construction. My impression was that the B.&O. would be interested in relieving the canal by extending this sewer under the canal to relieve the canal of the deposits being continually made therein from the B.&O. operations. Either that, or the B.&O. must so arrange the outlet of this sewer so that they can control the deposit that is now coming into the canal from their operations at the shops and roundhouses. When I suggested the extension of this sewer and permitting the City to use it I assumed that the B.&O. storm sewer was of ample size to take care of this service."

[202] George A. Pearre, Company Counsel, Baltimore and Ohio Railroad Company, to G. L. Nicolson, General Manager, 28 December 1921 (Damage Prevention-Receiver)

"Mr. Richards was in my office on Saturday last, and stated that he had done all he could to get the City to extend its own sewer to Evitts Creek and then under the Railroad and Canal to the River, but it seems that he has been unable to accomplish anything."

#### 1922

[202] G. L. Nicolson, General Manager, to Hugh L. Bond, Jr., 7 January 1922 (D) (E)

"A few days ago Col. Pearre sent me some correspondence with Mr. Petri, the B. & O. Division Engineer at Cumberland. Mr. Petri flatly refuses to permit the City of Cumberland to discharge the city drainage into the B. & O. sewer, & further declines to permit the B. & O. sewer to be extended under the canal with an outlet at the river on the ground that the sewer was not of sufficient size to take care of the additional drainage. Whether Mr. Petri can maintain this position I am not prepared to say, but I do know the extension of the sewer could be made larger than the present sewer so that the additional length would not reduce the capacity of the present sewer which, to my mind, looks amply large, considering the length of same."

". . . I further told Mr. Richards that I understood the B. & O. was interested in his development on account of housing facilities for their employees and that we were not inclined to permit a bridge over the canal unless we got some benefits, at least the discontinuance of the nuisance of the B. & O. sewer now being emptied into the canal."

[202] George A. Pearre, Company Counsel, Baltimore and Ohio Railroad Company, to G. L. Nicolson, General Manager, 27 January 1922 (Damage Prevention-Receiver)

Pearre discusses a meeting between Mr. Petrie, Division Engineer B&O, Mr. Geo. Pearre, Counsel, and the City and Council of Cumberland concerning disconnection of the sewer. In the discussion it was discovered that the B&O was also discharging waste into the canal and so they decided that Mr. Petrie and the Cumberland City Engineer work together to devise a plan to get rid of all waste.

### 1923

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, Baltimore, 12 January 1923 (Easements-Flood Implications, Easements-Receiver)

". . . for your files, executed Agreement with the Williamsport Power Company for the construction of a dam and railroad bridge over the canal at Williamsport, Md., and the following drawings and data . . ."

"Mentions drawings of a profile of the river at Williamsport, plan and section of power station and proposed dam, flood duration chart, table comparing flood stages at and below the intake dam, drawings of steel and masonry plans of canal crossing."

[202] Secretary, Executive Office, Commissioners of the District of Columbia, to G.L. Nicolson, General Manager, 16 February 1923 (Damage Prevention-Receiver)

"The Commissioners of the District of Columbia direct me to acknowledge the receipt of your communication of the 15th instant, calling attention to the condition of the ringstone, near springing line, at the north end of big tunnel under the canal at Foundry Branch, and to state that the matter has been referred to the Engineer Department for prompt attention."

[202] G. L. Nicolson, General Manager, to W. T. Pratt, Health Officer, Montgomery County, Rockville, 20 February 1923 (Damage Prevention-Receiver)

In reference to dumping sewerage into the canal. Nicolson had been trying for years to convince the city of Glen Echo to stop dumping and clean up the mess. He was now threatening to block the outlets into the canal from their sewers.

[202 ] G. L. Nicolson, General Manager, to George W. Offutt, Jr., 20 February 1923 (Damage Prevention-Receiver)

"The last time I saw you, you asked me how they were getting along at Glen Echo. Since this time I have made some inquiry and find that very little has been done by the Town Council in accordance with our understanding. You may be surprised when I tell you that I have been appealed to by citizens and property holders in Glen Echo to take the most drastic action that is possible to enforce our demands upon the town."

"I am advised that the Washington Suburban Sanitary Commission stands ready to supply the necessary money and engineering work to properly water and drain Glen Echo . . ."

[202] Robert B. Morse, Chief Engineer, to Abel Wolman, Chief Engineer, State Department of Health, 12 April 1923 (Damage Prevention-Receiver)

"I can not tell you anything about the improvements of sewerage conditions at Glen Echo. We have nothing to do with the situation as we do not own the system."

[202] G. L. Nicolson, General Manager, to H. H. Keedy, Jr., Hagerstown, 12 April 1923 (Damage Prevention-Receiver)

"Confirming our conversation of yesterday, the conditions at the sand plant as Round Top, operated by the Maryland Glass Sand Co., Mr. R.J. Funkhouser, President, are anything but satisfactory. We have been having trouble from the wash water at this plant due to leaks or overflow in the troughs crossing the canal and thence to the river. I was up there a short time ago and found there had been a bad leak on the berm side and that a lot of sand had washed into the canal. At this time there was no leak directly over the canal, but there was a leak in the trough between the canal and the river with a pond of water and sand just back of the tow-path. Between the canal and the bins there were numerous leaks which ultimately find their way into the canal. I have warned Mr. Funkhouser several times regarding these conditions and have told him that we were not going to say anything more to him, that at the next complaint his crossing would come down, never to be replaced. I think it would be well for you to take this up with him when you see him."

[202] Abel Wolman, Chief Engineer, State Department of Health, to W. T. Pratt, County Health Officer, Rockville, 17 April 1923 (Damage Prevention-Receiver)

In reference to the complaint of the C&O Canal Company, it was more important to have a healthy water supply and that relocating the sewers were not as important.

"If the operators of the Chesapeake and Ohio canal see fit, they may have legal recourse against

the town of Glen Echo for such damage as they assume to have suffered."

[202] G. L. Nicolson, General Manager, to George A. Pearre, Company Counsel, Baltimore and Ohio Railroad Company, 18 April 1923 (Damage Prevention-Receiver)

"A short time ago I was in Cumberland was over the canal and found the usual big deposit at the B. & O. sewer. Has the city done anything toward diverting its sewage from the B. & O. sewer in South Cumberland."

[202] Chief Clerk, Engineer Department, Government of the District of Columbia, to G. L. Nicolson, General Manager, 18 April 1923 (Damage Prevention-Receiver)

"In further response to your letter of February 15, 1923, calling attention to the condition of the ringstone, near the springing line at the north end of the big tunnel under the canal at Foundry Branch, I am directed by the Engineer Commissioner to inform you that the Commissioners have ordered the repair of this structure."

[202] George A. Pearre, Company Counsel, Baltimore and Ohio Railroad Company, to G. L. Nicolson, General Manager, 25 April 1923 (Damage Prevention-Receiver)

In reference to the situation at Cumberland?, "I had a talk with Mr. Ralph Rizer, City Engineer, yesterday concerning your inquiry... and his answer to my inquiry was that the City had done nothing toward diverting its sewerage from the Baltimore and Ohio ... sewer at Evitts Creek ... discharged into the C. & O. Canal, and that the City contemplated doing nothing at this time to change these conditions, but that the city had prepared in full outline and detail, disposal plans, which when installed and completed would divert this sewerage from the C. & O. Canal into the Potomac River."

#### 1924

[CF] The Evening Star (Washington, D.C.), 29 March 1924, 1-2 (Flood-March/April 1924)

"2 Trains Isolate In Potomac Flood Bridges Washed Away, Bank Overflowed--Water Rushing Toward Capital." Article does not specifically mention the canal.

[CF] The Evening Star (Washington, D.C.), 30 March 1924, 1-2 (Flood-March/April 1924)

"Cumberland Under Water, Hundreds Flee To Hills" and "Flood Will Reach Crest Here Today" Article does not specifically mention the canal.

[CF] The Washington Post, 30 March 1924, 1-2 (Flood-March/April 1924)

"Worst Flood in History Strikes Cumberland and Vicinity." Article does not specifically mention the canal.

[CF] The Evening Star (Washington, D.C.), 31 March 1924, 1, 4 (Flood-March/April 1924)

"Six Flood Deaths Known As Waters Reach Crest Here" Article reports the Williamsport Division of the canal "has been destroyed and may never be rebuilt."

[CF] The Evening Star (Washington, D.C.), 1 April 1924, 1-2 (Flood-March/April 1924)

"Fury Of Blizzard Adds To Suffering Of Flood Victims" Article mentions J. C. Nicolson is surveying the damage, looking toward repairing the canal.

[CF] The Morning Herald (Hagerstown), 1 April 1924, 1, 6, 9 (Flood-March/April 1924)

"Rapid Drop In Potomac" Article reported that the damage to the canal on the Williamsport division was not as bad as initially expected, but that the damage at Cumberland was worse because the flood had been fiercest here.

[CF] The Evening Star (Washington, D.C.), 2 April 1924, 2 (Flood-March/April 1924)

"Rescuers In Flood Area Battle Cold" Article reports the location of the major breaks in the canal and indicates the damage will be repaired by the Vang Construction Company. Nicolson denies reports the canal will be abandoned.

[CF] The Morning Herald (Hagerstown), 3 April 1924, 1, 12 (Flood-March/April 1924)

"Official Denies That Canal Will Not Be Operated" Article refutes rumors of the canal being closed and indicates the damage to the canal in the vicinity of Cumberland is in the hundreds of thousands of dollars, with lesser damage downstream, and that contracts have been let for the

canal's repair.

[202] George M. Shriver, to H. R. Preston, 5 April 1924 (Flood-March/April 1924)

"Under the circumstances, the work of restoring the dam at Cumberland should be undertaken at once. Before doing anything further in the way of thorough repairs, I think we should await the detailed report of Mr. Nicholson as to the extent of the damage he finds and his estimate to restore the property to full operation."

[202] General Solicitor, Law Department, Baltimore and Ohio Railroad Company, to G. L. Nicolson, General Manager, 7 April 1924 (Flood-March/April 1924)

"I reported to Mr. Shriver the condition of the canal as we discussed it, and enclose copy of his reply."

"I have advised him that you would proceed with repairs but keep the cost down to a minimum until we have had an opportunity to make a general estimate of the total cost of making such repairs as would be necessary to put the canal in operation."

"As more as you can be in a position to do so I would like to have a report, but, of course, it need not go into the details of each item. I think the main thing Mr. Shriver will want is to know, as nearly as you can estimate it, the total cost. I do not understand that he objects to continuing the work as we planned it, but would like a report before too much money has been spent."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, Baltimore, 10 April 1924 (Flood-March/April 1924)

"Since I saw you the breaches in Cumberland have increased considerably on account of the continued high river and great volume of water passing through these openings. We have materially checked the flow of water into the canal above the dam and by the end of the week will have it practically closed. I believe the estimate that I gave you of \$10,000. to the Canal Company at Cumberland will be approximately correct, possibly a little lower. The estimate of \$20,000 to put the canal in shape to open from Cumberland east I believe is sufficient. You understand, these figures mean additional to our regular usual spring expense of opening the canal. When the canal is opened it will have a great many miles of rough tow-path which will have to be improved gradually. It will probably be six weeks before we can be ready to open."

"The delay at Cumberland will be due largely to detention in shipping material in over the railroad. We estimate we will need approximately 100 carloads of material and we get in six cars a day we will average very well. There is no difficulty in getting the material loaded, but to get it switched in and out to the stub track, this track being on the main line, causes the delay."

"I was informed yesterday that the City of Cumberland had agreed to contribute \$3,000 towards the expense of restoring conditions at the dam. I shall demand that this \$3,000. be deducted from the gross bill before the 40 and 60% division takes place."

"The canal from Washington to Harpers Ferry will not cost \$1,000 to open. From Harpers Ferry to Hancock I do not think the expense will exceed \$5,000.00. From Hancock to Cumberland somewhere between \$10,000. and \$15,000."

"It is difficult to give accurate figures for the reason that the work is so scattered and so little at some places that the cost of moving from place to place will absorb more, and some times less, than the estimate, but I believe the gross will cover the probably additional expense."

[202] H. R. Preston, Law Department, Baltimore and Ohio Railroad Company, to George M. Shriver, 11 April 1924 (Flood-March/April 1924)

"I enclose letter from Mr. Nicolson of April 10th, giving an estimate of the cost of putting the canal in condition, which I think, is as accurate as can be made. As I explained before, the damage, except at Cumberland, is all washing away of the tow-path and this, of course, cannot be accurately measured but with Mr. Nicolson's experience in the past of surfacing the tow-path, I have no doubt his figures are very close to the actual. These figures give a total of \$30,000.00 which is in addition to the usual expenditure which must be made every Spring. I do not think we can do anything but incur this expense. Mr. Nicolson has begun work with the force he has on hand, but in view of your instructions that you should have a further report before authorizing taking on additional forces, he will defer this until you authorize it."

[202] Secretary-Treasurer, Vang Construction Company, to G. L. Nicolson, General Manager, 14 April 1924 (Flood-March/April 1924)

"We are ordering tools and material to the stop lock today and getting started on the cofferdam."

[202] General Solicitor, Law Department, Baltimore and Ohio Railroad Company, to George L. Nicolson, General Manager, 15 April 1924 (Flood-March/April 1924)

"I have received authority from Mr. Shriver to proceed with the work on the canal."

"I sent him your letter of April 10th and he understands that you expect to do no more than put the canal in condition for operation with as little expense as possible."

[202] J. C. Shriver, to G. L. Nicolson, General Manager, 17 April 1924 [Telegram]  
(Flood-March/April 1924)

"Finishing cofferdam Friday morning advise putting in small cofferdam other side spillway it will cost little if any more to pump out and place concrete in the dry than to build forms and place concrete through the water wire advice"

[202] J. C. Shriver, Secretary-Treasurer, Vang Construction Company, to G. L. Nicolson, General Manager, 17 April 1924 (Flood-March/April 1924)

". . . about twenty cars of good clay sent into the Western Maryland Railway by the Pennsylvania Railroad intended to be used for refilling places washed out by the flood . . ."

"It is our intention to dump about three cars of clay on the outside of the rock dam so as to close off all the water."

"I would advise you to let us build cofferdam below the spillway and to pump out instead of placing concrete under water. I do not think there will be much expense to build cofferdam sufficient to hold back the water from the river, and we want to have a pretty dry hole--so it would not cost much to pump it out and we can see exactly what we are up against and be sure of making a good job."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, Baltimore, 17 April 1924  
(Flood-March/April 1924)

"I was in Cumberland yesterday. We have the water broken above the abutment and have a head of about six feet of water against the stone rip-rap bank, covered with broken bricks, cinders, etc., and are now proceeding to put in the earth clay fill. We are also building a coffer-dam across the breach at the waste-weir near the N. & G. Taylor Company plant in order to give water to this plant at as early a date as possible."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, Baltimore, 18 April 1924  
(Flood-March/April 1924)

". . . we find it impracticable to secure sufficient labor to make repairs to the canal between Lock 58, head of Orleans Level, and Okonoko, therefore we have made arrangements with the Empire Engineering Company of Baltimore (who were very highly recommended by Mr. Lane, Chief Engineer of the B. & O.) to do this work, cost plus 15%. Any tools that they have to buy, such as wheelbarrows, shovels, scoops, etc., are to be turned in to the Trustees at the completion of the work. This item cannot amount to much as they expect to use a force of from ten to twenty men, which they estimate will do the work by the middle of May, unless the weather interferes."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, Baltimore, 18 April 1924  
(Flood-March/April 1924, Easements-Flood Implications)

"There has been some rumor around Cumberland that the authorities are going to suggest flood gates in the dam. I have told several persons in Cumberland that flood gates in the dam would have no effect on the high freshet line of the river for the reason that the dam is so low that in freshet time you cannot tell where it is."

"One of the chief troubles in Cumberland is the fact that the Western Maryland was permitted to very seriously obstruct the hydraulic section of Wills Creek, just above Baltimore Street Bridge, in the construction of its crossing. The piers are heavy and stand at an angle with the thread of the stream, causing a great obstruction to the flow of the water, thereby increasing the elevation of the water in Wills Creek, above the bridge, forcing the water down through the City."

[202] Board of Commissioners, Hagerstown, to G. L. Nicolson, General Manager, 18 April 1924  
(Damage Prevention-Receiver)

In reference to discussion of previous year concerning water supply for the city, they now have plans for the intake and tunnel under the canal to the river.

[202] G. L. Nicolson, General Manager, to J. C. Shriver, Secretary and Treasurer, Vang Construction Company, Cumberland, 30 April 1924 (Flood-March/April 1924)

"Yesterday afternoon I was down at the waste-weir and the scow came down with cement, sand and steel. I do not know what the man was thinking about in sending the steel as he had several 1 1/2" bars and many of the pieces were corkscrews, all pretty rusty and some greasy. It was a bum looking lot of reinforcement and I told the foreman he must see that the grease was cleaned off before being placed in the concrete."

"I gave the levels to the foreman. The finished coping of the overflow should be 2'2" below the corner of the coping at wastewear next to the river on the lower side. The finished work on overflow on the east end 1' 5 1/1" below top of stake driven in the bank, with the wing wall on the east end to be built to the same elevation as top of coping on waste-weir. I also told him it would be a good idea to build the wall on top of overflow 3 or 4 ft. long, the top elevation the same as coping on the waste-weir. This would give us room for the earth fill."

[202] William R. Reynolds, Harper's Ferry, to G. L. Nicholson, 9 May 1924 [telegram]  
(Flood-May 1924, Harper's Ferry-Sustainability)

"Water Harpers Ferry seventeen feet and half raising five inches per house" (hour)

[202] G. L. Nicolson, General Manager, to J. E. Shriver, Vang Construction Company, Cumberland, 12 May 1924 (Flood-May 1924)

"I regret exceedingly that my fears have been realized at Cumberland. When this wave passes off it is urgently necessary for us to close the breach below the abutment promptly. Will it be possible to use side-dump cars, in which case we might build a light trestling across from the abutment and try and close at least the river side of the breach, after which time we can clean out on the canal side and put in a water-tight, carefully filled section. In other words, If we could build to slope on the river side nearly to the top, with as narrow a bank as we could dump, we could then add to this bank after cleaning out the bottom at the toe of the slop on the canal side."

"I understand that the water is in Mechanics Street this morning and rising above, not a promising outlook."

"Could you get me a picture or two, showing the river at its highest at the dam and below."

[CF] The Evening Star (Washington, D.C.), 12 May 1924, 1, 9 (Flood-May 1924)

"Scores Flee Homes In Return Of Flood" The Star reports on new flooding on the Potomac an its tributaries. No mention made about the canal.

[CF] The Evening Star (Washington, D.C.), 13 May 1924, 1-2 (Flood-May 1924)

"Scores Homeless, Millions Damage, In Floods Rushing On to Washington" Article reports the Potomac has overflowed the canal, and in many places the canal has disappeared into the river. The repairs made to the canal since the last flood have been destroyed.

[CF] The Evening Star (Washington, D.C.), 14 May 1924, 1, 4 (Flood-May 1924)

"Flood Is Abating In Upper Potomac; Still Rages Here" Article reports "C. & O. Canal Likely Doomed." It gives some details of the extent of the damage.

[CF] The Morning Herald (Hagerstown), 14 May 1924, 1, 10 (Flood-May 1924)

"Slow Drop Of Water Leaves Towns Facing Disrupted Industry" Herald also reports the merging of the canal and the river and initially indicates the canal will be out of operation for some months. However, later in the article states the canal has "been dealt a death blow."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, Baltimore, 15 May 1924  
(Flood-May 1924)

"Since talking with you yesterday, I have talked over the telephone with the Supervisor of the Cumberland Division, also the Supervisor of the Hancock Division, which covers the canal from Little Slack Water, seven miles above Williamsport, to Cumberland."

"In the Cumberland Basin there was a little of the new material washed out, but no serious consequence. From Cumberland to South Branch, there was no increased damage. From South Branch to Dam No. 6 most of the tow-path that had been replaced has been washed out and some additional scouring, but nothing serious. From Dam No. 6 to Hancock the canal in scoured worse than with the March freshet, but no big breaks. There is too much water in the canal to see the bottom to know about the bars."

"Below Hancock, on the 14 mile level, the damage is not serious - about what it was in March. There three-span bridge over the feeder at Dam No. 6, which was washed out and caught in the March freshet, was lost. This only means getting a few thousand feet of lumber."

"I have just talked with Mr. Richards, Supervisor of the Williamsport section. The damage on this section is very much less than I expected. He has two small breaks below Williamsport, one about 40 and the other 60 feet long, with some bars in the canal and the tow-path badly washed in various places. About 3 1/2 miles above Williamsport there is a small break around what is known as the 'Rocks' with bars in the canal and abrasions to tow-path. I have instructed the Supervisor to put a little water on and work a small force scowing material to places where it is not available."

"I have not yet received reports from Big Slack Water to Washington."

[CF] The Evening Star (Washington, D.C.), 15 May 1924, 1, 4, 6 (Flood-May 1924)

"River Flood Leaves Desolation In Wake" Article indicates that a decision to close the C&O Canal will be deferred until the canal company has a chance to make a thorough inspection of the waterway. An editorial in the same edition laments the probable closing of the canal.

[202] L. L. Helmer, N. & G. Taylor Company, to G. L. Nicolson, General Manager, 16 May 1924 (Flood-May 1924)

"From all reports, the second flood did more damage to the canal than the first one,..."

[202] Trustees of the C&O Canal Company and G. L. Nicolson, General Manager, to the Commissioners of the District of Columbia, 17 May 1924 (Flood-May 1924)

"We wish to request emergency permission to allow our contractor, W. F. Brenizer Co., to operate in restoring bank of canal, east of Chain Bridge, on tomorrow, Sunday, May 18th, in view of the urgent needs of industries such as the District of Columbia Paper Manufacturing Company, the flour mill, ice plants, etc., in having their water supply restored to them to permit the resumption of their operations."

[202] Executive Office, Commissioners of the District of Columbia, to G. L. Nicolson, General Manager, 17 May 1924 (Flood-May 1924)

"Referring to your letter of May 17th, requesting that you be authorized to allow your contractor, the W. F. Brenizer Company, to work on Sunday, May 18th, in the restoration of the bank of the canal east of Chain Bridge, and in restoring and repairing the intake at the Wilkins-Rodgers Flour mill on the canal just west of the line of Potomac Street, I am delivered by the Commissioners to inform you that in view of the fact set forth in your letter indicating an emergency, they have instructed the police not to interfere with the operations. . . "

[202] H. R. Preston, Law Department, Baltimore and Ohio Railroad, to G. L. Nicolson, General Manager, 22 May 1924 (Flood-May 1924)

"I told him (Shriver) about the two breaks at Georgetown, and explained to him that the upper one was not necessary for taking care of the water power and gave him the reasons why we had made the arrangement to have it repaired. He assented to this. As to the rest of the work, he thought we ought to keep down the cost as low as possible, working only at points where a small amount of work would save possible great damage in the future."

"I told him what Andrews had told me, and he thought we should consider the possibility of operation as far as Williamsport, and as to the rest of the Canal say that on account of the present condition of the coal trade we did not expect to open the lower part until there was improvement in the business."

[202] S. E. Fisher, Point of Rocks, to G. L. Nicolson, General Manager, 4 June 1924 (Flood-May 1924)

"I wish you would ship the Derrick you can ship it to Wereton or sandy Hook as I can get it at Either Point. I have some of the wall up but the stone are getting farther away. I am getting the Break filled but very slowly it gets so mucky and Bad I have to stop scooping and find something to dry it up so the Teams can get through."

[202] S. E. Fisher, Point of Rocks, to G. L. Nicolson, General Manager, 16 June 1924 (Flood-May 1924)

"I am through with the derrick. I havent Finished filling up the Break as I have gotten all the dirt that is handy to get I will have to Finish it with the scow Just as soon as I can get in shape to Put some water on. The B&O has quit taking out the stone and dirt they Put in the Canal at Millers Bend"

[202] H. R. Preston, Law Department, Baltimore and Ohio Railroad, to G. L. Nicolson, General Manager, 19 June 1924 (Flood-May 1924)

"Mr. Shriver submitted to Mr. Willard a memorandum covering the C. & O. situation, in which he said that he had directed that no general repairs be undertaken pending the report of an estimate of the cost, and that he had suggested that arrangements be made looking to shutting down the Canal for this season, even to the point of disbanding the organization, such as locktenders, etc."

"I talked briefly with Mr. Shriver a few days ago about the general outlook, and told him that Andrews had told me that he did not see how he could ship any coal this summer even to Williamsport, and that he was considering the sale of the mules and expected to take up with you in a short time."

"We have now undoubtedly reached a point where we have got to come to some final conclusion, and I would like to have a talk with you before I make an engagement for both of us to go over the whole matter with Mr. Shriver."

[202] H. R. Preston, Law Department, Baltimore and Ohio Railroad, to G. L. Nicolson, General Manager, 23 June 1924 (Flood-May 1924)

This letter asks for amount of money it would take to run the canal.

"Will you also give me a statement based on keeping only supervisors and dredgemen to patrol the property . . ."

[202] H.R. Preston, Law Department, Baltimore and Ohio Railroad, to J. C. Shriver, Cumberland, 24 June 1924 (Flood-May 1924, Flood Damage Prevention-Accomplished, Sustainability-Embankments)

This was a report to Mr. Shriver as to the condition of the Canal Company and the potential of its closing.

"The breaks in the Canal have practically all been restored. It was necessary to do this work, because if they were left in case of ordinary high water these breaks might be so enlarged as to very greatly increase the expense of restoring the Canal."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 26 June 1924 (Flood-May 1924, Sustainability-Dams)

"In reply to yours of the 23rd as to the physical condition of the canal. While I have not yet been over the entire line, knowing the canal as well as I do and from reports received from the Supervisors, I feel perfectly safe in writing as follows: The main and largest breaches have been repaired but there still remain some minor washes through the top of tow-path and many miles of badly rough tow-path, the greater portion of which will carry a full level of water. There are a number of bars that will have to be removed prior to resumption of navigation."

"There is a section of bad cribbing on the lower side of Dam No. 6 near the W. Va. abutment. This should be repaired at this time and could probably be taken care of for \$2500. or \$3000. Should it be left to wash out, it is difficult to say to what extent the breach will go in this old crib work."

"The dam at Little Falls, from which water is taken for Georgetown Level (mill supply) is apparently pretty badly washed. While the river has not yet reached its low stage there is a shortage of water in Georgetown. This work will have to be begun immediately. This dam, as you know, is nothing but a pile of rock across the river from the point of High Island to Snake Island and thence to Virginia. The restoration of this will approximate \$2,000.00."

[202] G. L. Nicolson [?] to H. R. Preston, Trustee, 26 June 1924 (Flood-March/April 1924, Flood-May 1924)

Note: this letter of 26 June letter could be a rough draft of 27 June letter. It includes extensive figures for repairs and sheets from an accounting book indicating contractors costs and repair costs.

"I am enclosing herewith statement showing cost, actual and estimated, of repairs to the canal . . ."

"In looking over these figures keep in mind the fact that we have had three freshets, one the latter part of March, a moderate freshet about two weeks later and then in May. This last freshet (May) was the biggest freshet in the Potomac since 1889. The canal was about ready for water when the May freshet came, causing greater damage than the March freshet."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, Baltimore, 27 June 1924 (Flood-March/April 1924, Flood-May 1924)

". . . bet to say that it is almost impossible to give an accurate estimate of the cost of repairs to Dam at Little Falls (supply for Georgetown Level) on account of the stage of the river at the present time." Nicolson made an estimate for maintaining canal from Great Falls to Washington with a deficit of \$98,357.48 for the year.

[202] G. L. Nicolson, General Manager, to Mr. Helmer, General Manager, N. & G. Taylor Company, 23 July 1924 (Flood-March/April 1924, Flood-May 1924)

This letter concerns a bill for the repair of the Guard Bank at Cumberland Dam. It appears from other letters that the Taylor Co., Potomac Edison, and Kelly-Springfield was responsible for 40% of the bill for repairs, and the city of Cumberland paid \$3000.

[CF] The Evening Star (Washington, D.C.), 10 August 1924, 22 (Flood-May 1924)

"Floods Put End To Famous Canal" The Star writes the obituary of the C&O Canal as a functioning waterway.

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 12 August 1924 (Flood-May 1924, Widewater-Sustainability)

"Sunday night there was a big washout in the canal at the foot of the Wide Water (Log Walls) taking out a part of the break that was recently put in. When these repairs were made in June and the water turned in a small leak showed up, coming out almost down at the river. This leak was of no great volume and ran intermittently clear and muddy, sometimes an increased flow and then again hardly any water passing. We took the water off the level in an endeavor to locate the outlet from the canal but we were unable to find it. The water was put back in the canal and a few days later there was a slight increase in the flow, at which time we found a small hole in the berm bank, which was filled, and the water almost entirely stopped. It remained in this



condition for a number of days. During the whole time it would run intermittently muddy and clear, indicating that there was material dropping in the stream, which, of course, was creating a cavity in the banks. There was a heavy rock fill and dry wall back of this bank and no one dreamed that it would wash out from such a leak as we had. It has been about seven weeks since the water was turned in after repairs to the break due to the May flood. It is a serious washout and will take some time to properly repair and I guess it will cost in the neighborhood of \$15,000. However, I am going to get a bid from one or two people, if possible, to submit to you within the next few days. The McLean Contracting Company are on the ground and I presume will be glad to undertake to do the work upon completion of their Government contract, about October 1st. In the meantime we could be placing some stone in the wall and rock fill and not interfere with their present contract operation."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 20 August 1924 (Flood-May 1924, Widewater-Sustainability)

"I have been over the matter of repairs to breach in the canal at the Log Walls, below Great Falls, with the McLean Contracting Company and have this morning a letter from them . . ."

"There is approximately between seven and eight thousand yards of material to be moved, a major portion of which can be rock and a large portion of this can be thrown into the bottom of the breach by blasting, removing it from the cliff."

"Personally, I think the estimate is full as we can certainly put that fill in for \$2.00 per cubic yard."

[CF] The Evening Star (Washington, D.C.), 20 November 1924, 27 (Flood-May 1924)

"Canal To Operate Again Next Year" In what has to be an erroneous report, the Star claims the canal company will repair the damage from the 1924 floods and open the canal for operation on April 1, 1925.

#### 1925

[CF] Frank Moore Colby and Herbert Treadwell Wade, eds., The New International Year Book: A Compendium of the World's Progress for the Year 1924 (New York: Dodd, Mead and Company, 1937), 249 (Flood-May 1924)

"In May, 1924, the Potomac and its upper tributaries, especially the Shenandoah, experienced high water resulting in considerable damage of a minor character mostly to riverside houses and to a few highway bridges. The flood was of a limited duration, and while it did reach a high point giving concern at Washington, the peak quickly passed without serious trouble; in fact on several occasions, notably the great freshet of 1889, the high water stage of the Potomac had been exceeded. In 1924, however, there was no flooding in Washington, except where there had been encroachments of the river banks, and no backing up of sewers."

[Brown] Report of the Surviving Trustees, George A. Colston and Herbert R. Preston, 4 February 1925 (Flood-March/April 1924, Flood-May 1924)

"In the Spring of 1924 there occurred freshets in the River, which involved considerable expenditure for the restoration of the Canal, which were made, and the Canal prepared for operation. The continuance of depression in the coal business made it inadvisable to operate the Canal except in a limited way for traffic other than coal, and consequently there was a very small amount of operating revenue received. The Canal, its dams and locks have been maintained, and the flood damage repaired except as to one or two places which did not require a great expenditure, the repair of which has been postponed, so that the Canal is in condition to be put into operation without considerable expenditure as soon as a recovery in the coal trade warrants it."

[CF] The Evening Star (Washington, D.C.), 10 February 1925, 1 (Flood-February 1925)

"Potomac Flood Feared." Star reports the Potomac river is out of its banks due to melting snow and rain. No mention made of the canal.

[CF] The Evening Star (Washington, D.C.), 12 February 1925, 38 (Flood-February 1925)

"River Rise Beneficial." Article indicates high waters carry off river ice without it causing damage. No mention made of the canal.

[CF] The Evening Star (Washington, D.C.), 13 February 1925, 23 (Flood-February 1925)

"Potomac Up 12 Feet." The Star reports, "The towpath of the Chesapeake and Ohio Canal was being baldy washed by the waters of the river and it was feared much damage would be caused to this waterway."

[202] First National Bank, Cumberland, to G. L. Nicolson, General Manager, 25 May 1925 (Maintenance-Lack of Diligence)

". . . in reference to the repairs in the break of the tow-path above and below the dam, and to accomplish this a spur track was thrown in on the upper part of the tow path to carry material to fill these breaks. In grading up this spur the level of the tow path was raised five to six feet and in making the fill in that portion of the tow path adjacent to the three wells which are

connected with the intake water supply for . . . a considerable quantity of this fill ran into the wells . . ."

[202] Vice President, Potomac Edison Company, Hagerstown, to G. [?] F. Nicolson, 13 June 1925 (Easements-Flood Implications)

"I am in receipt of a letter directed to our General Superintendent at Cumberland from Mr. J. H. Kimball, Consulting and Flood Prevention Engineer of the city of Cumberland, in which he raises the question regarding some changes in the Dam at Cumberland in connection with taking care of high water. To change the level of the pool at Cumberland, would naturally involve our water supply for steam . . ."

"Personally I am rather dubious about having anybody put flood gates in the Dam, which is likely to be opened at some time through error or excitement and draw down the pool to such an extent to put us out of business . . ."

[202] G. L. Nicolson, General Manager, to C. M. Harris, Vice President, Potomac Edison Company, 15 June 1925 (Easements-Flood Implications)

"The question of changing the dam at Cumberland has not come to us yet. I do not believe that the dam had any effect on the extreme freshet heights. We will have to be shown pretty well before any changes are permitted."

[202] C. M. Harris, Vice President, Potomac Edison Company, to G. L. Nicolson, General Manager, 5 September 1925 (Sustainability-Dams)

"Due to the low water condition in the Potomac River, we made some investigations yesterday with Mr. Waesche relative to the leaks at Dam 4, and found the travel of all the leaks except one large "Boiler", by the use of permanganate potassium. This worked very successfully and gave very definite results."

[202] C. M. Harris, Vice President, Potomac Edison Company, to G. L. Nicolson, General Manager, 21 September 1925 (Sustainability-Dams)

"The day after you were up to Dam 4, the young man who was with us that day did some further experimenting, due to the river rising slightly and filling some of the holes between the old dam and the new dam, and located the course of water into the big 'Boiler', which we were unable to locate the day you were there, so it looks as though we have found the entrance of the water to this particular spot, and it seemed that all the water leaks between the two dams."

[Blueprint showing the location of the leaks at Dam No. 4. See Box 13, File 235, pt. 1.]

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 22 September 1925 (Sustainability-Tunnel)

"Mr. M. A. Long has just left the office. He, as you know, is the contractor for the Government conduit tunnel under the canal and canal property at the Great Falls. Messrs. Kefauver & Allen were the sub-contractors who started the work and got so badly behind that Mr. Long had to take the work over and complete it himself and, I understand, will have a considerable loss."

"Mr. Long advises that he has told you of a tremendous cavity caused by a slide in the tunnel coming through to the surface leaving a hopper probably fifty feet in diameter and from forty to forty-five feet deep. This cavity is in the canal land and is a portion that is a very desirable villa site in the future if ever the Potomac Water Development takes place. I had notified Major O'Connor, U. S. Engineer in charge, that the hole had to be filled and that we would be willing to permit them to use material off the canal land provided the surface was left in reasonable condition. Mr. Long states that he has explained the matter to you and that you were willing to leave the cavity remain."

[CF] The Evening Star (Washington, D.C.), 13 November 1925, 1 (Flood-November 1925)

"High Water Suspends Ferry At Cumberland" Article makes no mention of the canal.

[202] S. E. Fisher, Point of Rocks, to G. L. Nicolson, General Manager, 12 December 1925 (Miscellaneous, Harper's Ferry-Sustainability)

"The scow at Harpers Ferry is about sunk it will not take long to raise it."

"The worse trouble we will have is getting through the locks lock 34 has a good deal of sand in it I shouldt wonder if we dont have to scoop some of the sand out before we can open the lower gates lock 33 & 32 I dont think they will give much Trouble Please let me Know when Mr. James is ready to Began moving [or mowing??] as I will have to Put more water on levels"

1926

[CF] The Evening Star (Washington, D.C.), 31 January 1926, 6 (Flood-May 1924)

"Breaks In C. & O. Canal Repaired" Article reports that "all breaks in the historic and picturesque Chesapeake & Ohio Canal made during the freshet several years ago have been entirely repaired and the waterway is ready for use in short notice should business develop." This is evidently the beginning of the line maintained by B&O officials that the canal continued ready for operations, in order to forestall its sale by the court.

[CF] The Evening Star (Washington, D.C.), 4 February 1926, 8 (Miscellaneous)

Editorial laments the passing of the canal from operational use.

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 13 August 1926 (R)  
(IMaintenance-Dams)

"I am drawing on the Treasurer for \$5,000. to be applied on account of the new head gates for the Georgetown intake."

[CF] The Evening Star (Washington, D.C.), 20 August 1926, 1 (Flood-August 1926)

"River Rise Continues As Rains Set Record" The Star reports of apprehension of flooding around Hancock. No mention made of flooding on the canal.

[CF] The Evening Star (Washington, D.C.), 22 August 1926, 1-2 (Flood-August 1926)

"Gale Lashed Seas Sweep Ocean City; Hundreds Leave" Article mentions flooding on river at Alexandria, Hains Point, Hancock and Cumberland. No mention made of flooding of the canal.

[CF] The Evening Star (Washington, D.C.), 23 August 1926, 5 (Flood-August 1926)

"High-Water Now Believed Past" The Star does not mention the canal.

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 27 September 1926  
(Flood-September 1926, Sustainability-Culverts)

"Mr. J. Frank Wine, canal employee located on the Williamsport section, advises that the very heavy rain of a few days ago did quite a little damage to the canal at culvert about one mile below Dam No. 5 and also to culvert below Williamsport. From what he writes I take it that the culvert was not big enough to pass the water and the water ran over the bank cutting through the berm and tow-path at the culvert below Dam No. 5 and washed in the berm and put a lot of rock into the canal at culvert below Williamsport. I will do nothing unless you instruct me to make repairs."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 2 October 1926  
(Flood-September 1926, Sustainability-Culverts)

"The heavy rain of which I wrote you doing damage to two culverts on the Williamsport section also washed the berm banks on three other culverts, two on the Dam No. 4 Feeder Level and one at Sharpsburg and put some bars into the canal, but nothing very serious."

## 1927

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 13 January 1927 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

". . . regarding the situation on the W.Va. end of Dams Nos. 4 and 5."

"The Canal Company owns to the water line of the river for several miles above and below both Dams Nos. 4 and 5. At Dam No. 4 the rock bluff on the West Virginia shore came to the water line of the river and the abutment to the dam was built into and along this bluff. When the Martinsburg Power Company arranged with the Trustees to use the surplus water at Dam No. 4 they built their head gates above the canal dam and at right angles to the axis to the dam, taking down the bluff and building a curved forebay around the West Virginia end of the abutment leading to the power house situated below the line of the dam."

"At Dam No. 5 there was a family of Colstons who owned the shore line and land and they at that time operated one of the old fashioned country mills . . . An agreement was made whereby the Canal was to build a dam, pay for the flowage rights and to pay certain royalties for stone to be taken from the quarries located on the Colston land. The dam was built similarly to No. 4, only with a small forebay leading to the mill. Later on the mill was acquired and converted into a pulp mill that used a great deal more water than the original mill. This company apparently failed, at any rate it was absorbed by the Martinsburg Power Company who changed over from pulp to electric power. . . . Subsequent to this the Martinsburg Power Company built a new station, out and out, at which time they made considerable repairs to the dam, stopping a leak on the West

Virginia abutment and putting a new concrete top on the entire dam and building a similar arrangement at Dam No. 5 as at Dam No. 4."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 25 February 1927 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

Nicolson writes concerning the nature of Dam No. 1, at Little Falls. This dam was still of concern to the company, because it supplied water to the canal in Georgetown, and water power rents were the Company's major source of revenue after navigation on the canal halted after 1927.

"The dam at the Little Falls is nothing but a pile of stone at the head of the rapids which it is impossible to make tight. This dam varies from 2 to 5 feet high, approximately 1800 feet long. The river bed formation consists of large stones imbedded in smaller stones and gravel which, of course, will permit seepage of water through but in no considerable volume. It is believed that with a small dam of about 9 foot base on this river bed, just below the present dam, with a cinder and gravel fill, covered with rock between the concrete and present dam, would make it perfectly feasible to supply the present leases . . ."

"Something over twenty years ago we built a small section dam as an experiment at Seneca and this has stood the ice pushes and freshets with very slight damage up to the present time."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 18 March 1927 (Easements-Receiver)

"Information has come to me that the City of Cumberland has arranged to have a bill introduced and passed, during the last hours of the Maryland Legislature, empowering the City of Cumberland to condemn canal property, the railroad property and any other property needed in the carrying out of its contemplated flood prevention improvements at Cumberland. This information is confidential but from a very reliable source."

#### 1928

[202] H. R. Preston, Trustee and General Solicitor, to George M. Shriver, Senior Vice-President, 6 February 1928 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

Preston writes concerning Dam No. 1 at Little Falls.

"Mr. Nicolson has been urging a more permanent repair to the dam than the minor repairs which have to be put on each year. The present dam is merely a pile of stones from 2 to 5 feet high. This has to be repaired each year at a cost of \$1,000. to \$2,000. The suggestion is that the present dam be improved by putting in a tight dam of the same height just below the present dam with cinders and gravel fill, so as to make a tight dam rather than a very loose one, which we have a present."

[202] G. L. Nicolson, General Manager, to W. H. Brenizer, 26 March 1928 (I)

"I am enclosing herewith a blueprint for suggested sections for dam at Little Falls. I think it would be improved by a small quarter round at the downstream corner, where the curve joins the vertical. While the base of these sections is shown as 10", it is contemplated that they will vary from 6 to 12 or 13 inches, depending upon the profile of the bottom longitudinally with the dam. In other words, we will not vary the forms for a few inches variations in the bottom. My idea is that the average section will be about 4 ft."

Due to high water the work noted above was not to have been completed until the following season.

[202] Leander Schaidt, Civil Engineer and Surveyor, Cumberland, to G. L. Nicolson, General Manager, 30 April 1928 (Easements-Receiver, Flood Damage Prevention-Proposed, Sustainability-Waste Weirs)

". . . I herewith enclose application for permission to place fill on Canal Tow Path."

"Relative to the raising of gates at Canal Locks to keep flow of Wills Creek out at flood times and regarding the proposed back water gate on the main canal channel, and your suggestion as to a waste weir farther down the canal, would say, have started surveys for same and as soon as plans are completed will take these matters up with you. In the meantime I would appreciate the permission to make said fill along the Tow Path, as per request."

[202] Leander Schaidt, Civil Engineer and Surveyor, Cumberland, to G. L. Nicolson, General Manager, 30 April 1928 (Easements-Receiver, Flood Damage Prevention-Proposed)

"Referring to our conversation of Saturday the 28th. inst., relative to flood protection along the C. & O. Canal at Cumberland, Maryland, I hereby make application for permission to allow the City of Cumberland to make a fill on the C. & O. Canal Tow Path, to the height and in a manner as outlined to you, being an average depth of about 3 feet, extending from the Canal Locks and Dam at Cumberland down the Canal Tow Path to about or near Wileys Ford Road Bridge."

"In making this fill the material will be placed so as not to obstruct or lessen the capacity of the present channel of the Canal."

[CF] The Evening Star (Washington, D.C.), 30 April 1928, 1-2 (Flood-April/May 1928)

"Swollen Potomac Continues To Rise" Article discusses flooding in the vicinity of the district and around Williamsport. No mention made of the canal.

[CF] The Evening Star (Washington, D.C.), 1 May 1928, 23 (Flood-April/May 1928)

"Flood May Reach 8 Feet In District" Reports of flooding in the river below Hancock. No mention made of the canal.

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 2 May 1928 (Easements-Receiver, Flood Damage Prevention-Proposed)

"Saturday, April 28th, I was called on by Mr. Leander Schaidt, Special Flood Engineer, and Mr. Heskett, Counsel for the City of Cumberland, regarding certain work that the City of Cumberland desired to do on canal property to protect it against freshets."

"Mr. Schaidt's plan is to keep Wills Creek out of Cumberland by walls and embankments above its junction with North Branch and they desire to raise the canal tow-path embankment, running some distance below Cumberland. It means raising the masonry on the feeder lock and lift lock, above the R. R. crossing, and putting in new and higher gates. I suggested also that they would finish the started concrete work on the slope wall below the dam, which they agreed to do. As soon as this can be planned and mapped, one will be submitted. In the meantime I agreed with them that I would take the matter up with you and advise them of your decision. Their reason for early consideration is that they are excavating some good material up Wills Creek that they desire to use in raising the canal embankments below the dam."

"I recommend that you permit me to accept their proposal as I feel that the canal will be greatly benefitted by this change."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 2 May 1928 (Flood-April/May 1928)

"There is quite a freshet in the Potomac. It is over the canal at some points but so far I doubt that there is any material damage. . . . I will advise."

[CF] The Evening Star (Washington, D.C.), 2 May 1928, 5 (Flood-April/May 1928)

"Washington Flood Danger Is Passed" The Star indicates the Potomac will not overflow banks around Washington, D.C. No mention of flooding of the canal.

[202] S. E. Fisher, Point of Rocks, to G. L. Nicolson, General Manager, 4 May 1928 (D)

"I was over my Division and I find the damage very small. on 9 mile level below marble quarry top washed of towpath about 6 in deep and 35 or 40 feet long. on Eight mile level Below Edwards Ferry at red Hill Towpath washed about 6 or 7 in deep 25 or 30 yards long and a little wash at Rope Harbor can carry feel [?] level all the way Through to Seneca. things was much better than I Expected to find them it looked to me as there was 18 to 20 in water over the head of 9 mile level"

[CF] The Evening Star (Washington, D.C.), 4 May 1928, 2 (Flood-April/May 1928)

"Potomac Is Receding" No mention of the canal--the Star provides an aerial view of the flooding at Great Falls.

[CF] The Evening Star (Washington, D.C.), 22 June 1928, 17 (Flood-June 1928)

"Heavy Rains Threatens Flood" The article reports localized flooding in the Potomac Basin because of heavy rains. It makes no mention of the canal.

[202] G. L. Nicolson, General Manager, to Charles Z. Heskett, Attorney at Law, Cumberland, 17 July 1928 (Easements-Receiver)

". . . I have had a copy of the report of Mr. Waesche to the Potomac Edison Company on the effect to their Company of lowering the dam three feet. (Also, I have heard Mr. Roe's report to the Kelley-Springfield Co.) Mr. Waesche's report is based on the report of Mr. Kimball, the Consulting Engineer of Cumberland. This information was submitted to the Trustees and I am directed to say that they will not enter into an agreement with the City of Cumberland if such agreement is going to be injurious to the users of the water from the canal pool above Cumberland, viz: The Potomac Edison Company and the Kelley-Springfield Co."

[202] Leander Schaidt, Civil Engineer and Surveyor, Cumberland, to G. L. Nicolson, General Manager, 19 July 1928 (Easements-Receiver)

"Your letter dated July 17th to Mr. Chas. Z. Heskett, City Attorney, has been referred to me by Mr. Heskett, and wish to say that I am very much surprised at said letter."

"First, because I have never seen or hear of either Mr. Waesche or Mr. Roe's respective reports relative to lowering your Dam."

"Second, because they came to me for information relative to lowering of said Dam, which I freely

gave them, and"

"Third, they told me they wished to assist me in anyway they could regarding the problem of lowering the Dam, and at the same time devise a means of maintaining the present water level, and as yet I have not heard from either of them as to their views on the matter."

"However, we are still willing to abide by our agreement with you to lower the crest of the Dam 3 feet and put on flashboard or gates to maintain the present water level for the need of the C. & O. Canal."

"The Kelley-Springfield Tire Co. and the Potomac Edison Co. should have no bearing on our previous agreement with you, from which agreement we have gone ahead and let contract for part of the work which is now under construction."

"If the Kelley-Springfield Tire Co. and The Potomac Edison Co. have any objections to our lowering the Dam, they should so advise the City of Cumberland together with their reasons."

"Therefore, in all fairness to this City, Mr. Heskett, and myself, I ask that you fix up the suggested agreement as originally outlined."

[202] Charles Z. Heskett, Attorney at Law, Cumberland, to G. L. Nicolson, General Manager, 19 July 1928 (Easements-Receiver)

"The importance of maintaining the level of the pool in this dam because of its relationship to the operation of the Canal Company, and the needs of the Kelly-Springfield Tire Company, as well as the Potomac Edison Company, have been fully kept in mind during all of this program. We especially realize that nothing should be done to hamper the operations of so large and important an industry to Cumberland as the Kelly-Springfield Tire Company. For this reason, the Engineer of the City has been particularly cautioned that any changes in this dam must be such as to prevent injury to anyone."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 19 July 1928 (Sustainability-Dams)

"With this hot weather and season of the year we may expect early work on the dam at Little Falls. We are now delivering sand and gravel preparatory to beginning operations in the river . . ."

[202] G. L. Nicolson, General Manager, to Leander Schaidt, Consulting Engineer, Cumberland, 23 July 1928 (Easements-Receiver)

"I am rather surprised that you have not yet seen the report and claims of the Potomac Edison and Kelley-Springfield Companies as to the possible effect on them by lowering the crest of the dam three feet. These people claim possibly \$150,000 necessary outlay to protect them from injury. When the Trustees were advised of this condition they thought that the question must be settled between these interests and the City of Cumberland before they would be willing to execute the suggested agreement, as their position is to be neutral and do what is best for the community, which was the understanding had between you, Mr. Heskett and myself when the statement was made that the Trustees would do what was right and reasonable in considering the matter. This is still their position."

"As I understood Mr. Kinball, the Consulting Engineer for the City of Cumberland, the lowering of the dam three feet would reduce the level of the water in Wills Creek about twelve inches at the Western Maryland Bridge and about six inches at the B. & O. Bridge over Wills Creek. Would it not be much less expensive to raise the retaining wall along Wills Creek this one foot at the Western Maryland Bridge and six inches at the B. & O. Crossing, rather than lowering the crest of the dam and maintaining flashboards?"

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 23 July 1928 (Easements-Receiver)

"You will recall my visit to you soon after the City of Cumberland, through Mr. Heskett, Attorney, and Mr. Schaidt, called on me to discuss the flood question at Cumberland relative to raising the canal banks and lowering of the dam three feet, this three feet to be maintained by flashboards."

"I stated to Messrs. Schaidt and Heskett that I knew the Trustees would do what was right and reasonable in the premises, all things being considered, and at that time called their attention to the possible effect that lowering this dam might have on the Potomac Edison and Kelley-Springfield Companies. You consented to the raising of the canal embankments and modifications in the head walls of the locks, after which I wrote Mr. Schaidt, the engineer, advising him that he could proceed to do this work on the canal embankments provided that all the material deposited must be so placed as not to come within the canal section. Some time after this, Mr. Harris, of the Potomac Edison Company, sent me a copy of the report of his hydraulic engineer stating this it would probably cost the Potomac Edison Co. \$50,000 to \$75,000 to reconstruct their intake from the Potomac if the canal dam was lowered. the Kelley-Springfield Company claims about the same condition. When you heard this you advised me to notify them that

they must arrange with these people before the Canal would enter into an agreement with the City of Cumberland as to lowering the dam. Mr. Harris and his hydraulic engineer and Mr. Roe, of the Kelley-Springfield Company, came to see me on July 17th. After a conference with them I wrote Mr. Chas. Z. Heskett, City Attorney, as per copy of letter attached. I am this morning in receipt of the attached letter from Mr. Schaidt and attach hereto copy of my reply to him."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee. 28 July 1928  
(Easements-Receiver)

Concerning a meeting Nicolson attended in Cumberland with the Mayor, Potomac Edison Company, Kelley-Springfield Tire, City Attorney, City Engineer and Special Engineer for flood prevention concerning losses businesses would have if dam was lowered three feet.

Companies agreed to cooperate with city engineer "and try and devise some method by which these companies would be protected against the failure of water due to the operations of flashboards, etc."

"In conversation with the Mayor and the City Attorney, Mr. Heskett, I have come to the conclusion that our position in telling them not to touch the dam is looked upon with great favor. The Mayor stated, in open meeting, that none to the engineering experts had recommended lowering the dam, in fact he stated that the engineers had advised that modifying the dam would have a very small effect on the extreme flood heights and that the cost of making such a change would be really a waste of money."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 23 August 1928  
(Sustainability-Dams)

"I have yours of the 21st advising that the Court had approved your application in regard to the situation at the Little Falls."

"Owing to the continued rains, the stage of the river has been such that we have been unable to do anything up to this time and it is now so late that I think it would be unwise to undertake to do the work this fall. It is true that occasionally October is an exceptionally good month for this kind of work but as a general rule October would not permit the successful operation as we contemplate handling, therefore I think it had better go over until next summer. I have conferred with Mr. Brenizer, the contractor who is going to do the work, and he thinks this conclusion is wise."

"We have had to quarry considerable stone to fill in washoffs and breaks in the old dam but have been unable to complete the work on account of the stage of the river. It will have to be done certainly between now and late fall. It is a question of only a few days, having the stone ready on the river bank."

"We have delivered a certain amount of sand and gravel which, of course, will have to be paid for but it will not suffer any injury from storage and will be available for next year's operations."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 12 October 1928  
(Easements-Receiver)

"On my trip to Cumberland last Tuesday I met Dr. Koon, Mayor of Cumberland, on the train and had quite a talk with him about the flood prevention work in Cumberland. He stated that Mr. Waesche, the Hydraulic Engineer for Sanderson and Porter, who went with Mr. Harris and myself before the Mayor and Council some time ago, will be ready to make his report about this time. Mr. Koon is opposed to doing anything with the canal dam for the reason that their engineer reports that any modifications of this dam would have a very slight effect on the flood conditions. The public believes that the lowering of this dam would be very effective, regardless of the engineer's report, and he fears the Council may pass a resolution directing this work to be done to meet the public favor, as they see it. Mr. Koon does not wish to be quoted, but he hopes the Trustees will not permit any tampering with the dam as he feels it will be a waste of money and of no benefit."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 13 October 1928 (D)  
(Maintenance-Dredging)

"There has been an accumulation of bars on the Georgetown Level since 1924 and the very heavy rains of this summer made them so extensive as to make it necessary to put the dredge in operation and clean them out. ... Mr. Brenizer has not yet rendered his bill for labor and material for quarrying stone for the dam."

[202] G.L. Nicolson, General Manager, to H. R. Preston, Trustee, 22 October 1928 (Flood Damage Prevention-Proposed, Sustainability-Culverts)

"There is no doubt but what it would be advisable to run some water over this level and it would have been done but for the fact that, due to a cloudburst in September a year ago, the culvert was inadequate and the water ran across the canal at what is known as Charles' Mill, near the head of the Williamsport Level, causing a small break of which I talked to you and you thought it not advisable to repair at that time. It would probably cost \$1,000. to fix the break and stop a few leaks in this level in order to run water over it. It is too late to do anything this season but it might be well to plan to make this repair next spring in order to avoid this complication."

[202] C. M. Harris, Vice President, Potomac Edison Company, to G. L. Nicolson, General Manager, 25 October 1928 (Easements-Receiver)

In reference to the hearing held in Cumberland concerning the flood prevention program.

"Of course the great question involving the two industries, namely The Potomac Edison Company and the Kelly-Springfield Company, is the changing of the height of the Dam and use of flash boards, which both Companies very strenuously oppose on account of the difficulty in restoring flash boards after their destruction by high water."

"Mr. Waesche presented in brief the proposition of clearing away the obstruction on Smith Island and along the Maryland and West Virginia shores to high water line of all trees and underbrush which had been the question of holding lumber, buildings, trees and other materials which had always been washed down during high water times and helped to form a barrier for the free flow of the stream; in addition to this would involve dredging of some forty thousand feet of material between the head of Smith Island and the C.&O. Canal Dam."

"This was listened to with a great deal of interest by the Mayor and Commissioners, and believe it has done a great deal to put them to thinking of changing their plan of action at this time, as this will give them practically the same relief as changing the Dam and would have to be done sooner or later. Of course this also involves raising the tow path to keep the slack water out of the low ground which would reach back to Baltimore Street with a flood the same height as March 1924."

1929

[202] George S. Humphrey, Vice-President, Hagerstown, to Leander Schaidt, Civil Engineer and Surveyor, Cumberland, 12 January 1929 (Easements-Receiver)

"We have your letter of January 9, together with the general plan for extending the C. & O. Canal Company's Dam a distance of approximately one hundred feet (100') on the Ridgely end, and building into this extension six gates for flood control, as shown on the blue print, titled, "Situation Plan, C. & O. Canal Dam", dated December, 1928. We believe this installation will not jeopardize the electric service which we supply to Cumberland, and consequently we have no objection to it, provided of course, that the dam extension and gates are built with sufficient strength and with dependable means of operation, so that there will be no danger of the water level getting below the point where it has been established for many years."

"It seems to us that you have now found a very happy solution to this problem, since the installation of the gates will apparently do no one any harm, and yet will be of much more benefit in flood prevention than any other proposal that has come to our attention."

[202 ] G.L. Nicolson, General Manager, to H. R. Preston, Trustee, 14 January 1929 (I) (Easements-Receiver)

In reference to the flood prevention program under contemplation for Cumberland, "Mr. Schaidt, Engineer for the City, has gotten up a modification plan for the dam by extending its West Virginia end and putting in modern control gates which meets with the approval of the Potomac Edison Company and the Kelley-Springfield Co."

[202] Leander Schaidt, Special Flood Engineer, City of Cumberland, to G. L. Nicolson, General Manager, 15 January 1929 (Easements-Receiver)

"I herewith enclose Blue Print showing the location of the C. & O. Canal Dam at Cumberland, together with the proposed extension of said Dam on the West Virginia side thereof, which proposed extension of Dam is to be controlled with six Rack and Pinion Gates by overhead bridge and mechanism, details of which will be worked out as soon as possible."

[Letter followed by blueprints of the work to be done by Schaidt. See Box 8, file 83, pt. 1]

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 16 January 1929 (Easements-Receiver)

"Mr. Leander Schaidt, Special Flood Engineer for the City of Cumberland, makes application for approval of modification to the West Virginia end of the dam as indicated in red. Practically all of the land to be taken for this change belongs to the Canal Co. The extension to the dam is about 100 feet, occupied by flood gates and piers between the gates with an overhead bridge for operating the same. If this plan is properly constructed I can see no objection from the canal standpoint, provided the gates are tight and do not waste water. I understand the City of Cumberland stands ready to guarantee the Canal Co. against loss from any source whatever if their permission is given."

[202] John J. Shank, Wayne Laboratories, to the C&O Canal Company, 28 January 1929



(Easements-Receiver)

Mr. Shank had purchased fifteen acres on the river above Dam No. 4. He wanted to remodel the house and keep a small boat on the river. A stream enters the river at that point.

"The stream now enters the river by means of a culvert sufficiently large to get small boats under it. However, the space is not adequate for a larger boat. It is my hope that I could properly enlarge the present opening, build a new bridge or culvert so as to keep the towpath intact, and then have a basin in the stream on my property for dock facilities."

Nicolson responded that an engineer should look at the site before he would present the proposal to the Trustees.

[202] John J. Shank, Wayne Laboratories, to the C&O Canal Company, 2 February 1929  
(Easements-Receiver)

Shank wrote Nicolson back indicating he had already contacted an architect and engineer.

"As you will note, construction is permanent and of a nature such that the change will be an asset to the location. The walls will be concrete, the west side containing a stairway to the water for access to boats. The walls will become an integral part of the present towpath walls at the culvert which now are only dry-masonry walls. The basin proper is to be covered by a roof for weather protection and will be of such construction to carry chain hoists, etc, for handling boats. No change is contemplated to the towpath and culvert, other than to enlarge the opening from its present width of six (6) feet to ten (10) feet."

Nicolson granted permission, February 16, 1929, "for the proposed improvement at Charles' Mill on Big Slack Water has been submitted to the Trustees and I am this morning in receipt of their approval . . ."

"This must be of stone arch or reinforced concrete slab sufficiently strong to carry a ten ton load, the width not less than the present."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 6 February 1929  
(Easements-Receiver)

"A short time ago I had a letter from John J. Shank asking permission to increase the span of a culvert carrying the tow-path over a stream at Charles' mill, Big Slack Water, in order to provide an entrance for a power boat into his basin which he proposed to construct. I suggested that he have an engineer go over the location and submit a map showing what he desired and that I then could intelligently advise him. I am this morning in receipt of the attached letter and sketch. The old mill, with an overshot wheel, is on the right edge of the drawing. The tow-path is on the left edge, shown by tinted lines. The location of this is about three-quarters of the way up Big Slack Water from Guard Lock No. 4. The basin will be located partially on canal land, should say about two-thirds will be on canal property. There is no objection that I can see from an operating standpoint, it simply means putting in a ten foot span culvert instead of a six foot span. It is almost entirely rock excavation, so you can see that he contemplates spending quite a little money for a harbor for his power boat. There is no safe place on this slack water to keep boats of this type. In fact there is no other way for him to get to this property as it is not permitted to moor these boats along the tow-path."

[202] Leander Schaidt, Special Flood Engineer, City of Cumberland, to G. L. Nicolson, General Manager, 11 March 1929 (Easements-Receiver)

"... as only this morning I was instructed to go ahead and get my Plans and Specifications ready for the proposed raising of the Tow Path and dredging of the lower river; also for the proposed extension of the C. & O. Canal Dam by installing five gates on the West Virginia side of the Dam."

[Letter followed by blueprints of the work to be done by Schaidt. See Box 8, file 83, pt. 1]

[202] S. E. Fisher, Point of Rocks, to G.L. Nicolson, General Manager, 22 April 1929  
(Flood-April/May 1929)

"I was over my division and I found damages very light. small wash on 9 Below Marble quarry wide water and on 8 at Rope Harber. I drove over them. have good deal of drift in lock at Monocacy and Edwards Ferry from Point of Rock to Harpers Ferry there are few little washes on front of towpath."

"I had to move out River was 6 inches of Being in house."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 29 April 1929  
(Flood-April/May 1929)

"The recent freshet in the Potomac was over the canal in various places and in various depths from a few inches to as much as 12 feet but there was surprisingly little damage done. There are several small washes of from 1 to 2 feet deep, 12 to 15 feet long, across the tow-path and face of tow-path is washed off where water ran into the river. There is a break on the Hancock Level at Round Top Mountain. This break is reported as 35 feet long at the top and about 10 feet long at the bottom and below bottom of canal. Material is scarce at this place and it is a long haul."

I ordered a temporary stank, or small dam, across this breach to prevent the water running out and making it larger. There is damage to the lower side of dam at Dam No. 6. The river has been too high to inspect it. I am scheduled to go there Wednesday morning and will report on my return."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 2 May 1929 (Flood-April/May 1929, Sustainability-Dams)

"Yesterday I visited Dam No. 6 and the break in the canal at Round Top Mountain. The break is a small affair and it is absolutely necessary to put it in order to flush the canal as required by the Department of Health, State of Maryland [too prevent a overly stagnant canal from becoming a breeding ground for mosquitoes], so I gave instructions to our people to make repairs and fill up several other small top washes."

"There is about 60 ft. of the lower crib of Dam No. 6 out. This dam consists of a double line of cribs, as shown on the sketch at the lower corner of the letter. I do not know the exact width of the upper crib but think it is 26 ft. The lower crib is 24 ft. wide. The height of this dam varies with the height of the river bottom. It runs from approximately 20 ft. to, in extreme cases, I think about 30 ft. The section that is out is near the W. Va. end, almost adjacent to the section that we put in after the 1924 freshet. There is too much water running over the dam to make an accurate estimate, but from the action of the water falling over into the gap it would appear that the crib has gone to the bottom of the river, or thereabouts."

"P. T. Nolan, who owns a mill at Great Cacapon, can supply timbers for the crib work and deliver them on the river bank just above the dam at \$30.00 for the short pieces and \$35.00 for the longer ones, per 1000 feet."

"From what I saw, I would say it will cost between \$7500. and \$10,000 to replace the crib that has washed out."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 6 May 1929 (Flood-April/May 1929, Sustainability-Culverts)

"The night of the recent storm there was a tremendous rain in and around the Harpers Ferry District, so much so that a culvert under the canal near Sandy Hook blew up into the canal making a hole about 3 by 6 feet in the arch. I have instructed Mr. S. E. Fisher, the Supervisor, to put in a concrete plug which will cost but very little and will protect the culvert from destruction."

[202] F. G. Hoskins, Superintendent, B&O Railroad, Camden Station, Baltimore, to G. L. Nicolson, General Manager, 12 June 1929 (Flood-April/May 1929)

"Investigation has developed that subsequent to the recent heavy rain some of our local people at Brunswick cut several ditches directly thru the berm bank of the canal leading the water directly into the canal instead of carrying it along to the first underpass."

Arrangements were made to fill the ditches, completed July 31, 1929.

[202] G. L. Nicolson, General Manager, to Leander Schaidt, Special Flood Engineer, City of Cumberland, 8 June 1929 (Easements-Receiver)

"In looking over the plans for the flood prevention in Cumberland, I wonder what will be the result when the canal is equipped to keep out the river up to the top of the stop-lock at the steel mill and how long would it take the sewerage and surface drainage coming into the canal to fill the pool up to freshet level, and to what extent would this flood Cumberland?"

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 12 June 1929 (Flood-September 1927, Flood-April/May 1929, Sustainability-Culverts)

"Included in the water-way and tow-path item is \$620.00, of which \$382. covers the cost of repairing break near the head of Williamsport level, caused by the severe rain of September, 1927. It was necessary to put this break in, as heretofore explained, to meet the requirement of the Health Department of the State of Maryland, the flushing of the Williamsport Level."

"The sum of \$238, was spent repairing the culvert at Sandy Hook and moving drift, put into the canal by the freshet, in order to run water through the canal for flushing purposes and making repairs to the surface of tow-path to enable our representative on the Williamsport section to have an outlet."

"As verbally reported, the culvert under the canal a short distance below the crossing by the Cumberland Valley R. R., about two mile below Williamsport, is in serious condition. This culvert was evidently undermined by the severe storm of Sept., 1927. The damage was not indicated until after the freshet of this past spring when there was a fall-in in the middle of the canal. An inspection showed that the sidewalls were undermined but to what extent is not now shown as there was too much water in the culvert to determine when inspected. Enough was seen to know that it is serious and will probably cost from one to two thousand dollars to restore."

[202] Abel Wolman, Chief Engineer, State of Maryland, Department of Health, to G. L. Nicolson, General Manager, 14 June 1929 (Damage Prevention-Receiver)

"At a recent inspection of the section of the C. and O. canal which passes through Hancock, our

engineer reports that numerous pools of stagnant water were observed in the bed of the canal and the banks were very foul with refuse and sewage."

"As this condition should not be allowed to continue into the warm weather period, I am requesting your cooperation in forestalling the development of a more serious nuisance."

[202] G. L. Nicolson, General Manager, to Abel Wolman, Chief Engineer, Department of Health, State of Maryland, 17 June 1929 (Damage Prevention-Receiveers, Flood-April/May 1929)

"In reply to yours of June 14th, beg to state that a short time before we expected to turn the water in the canal on the Hancock Division, for flushing purposes, there came a considerable freshet in the Potomac which made a small break in the tow-path at Round Top Mountain. We have been delayed in repairing this due to the fact that the farmers were so busy that we could not get teams, but can now advise that repairs are about completed and that the water will be turned through the canal within the next few days."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 29 June 1929 (Flood-April/May 1929, Sustainability-Dams)

"I have been hoping that the Potomac would be low enough to make a thorough inspection of the trouble at Dam No. 6, but up to this time the river has been too high to get in under the dam. It can be done, of course, by spending some money, by putting a stop on the crest of the dam, but I did not feel that this expense would be justified."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 22 July 1929 (Flood-April/May 1929, Sustainability-Dams)

"I was at Dam No. 6 Saturday and was able to make a thorough inspection of the dam and regret to advise that the cost of replacement will be more than I first thought. As you know, this dam is very old and the timbers are in very bad condition."

"The breach in the lower crib is about 50 ft., all gone. On the Maryland side of the breach there is about 25 ft. that is so damaged that it will have to be taken down to the water level below the dam and rebuilt. About 40 ft. of the sheathing on the lower crib will have to be taken up and replaced. The river bottom is rough and very irregular in depth, running from 4 to 12 ft."

"Any estimate must be more or less of a guess. At any rate I think it will be not less than \$15,000 under the most favorable river conditions and can be materially increased in the event of any considerable rise in the river prior to completing the work."

"The timber in the lower face of the upper crib, exposed by the removal of the lower crib, shows a large amount of rotten timber, a strip about 3 ft. wide running across the entire opening showing the longitudinal logs almost entirely gone, leaving the stone filling exposed. Should there be a reasonably flush river, with any ice moving, I fear that this stone would be dislodged and cause a failure of the crib. I do not believe the dam would overturn from the water stresses. The two ends of the lower crib that are exposed are in an uneven state. The timbers should be cut off and some holes plugged and I believe that some temporary repairs could be made to protect the lower face of the upper crib across the opening at a cost of possibly \$1500., certainly not over \$2,000."

"If anything is going to be done we should begin work as soon as possible on account of the uncertainty of the river stage later in the year."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 23 August 1929 (Easements-Receiveers, Flood-April/May 1929, Sustainability-Dams)

"I was at Dam No. 6 yesterday and can report that repairs to the dam have been completed."

"I went from Dam No. 6 to Cumberland and found that the City had gotten in the foundation for the flood gates at the West Virginia end of the dam... They have just begun the removal of the irregularities in the river channel. They have one steam shovel and dinkey train . . ."

[202] Abel Wolman, Chief Engineer, State of Maryland, Department of Health, to G. L. Nicolson, General Manager, 5 September 1929 (Damage Prevention-Receiveers, Improvements-Unspecified)

"Our engineer who recently inspected conditions in the C. and O. canal, Williamsport . . . reports that there were approximately 2 feet of very foul stagnant water in the canal and that the old boats about which we have had several complaints have not been removed."

"The existing condition of the canal is a menace to the health and comfort of the citizens of Williamsport and we insist that it be immediately abated."

[202] G. L. Nicolson, General Manager, to T. W. Koon, Mayor, City of Cumberland, 7 September 1929 (Damage Prevention-Receiveers, Easements-Receiveers)

In reference to the Flood Prevention work that was underway: "I was in Cumberland yesterday and walked over the tow-path of the canal and regret to advise that the work was not being done in accordance with the agreement between the Trustees and you for the City of Cumberland."

"On my return trip I crossed the river and found Mr. Schaidt on the work on the W.Va. end of the

dam and a little later the contractor came. I went over the matter with both Mr. Schaidt and the contractor and told them that they were not doing the work according to agreement. They agreed that this was so and that they would discontinue this violation and correct what had been done contrary to the agreement."

[202] G. L. Nicolson, General Manager, to Leander Schaidt, Special Flood Engineer, City of Cumberland, 26 September 1929 (Damage Prevention-Receiver, Easements-Receiver)

In reference to a trip he had taken to Cumberland:

"I was disappointed to find so many boulders on the face of the slope next to the canal. There were more there on this visit than on my last visit. You understand these have all got to be removed. We cannot permit them to remain in a position where they will easily roll into the canal."

[202] H. R. Preston, Trustee, to G. L. Nicolson, General Manager, 5 October 1929 (Easements-Flood Implications)

"Mr. Martin J. O'Connell, Vice-President of the Harpers Ferry Paper Company, and Mr. Mish and Mr. Brown, attorneys for that Company, called on me today to ask what the attitude of the Trustees would be upon a proposition of the Paper Company to raise its dam at Harpers Ferry. I told them that I could not tell them anything about it until I knew what the proposition was. What they would want would be the right to flood a part of the Canal lands, but they had no idea of what the elevation of the proposed dam would be. I told them that the first step was to call on you and show you what their plans were. They said their engineers have not made any definite plans, but that next week they would come down to Washington and would call on you."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 19 October 1929 (Flood-October 1929, Sustainability-Dams)

"A short section of the lower crib at Dam No. 6, on the Maryland side of the breach that we made repairs to, broke out with the recent rise in the river."

If you will recall, I told you that there was a section that the lower face logs were practically all gone and had shown some movement when the former breach took place but that it was so much of a job to take it out and repair it that we did not attempt to do anything. Nothing can be done with this at this season of the year except at very heavy expense."

[202] Superintendent of Power, Potomac Edison Company, Hagerstown, to G.L. Nicolson, General Manager, 21 October 1929 (Easements-Receiver)

Requesting permission to install a 4 inch water line across the canal. Nicolson responded on October 23, 1929:

". . . that you desire to run a 4" water line across under the canal, about on line with your power line crossing below Steffey [?] & Finlay. I am satisfied that the Trustees will permit you to have such a line, properly installed, your Company to hold the Canal Company harmless of any damage that may accrue from such line."

"The conditions will require that the pipe be placed several feet below the canal and where it passes through the tow-path embankment to have two concrete cut-off walls, 8 or 10 ft. apart, and extending two feet from the pipe to prevent a water course following the pipe line. This to be put in with clay, properly tamped."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 28 October 1929 (Flood-October 1929, Sustainability-Culverts)

"The heavy rains of last week caused a considerable rise in the Potomac. The river got over the canal in a few places. At Sir John's Run, foot of the four mile level below the dam, there is a small breach on the berm side right over a road culvert and if not repaired may cause the loss of a portion of this culvert with the next material rise in the river, as I have ordered the Supervisor to repair the break. If this does not meet with your approval, kindly advise and I will take them off."

[202] Leander Schaidt, Special Flood Engineer, City of Cumberland, to G. L. Nicolson, General Manager, C&O Canal, 7 November 1929 (Easements-Receiver, Sustainability-Spillways)

"I have specified 2" Yellow Pine Lumber for sheeting on Gates at Spillway, Feeder Locks & Stop Gates on Tow Path at Cumberland, and the Contractor asked if he could substitute Chestnut instead of Yellow Pine."

[202] G. L. Nicolson, General Manager, to Leander Schaidt, Special Flood Engineer, City of Cumberland, 9 November 1929 (Easements-Receiver, Sustainability-Spillways)

"In reply to yours of the 7th in regard to substituting chestnut for yellow pine for sheathing on gates at spillway, beg to advise that chestnut will last longer than yellow pine, exposed to the weather, unless the pine is kept painted. It is not quite as strong but if it is to be used for stops on the openings at the spillway I think it is sufficiently strong to serve the purpose."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 11 December 1929 (Improvements-Unspecified, Sustainability-Dams)

"Yesterday I had an interview with the Vice President of the West-Penn Co., who was brought here by Mr. Lewis, the Potomac Edison representative at Hagerstown. They are very desirous of strengthening their position at Dam Nos 4 and 5."

Does this mean improving the dams or taking more control of the structures from the canal company?

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 13 December 1929 (Sustainability-Culverts, Sustainability-Dams)

"Repairs to Dams, \$2,479,24, is the bill of Brenizer for quarrying stone and labor furnished working on Little Falls Dam, Feeder for the Georgetown Level."

"An extra amount of \$210.50 in the payroll of Mr. Hassett for putting in break opposite of Sir John's Run."

### 1930

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 15 January 1930 (Sustainability-Dams)

"In the item of Dams. There was something slightly over \$1500. spent on Dam No. 6. The other Dam expense is Little Falls, supplying the Georgetown Level."

[202] G.L. Nicolson, General Manager, to H. R. Preston, Trustee, 15 January 1930 (Miscellaneous)

"Examining the minutes of the Canal Company from 1831 to 1833, I find two resolutions as per copies attached. I have an appointment with Mr. Hamilton for tomorrow afternoon and I shall get him to find out if there is any record at the War Department mentioning the arrangement between the canal and the Government as to the dam at Harpers Ferry."

"The statement that I made to you to the effect that Canal Company employees dumped stone into the intake at Harpers Ferry plant was a statement from former employees of the Canal Co. and not in official records that I have ever seen."

[202] Brehon Somervell, Major, Corps of Engineers, District Engineer, to G. L. Nicolson, General Manager, 23 April 1930 (Easements-Receiver, Flood Damage Prevention-Proposed, Sustainability-Dams)

"A pencil copy of a small drawing showing the construction of proposed flash boards on top of Great Falls Dam is inclosed herewith."

"This drawing shows the maximum proposed height of three feet for the flash boards and they have been designed to fail when the water reaches a level of six feet above the crest of the dam."

"The present intention of this office is to put in the flash boards only one foot high and try this out for a few months or perhaps a year to determine the benefit of this increase in height. The one foot flash boards are so low that they are not intended to fail when the water rises."

"It is possible that next year a height of flash boards of two feet will be tried out. These boards would be held in place with two-inch standard pipe which would fail when a crest of approximately six feet above the dam was attained."

[202] G. L. Nicolson, General Manager, to Major Brehon Somervell, Corps of Engineers 6 May 1930 (Easements-Receiver, Flood Damage Prevention-Proposed, Sustainability-Dams)

"At a recent interview we discussed the position of the Canal in the premises and its legal right to protect itself against any modification in construction or increase in the height of the dam which would injure the canal or lessen the flow of water over the dam at low stages of the river; this position being based on a legal conclusion heretofore recognized by your Department."

"It is, however, the wish of the Trustees of the Company to comply with the wishes of your Department as far as possible and when they are not detrimental. They would be willing to permit the placing of a flash board one foot high on said dam to be removed if it is demonstrated that it does interfere with our conditions and also that any damage caused by this increase in height will be borne and paid for by the Government, and provided further it is understood and made a

matter of agreement that the Canal's consent does not in any way prejudice its legal rights in the premises."

"Any increase over the one foot raise now suggested in the flash board will be considered as a new proposition in the light of the year's experiment."

[202] Mayor and Council of Glen Echo, to C&O Canal Company, 6 May 1930 (Damage Prevention-Receiver, Easements-Receiver)

These official request that water be allowed to flow on the level to remove stagnant water.

It is followed by a letter from Nicolson to the Clerk of Glen Echo that a sufficient amount of water was flowing in the canal and "If the Town Council would prohibit the sewerage discharge into the canal, the nuisance complained of would not exist."

[202] Superintendent of Power, Potomac Edison Company, Hagerstown, to G. L. Nicolson, General Manager, 1 August 1930 (Sustainability-Dams)

"Wishing to explore and plot the leaks below the dam at Dam No. 4, we would appreciate very much to be advised if you have in your possession any drawing or sketch showing the construction and especially the base foundations at Dam No. 4."

Nicolson replied on August 7, 1930, stating that he did not have any information as to the construction of Dam No. 4 and that the river was lower than it had been for a great many years.

[202] Superintendent of Power, Potomac Edison Company, Hagerstown, to G. L. Nicolson, General Manager, 10 September 1930 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"The leakage in the end wall and main dam wall at Dam No. 4 seems to be increasing considerably, especially in the end wall. During the present drought we drew down the river to a point where it was possible to do some exploring below the dam to ascertain what formation and size the crevices were from which the water was spouting, with the idea in view of collecting some data in regard to the possibility of making repairs at some future time.

"Today we have had Mr. George W. Christians, Hydraulic Engineer, from Chattanooga, Tennessee, who heads up the American Asphalt Grouting Company, spend the day here and at Dam 4. He made a very minute inspection of the dam, the source of leakage and expressed his opinion that the leakage could be very easily stopped. His suggested method to stop this leakage is by driving holes down through the dam wall and forcing asphalt, which is kept hot, under pressure into the crevices and allowed to chill."

Nicolson replied on September 12, 1930, that he had seen this used before and approved of it.

[Literature can be found in, Box 13, file 235 pt. 2. Consists of advertisements and articles from professional journals]

[202] American Asphalt Grouting Company, Chattanooga, Tenn., to G. L. Nicolson, General Manager, 13 September 1930 (Flood Damage Prevention-Proposed, Sustainability-Dams)

This letter is in reference to the leaks at Dam No. 4.

"While the leakage is very considerable, there appears to be none that cannot be stopped very readily by means of Asphalt Grouting."

"Most of the dam makes good connection with sound foundation rock, but there are isolated points of faulty connection apparently due to fissures near the surface of the rock. These have resulted in groups of leak outlets at these points which discharge large amounts of water. At several points the dam has settled and serious weakness had developed. This condition is not likely to get better but is more apt to get worse and may possibly result in failure."

"To stop the leakage it will be necessary to drill holes at least 2" in diameter down from the top of the dam to intercept the leakage under the dam near the upstream face. Electrically heated Asphalt Grout pipes are then installed and hot fluid asphalt pumped down under pressure into the water passage. As soon as the hot asphalt touches the water it congeals on the outside, immediately forming a tough enclosing membrane which resists the flowing stream of water. By controlling the rate of flow and the temperature the semifluid mass of asphalt is expanded until it completely fills the cavity and stops the flow of water."

"The large leakage at the east wing wall can be stopped by a line of about six holes between the end of the dam and the earth dike of the canal."

"The present dry season would have been an ideal time to have done this work but we believe it can be done almost any time by installing a light cofferdam or flashboard on top of the present dam to protect the working place during normal river flow."

"We estimate that to stop the leakage about thirty-four holes averaging 37' or a total of 1280 lineal feet.; and that about 400 drums or 100 tons of asphalt will be required; and that the job can be done in about fifty days' work."

"Utilizing the canal companies labor the estimate was \$15,120.00. Utilizing the Grouting companies labor the estimate was \$25,000.00."

From information found in another file the bid obtained for grouting the leaks was prohibitive, and the work was not completed.

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 17 September 1930  
(Easements-Flood Implications, Easements-Receiver, Sustainability-Dams)

"The only point that I raise any question about is the statement regarding Little Falls Dam. While we have had increased expense since the Government diversion, we have not yet undertaken the construction work which is contemplated and when done will produce more revenue for the reason that we can supply more water. At the last conference with you on the subject of this improvement, it was considered best to await the final decision of the Federal Power Commission on the application before them for the Potomac Development." It is unknown whether this work was completed.

[202] Mr. [?] Lewis, Superintendent of Power, Potomac Edison Company, Hagerstown, to G. L. Nicolson, General Manager, 22 September 1930 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"The question of the excessive leakage at Dam #4 is giving us some concern." Christians had sent Nicolson an estimate.

"The leakage on the Maryland side seems to be getting greater all the time and no doubt if it is left to continue, sooner or later a total collapse of the abutment will take place. As we have considerable money invested in the generating plant the failure of the dam putting this plant completely out of commission would be somewhat of an embarrassment to us, as well as the loss of some source of income to your company."

Due to Lewis' illness the matter was allowed to lie.

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 31 October 1930 (Flood Damage Prevention-Proposed, Sustainability-Dams, Harper's Ferry-Sustainability)

This letter is in reference to a series of letters written concerning the ownership of the Harpers Ferry Dam located on the Potomac north of lower town.

"It is my opinion that the Government did nothing on the Maryland shore at Harpers Ferry Dam beyond connecting their crib work with the rock ledges at about 150 feet from the present river side of canal bank. Of course, the canal was not built at that time and the ledges evidently went further in. In fact, I think the canal had to excavate through these ledges for the water-way. The stone wall protecting the canal bank was built by the Trustees, under my direction, after one of the freshets which took out the canal bank. Prior to that time it was simply an ordinary fill with a few rocks on the slope."

#### 1931

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 14 January 1931  
(Maintenance-General)

"In 1930 we had extra expenses for dredging the Cumberland Basin, dredging the Georgetown Level and repairs to Dam No. 6 and an increased expense at Little Falls Dam, supplying the Georgetown Level, over the previous year, a total of \$3797.75."

[202] Charles S. Moore, to G. L. Nicolson, General Manager, 19 March 1931 (Damage Prevention-Receiver)

This letter concerns a resolution passed by the city of Glen Echo requesting that the Canal Company allow water to flow in the canal to eliminate stagnant water.

It was followed by a letter, March 21, from Nicolson which states that he had been trying for years to get the city to eliminate the dumping of sewage into the canal, 13 outlets into the canal, and had gotten no where. That the canal company maintained a flow of water from late April until frost which moved faster than the river during the summer which kept stagnant pools from forming.

The problem of sewerage in the canal at Glen Echo was continually a problem into 1933.

[202] Mr. [?] Lewis, Superintendent of Power, Potomac Edison Company, Hagerstown, to G. L. Nicolson, General Manager, 22 April 1931 (Flood Damage Prevention-Proposed, Sustainability-Dams)

Lewis had attended a meeting of the Upper Potomac River Board in Cumberland where it was predicted that they would have a very dry summer.

He addressed this letter to Nicolson to point out that a decision had not been made yet as to the repair of Dam No. 4 and that the abutment on the Maryland side was getting worse. "In view of the prediction of a low flow summer it might be well for all parties concerned to give this matter some thought at this time as undoubtedly the settling of the masonry in the dam wall on the

Maryland side is getting such that we feel that it might be giving you some concern, as well as ourselves, from the standpoint of available generation at this point."

[202] G. W. Burgan, Sharpsburg, to G. L. Nicolson, General Manager, 18 July 1931 (Flood-July 1931, Sustainability-Culverts)

"I am enclosing herewith views of the culvert at Sharpsburg landing showing damage done by the large rain of last week, I am ready to pour concrete Monday the 20th."

[5 small photographs of the culvert in Box 1, File 1931 - 1938]

[202] G. W. Burgan, Sharpsburg, to G. L. Nicolson, General Manager, 27 July 1931 (Flood-July 1931, Sustainability-Culverts)

"I have the culvert completed at Sharpsburg landing. Do you want the large cavity filled in on the culvert? There is but very little of the burm bank standing, another large rain would take it all out, as there is only 2ft of bank left standing."

"Should you want the fill put in I can get material off burm slope, can put three or four men and wheel it in in a week."

[Note: found in Box 1, File 1931 - 1938, 5 photos]

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 14 August 1931 (Flood-July 1931, Sustainability-Culverts)

This letter is in reference to the General Balance Sheet:

"The increase in Water Way and Tow Path is due chiefly to the repairs made necessary on the culvert at Sharpsburg on account of the abnormally heavy rain that washed out the foundations of the side walls in the body of the culvert under the canal section and the foundation of the river end and wing walls. The damage turned out to be more extensive than was at first reported due to the fact that the water had not been drained out and the extent of the damage could not be determined in the preliminary report. It exceeded the estimate by about \$150.00. Had the work not been done the culvert would have fallen in the course of time and would have cost several thousands to replace."

[202] Abel Wolman, Chief Engineer, State of Maryland, Department of Health, to G. L. Nicolson, General Manager, 5 October 1931 (Damage Prevention-Receiveers)

". . . conditions in the . . . canal in Hancock . . . in which it is alleged, that the canal holds approximately two feet of water, standing stagnant and filthy."

"After years of contact with your company in connection with this question and the problems in sanitation arising therefrom, I had conceived the idea that you had agreed to attempt to remedy or control conditions . . . by periodical flushing."

[202] G. L. Nicolson, General Manager, to Abel Wolman, Chief Engineer, Department of Health, State of Maryland, 9 October 1931 (Damage Prevention-Receiveers)

". . . for a few days the water in the canal at Hancock was stagnant, due to the drop in the river and lack of water at Dam No. 6, but that condition has passed and water is now going through the canal as usual."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 4 November 1931 (D) (Flood Damage Prevention-Proposed, Sustainability-Dams)

"We have bills in for work at Dam No. 6. The cost for repairs made was approximately \$1134.00. We were fortunate in having good weather and low water while make the repairs."

"You will recall, from the pictures shown you, that several tiers of timbers were gone and also face of upper crib which is exposed due to the fact that the lower crib had washed out. We filled in this vacant space, where the timbers had gone out, with good heavy timbers and tied in, as well as possible, to the existing timbers and refilled the dam with stone. In one section of the dam, for about 25 feet, the stone filling had almost entirely disappeared and I believe, without any question of doubt, that had repairs not been made the dam would have gone out before next spring. This dam is very old and the timbers are in very bad condition. However, we hope that the repairs will make it safe against normal conditions."

## 1932

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 15 January 1932 (Easements-Flood Implications, Flood-February 1897, Flood-February 1902)



In reference to the sale of property at one end of the Harpers Ferry Dam to the Harpers Ferry Paper Company (of which there is a series of letters in file 80 pt. 7 and 8):

"I have yours of the 14th enclosing attached blue print and deed from the Trustees of the Chesapeake & Ohio Canal to the Harpers Ferry Paper Company for a portion of the canal bank and river front beginning at the intake lock and running thence down the canal over 1000 ft. to a point below the abutment to the unfinished dam known as the New Government Dam."

"In the deed it is stipulated that the dam will be maintained to its present elevation but not limited to the present elevation. If the canal is to be operated or maintained it would be very serious to have this dam raised as it would subject the canal to submergence with much less freshets than under present conditions."

"I do not see why the Trustees should give them over 1000 ft when a couple of hundred feet would be all that is necessary."

"P. S. I enclose a pencil tracing of the canal property map. This map was made in the 90's and the freshets of 1897 and 1902 changed the river lines to the present lines shown on the blue print. If you put the tracing over the blue print you will see that there are some variations in the drawings."

[202] G. L. Nicolson, General Manager, to H.R. Preston, Trustee, 16 January 1932  
(Maintenance-General, Sustainability-Dams)

This letter is in reference to the General Balance Sheet:

"There was very little work required to be done on the dam at the Little Falls, supplying water for the Georgetown Level. There was, however, quite a considerable amount spent on Dam No. 6."

[202] H. R. Preston, Trustee, to G. L. Nicolson, General Manager, 23 February 1932  
(Easements-Flood Implications)

In the sale agreement with the Harpers Ferry Paper Company the Canal Co. reserved the right to maintain the guard bank and to protect the walls "as now constructed" and required the Paper Company to maintain the dam at its current height.

[202] W. M. Reynolds, to G. L. Nicholson, 13 May [1932] [Telegram] (Flood-May 1932)

"River has raised seventeen feet at Harpers Ferry"

[CF] The Evening Star (Washington, D.C.), 13 May 1932, A1 (Flood-May 1932)

"River Threatens To Leave Banks" Article describes rising water on the Potomac. No mention of the canal.

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 14 May 1932 (Flood-May 1932)

"Due to the heavy rains the first four days of the past week, we have a considerable freshet in the Potomac this morning. While we do not anticipate any serious damage, we will be unable to tell until the water has fallen and our men have had an opportunity to go over the canal."

[CF] The Evening Star (Washington, D.C.), 14 May 1932, A1 (Flood-May 1932)

"Potomac In Flood; Families Routed" Article reported that the river "was so high at several places," between Key Bridge and Great Falls, "that it covered all the ground between the normal bank on the District or Maryland side and the old Chesapeake & Ohio Canal."

[CF] The Evening Star (Washington, D.C.), 15 May 1932, A1 (Flood-May 1932)

"Potomac Receding After Steady Rise" Article reports, "the flood caused more inconvenience than property damage." No mention of the canal.

[202] S. E. Fisher, Point of Rocks, to G. L. Nicolson, General Manager, 17 May 1932 (Flood-May 1932)

"I am writing you In regards to condition of things on my section everything ok there were 3 feet of water over the head of nine mile level there are a great deal of drift in the Monocacy lock which I am clearing out. I did not have to move out the water was in my yard."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 17 May 1932 (Flood-May 1932, Sustainability-Culverts)

"The freshet has subsided and we have heard from the upper end of the canal and there is no serious damage. There is, however, a break at the foot of the Four Mile Level, Dam No. 6. It will probably cost from \$200. to \$250. to repair it and I have ordered the work to be done as soon as possible. This break is at a culvert, all with made ground, and if not repaired would probably result in a very serious situation for the reason that any water that comes in the four mile level would go out through this opening."

[202] G. L. Nicolson, General Manager, to A. H. Horton, District Engineer, U.S. Geological

Survey, Washington, D.C., 25 May 1932 (Flood-May 1932)

"The water at Seneca has been cut off pending repairing a breach in the canal about four miles above Great Falls."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 14 June 1932 (Flood-May 1932, Easements-Flood Implications)

In reference to the General Balance Sheet:

"You will note an increase in Waterway and Towpath of \$331.45. This is due to the cost of putting in the break opposite Sir Johns Run and the one between Seneca and the Great Falls. The latter was a washout where the Natural Gas Company's line crosses the canal and, I believe, was due to defective replacement of their excavation. They were notified to this effect at the time the work was done for the reason that they gave us no opportunity to have an Inspector on the job, as was agreed. We have billed them for the cost of restoration in the amount of \$287.18 ..."

[Brown] Report of the Surviving Trustees, Herbert R. Preston and George A. Colston, 27 June 1932 (Maintenance-General)

"The Trustees have made only such expenditures as were necessary to prevent serious depreciation in the Canal, and have repaired several small breaks in the Canal, which did not involve serious cost, and which if not repaired might later lead to much more serious breaks."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 26 July 1932 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Yesterday, I was at Dam No. 6, the first opportunity I have had to see it with the water off this season. We had two pretty big freshets earlier in the season. No damage was done to the sections that we had repaired last summer and the summer before. These repairs were on the lower face of the upstream crib (the dam being composed of two lines of cribs). There was, however, some damage done to the exposed ends of the lower crib. This entire structure is in very bad condition but under existing circumstances I do not believe that it is wise to make repairs at the present time. There is no doubt that in the event of a big river, or ice freshet, there will be some damage on each end of the lower crib, but to go there now and cut it out and replace it will involve more money than I feel inclined to recommend spending. Materials and labor are cheap; labor, in the vicinity of Hancock, \$1.00 to \$1.25 per day of ten hours and employers are charging \$.15 for transportation in and out."

[202] H. R. Preston, Trustee, to G. L. Nicolson, General Manager, 28 July 1932 (Flood Damage Prevention-Proposed, Sustainability-Dams)

". . . I agree with you that we do not want to spend any money that we do not have to spend, and in spite of the fact that something might happen to Dam No. 6 I think we should take that risk rather than undertake any work now."

[202] Abel Wolman, Chief Engineer, State of Maryland, Department of Health, to G. L. Nicolson, General Manager, 18 August 1932 (Damage Prevention-Receiveers)

"We are in receipt of complaints concerning the condition of the ...Canal Company's property at Cumberland."

"Our investigation shows that a considerable amount of wastes apparently from the Footer's dyeing and cleaning plant together with sewage from Cumberland properties are allowed to pool in the canal. The condition is such as to cause a menace to health. We wish to request that you take such means as may be necessary to correct this condition."

"We feel that greater attention should be given to keeping the entire canal bed in better condition."

[202] G. L. Nicolson, General Manager, to Abel Wolman, Chief Engineer, Department of Health, State of Maryland, 20 August 1932 (Damage Prevention-Receiveers)

In reference to problems at Cumberland from dye plant, Nicolson stated that the conditions at Cumberland had been bad for several years and they had been unable to get help from the city to clean it up. "We keep a certain amount of water running into the canal and out over the over-flow at the lower end of the Basin in order to keep it as sanitary as circumstances will permit."

"Isn't there some way that your Department can aid us . . . ?"

Wolman responded on 26 August that one of their engineers would inspect the situation and report.

This is an ongoing problem during this time period.

Nicolson wrote Wolman on August 27, 1932, stating that the Potomac was low at Cumberland. Dam No. 6 leaked and the water from the river was not running into the canal. Hence, there might be complaints from Hancock due to stagnant water. "It is very difficult to drain the canal bottom dry and do away with any pools in the bottom... therefore, I request that you advise what

treatment we can give the water . . .to make it satisfactory from a health standpoint. I know oil will prevent mosquitos."

Wolman replied on September 3, 1932, stating that the "use of calcium hypochlorite will be of advantage in controlling odors. I should suggest for this purpose that HTH or Perchlaron be used."

Wolman wrote again on August 4, 1934, stating that there had been complaints about weeds and stagnant water in Hancock and would the canal company take care of it.

Wolman wrote on April 29, 1935, concerning draining the canal in the Hancock area to avoid mosquito breeding.

Nicolson had two outlets opened in a culvert at Hancock to drain the canal in May, 1935.

[202] Mr. Lewis, Superintendent of Power, Potomac Edison Company, Hagerstown, to G. L. Nicolson, General Manager, 20 August 1932 (Sustainability-Dams)

"During a recent visit to Cumberland I was advised that considerable washing is taking place under the concrete apron which projects upstream a short distance above the recently installed flood gates at the Cumberland Dam."

". . . that you will give this situation a looking over as it may be working out to the detriment of the masonry of the dam. The Kelly-Springfield and Potomac Edison Companies are more vitally interested in it than any of the other industries located above the dam. We would hate to see this condition continuing with the possibility that it would lower the water height. . . . possibly your close connection with the city government may be of some use in bringing the matter to their attention . . ."

Nicolson replied on August 22, 1932, stating that he had seen the foundations for the apron and that there probably was not any danger of undermining.

Nicolson wrote a letter to the Mayor of Cumberland on August 27 regarding the condition at the flood gates.

[202] Clerk to the Board, Burgess and Commissioners, Hancock, to G.L. Nicolson, General Manager, 24 August 1932 (Damage Prevention-Receiveers)

A letter concerning stagnant water in the canal, requesting that they keep running water in the canal level thru Hancock.

[202] G. L. Nicolson, General Manager, to Mr. Henderson, Mayor of Cumberland, 27 August 1932 (Sustainability-Dams)

"A few days ago information was received at this office to the effect that the apron below the flood gates was undermined. Yesterday I visited Cumberland and made an inspection of conditions at the flood gates and found that the concrete apron was undermined from the old abutment of the dam to the West Virginia end of the gate, across the entire front of the gate. This undermining varied from 6 to 10 feet horizontally and from 2 to 6 feet vertically. Of course, it was impossible to make an accurate measurement under the conditions and facilities which we had, at the same time the evidence is sufficiently accurate to advise that existing conditions are dangerous and immediate steps should be taken to correct them."

[202] G. L. Nicolson, General Manager, to Burgess and Commissioners, Hancock, 27 August 1932 (Damage Prevention-Receiveers)

Explaining that the water level is so low in the Potomac that it was difficult to get water into the canal at Dam No. 6, and that he had contacted the Board of Health for suggestions.

### 1933

[202] G. W. Burgan, Sharpsburg, to G. L. Nicolson, 17 January 1933 (Sustainability-Bridges)

"The bridge over canal at Shepherdstown has gone down in the center, this is due to the old crib lock decaying. It looks to me that the old crib work will have to be taken out and concrete abutment built in for the bent to set on so as to have a good foundation, the tow-path side of this old crib is also giving away close to the abutment on tow-path but I do not think it will weaken the stone abutment on tow-path."

"One of the bottom timbers in bent does not look so good, I can get some timbers and strengthen it."

"P.S. Freight has gotten very heavy over the bridges."

[202] G.L. Nicolson, General Manager, to George E. Hamilton, Attorney, 8 April 1933 (Damage Prevention-Receiveers)

"The enclosed clipping from the Evening Star of this week indicates that the office of Public Buildings and Grounds contemplates making the fill on the Washington side and the Georgetown side at Rock Creek at the new approach over the Creek, south of Pennsylvania Avenue."

The agreement that the Trustees entered into for the construction of this bridge was that the bridge could be erected without prejudice to either party but made no provision, or agreement, as to the use of the canal ground approaching the bridge on the Washington side or the Georgetown side. This strip of land on the Georgetown side, from the canal to M Street, is supposed to be Canal Company's land. Col. Grant has already caused a filling to be made on a portion of this ground between M Street and Pennsylvania Avenue without saying anything to the Trustees about it." [Newspaper clipping enclosed with the letter]

[202] G.L. Nicolson, General Manager, to George E. Hamilton, 19 April 1933 (Damage Prevention-Receiver)

This letter is in reference to "ground South of K Street and West of 28th Street and Virginia Ave":

"During the last couple of years, under the direction of the Public Buildings and Grounds, this area has been filled and the filling has been extended out into the waterway of the canal on the Washington side of the Creek, opposite the outlet lock, to such an extent that there will have to be a modification of the canal either on the river side or the Washington side before navigation can be resumed. Recently this area has been top-dressed and it is now being planted with shrubbery, etc."

[CF] The Evening Star (Washington, D.C.), 22 April 1933, A12 (Flood-April 1933)

"River Rise Halted At 24-Foot Mark" The Star reports lowland flooding along the river. It makes no mention of the canal.

[202] Mr. Lewis, Superintendent of Power, Potomac Edison Company, to G. S. [?] Nicolson, General Manager, 5 May 1933 (Maintenance-Dams, Sustainability-Dams)

Lewis acknowledges that work had been completed on the apron at the dam gates in Cumberland to protect from erosion.

[CF] The Evening Star (Washington, D.C.), 24 August 1933, A1-A2 (Flood-August 1933)

"Potomac Rising. Flood Damage Is Unlikely." Article reports flood waters on the upper Potomac. No mention of the canal.

[202] G.L. Nicolson, General Manager, to Western Maryland Railway Company, Baltimore, 2 September 1933 (Flood-August 1933)

"I write to advise that there is a breach in Dam No. 6 where the Canal takes its water from the river for the supply from Dam No. 6 to below the Big Pool, and you will not be able to get canal water from the Big Pool, other than surface drainage, on the 14 Mile Level, which the past has demonstrated is not sufficient for your demand. I am satisfied that the Trustees will not, at this time, undertake to repair the breach, therefore this note in order that you may be prepared to meet the situation."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 8 September 1933 (Flood-August 1933)

"Friday, the 1st day of September, I visited Dam No. 6. There has been a break through the dam. The water was too high to see definitely what the real condition was. I instructed our man at Hancock to report as soon as the river had run down. He advises that they have had heavy rains in the upper Potomac watershed and the river had raised considerable and as soon as it went down he would report."

"As I reported over the telephone, the Western Maryland water station at Big Pool gets its supply from the canal. I have notified them of the Breach in the dam and our inability to run water down the canal and that their supply will be only what can be furnished them from surface drainage."

[202] Rockville Maryland Chapter, Izaak Walton League of America, to G. L. Nicolson, General Manager, 8 September 1933 (Easements-Receiver)

The League wished to construct a dam across the canal at Seneca which would cause the water to back up as far as 'The Old Quarry', "by placing five or six four by six planks in the slots already cut in the stone at the west or upper end of the Aqueduct," for fishing purposes.

Letter and sketch was also sent concerning the subject on November 8th, 1933, stating that they would be held responsible for any damage to the canal, and that it was to be constructed halfway between the west end of the Aqueduct at Seneca and the Basin.

Nicolson agreed to the construction of a dam after discussing it with the local game commission.

[202] Lane, Ballentine & Mish, Hagerstown, to G.L. Nicolson, General Manager, 18 December 1933 (Damage Prevention-Receiver)

"Dr. W. Ross Cameron, who is in charge of public health work in Washington County, Maryland, consulted us today as attorneys for the C. & O. Canal Company, with reference to the condition of the C. & O. Canal at Williamsport, in Washington County, Maryland."

"Under the Civil Works Administration, a number of men are being assigned to the Department of Health in order to clean up what are termed bad conditions from the point of view of health."

"Dr. Cameron seeks permission from the Canal Company to put a force of men to work on the Canal between the aqueduct above Williamsport and the lock below Williamsport, to clean up weeds, brush and debris."

"When the matter was submitted to the local Civil Works Administration, they thought that Dr. Cameron should make demand upon the Canal Company to clean up at the expense of the Company."

"We have advised Dr. Cameron that the Company would be forced to contest any such action on the part of the public health authorities, as it might lead to similar demands along the entire Canal."

"Dr. Cameron has now recommended to the Civil Works Administration that if the Canal Company will give permission the work will be done under the jurisdiction of the Civil Works Administration, without any expense whatsoever to the Canal Company."

"He mentions also a place at Hancock, Maryland, which should be cleaned up and which he will recommend being done, if permission is granted by the Canal Company."

"Dr. Cameron informs us that work of this kind, if connected with health, can be done upon private property with the consent of the owner."

"We enclose herewith a blue print showing the part of the Canal which it is proposed to clean up in order to protect the health of the people of Williamsport."

"It is desired to begin work by Thursday of next week, if the approval of the Canal Company is given."

"It seems to us that consent should be given, as there would be no expense to the Canal Company and the question as to whether the Company can be compelled to keep the Canal clean and free from stagnant water will not be brought up."

"Will you kindly advise us promptly concerning the matter in order that we in turn may advise Dr. Cameron and the local Civil Works Administration."

[202] G. L. Nicolson, General Manager, to Messrs. Lane, Ballentine & Mish, Hagerstown, 20 December 1933 (Damage Prevention-Receiver)

"I have yours of December 18th enclosing blue print showing the contemplated work by the Civil Works Administration in draining the canal bed through Williamsport. I note from your letter that they contemplate the same thing at Hancock if the Canal Company will grant them permission to do the work. It has always been the desire of the Trustees to co-operate to the fullest extent possible with local health authorities along the canal and I unhesitatingly say that their request is hereby granted. There is one thing I would like to say, and that is that the excavation from this ditch should be put outside of the canal section, otherwise it will be necessary for the Trustees to go to the expense of moving this dirt if piled in the bottom of the canal at this time. If it was uniformly distributed on the tow-path slope, near the top of the bank, it would be satisfactory."

[202] Lane, Ballentine & Mish, Hagerstown, to G. L. Nicolson, General Manager, 22 December 1933 (Damage Prevention-Receiver)

"We have your letter of December 20th in answer to our letter of December 18th, concerning the work contemplated by the Civil Works Administration in cleaning and draining the canal bed at Williamsport and at Hancock in Washington County, Maryland."

"We have advised Dr. W. Ross Cameron, who is in charge of the public health work in this County, that permission has been granted by the Company to do this work and we have advised him that any dirt gathered from the bottom of the canal should be uniformly distributed on the tow-path slope near the top of the bank."

"Dr. Cameron has agreed that this will be done and has advised us that work at both points would be started on Wednesday of next week."

"Dr. Cameron fully realizes that if dirt and debris were pile in the bottom of the canal it would make a worse condition than now exists, and we have no doubt that they will endeavor to handle the matter satisfactorily."

#### 1934

[202] G. L. Nicolson, General Manager, to Harvey H. Weiss, Health Officer, City of Cumberland, 27 June 1934 (Damage Prevention-Receiver)

". . . you are authorized to clean up the canal from the intake, or feeder lock, down through South Cumberland and the refuse taken from the canal will be removed some distance therefrom. You are also authorized to remove the old sunk canal boats from the canal, saving all of the heavy irons..."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 1 September 1934  
(Sustainability-Dams)

"Our representative at Hancock phoned yesterday afternoon that Dam No. 6 was on fire and pretty well destroyed, on the W.Va. end between the break in the Dam and the W.Va. abutment."

"Unquestionably this was due to fishermen who were at the breach fishing or else it was purposely fired."

"As heretofore reported, this dam has been in such bad condition that I doubt exceedingly that it would ever be restored as the existing dam is in too bad condition to build on. It would be necessary to restore the dam practically in entirety."

[202] H. R. Preston, Trustee,, to G. L. Nicolson, General Manager, 3 September 1934  
(Sustainability-Dams)

"...I do not suppose the fire at Dam No. 6 is important, in view of the fact that the probability of its ever being restored is very small."

[202] J. Frank Wine, Williamsport, to G. L. Nicolson, General Manager, 4 September 1934  
(Easements-Receiver)

"Some of the Farmers wants to fix the break in the canal above Williamsport if they can get the water in the canal to water their stock."

[202] G. L. Nicolson, General Manager, to F. Wine, Williamsport, 5 September 1934  
(Easements-Receiver)

"I have your letter of the 4th inst. advising that the farmers will repair the break in the canal near Spring Culvert on the Seven Mile Level, if we will put water in it, in order that they can water their stock. You can arrange with them to do this work, at no cost to the Canal Co., and you see that it is properly done. Let me know when it is completed."

[202] Frank Wine, Williamsport, to G. L. Nicolson, General Manager, 26 September 1934  
(Easements-Receiver)

"I have not heard anything of those people that wanted to fix the break in the canal. I sopose the rain has given them plenty of water and the sewage is going pretty fast they are getting ready to start the tank below the lock to morrow the 27 they said they would let me know when they where going to dig maby you would better come up if it suits"

[CF] The Evening Star (Washington, D.C.), 1 December 1934, A1 (Flood-December 1934)

"Rising Potomac Perils Property." Article reports on a rising river on the Upper Potomac. It does not mention the canal.

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 27 December 1934  
(Sustainability-Dams)

"I find that the first breach in the upstream crib, at Dam No.6, was in 1933. This breach was not serious, reducing the head of water about 5 1/2 to 6 ft., but after January 1, 1934, the breach was materially enlarged and taken out to the foundation."

[202] F. L. Bentz, Bentz & Dunn, Hagerstown, to Frank Wine, Williamsport, no date [c. 1934]  
(Easements-Receiver)

". . . a group of farmers headed by A ?McDerr? asked me to write the C and O Canal Co. saying they would fill the break in the canal above Williamsport if the company would put water in."

"They want to use canal to water their stock."

## 1935

[Brown] Report of the Surviving Trustee, Herbert R. Preston, 26 March 1935  
(Maintenance-General)

"There has been expended on the Canal only money necessary to protect the Canal from damage from high water. This is necessary in the matter of small breaks in the Canal, which might otherwise result in serious damage."

[202] S. E. Fisher, Point of Rocks, to G. L. Nicolson, General Manager, 24 April 1935 (Damage Prevention-Receiver)

"The Washington County Well fare Board are widening the county road from lock 33 to lock 34 They are blasting off a bluff of rocks about 300 yards above Harpers Ferry lock. They are good deal of the stone going in canal I was talking to Mr. Kellar the boss and I asked him to try and clean them out by the first of May. As I may get orders any time after May the first to run water through"

[202] S. E. Fisher, Point of Rocks, to G. L. Nicolson, General Manager, 29 June 1935  
(Maintenance-General)

"The cement was used to repair hole in Monocacy aqueduct. And spikes was used at Whites Ferry Bridge and the lumber was used for waster weir plank at Brunswick Roll Roofing to repair porch roof on company house"

[202] G. W. Borgan, Shepherdstown, W.Va., to G. L. Nicolson, General Manager, 12 August 1935  
(Sustainability-Dams)

"I will say that the upper gates at feeder lock Dam #4 is in fair condeation, and probly will last a few more years, there is at least 8ft of a fill on the river side of the upper gates, you can walk above them. I always pay close attention to these gates and will advise you to condeations of them."

"The lower gates are not as good as the upper ones, the beams on upper gates are gone bad for some time, and also the lower beams."

1936

[202] G. W. Borgan, Shepherdstown, W.Va., to G. L. Nicolson, General Manager, 29 February 1936  
(Sustainability-Dams)

"As near as I can say about 40ft, of Dam #4 has gone out, near the Maryland abutment where the leak was in the Dam the river at present is two full to tell if dam is gone out to bottom of river, but looks like it by the flow of water is going through breech. Just as soon as the river gets low enough I will give you full details."

A clipping from an unknown newspaper describes the circumstances of the break.

[202] G. W. Borgan, Shepherdstown, W.Va., to G. L. Nicolson, General Manager, 5 March 1936  
(Sustainability-Dams)

"There is still two [sic] much water in river to give you the exact amount of Damage is done to Dam No. 4. it looks like is gone in V Shape. I am enclosing herewith picture of Dam No. 4 Showing where breach is in Dam. Just as soon as the river gets down I will advise you."

A small photograph enclosed with letter.

[202] G. W. Borgan, Shepherdstown, W.Va., to G. L. Nicolson, General Manager, 16 March 1936  
(Sustainability-Dams)

"I am enclosing herewith picture of Dam No. 4 showing portation of dam that went out during the flow of heavy ice, which will give you aidea of the damage."

Better pictures showing the break.

[202] J. Frank Wine, Williamsport, to G. L. Nicolson, General Manager, Washington, D.C. [c. 17 March 1936] (Flood-March 1936)

"Wish to make the following report on part of this Section of the Canal."

"The Bridge at Dam No. 5 has washed away and the one at Falling Waters is gone too."

"The Corn Shed and Carpenter Shop at Williamsport Locke is in very bad shape. All broken and laying down in the Flume. Please inform me, what to do about the Buildings."

"As soon as possible, I will inform you concerning conditions of the balance of my Section of the Canal. There are some lines and tools left here and I tho't we might use of the old lumber from building to build another shed."

[CF] The Evening Star (Washington, D.C.), 17 March 1936, A1-A2 (Flood-March 1936)

"Upper Potomac Flood Forecast" Article reports the river is rising on the Upper Potomac. It does not mention the canal.

[CF] The Evening Star (Washington, D.C.), 18 March 1936, A1, A4, A6 (Flood-March 1936)

The Star reported, in the vicinity of Washington, D.C., "everything between the old Chesapeake and Ohio Canal bank and the Virginia shore is under water."

[202] J. Frank Wine, Williamsport, to G. L. Nicolson, General Manager, Washington, D.C., 19 March 1936 (Flood-March 1936)

"Just a line to let you know the extent of damages up here. The carpenter shop at Williamsport moved down, across the floom and the corn shed collapsed. Walter Roofs house at the lower lock is gone and the staple [stable?] and all buildings except the house at the company house are gone. I couldn't get up to the dam yet to find out the damages. The house on the short level at the two locks is still standing. Mr. Roof wants to move the short level house if the canal company will get some roofing and some plastering."

"The lock house at Williamsport was under all but 3 feet and it is standing up fine. The Potomac Edison want to repair the canal bridge at their cost. It is raised up at one end. I told them to go ahead and fix it up. I suppose that was all right. The shed at the company house with all the tools, harness and wheel-barrows went away. As soon as I can get over the canal I will let you known if there are damages or brakes."

[CF] Cumberland Evening Times, 19 March 1936, 8 (Flood-March 1936)

"Random Notes on the Flood" The paper reported, "the old Chesapeake and Ohio canal was temporarily eliminated in the Wiley Ford section where the river became one vast expanse."

[CF] The Evening Star (Washington, D.C.), 19 March 1936, A3- A4 (Flood-March 1936)

"Families Watch Homes Engulfed" Article reports the river and canal were indistinguishable between the Key Bridge and Great Falls.

[CF] The Evening Star (Washington, D.C.), 20 March 1936, A1, A5 (Flood-March 1936, Harper's Ferry-Sustainability)

"45.9 Ft. Above Low Mean Set by Run-Off." Reports on flood damage. Nothing on the canal, except that water was drained from a section to repair a B&O Railroad spur bridge.

[202] G. W. Burgan, Shepherdstown, W.Va., to G. L. Nicolson, General Manager, 21 March 1936 (Flood-March 1936, Sustainability-Dams)

"This has been some high water, the bridge over canal at Shepherdstown, was washed away, and also the river bridge is gone, the dam looks like some more of it has gone out, it is hard to tell how much of it, as the river is two high to give any details at present, the cross bank at Dam #4 has some damage to it also, all little buildings along the canal has been sweep-away."

[202] James L. Hicks, Cumberland, to G. L. Nicolson, General Manager, 21 March 1936 (Flood-March 1936)

"I regret to inform you that Lock House No. 61 which I rented from you, as well as the small house opposite were completely washed away during the late flood."

[202] J. R. Keyser, Knoxville, Md., to G. L. Nicolson, General Manager, 21 March 1936 (Flood-March 1936)

"The Blacksmith shop at Sandy Hook is gone entirely the Carpenter Shop Part of the frame work is gone and all of the sideing the boreing machine and part of the augers I have saved the little of the shop that it left I would like to have before it is Carried away If it not gone to repaired"

"I will try keep it from being carried away until I hear from you"

[202] Thomas Shives, Hancock, to G. L. Nicolson, General Manager, 22 March 1936 (Flood-March 1936)

"had a flood this time"

"i was up to the Dam today walked the towpath lock House at the upper lock, at Dam #6 washed away House at 53 is gone and the Half of my House is gone it took the half Next to the river."

"And their is only one Break, that is above Round top where company Boat layed it is 9 steps in the Bottom and Three or four ft Below The bottom and from The cement Mill down to Keefer it washed 2 ft off the towpath out side of that it haivt [?] any worse than it was The Company Boat washed away The Porachs at McCarty House it got in the Shop 8 ft But didn Move it That Building at thy Place whenet away with of the company stuff"

"i lost Every thing i had moved every thing up stairs and it all whent down to my cloths and my wifes lost."

"i dont know when you will get This as Their hasen Been no Mail to Hancock Since the flood Hald of the Dam is gone"



"The sheeting of the other Side is gone"

"i would of whent up Sooner But i was whiped"

"The Mule Bridge at my Place is gone that is at acqueduct."

[202] H. F. Sterling, to G. L. Nicolson, General Manager, [c. 22 March 1936] (Flood-March 1936)

The first part of this letter is missing.

"Concrete Slab below Dam undermined."

"Wash out around Stop lock on towpath side 15 ft wide 3 ft deep"

"Top. Towpath wash off below"

"R. R. bridge at Chas Wolf"

"Below Wiley ford Top towpath wash off. 150 ft 2 ft."

"Below Lower R.R. bridge tow path wash off 2 ft deep 200 ft long"

"Head Daughtery wide water"

"Small brake 20 ft widw 2 ft below bottom of Canal"

"5 mile stake waste weir and colvert choked with drift"

"Lockhouse at 10 mile lock foundation gone 12 ft one upper S on next to river."

"8 ft under porch speper [?] 8 ft. high"

"Windows gone out of pump house"

Front of pump house bridged out toward the Canal"

"Bridge ayersack [?] at Patterson Creel wash away 8 in at bridge 6 ft deep 25 ft long."

"In the bend at Spring Gap"

"Top of Towpath Wash off."

"Small Brake 4 ft Deep 25 ft long"

"Brake at Kellys culvert on 8 mile level 30 ft long 8 ft below the bottom"

"Lock & Waste weir at #71 full of drift (Windows out Lock 68)"

"Foundations lock house 68 undermined at upper corner"

"Top of Town Creek Aqueduct wash off"

"Lock house #67 gone"

"Below Keifers R.R. bridge"

"Top of Towpath wash off 300 ft long 2 ft deep"

"Channel filled up 250 ft long 3 ft deep"

"Lock house # 61 gone"

" 60 gone"

" 59 gone"

" 58 gone"

"House boat Little Orleans gone Berm side Sildeing Hill Aqueduct gone"

[202] G. W. Burgan, Shepherdstown, W.Va., to G. L. Nicolson, General Manager, 24 March 1936  
(Flood-March 1936, Sustainability-Dams)

"I have yours of the 20th, and will say that all bridges has been washed out, The bridge Company are talking if puting pauntoon bridge over the river at Shepherdstown, if this is true we can soon put a bridge lodged at the old out-let lock, which we could soon get and place over lock 38, I have asked the bridge President to keep me advise to this. The high water took boath approches to the feeder lock Dam No.4 and has done some damage to cross-bank at stop-lock on each side of same. The lock house at Lock 40 was sweep away and is acomplete lost, with all of its content, the Company house on 5 mile level is all right, the lock house at Shepherdstown, has been damaged and not fit to live in, as the N.W. corner was knocked in by heavy drift. The guard bank has a

very little damage done it, as the river receids it shows very little damage done to Dam No. 4 if any than was done by the ice."

"I will get over rest of my section in a day or so and advise you as to damage. I never saw the trees broken by high water as they was this time."

"I regret to know that the Georgetown level was badly damaged. this water was about 5ft higher than 80 at this point."

[202] Amos Everitts, Big Spring, Md., to G. L. Nicolson, General Manager, 25 March 1936  
(Flood-March 1936)

I was over my line from Little Pool to aquaduct wood work all gone. on down to culbert where Sam Kelly's boat went out Small washout 4 ft deep 10 ft long where old break was. R.R. bridge at Big Pool Small washout from waste way to foot of Big Pool is washed out any where from 1 to 2 feet deep with Several dips 4 & 5 ft deep and around stop lock wall toe path side dipped out at least 7 ft. on down to Kinsells crossing above Ferry a washout about 35 ft long and 10 ft deep. Four Locks Flynn housed washed away 2 mile level not very much damage. bridge at 2 lock washed over in canal on Short level & considerable damage to Frank Davis house all other damage Small"

[202] S. E. Fisher, Point of Rocks, to G. L. Nicolson, General Manager, 25 March 1936  
(Flood-March 1936)

"Guard Bank at Harpers Ferry Broken in two places lock House washed down foor. Feeder level lock House washed away ay Lock 33 and Guard Banl Below Lock 33 gone short level full of stone. small wash out in Towpath at Sandy Hook"

"Bridge across lock N 30 washed away. Company House at Pt of Rocks washed away and all out Buildings. Bridge across Canal at Noland's Ferry on seven mile level [?] washed of abutments om canal 3 wash breaks on Eight Mile level and just above Aqueduct and 1 near Beaver dam Culvert. I was talking to Connell today & told him to go to Edwards Ferry tomorrow get horse from Mr Jarboe and ride up as far as White ferry look Every thing over and let me hear from him i was at woods lock and Monocacy Acqueduct no trouble"

[202] G. W. Burgan, Shepherdstown, W.Va., to G. L. Nicolson, General Manager, 30 March 1936  
(Flood-March 1936, Sustainability-Dams)

"I am glad to say there is very little damage to canal banks from Shepherdstown to lock No 36, the Lock gates are in bad shape, the upper gates at feeder lock are still good, one of the lower ones are gone out."

"I expect tp here from the bridge Company one day this week, as to what they are going to do, they are holding a meeting to day the 30th in Baltimore, after this meeting they will know what they are going to build or not."

"P.S. I am glad to say no more of the Dam #4 went out as the river is getting down and shows about same breach as befor Highwater."

[202] G. L. Nicolson, General Manager, to Unknown [c. April 1936] (Flood-March 1936)

"I was at Harpers Ferry yesterday, Sunday Apr. 4th, and went over the canal pretty rhoroughly from the feeder lock, above the dam, to Sandy Hook. Up at the feeder there is a breal through the guard bank about 40 feet long and I would guess 25 feet deep. The top of the guard bank is pretty badly washed and many of the stone in the wall next to the river washed off and the feeder is pretty well filled up with stone washed from the wall and towpath and the break the guard bank. The towpath i roughed up pretty badly for a few hundred feet below the dam. The towpath was materially injured. The section of the canal from the entrance of the feed into the canal down,had a tremendous amount of deposit washed out. At the first lock below the feeder, the lockhouse, a brick house, washed away and the guard bank below thelock,badly washed and the level below has quite a deposit. The lockgates were washed out. From there down to the lock at Harpers Ferry bridge the towpath was not badly damaged but at the lock there was severe damage. The lockhouse and gates washedaway, the stone walls badly damaged. The filling around the lockwashed out. The guard wall, bank and towpath from the bridge to a few hundred feet below the highway bridge crossing it badly washed, most of the stone is in the canal. From this point to the Sandy Hook lock the damage is heavy. It is difficult to make an accurate estimate without a survey and even then I would guess that the damage from Sandy Hook Lock up to an including the damage at the feeder lock would amount to between \$25 and \$40,000. A considerable portion of the dam appeared to be gone. This, I presume, will be restored by the Electric Co."

[202] J. Frank Wine, Williamsport, to G. L. Nicolson, General Manager, 10 April 1936  
(Flood-March 1936)

"in Reply to your Request of the Damage to the Cannal Property the House at the 2 Locks the Lower one is gone the one on the Short Leavel is Still Standing and Walter Roof had Repaired it and Liveing in it the Louse at the one Lock that Mr ader Had Rented Part of it has gone the Kitchen I Called up down their to know if they were going to Rent it and Mr ader was in new york as Soon as he Comes home I will Let you Know Every thing is gone at the Company House where I Lived But the House the way Bill office is up Set at Williamspsport at Williamsport the corne House has gone and the Carpenter shop has turned around and floor has Dropped out of the house has Stood and Brant Has Repaired it and Liveing in it again every thing at the Lime Kiln has gone the uper Company house on the 7 mile Level is alright and no washouts to amount to anything But Plenty of Sand in

the Cannal at millers bend falling waters Bridge is gone and the Bridg at Dam no 5 has gone not Saying annything about the tree about 10 thousand of them"

[Brown] Report of the Surviving Trustee, Herbert R. Preston, 8 June 1936 (Flood-March 1936)

"Although the high water in March, 1936, exceeded any record of flood height in the Potomac Valley, the damage to the Canal by the flood was not great. The only serious damage was to the Georgetown Level, which supplies the water leased at that point. To comply with the obligations of the leases and to prevent great loss to the plants holding these water leases, it was necessary to promptly repair this damage, which was done in about a month. Some further expenditure will be required, but it is estimated the total expenditure will not exceed from \$20,000 to \$22,000, which will be not more than one year's net rental."

"There was some damage at Great Falls and at Harper's Ferry and a number of lock houses were washed away. The tow path at points was somewhat injured, but not seriously. Further repairs will not be made until operation is resumed on the Canal."

[202] G. L. Nicolson, General Manager, to Thomas W. Koon, Mayor, City of Cumberland, 6 July 1936 (Flood-March 1936, Flood Damage Prevention-Accomplished)

In reference to construction of a dam which the City of Cumberland was responsible for maintaining:

"You will recall that the City of Cumberland arranged with the Trustees of the Canal to do certain flood protective work on the guard bank between the feeder lock and the stop-lock. Some of this protective work has been damaged. I write to say that you have the Trustees' permission to restore this to the line existing prior to the recent freshet."

[202] G. L. Nicolson, General Manager, to H. R. Preston, Trustee, 4 December 1936 (Flood-March 1936, Flood Damage Prevention-Financing)

"I have the complete statement from Mr. Brenizer for repairs made to the canal due to the freshet. It is as follows:

Repairs to Georgetown Level and removing trees and deposits from Feeder to Georgetown Level	\$19,713.90
Repairs to Little Falls Dam	5,043.88
Amount paid for lumber used for coffer-dams, etc., which we now have on hand	<u>702.27</u> \$25,460.05

"We have paid Mr. Brenizer \$19,325.22, leaving a balance of \$6,134.83 which we are paying in vouchers for month of November. To cover this remittance we are drawing on the Treasurer for \$6,000. Kindly honor draft when presented."

[202] Martin J. Urner, Operations and Engineering Department, Potomac Edison Company, "Report on 1936 Repairs and Improvements at Dam No. 4," 10 December 1936.

Contains a summary history of the dam. A description of the break in Dam 4 in February 1936 by an ice freshet; its widening by the flood of March 1936; contracting for the repairs; and a description of the work. The work included building coffer dams and repairing the fifty-five-foot break. Potomac Edison and the canal receivers shared the cost of the work. There is also a copy of the repair contract in the report and a detailed budger for the repairs. Finally, the report contains drawings and actual photographs of the work. [See Box 24 of 202]

[202] G. L. Nicolson, General Manager, to A. H. Horton, District Engineer, Department of the Interior, Geological Survey, 19 December 1936 (Flood-May/June 1889, Flood-March 1936, Flood Damage Prevention-Financing)

"In reply to your letter of December 16th, regret to say that I am unable to give you the elevations of the freshet of 1936. The best I can do is to give you some comparisons between 1936 and 1889 according to the reports received from employees of the canal as to the elevations on the various structures in 1889 and 1936:"

"At lockhouse No. 6, near Little Falls Dam, the 1936 freshets was about 1 ft. higher than 1889."

"At Seneca Aqueduct, 1936 was 7" higher than 1889."

"Brickhouse at Lock No. 33, above Harpers Ferry Bridge was destroyed in 1936. It withstood the 1889 freshet."

"Lockhouse No. 47 withstood the 1889 freshet but went out in 1936."

"Lockhouses Nos. 58, 59, 60, 61 and 67, on the Cumberland Division, went out in 1936 but withstood the 1889 freshet."

1937

[CF] Frank H. Vizetelly, ed., The New International Year Book: A Compendium of the World's Progress for the Year 1936 (New York: Funk and Wagnalls Company, 1937), 432 (Flood-March 1936)

"Valleys in the western uplands of Maryland were swept in the plague of floods that followed the sudden mid-March thaw throughout the East from the Potomac northward. Loss of life was comparatively slight, but buildings were carried away, and many bridges and roads suffered damage or ruin. Along the southern border of the Potomac River spread beyond its limits for the first time within living memory and did damage almost down to the tidewater."

[CF] The Evening Star (Washington, D.C.), 24 January 1937, B1 (Flood-January 1937)

"Potomac Rising, but Peril Fades Despite Rain Forecast Today" The Star reports high water on the Upper Potomac moving downstream.

[Brown] Report of the Surviving Trustee, Herbert R. Preston, 8 June 1937 (Flood-March 1936)

"There has been no substantial change in the situation with respect to the Canal Company. In the last report filed by the Trustee, it was stated the flood in March, 1936, had done very considerable damage to the Canal and that it was estimated that it would cost \$20,000 to \$22,000 to restore it. The final cost was not then determined, but it amounted to \$25,406.05. This required an advance from the Chesapeake and Ohio Transportation Company of \$3,356.12 to cover deficit in operation. But for the cost of restoring the damage to the Canal by flood, which was principally damage to what it known as the Georgetown Level, which supplied water power from which the revenues of the Canal are very considerable, the water rents and house and land rents would have been more than enough to cover all expenditures."

"Additional damage was occasioned by high water in 1937, which will have a bearing on the report for that year, but the damage will probably not amount to more than \$5,000 and has been repaired.

Except for these losses from the floods, the property is yielding a sufficient amount to pay its operating expenses and keep the Canal in condition to protect it from further damage except in case of extraordinary floods."

[1570-35] Unattributed notice, 12 noon, 27 April 1937 (Flood-April 1937)

"Report on flood from U.S. District Engineer Office"

"Predictions for flood"

"Crest is to arrive here sometime about 6:00 a.m. tomorrow or a period of 2 to 4 hours thereafter."

"Present estimate - crest heights above mean low water

Key Bridge	- 17.0
Wisconsin Avenue	- 15.0
A.M. Bridge	- 12.0
Hains Point	- 10.5
Points on Anacostia River	- 10.5"

Handwritten annotation indicates the actual crests were half a foot to two feet lower than expected.

#### Abbreviations for Documents at the National Archives at College Park

[180]: Proceedings of the Stockholders, 1828-90, Chesapeake and Ohio Canal Company, Entry 180, Record Group 79, Records of the National Park Service

[182]: Proceedings of the President and Directors, 1828-90, Chesapeake and Ohio Canal Company, Entry 182, Record Group 79, Records of the National Park Service

[190]: Letters Received by the Office of the President and Directors, Chesapeake and Ohio Canal Company, Entry 190, Record Group 79, Records of the National Park Service

[191]: Letters Received, by President and Directors, 1873-80, Chesapeake and Ohio Canal Company, Entry 190, Record Group 79, Records of the National Park Service

[194]: Letters Sent, by the Office of the President & Directors, 1828-70, Chesapeake and Ohio Canal Company, Entry 194, Record Group 79, Records of the National Park Service

[196]: Letters Sent, by President & Directors, 1879-81, Chesapeake and Ohio Canal Company, Entry 196, Record Group 79, Records of the National Park Service

[202]: Correspondence of Office of Trustees, 1913-38, Chesapeake and Ohio Canal Company, Entry 202, Record Group 79, Records of the National Park Service

[207]: Letters Received By The Chief Engineer, 1834-52, Chesapeake and Ohio Canal Company, Entry 207, Record Group 79, Records of the National Park Service

[210]: Drafts of Letters Sent By the Chief Engineer, 1836-38, 1846-52, Chesapeake and Ohio Canal Company, Entry 210, Record Group 79, Records of the National Park Service

[211]: Letter Book of the Resident Engineer of the 1st Residency of the 1st Division, 1828-31, Chesapeake and Ohio Canal Company, Entry 211, Record Group 79, Records of the National Park Service

[214]: Records of Ellwood Morris, Principal Assistant Engineer, 1838-40 Chesapeake and Ohio Canal Company, Entry 214, Record Group 79, Records of the National Park Service

[320]: Printed Materials, 1816-1907, Chesapeake and Ohio Canal Company, Entry 320, Record Group 79, Records of the National Park Service.

[650-03]: National Park Service, Central Classified File, 1933-49, National Capital Parks, 650-03, Record Group 79, Records of the National Park Service.

#### Other Abbreviations

[1460-C&O-5] Administration, Protection and Maintenance File 1460/C&O-5, National Capital Parks, National Park Service, Washington National Records Center, Suitland, Md.

[68A-3048] Administrative Correspondence, 68A-3048, National Capital Region, National Park Service, Washington National Records Center, Suitland, Md.

[Brown] Brown et al. Trustees v. Chesapeake and Ohio Canal Company, Nos. 4191 and 4198 Equity, Circuit Court of Washington County, Hagerstown, Md.

[CF] Clipping File

[LIB-PHP] Library, Park Headquarters

[RF-PHP] Restoration File, Park Headquarters Papers

[UMCP] The Chesapeake and Ohio Canal Company Collection, Archives and Manuscripts Department, McKeldin Library, University of Maryland, College Park.

Note: see the end of the document for the key to abbreviations.

### 1938

[CF] The Evening Star (Washington, D.C.), 31 July 1938, B1 (Renovation-1938-42)

"P.W.A. Gets Cash To Buy Canal For Use As Parkway" Article announces the sale of the canal to the U.S. government and the plans to use CCC workers to restore it."

[CF] The Evening Star (Washington, D.C.), 13 August 1938, A2 (Renovation-1938-42)

"Canal Is Cleaned; Legal Moves Due" Article indicated that, "preparatory to the Government taking over the old Chesapeake & Ohio Canal, a corps of booted men are flushing and removing accumulate debris of years in the canal bed in Georgetown."

[CF] The Evening Star (Washington, D.C.), 14 August 1938, C2 (Renovation-1938-42)

Editorial approves of the restoration and use of the canal as a park.

[650-03] Superintendent, Yellowstone National Park, to Director, National Park Service, 10 December 1938 [Memorandum] (Renovation-1938-42)

This memo discusses the work of the two CCC camps working along the canal:

"The major work project of both camps is the rehabilitation of the canal which will involve the clearing of the accumulated debris in the canal and along the tow path, the re-establishment of the grade of the floor of the canal, and reconstruction and re-enforcement of the canal dykes and tow path at some points and the reconstruction of the lock gates. So far only the removal of the accumulated debris and volunteer growth which has come up since the canal was abandoned has been undertaken. No dirt has been moved. On the side opposite from the tow path the clearing is being carried only to the high-water line of the slope. On the tow path side the clearing is being carried at present, only to a point sufficient to permit the operation of trucks on the tow path."

### 1939

[CF] The Evening Star (Washington, D.C.), 20 January 1939, B6 (Renovation-1938-42)

"Canal Recreational Work Is Now in Progress" Article reports on the work being done to restore the canal and work due to be done to restore it.

[CF] The Evening Star (Washington, D.C.), 31 January 1939, B1 (Renovation-1938-42)

"Progress on Canal Restoration Work Is Reported" The Star gives more information on the restoration work occurring on the canal.

[650-03] "Specifications for The furnishing and placing of earth fills and the construction of concrete retaining walls, spillways, culvert, stone walls, trestle and other work for the restoration of the Chesapeake and Ohio Canal in the vicinity of Widewater between Cropley, Md. and Great Falls, Md," 26 July 1939 (Renovation-1938-42, Widewater-Sustainability)

Self explanatory. A very large document. Very detailed. In Box 2836.

[650-03] Thomas C. Vint, Chief of Planning and Dallas D. L. McGrew, Associate Architect, Branch of Plans and Design, National Park Service, "Outline Report of Architectural Work on the Restoration of the Chesapeake and Ohio Canal For Recreational Use (Georgetown, D.C., to Seneca, Md.), Undated [c. 1939?] (Renovation-1938-42)

This is a detailed description, containing numerous blueprints and photographs, showing the plans for the restoration of structures along the canal between Georgetown and Seneca. A very large document. Very detailed. In Box 2838.

[650-03] Report of T. Sutton Jett, Assistant Research Technician, Chesapeake and Ohio Canal Project, 15 August 1939 (Renovation-1938-42, Widewater-Sustainability)

"The plans for flood control structures and repair to the canal banks in the widewater area, were reviewed, discussed, and approved during July. Approval of the plan for stop-lock building for the Great Falls area was also given by the Branch of Historic Sites during the month."

[CF] The Evening Star (Washington, D.C.), 24 August 1939, B4 (Delays-Bureaucratic, Renovation-1938-42, Widewater-Sustainability)

"Wage Rate Error Delays Canal Job Bid Opening" Article indicates this error delays the start of the Widewater restoration project.

[650-03] Report of T. Sutton Jett, Assistant Research Technician, Chesapeake and Ohio Canal Project, 14 September 1939 (Renovation-1938-42, Widewater-Sustainability)

"The contracts for repair of flood damage in the tidewater [widewater?] area, and the flood control structure, has been awarded. The cost of the work will be approximately \$101,000."

[CF] The Evening Star (Washington, D.C.), 15 September 1939, B1 (Flood Damage Prevention-Ordered, Renovation-1938-42, Widewater-Sustainability)

"Opening of Canal Seen by Next Summer As Work Is Begun" Interesting description of how the engineers restoring the canal in the late 1930s sought to deal with flooding in the vulnerable widewater area as opposed to the original builders of the canal.

[650-03] T. Sutton Jett, Assistant Research Technician, Chesapeake and Ohio Canal Project, to the Supervisor of Historic Sites, 25 September 1939 (Flood Damage Prevention-Ordered, Renovation-1938-42, Widewater-Sustainability)

"It has been a policy on the Chesapeake and Ohio Canal project to concentrate labor on work necessary for the readmission of water to the Seneca-Little Falls section. It is now anticipated that upon the completion of the repair to the Widewater area, which is expected by Spring, that this objective will be reached. During this winter the major construction in progress will be the repair of flood damage, and installation of flood control measures, in this region. Contracts involving \$101,000 of PWA money have been recently let for this work. Likewise, the CCC activity will probably be concentrated in the Widewater section during this period, engaged in repairing badly damaged towpath."

[650-03] Report of T. Sutton Jett, Assistant Research Technician, Chesapeake and Ohio Canal Project, 8 November 1939 (Flood Damage Prevention-Ordered, Renovation-1938-42, Widewater-Sustainability)

"The work let by contract for repair of the towpath and construction of flood control devices in the Widewater area is well under way, and considerable progress has been made. The major breaks at the eastern end of this area have been largely filled."

"CCC work has been concentrated in the Seven Locks area (between locks #8 and #14) during October. Repair of minor breaks in the towpath, clearing of underbrush, and the removal of deposits in the canal constitute the principal projects."

[650-03] C. W. Porter, Planning and Interpretive Section, to Branch of Historic Sites, [Memorandum] 20 November 1939 (Flood Damage Prevention-Study, Renovation-1938-42)

"The flood of 1889 carried away the stop lock building of this type which stood between locks #15 and #16. It was never replaced, and the only available evidence on its appearance is a building constructed and used for the same purpose still standing at Dam #4 on the canal."

"The exterior appearance of this structure as here designed closely resembles the existing stop lock building mentioned above, the major variance being one of dimension necessitated by a difference in the span of the two locks. The interior is considerably altered to afford easy control of the stop logs, and to give added structural stability."

"The necessity for effective and rapid control at times of emergency, and for a stout construction as protection against flood damage, is recognized, and as a matter of expediency no objection is made by this branch."

[650-03] Report of T. Sutton Jett, Assistant Research Technician, Chesapeake and Ohio Canal Project, 9 December 1939 (Flood Damage Prevention-Accomplished, Renovation-1938-42, Widewater-Sustainability)

"The repair of the canal embankments preparatory to the expected admission of water this spring is nearing completion. At the beginning of November the major repairs necessary were at the large breaks at Widewater, and the contractor for this work has made much progress during the month."

"The spillway dams at Locks #15 and #16, begun in November, are rapidly nearing completion."

"C. C. C. work has been concentrated between Locks #5 and #14 in the repair of minor breaks in the towpath, and excavation of the bed where additional depth is required for navigation."

#### 1940

[CF] The Evening Star (Washington, D.C.), 9 June 1940, B1 (Renovation-1938-42)

"C. & O. Canal Restoration Nearly Done" Article reports on the progress of restoration of the canal between Georgetown and Seneca, including the restoration of flood control structures in Georgetown. The story indicates the \$500,000 restoration appropriation by Congress is nearly exhausted.

[CF] The Evening Star (Washington, D.C.), 18 September 1940, B5 (Flood Damage Prevention-Maintenance, Renovation-1938-42)

"C. & O. Canal Opened To Canoe Travel As Far as Seneca" Pretty self explanatory, except the article also mentioned the refusal of Congress to appropriate money for the maintenance of the canal. The article warned, "unexpected fluctuations in the Potomac might cause considerable damage to the canal, which might be averted by trained employees."

## 1941

[1460-C&O-5] Frank T. Gartside, Assistant Superintendent, National Capitol Parks, to Harry J. Athey, Cumberland, 24 July 1941 (Warnings-Flood VulnerabilityD)

This letter shows the awareness of Park Service officials of the vulnerability of the canal to flooding, even before the catastrophic flood of October 1942. The Park Service replied to a letter from Athey to President Roosevelt, suggesting the C&O Canal be transformed either into an underground highway, which could be used as a bomb shelter, and whose roof also could be used as a emergency landing strip for planes.

Gartside told Athey that his plan was not feasible because, among other reasons, "The canal property, in many places, is subject to complete inundation during periods when the river is in flood stage."

## 1942

[CF] The Evening Star (Washington, D.C.), 24 May 1942, A1 (Flood-May 1942)

"Potomac Expected to Rise Over Flood Stage Today" The Star reports the Potomac expected to exceed flood stage. It gives no specific information on the canal.

[CF] The Evening Star (Washington, D.C.), 25 May 1942, B1 (Flood-May 1942)

"Potomac Falls After Slight Flood Damage" Article reports water flooded low spots. It gives no information concerning the canal.

[CF] The Evening Star (Washington, D.C.), 16 October 1942, A1-A2 (Flood-October 1942, Flood Damage Prevention-Accomplished)

"Two Are Dead, Many Homeless As Waters Rise" The Star reported "families along the C. & O. Canal at Brookmont, Md., were moving to higher ground as the river lapped at their homes."

"40 Families Removed From Flooded Area Along K Street" The article indicated the following flood damage prevention measure was taking place on the canal. "To maintain the canal flow at the present level," the Star reported, "District workmen were opening the canal locks to permit the rising waters to empty into the Potomac River."

[CF] The Evening Star (Washington, D.C.), 17 October 1942, A1, A3 (Flood-October 1942)

"Flood" The article reported the the C&O Canal had "overflowed its banks near Fletcher's Boathouse, tearing a 100-foot gap in a freight roadbed and toppling two freight cars into the river."

[CF] The Evening Star (Washington, D.C.), 19 October 1942, B1 (Flood-October 1942)

"Three Major Breaks in Canal Revealed as Flood Recedes" Article reports on flood damage to the canal in the vicinity of Washington, D.C. Park spokesmen candidly admit they do not know where they will get the money for repairs.

[1570-35] William G. Haywood, Associate Civil Engineer, to F. F. Gillen, Acting Superintendent, National Capital Parks, 22 October 1942 (Flood-October 1942)

"Report on inspection made October 20, 1942, with Officer Sconyers on section of C. & O. Canal from Lock #23 to Lock #20."

"Violet Lock and Lock #23 undamaged. Dam #2 appears undamaged. Log Cabin gone (lodged downstream about 500'). 300 cu. yards. required in area."

"10' water over Towpath, 1000' below Lock #23."

"Station #38730 for 300' down-fill 1' to 10' x 300' = 110 cu. yds."

"Water was 32" deep in Pooles home at Pennefield - Lock #22."

"Buzzard Roost - 20' x .5' x 40' = 15 cu. yds. Bridge from Lock #22 lodged here."

"3,000' above Lock #21 - 30" oak over Canal and Towpath.  
2,000' above Lock #21 - 100' x 1' x 10' = 37 cu. yds.  
1,700' above Lock #21 - 8' X 50' x 20' = 300 cu. yds.  
1,700' above Lock #21 - 10' x 1' x 300' = 110 cu. yds."

"4' water over Towpath immediately above Lock #21."

"Water at Lockhouse #21 was 1.5' lower than 1936 flood. Water was at bottom of lintel on north door on west side."



"3,000' below Lock #21 - 500' x 1' x 10' = 185 cu. yds."

"4,000' below Lock #21 - 20" oak in Canal."

"5,000' below Lock #21 - 200' x 10' x 1' 75 cu. yds."

"Station #38860 to #38854 - 1' x 15' x 2200' = 1,200 cu. yds.

Station #38853 to #38851 - 1' x 10' x 800' = 300 cu. yds.

Station #38851 to #38850 - 2' x 15' x 200' = 220 cu. yds."

"Just below Station #38850 - 100' x 2' x 15' = 110 cu. yds., also  
100' x 3' x 15' = 165 cu. yds."

"1,000' above Lock #20 - 3' x 3' x 100' = 33 cu. yds."

"200' above Lock #20 - 3' x 6' x 30' = 20 cu. yds."

Total = 3,180 cu. yds."

"Entire Towpath from Seneca to Great Falls was under from 3 feet to 10 feet of water during this flood."

[1460-C&O-5] Arthur E. Demaray, Associate Director, National Park Service, to the Secretary of the Interior, 23 October 1942 (Flood-October 1942)

"It is estimated that the cost of repairing damage to the National Capital Parks caused by the flood of October 15 to 18 will total \$345,600. Of this amount, \$95,600 would be needed to repair the damage to National Capital Park areas used exclusively for recreation by War workers, and \$250,000 to restore the Chesapeake and Ohio Canal as far as Great Falls of which amount the United States Engineer's Office will provide \$40,000."

"The section of the Canal from Georgetown through Lock No. 5 provides a secondary source of water supply for the City of Washington. The District Engineer of the United States Engineer's Office has installed an emergency pumping station on Chesapeake and Ohio Canal property below Dalecarlia Reservoir so that, should the Washington conduit be bombed or otherwise disrupted, water could be supplied to the reservoir from the canal. The total annual revenue produced through furnishing water for power and rental of canal properties is \$29,000."

"In addition to the above-mentioned estimates, a total of \$6,112 was expended by the National Capital Parks for the protection park and other Federal properties during the flood period. This emergency expenditure was made upon orders transmitted through you."

"No funds are available to the National Capital Parks to repair the damage caused by the flood. It is requested that an allotment in the amount of \$311,712 be secured from the Emergency Fund for The President to repair the damage caused by the flood and to reimburse the National Capital Parks for the amount expended for flood protection purposes."

[CF] Tom Moore McBride, Washington Post, 14 November 1942, 5B (Flood-October 1942, Flood Damage Prevention-Failure, Widewater-Sustainability)

"Historic C&O Canal Runs Dry After Flood" Article describes the damage to the canal in the vicinity of the canal, and the problems in repairing into due to wartime restrictions. It also explains the failure of flood improvements made in 1939 at Widewater.

[1460-C&O-5] F. Eberstadt, Vice Chairman, War Production Board, Washington, D.C., to Harold L. Ickes, Secretary of the Interior, Washington, D.C., 19 November (Flood-October 1942)

"Repair of Flood Damage to the C. & O. Canal - This Project application has not been submitted to the War Production Board, and, therefore, is not subject to review by the Facility Review Committee. However, it is the view of the Committee that the project should be limited to that portion of the work essential for the provision of water supply to the District of Columbia."

[1460-C&O-5] E. A. Schmitt, Head Engineer, United States Engineer Office, Washington, D.C., to F. F. Gillen, Acting Superintendent, National Capital Parks, Washington, D.C., 21 November 1942 (Flood-October 1942, Flood Damage Prevention-Proposed)

"Reference is made to several conversations relative to the recent flood damage to the old Chesapeake and Ohio Canal and to proposals of restoring to an operating condition a portion of the canal. This office is materially interested in that section consisting of the feeder canal, from Little Falls Dam to the feeder lock, the various works constituting the feeder lock, and a short length of the main canal extending from this latter point to the intake of the Dalecarlia emergency raw water pumping station."

"It is of the utmost importance that the designated portion of the canal be restored to service in order that Washington may be provided with an emergency supply of water in the event of loss of one or both of the two Gravity flow conduits extending from Great Falls to Dalecarlia. The two conduits are extremely vulnerable to damage from sabotage or bombing and should not be relied upon as the only supply to the important activities served."

"Permission is requested to enter upon the canal property and perform the following named general items of work in connection with restoration of the section of canal required to serve the Delacarla emergency pumping station."

- "a. Clear as necessary the feeder canal throughout the entire length of debris."
- "b. Repair the outer gate of the feeder canal."
- "c. Repair apron of overflow spillway adjacent to the feeder lock gate."
- "d. Rebuild loose rock dam extending from feeder lock gate to main canal lock #5."
- "e. Rebuild loose rock dam extending from lock #5 to high ground on berm side of the main canal."
- "f. Repair rip rap and embankment of feeder canal from the feeder gate to the point of confluence with the main canal."
- "g. Construct a cut-off dam across the main canal at a point immediately downstream of the emergency pumping station, which is to be removed if and when the canal is restored to regular service."

"Practically all of these improvements will be of permanent value to the canal property and information is desired as to whether or not any part of the work can be immediately undertaken by and at the expense of your office."

"The work contemplated constitutes flood damage repair to the water supply system of the District of Columbia and Arlington County, Virginia, and costs will be borne by this office except as noted in the preceding paragraph."

[1460-C&O-5] A. E. Demaray, Associate Director, National Park Service, Washington, D.C., to E. A. Schmitt, Head Engineer, United States Engineer Office, Washington, D.C. , 4 December 1942 (Flood-October 1942, Sustainability-Dams)

"This Service will be pleased to permit the U.S. Engineer Office to enter upon the Chesapeake and Ohio Canal Parkway to perform the work necessary to the restoration of the Little Falls Feeder Canal, the works constituting the feeder lock and that section of the main canal between the feeder lock and the intake of the Dalecarlia emergency raw water pumping station . . ."

"There are no funds available to this Service for the accomplishment of any of the work outlined above and it is understood that the project will be undertaken entirely at the expense of the U.S. Engineer Office."

"Your attention is directed to the condition of the Little Falls feeder dam which also was damaged by the flood. In its present condition, the dam would not divert a sufficient flow of water to the feeder canal during the low water stages of the summer months to maintain the level necessary to provide an adequate supply for the raw water pumping station. It is recommended, therefore, that repairs to the dam be included in your project."

[1460-C&O-5] E. E. Hamilton, Secretary-Treasurer, Bethesda-Chevy Chase Chapter, Isaak Walton League of America, to Irving C. Root, Superintendent, National Capital Parks, 17 December 1942 (Damage Prevention-Park Service, Flood-October 1942, Flood Damage-Financing)

This letter contains a resolution to the effect that since the section of the canal from Seneca to Brookmont cannot be restored until after the war and because the canal, before its restoration in the late 1930s, was a breeding ground for mosquitoes and a dumping ground for trash, that "the National Park Service be requested to use what maintenance funds available to ditch the center of the remaining canal bed so that drainage and what stream water entering it will not collect into pools, and that the paddles in the closed locks be kept open so that this water may be kept moving and allowed to drain out." The League also requested that "'No Dumping' signs be erected along the canals" and the regulation enforced."

#### 1943

[1460-C&O-5] Lewis Radcliffe, Vice President, Isaak Walton League of America, Washington, D.C., to Millard E. Tydings, U.S. Senate, 1 March 1942 (Flood-October 1942, Flood Damage-Financing)

Radcliffe asks Tydings to support H.R. 1975, a House resolution providing for, among other things, \$110,000 for the restoration of the C&O Canal from Georgetown to Little Falls. Radcliffe noted that an additional \$140,000 would "restore the canal all the way to Great Falls."

[1460-C&O-5] "Staff Meeting," 16 March 1943 (Flood-October 1942)

Unattributed minutes from a National Capital Parks [?] staff meeting, stating, "12. Towpath: There was considerable discussion regarding temporary repairs to the towpath, and it was agreed that repairs would be made as soon as plans could be prepared covering the towpath from Georgetown to Lock No. 5."

[1570-35] Lt. Col. Richard W. Cook, Executive Assistant, Corps of Engineers, U.S. Engineer Office, to Irving C. Root, Superintendent, National Capital Parks, Washington, D.C., Washington, D.C. (Flood-October 1942, Flood Damage Prevention-Contingency Planning)

"1. In confirmation of telephone conversations with Mr. P. E. Smith on April 16 and 19, 1943 relative to your plan of action during flood emergencies, the following paragraphs will be added, subject to your approval. A final draft containing the plans of all agencies will be submitted to your office in the near future. The emergency operations to be undertaken for protection of the C. & O. Canal will be added when a final decision is reached as to whether its function in the emergency supply for Washington would necessitate retaining the water in the canal."

"Chesapeake and Ohio Canal. Upon notification of an impending flood, protective measures along the canal route will consist of warning residents in the homes located within the park area from Georgetown to Great Falls. The District of Columbia Engineering Department will be responsible for warning residents of the section from Georgetown to the D.C. line for the area outside the limits of the C. & O. Canal property of the National Capital Parks."

[1460-C&O-5] Irving C. Root, Superintendent, National Capital Parks, to Joseph Clark Baldwin, U.S. House of Representatives, 2 April 1943 (Flood-October 1942)

"The Congress recently appropriated funds for the partial repair of the flood Damage . . . and this work will be rushed with all possible speed."

"The extent of the flood damage was much greater than is generally known, however, and it probably will not be possible to have a continuous flow of water through the canal between the Little Falls feeder dam and Georgetown before the month of August. In the meantime, temporary corrective measures will be taken to correct conditions along the canal insofar as it is feasible or practicable."

"No funds have been appropriated by the State of Maryland for the correction of any conditions along the C. & O. Canal, and no federal appropriation has been made for the repair of damages beyond the Little Falls feeder, which is located in Maryland approximately one mile west of the District of Columbia boundary."

[1460-C&O-5] F. F. Gillen, Acting Superintendent, National Capital Parks, Washington, D.C., to Arthur D. Hill, Jr., Acting Assistant Solicitor, Department of Labor, Washington, D.C., 16 April 1943 (Flood-October 1942, Delays-Bureaucratic)

"Reference is made to your letter of April 8, 1943, transmitting the decision of the Secretary of Labor pertaining to the wage determination under the Davis-Bacon Act, with respect to the contract for the restoration of the Chesapeake and Ohio Canal."

"This office wishes to appeal the decision as the wage rates seem to be based on the premise that the work involved is of heavy construction and carries too high a wage rate."

"The work actually to be performed is as follows:"

"1. Repairing an earth towpath which will consist of backfilling the breaks in the towpath with earth and compacting it with bulldozers, sheeps-foot rollers and tampers. Part of the towpath will be stabilized-cement-clay but the equipment and labor will be the same as for the regular type of towpath."

"2. Laying of rough riprap against the towpath from eroding. Stones will vary in weight from 20# to 200#."

"3. Construction of a concrete spillway 6" thick - a type of work usually performed by a road construction crew."

"4. Construction of an earth gravity dam 200' long with a concrete core wall approximately 2 feet thick and 15 feet high. The concrete will have light reinforcement in it but will be rough construction, requiring no high degree of skill for installation."

"5. Repairs to a stone dam across the Potomac River, which will consist of moving stones from downstream of the dam back to the dam. The stones will vary in weight from 20# to 300# and can be handled by hand or a dragline."

[1460-C&O-5] "Staff Meeting," 4 May 1943 (Flood-October 1942)

Unattributed minutes from a National Capital Parks [?] staff meeting, stating, "C&O Specifications will be ready this week for the repair of the canal from Lock 5 through the Georgetown area. Ninety calendar days will be given the contractor to complete the contract. This work will include restoration of the canal at Lock 5 and work on the dam across Little Falls to keep the water level up."

[1460-C&O-5] Irving C. Root, Superintendent, National Capital Parks, to William D. Williams, Chief Water Supply Section, Water Division, Office of War Utilities, War Production Board, Washington, D.C. (Flood-October 1942, Flood Damage Prevention-Ordered)

". . . you are advised that \$110,000 is to be spent in restoring the Chesapeake and Ohio Canal from Brookmont, Maryland, to Georgetown. The money was appropriated by Congress since the flood of October 16, 1942."

"The majority of the work will consist of building an earthen towpath, part of which will be

stabilized with cement, construction of an earthen dam with a concrete corewall, and repairing a loose stone dam across the Potomac River which is used to divert water from the river into the canal."

[1460-C&O-5] Irving C. Root, Superintendent, National Capital Parks, to Thomas H. MacDonald, Public Roads Administration, Washington, D.C., 14 May 1943 (Flood-October 1942)

"This Office is issuing invitations for bids for the repair and restoration of the Chesapeake and Ohio Canal from Brookmont, Maryland, to Georgetown in the District of Columbia. The majority of the work will consist of rebuilding the towpath using a specially constructed earth fill and, as an alternative, using a 6 inch soil cement stabilized covering over the towpath."

"In order to obtain the maximum density of the soil used, it will be necessary to run tests to determine the suitability of soils to be used by the contractor and to determine the maximum density and optimum water content of the soils. This Office no longer has the facilities to make such tests and it is, therefore, requested that the Research Laboratory of the Public Roads Administration make the tests for us."

[1460-C&O-5] Irving C. Root, Superintendent, National Capital Parks, to Major D. M. Radcliffe, U.S. Engineers Office, Washington, D.C., 17 May 1943 (Flood-October 1942)

"Invitation to bid for the Repair and Restoration of the Chesapeake and Ohio Canal from the Potomac River Dam at Brookmont, Maryland, to Georgetown in the District of Columbia, was sent to nineteen bidders on May 14."

[1460-C&O-5] A. E. Demaray, Associate Director, National Park Service, to the Director, National Park Service, 1 June 1943 (Flood-October 1942)

"It is requested that the unallotted balance of \$12,135 which remains in the appropriation '1431057 - Salaries and Expenses, National Capital Parks, 1943' be allotted to the National Capital Parks immediately to permit essential restoration work along the Chesapeake and Ohio Canal necessitated by the Potomac River flood of October 15-17, 1942."

"The supplemental appropriation of \$140,000 available for this purpose is insufficient to accomplish all the work necessary to maintain a flow of water through the area in which the Government has contractual obligations to the D.C. Papers Mills and the Wilkins-Rodgers Milling Company, due to the upward adjustment of wage rates and increases in the cost of materials which have been effected since the original estimates were prepared. Bids for the restoration work were opened on May 28. The low lump sum bid was for the repair of the canal proper was \$131,691; the low bid for the repair of the feeder dam in the Potomac River was \$22,176 - making a total of \$153,867. An alternative proposal for constructing a concrete cap in place of a rip-rap cap has been submitted, offering a deduction of \$4,500. It is proposed to accept this deduction, which will reduce the total amount necessary for the restoration of the flood damage to the canal from Lock No. 5 to Georgetown, to \$149,367. The balance which would be available in the event that the above-requested allotment is approved will be used for necessary expenses in connection with the administration of the contract."

[1460-C&O-5] "Staff Meeting," 2 June 1943 (Flood-October 1942)

Unattributed minutes from a National Capital Parks [?] staff meeting, stating, "A memorandum has been sent to the Chicago office asking them to have the Budget release funds for the restoration of the Chesapeake and Ohio Canal, and we are awaiting to hear from that before that before letting the contract for this work."

[1460-C&O-5] Tolson, National Park Service, to A. E. Demaray, Associate Director, National Park Service, Washington, D.C. , 3 June 1943 (Flood-October 1942) [telegram]

"YOUR MEMO JUNE 1. SEE OUR MEMEO JUNE 1. ALLOTING 7,135 DOLLARS NCP TODAY. IF 5,090 DOLLARS BUDGET RESERVE NEEDED PLEASE SECURE INFORMAL BUDGET APPROVAL FOR RELEASE."

[1460-C&O-5] Irving C. Root, Superintendent, National Capital Parks, to Corson & Gruman Co., 7 June 1943 (Flood-October 1942)

Root awards Corson and Gruman the repair and restoration contract of the canal from Brookmont to Georgetown.

[1460-C&O-5] Ivan H. Sims, Secretary-Treasurer, Bethesda-Chevy Chase Chapter, Isaak Walton League of America, to Irving C. Root, Superintendent, National Capital Parks, 19 June 1943 (Damage Prevention-Park Service, Flood-October 1942)

Another letter complaining about the odor and health issue of the unrepaired portion of the canal from Brookmont to Great Falls. Resolution requests that the Park Service make some provisions to provide for drainage of the canal.

[1460-C&O-5] Irving C. Root, Superintendent, National Capital Parks, to Ivan H. Sims, Secretary-Treasurer, Bethesda-Chevy Chase Chapter, Isaak Walton League of America, 25 June 1943 (Damage Prevention-Park Service, Flood-October 1942)

"The insanitary condition at some spots along the Canal also has been of concern to this office

and you will undoubtedly be pleased to know that one sewer pipe which drained into the Canal has been diverted and two or three others are in the process of being removed."

[1570-35] F. F. Gillen, Acting Superintendent, National Capital Parks, Washington, D.C., to Lt. Col. Byron Bird, Chief, Engineering Division, U.S. Engineer Office, Washington, D.C. (Flood-October 1942, Flood Damage Prevention-Contingency Planning)

"Subject: Emergency Flood Plan for Washington, D.C."

"2. For a predicted stage of 12.6 at Wisconsin Avenue:"

"Chesapeake and Ohio Canal - warn residents in homes located within park area from Georgetown to Great Falls.

Install stop logs for the Stop Lock located above Lock 16 upon receiving the work signal from the U.S. Engineer Office."

[CF] The Evening Star (Washington, D.C.), 4 October 1943, A2 (Flood-October 1942)

"C. & O. Canal Barge Trips Resumed on Sundays" This Star report indicates the canal was sufficiently repaired by October 1943 to resume the popular barge trips.

1944

[1460-C&O-5] F. F. Gillen, Acting Superintendent, National Capital Parks, Washington, D.C., to The Master Builders Company, Cleveland, Oh., 18 February 1944 (Flood-October 1942)

This company had tried to sell building materials to the Park Service for the C&O Canal repairs.

Gillen replied, "you are advised that the repair work on the Chesapeake and Ohio Canal was completed last Fall and that there are no plans for any further repair work on the Canal in the near future."

1945

[650-03] John Nolen Jr., Director Planning, to General Grant, 9 April 1945 [Memorandum] (Flood Damage Prevention-Debate, Flood Damage Prevention-Proposed, Widewater-Sustainability)

"Now that the power aspect of the so-called flood control report is disposed of, what would you think of requesting the Chief of Engineers to make a study and recommendations of ways and means for protecting the C. & O. Canal from excessive damage by the larger floods?"

"I am convinced that properly designed revetments, spillways, diversion levees and other facilities could mitigate if not entirely eliminate the bad wash-outs that occurred in the 1924, 1936 and 1942 floods. It is probably not feasible to attempt protections from what might be called minor erosion or wash-outs, but such major damage as occurred at Widewater and the upper part of the Feeder Canal could be eliminated."

"As the protective works would probably in most cases occur where damage has been done, a flood protection project for the C. & O. Canal would in effect mean its restoration under a River and Harbor authorization. Since the C. & O. Canal is Government property, this would be as reasonable a recommendation to Congress as are other protective works for Government property."

"Shouldn't we discuss this idea with Mr. Demaray, as I presume the Park Service as the custodian of the Canal, should make any request to the Chief of Engineers."

[Handwritten notation, presumably from General Grant]

"To Mr Demaray-

Something it might be worthwhile discussing with District Engineer when you are conferring about changes in the Washington D.C. protection works. WG"

[1460-C&O-5] 205th Meeting of the National Capital Park and Planning Commission, 19-20 April 1945 (Flood Damage Prevention-Abandoned, Flood Damage Prevention-Debate)

Unattributed minutes state;

"11. C. and O. Canal Recreational Waterway Protection:"

"Mr. Nolen reported that the report on the Potomac River Survey eliminated the need for any flood protection for the lower section of the C. and O. Canal, because the sections that are damaged badly were the sections that are flooded by the reservoirs. He recommended that the Chief of Engineers be requested to consider a program providing special protective works for those portions of the Canal which are a part of the George Washington Memorial Parkway. General Klingman expressed the view that the Chief of Engineers would hold that any protection for the Canal would be the responsibility of the National Park Service and not his office, and he did not believe such work could be justified under their flood control legislation."

"The Commission decided that the matter should be discussed informally by the National Park Service."

[1460-C&O-5] H. E. Van Gelder, Landscape Architect to Harry T. Thompson, 12 June 1945  
(Renovation-Post WWII)

"Program for Rehabilitation of C&O Canal - 1945"

"A. Repair of damage done by 1942 flood consisting of major repair and reconstruction work at Widewater and minor repair work (washouts) at Locks 7 and 8, including a proposed spillway at Lock 7; also, resurfacing of the entire length of towpath from Georgetown to Seneca."

[1460-C&O-5] Contract, 20 June 1945 (Renovation-Post WWII, Sustainability-Dams)

"Repairs to Feeder Canal Dam at High Island, Brookmont, Maryland, was awarded to J. L. McIlvaine for the lump sum of \$6,990.00 and as it may be modified by the application of Alternative Bid 'A' (\$31.00 per cubic yard of additional concrete.)"

[1460-C&O-5] P. E. Smith, Chief, Engineering Division, to H. T. Thompson, 29 August 1945  
(Renovation-Post WWII)

"Rewatering of Canal from Angler's Inn to Lock 5" [Here begins the discussion of restoring the canal from Brookmont up to below Widewater]

"An inspection made on Monday, August 27th, by Messrs. Sager, Van Gelder, Hudson and myself, of the C&O Canal, one of the items considered was the advisability of repairing breaks in the towpath at Lock 7 and at the core wall near the Angler's Inn, and obtaining water from the Washington Aqueduct for refilling the Canal between the Angler's Inn and Lock 5. It would be necessary to construct a dam across the Canal above the source of water to prevent the water flowing back into widewater which cannot be repaired at this time."

"We were all of the opinion that the idea was a good one. Based on your approval, Mr. Hudson will repair the break at Lock 7 and clean out and repair all locks, spillways, etc., between the above mentioned areas."

"We will contract for restoring the break and installing an earth dam at the Angler's Inn. It is estimated that between 4,000 and 5,000 yards will be needed at Angler's Inn."

[1460-C&O-5] Irving C. Root, Superintendent, National Capital Parks, Washington, D.C., to Colonel John M. Johnson, District Engineer, U.S. Engineer Office, 17 September 1945  
(Renovation-Post WWII)

"Since the meeting held in your office on August 27, at which time we discussed with Mr. E. A. Schmitt and Major D. M. Radcliffe the possibility of obtaining a limited supply of raw water from the Aqueduct to fill and maintain in a flushed condition the Chesapeake and Ohio Canal from Angler's Inn to Lock 5, we have decided that this portion of the Canal should be repaired and placed in operation as a public service as soon as a few necessary repairs can be made. Our plans are contingent upon completing arrangements with your office to supply sufficient water for this purpose until such time as permanent repairs can be made."

[1460-C&O-5] E. A. Schmitt, Chief Water Supply Division, U.S. Engineers Office, Irving C. Root, Superintendent, National Capital Parks, Washington, D.C., 2 October 1945 (Renovation-Post WWII)

Schmitt indicates that the water needs of Washington, D.C. are too large to spare water from the Washington Aqueduct to feed the canal from Old Angler's Inn. Schmitt suggests a partial solution would be to divert the water from Rocky Run, downstream from Old Angler's Inn to feed the canal, and to look into diverting other streams to feed the canal."

[1460-C&O-5] NCP Staff Meeting, 10 October 1945 (Renovation-Post WWII)

"The Repair and Construction Division is performing two major repair jobs on the canal, one at Lock 7 and the other at Angler's Inn."

[1460-C&O-5] William G. Hayward, Civil Engineer, P. E. Smith, Chief, Engineering Division, and Merel S. Sager, Planning Division, to Irving C. Root, Superintendent, National Capital Parks, Washington, D.C., 24 October 1945 (Easements-Park Service)

"Report of Investigation of the Flood Control Project at Cumberland, Md., and its Effects on the C & O Canal."

"An investigation was made by the undersigned in company with Mr. Shore of the U.S. Engineer Office for the purpose of determining the effect on the C & O Canal of the proposed flood control work at Cumberland, Md. The field inspection was made October 9-10, 1945."

"In general, the project affects the canal in two ways, first, the dam at Cumberland will be

removed, cutting off the supply of feeder water for the canal. Dam No. 6 has been destroyed, so that the next source of water is Dam No. 5 located 85 miles below Cumberland. Second, the canal and towpath will be filled, together with adjoining canal property to a depth varying from approximately four feet over the towpath to ten or twelve feet over the canal and adjacent property."

Because restoring the upper portion of the canal was not cost effective and the flood control project would protect the remainder of the canal property in the area, the Park Service cooperated with the U.S. Engineers in the project.

[1460-C&O-5] NCP Staff Meeting, 24 October 1945 (Easements-Park Service, Flood-September 1945, Renovation-Post WWII)

Unattributed minutes state:

"4. C&O Canal - The work on the canal is going along well and the dam at Anglers Inn has been constructed."

"Mr. Smith stated that the contractor had finished the work at the Feeder Canal Dam. A minor flood in September washed out some dirt adjacent to the contractor's work which the contractor has replaced on a cost-plus basis and we are now awaiting the figures on this work."

"Mr. Sager made a very interesting report of the trip to Cumberland made on October 9 and 10 with Mr. Smith and Mr. Hayward to investigate on the ground the U.S. Engineers' plan for control at that side [?]. The plan calls for dredging the Potomac River and Wills Creek and placing this fill over the canal and the canal property including the area now used for a ball park, raising the height of the walls through the city, relocation of the intake dam, and the construction of a breakwater at the confluence of the Potomac River and Wills Creek. The proposed fill over canal property would enhance its value for city park and recreation purposes but would preclude future use of the canal as a waterway within the city. This proposal and many other requests for use of the canal properties make it necessary that a policy for the future recreational use of the canal as a whole be determined."

[1460-C&O-5] A. E. Demaray, Associate Director, National Park Service, to the Secretary of the Interior, 11 December 1945 (Easements-Park Service)

Demaray recommends that the Park Service go along with the Corps of Engineers plans for flood control in Cumberland, because the restored section of the canal between Georgetown and Seneca "should be ample to disclose to the visiting public the historical aspects of the canal, and also should be ample to actively maintain as a recreational area. The restoration and maintenance of a greater area would involve great expense. . . . The canal property within the city of Cumberland, Maryland, both from the standpoint of expense and future use is such as not to justify the restoration of the canal, but the work contemplated by the War Department would enhance the value of canal property for recreational use as a city park or parkway."

#### 1946

[1460-C&O-5] Sidney McClellan, Senior Attorney, National Capital Parks, to Assistant Solicitor Edelstein, 10 January 1946 (Easements-Park Service, Flood Damage Prevention-Debate)

"Authority to cooperate with U.S. Engineer Office in its flood protection program at Cumberland, Maryland, and Ridgeley, West Virginia."

There seems to be a debate going on within the federal government in 1946, about whether the government had bought the C&O Canal to restore the canal as part of a park for recreational purposes or as the right of way for a parkway. McClellan took the latter position. He went further and stated:

" . . . the flood conditions that prevail in the lower Potomac would make the restoration of the canal at many places foolhardy. At the time of purchase, flood hazards were still a major factor to be considered in any development program. What the National Park Service does with the property will depend to a great extent upon flood control measures taken by the U.S. Engineers. It is essential, therefore, that we plan and work with that Agency insofar as the development of any property along the banks of the Potomac is concerned."

[1460-C&O-5] A. E. Demaray, Associate Director, National Park Service, Washington, D.C., to Colonel Donald G. White, District Engineer, U.S. Engineer Office, Washington, D.C., 24 January 1946 (Easements-Park Service)

"This Service has no objection to your Office adopting in principle the study for flood protection of Cumberland and Ridgeley which would provide for filling of the C&O Canal and adjacent properties along the upper reaches, the removal of the C&O Canal Dam, and the improvement of other features in Cumberland, Maryland, substantially as indicated on Print B-251-150. Permission will be granted to perform such work upon park lands and properties, providing that the Corps of Engineers will assume the obligation of providing suitable facilities for supplying water to the canal at some point downstream from the contemplated flood control work . . . ."

[1460-C&O-5] National Capital Parks Press Release, 1 February 1946 (Renovation-Post WWII)

"The Chesapeake and Ohio Canal is being refilled with water between Cropley and Brookmont,

Maryland, Irving C. Root, Superintendent, National Capital Parks, announced today. Completion of the operation will provide a continuous flow of water between Seneca, Maryland, and Georgetown, with the exception of a distance of approximately one mile in the vicinity of Wide Water, Md., where extensive construction work will be required to repair the damage to the canal basin caused by the flood of October 1942."

"Refilling of the canal was made possible through the cooperation of the United State[s] Engineer's Office, which was able to divert water to the canal from the Washington Conduit in connection with the annual operation for cleaning and repairing the conduit, The National Park Service also has arranged with the U.S. Engineers Office for a supply of water to supplement that which flows into the canal basin from natural sources, in an amount to maintain a continuous flow in the Croyley-Brookmont area during the coming season. The flow of water between Seneca, Maryland, and the stop lock at the upper end of the Wide Water area is provided by the Seneca feeder dam. The Little Falls feeder dam provides a similar service in the area between Brookmont and Georgetown."

[CF] [1570-35] Congress, House, Committee on Flood Control, Potomac River and Tributaries, Maryland, Virginia, West Virginia, and Pennsylvania, 79th Cong., 2d sess., House Document No. 622, p. 20-39 (Flood-November 1877, Flood-May-June 1889, Flood-October 1896, Flood-March-April 1924, Flood-March 1936, Flood-October 1942, Potomac River-Hydrology)

This report contains useful information on the hydrological characteristics of the Potomac basin, and information on the various floods.

Some of the more interesting excerpts include why the Potomac River is particularly flood prone (24):

"The capacity of streams in the Potomac River to translate run-off rapidly downstream results (a) from the mountainous terrain of the larger portion of the basin and (b) from the pattern of the streams in the watershed in which tributaries of nearly equal length converge at several points to synchronize flood crests. Studies indicate that the same amount of flood run-off will produce larger flood flows in the Potomac River Basin than in adjacent Middle Atlantic coastal rivers to the south."

The report also contains some useful information on the effects of development on flooding (31):

"The flood plains along the Potomac and its tributaries are subject to infrequent inundation from large floods which cause considerable loss and inconvenience to agricultural and urban areas, and to transportation and communication facilities. Flood damage occurs to property improvements which have encroached on the flood plain and to highways and railroads that constrict the stream channels with bridges and embankments. The agricultural areas subject to flood damage are widely distributed and generally lie in narrow strips along the streams. The limited acreage of the bottom land and its natural fertility have resulted in intensive use of farm land on the flood plains. Changes in land from forests or grass to crops on the fertile bottom land have increased erosion or scour. "

[1460-C&O-5] P. E. Smith, Engineer, to Robert C. Horne, Chief, Engineering Division, National Capital Parks, 17 October 1946 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Condition of Feeder Canal Dam across the Potomac River at Brookmont, Md."

"An inspection was made with Mr. Haywood on September 5, 1946 of the stone dam which diverts water from the Potomac River into the Feeder Canal above Lock 5."

"It was found that a large proportion of the stones have been dislodged. It is in sufficiently bad shape to recommend that it be repaired based on its present condition. After going through another winter subjected to possible ice jams and ensuing spring high waters, it should definitely need reconditioning next summer."

"The concrete cap between Station 2/00 to 4/00 was in good shape. This test section was poured in a section of the stone dam that previously badly washed out."

"The stones were relaid in the dam in the summer of 1943 at a cost of \$22,176 and again in the summer of 1944 at a cost of \$16,900. The 200-foot test section of concrete cap cost an additional \$4,200. The concrete cap is 4" thick, reinforced with wire mesh and extends to Elevation 39 on the upstream face and Elevation 39.5 on the downstream face. The river was very low in the summers of 1943 and 1944 which made relatively easy working conditions."

"The stones in the dam are laid loose and water flows through the dam at all times. This is true in the concrete test section also."

"After a period of two years, it is definite that the concrete cap prevents the dislocation of stones and in the long run will cut down the cost of maintaining the dam."

"Relaying the stones in the summer of 1947 will probably cost about \$30,000. Installing the concrete cap from High Island to Snake Island would cost approximately \$33,000 additional. Installing the concrete cap from Snake Island to the Virginia shore would cost approximately \$56,000. The total cost of capping the total length of the dam would be approximately \$89,000 which would balance out three relayings of the stone."



"If funds are available (approximately \$119,000) I recommend repairing the dam next summer and putting in the concrete cap for the total length of the dam."

[1460-C&O-5] Harry T. Thompson, Assistant Superintendent, to Chief, Construction and Repair Division, 30 October 1946 (Flood Damage Prevention-Failure)

"I am concerned that the repairs to the towpath above Lock 7 have not been completed to the point where the towpath has been raised to a level sufficient in height to avoid a repetition of the last washout at this location. Personal inspection suggests that the repaired portion of the towpath is still from 6 to 10 inches low which provide a natural point for the a repetition of the damage which has just been repaired. Please check this and do whatever is necessary to raise the towpath at this location up to or above the level of the towpath at either end of the washout."

[650-03] Irving C. Root, Superintendent, National Capital Parks, Washington, D.C., to F. Wallace Taber, Editor, Rally Sheet, League of Maryland Sportsmen, Baltimore, 14 November 1946 (Flood-October 1942, Flood Damage Prevention-Debate, Renovation-1938-42, Renovation-Post WWII)

"I read with regret the criticism of this Service in connection with its stewardship of the Chesapeake and Ohio Canal in an editorial published in the October issue of the 'Rally Sheet.'"

"Prior to its acquisition by the Federal Government in 1935, the canal had been in disuse and disrepair for approximately 180 of the 184 miles of its total length since 1924. Successive floods had made a shambles of locks and levees and the private owners found it to be uneconomic and impracticable to attempt to maintain the waterway. So far as we know, no state or private agency made any attempt to acquire and to restore the canal and the heavy growth of weeds, brush and trees to which you refer in your editorial were permitted to become established in the canal bed under private ownership."

"When the canal finally was acquired by the United States and placed under the jurisdiction of the National Park Service, the sum of \$500,000 of Public Works funds was made available for the rehabilitation of the canal. We immediately proceeded with the work of restoration and were able, in a comparatively brief period, to repair the canal for a distance of approximately 22 miles between Georgetown and Seneca, Md. This work was prosecuted largely with CCC and other types of emergency labor and every possible economy was effected in the construction program, but the tremendous expense of repairing locks, cleaning out the canal bed, rebuilding the towpath, bridges, etc., exhausted all available funds. In October 1942, a disastrous flash flood destroyed much that had been accomplished in the restoration of the canal between Seneca and Georgetown. Since that time, we have attempted to obtain funds to repair this flood damage and with some success have been able, during the past year, to maintain the flow of water between Seneca and Great Falls and between Old Angler's Inn and Georgetown. We were able to provide water for the section between Old Angler's Inn and the Little Falls Feeder only through cooperation with the U.S. Engineers, who have diverted water from the Washington Aqueduct for this purpose. The heavy cost of repairs and unavailability of funds have made it impossible to repair the damage at Widewater, however, and the canal has remained dry for a distance of approximately one mile between Great Falls and Angler's Inn."

"It would be difficult to forecast the future that is in store for the canal area above Seneca, Md. The National Park Service never has expressed the opinion that complete rehabilitation was feasible. It would cost many millions of dollars. The ever-present flood danger would challenge the wisdom of such an expenditure even if the money and material were available. We do believe, however, the certain areas along the canal lend themselves to the development of recreational facilities, and we shall continue our efforts to obtain funds for the accomplishments of these objectives. First, however, the question of flood control in the Potomac Valley must be solved and there must be reasonable assurance that any projects undertaken could be of a permanent nature."

"This office would be pleased to consider any practicable suggestions which the League of Maryland Sportsmen might offer in connection with the future development of the C. & O. Canal for recreational purposes. They should be made, however, upon a basis of sound engineering and with due consideration to flood hazards and construction costs."

1947

[CF] The Evening Star (Washington, D.C.), 29 May 1947, A2 (Flood-May 1947)

"Canal Repairs Planned After 50-Foot Break Lowers Water Level" The Star reported the break was blamed on the collapse of a conduit because of "recent heavy rains."

[CF] The Evening Star (Washington, D.C.), 30 May 1947, B1 (Flood-May 1947)

"D.C. to Rush Work On Sewer Line to Hasten Canal Repair" The article indicated the break drained five miles of the canal. It was the result of the failure of a 100 year-old culvert unable to handle the run-off from a modern storm drain.

[1460-C&O-5] Robert C. Horne, Chief, Engineering Division, to Harry T. Thompson, Assistant Superintendent, 20 June 1947 (Flood Damage Prevention-Proposed, Sustainability-Dams)

Horne recommends that the NPS proceed with the plans to repair and improve Dam No. 1 discussed

the previous fall, during the next low water period.

[CF] The Evening Star (Washington, D.C.), 4 July 1947, B1 (Flood-May 1947)

"Canal Temporarily Dammed" The article reports the break in the canal has been fixed.

[1460-C&O-5] Harry T. Thompson, Assistant Superintendent, to G. E. Clark, Chief, Construction and Repair Division, 9 September 1946 (Flood Damage Prevention-Proposed, Sustainability-Dams)

Thompson instructs Clark to proceed with repairs of Dam No. 1.

"Should it be impossible to complete restoring the entire dam to its design cross section before high water, it is desirable to repair the most badly damaged areas."

[1460-C&O-5] Robert P. Stevens, Landscape Architect, to Merel S. Sager, Chief, Planning Division, 7 October 1947 (Flood-May 1947)

"The general situation about Lock 7 (Berm side) and lockhouse adjoining it, is that the most recent heavy flood cut out around the back of the lock wall, around the back of the house, in the lawn area itself, along the sluiceway. The rock walls of the sluiceway have been replaced but subsequent rains have cut back of these walls to a degree and have apparently accentuated other washes started by the flood. The rock walk to the sluiceway and the stone porch on the west, are partially undermined."

"The principal reason for continuing erosion and water pockets is the fact that the original washouts were never filled, and that water flows toward the house from three directions. What is needed is not only a filling job but a grading job."

"Filling should be done along the inside of the lock wall; in the lawn area in the vicinity of the sycamore; along the south, west, and north sides of the house; along the walk from the porch to the sluice-way bridge; and along the sluiceway wall (south side). Approximately 175 yards of fill will be required. It does not appear that this would be available in the nearby area, but it may be obtained back of the Cabin John Firehouse. One hundred Ten yards of topsoil, placed to a depth of 4 inches, would be required to do the front, west and north sides of the house. If the back or north side was eliminated was eliminated, 90 yards must be required. To secure access by truck, a temporary bridge must be thrown across the lock walls, toward the east end."

"The area is very rough around the house, so that it should be rough graded, knocking off a high point existing in front of the house. A little leveling up could be done east of the basement entrance, and the slope back of the house on the opposite side of the sluiceway could be graded."

#### 1948

[1460-C&O-5] Irving C. Root, Superintendent, National Capital Parks, to Mrs. T. M. Andrews, Chairman, State Social Studies, Maryland State Division of the American Association of University Women, 9 February 1948 (Flood Damage-Long Term)

This letter was in response to Andrews' request for information on recreational facilities of the canal. Root responded, in part, "The canal towpath is open for hiking for the full distance from Washington to Cumberland, Maryland, with the exception of short distances where the path has been destroyed by floods or where the overgrowth makes hiking a very rugged pursuit. In most of these instances, however, the canal may be traversed or by-pass routes may be used. . . . Unfortunately there are no appropriated funds available for the restoration of the long stretches of the canal which are now in disuse because of flood damage."

[1460-C&O-5] Harry T. Thompson, Acting Superintendent, National Capital Parks, to H. J. Spelman, Division Engineer, Public Roads Administration, Arlington, Va., 5 March 1948 (Easements-Park Service)

"The flood protection project for Cumberland has advanced to the point where the Corps of Engineers hope to start work shortly after July 1 of this year. This project includes levees, fills, and proposed railroad construction on U.S. Reservation 404M, C&O Canal, in the area where we visualize the parkway location. We also understand the city of Cumberland has secured authority to issue bonds for the construction of a new bridge and viaduct for route U.S. 40 just north of the terminus of the C&O Canal."

[CF] The Evening Star (Washington, D.C.), 16 April 1948, A10 (Flood-April 1948)

"Flood Stage Reached Above Chain Bridge" Reports the Potomac just over flood stage at Chain Bridge as a result of heavy rain and high water farther upstream. No mention of the canal.

[1460-C&O-5] Harry T. Thompson, Assistant Superintendent, National Capital Parks, to Robert C. Horne, Chief, Engineering Division, National Capital Parks and Merel S. Sager, Planning Division, National Capital Parks, 26 July 1948 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"The following is quoted from a letter written 7/19/48 by Colonel Harry W. Wolfe, Corps of Engineers, District Engineer, to Mr. William H. Cary Jr., Director, Bureau of Public Health Engineering, Office of the Health Department:"

'The existing rock-fill feeder dam near High Island will be replaced with a permanent diversion dam and at its Maryland end a pumping station with a capacity

of about 427 m.g.d., will be constructed to deliver additional water to the Dalecarlia reservoir about three-quarters of a mile distant.'

"I am interested in this statement since we have within the past two years and are currently attempting to cap the existing High Island dam with concrete. There has been inserted in the P.C.P. program an item for its entire distance across the river. Currently, Mr. George Clark is engaged in reshaping the dam in order to provide water for the paper and flour mills."

"Will you jointly determine in consultation with the U.S. Engineers the grounds for their statement that there will be a permanent dam erected at this location in order that we may govern our operation on the present rock dam accordingly."

[1460-C&O-5] Robert C. Horne, Chief, Engineering Division, National Capital Parks, to Harry T. Thompson, Assistant Superintendent, National Capital Parks, 28 July 1948 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Reference is made to letter of July 14, 1948 from the D.C. Paper Mills, Inc., advising that they and the flour mill, Wilkin-Rogers Milling Company, had changed over from Potomac Electric Power Company service to water power on Sunday, July 11, 1948, but have been unable to operate because of insufficient water in the canal."

"On July 22 I examined the condition of the dam from the shore and found that the water level behind the dam was approximately elevation 39, 2 feet below the designated elevation of the top of the dam (elevation 41.0') and that the top approximately 2 ft. of stones of the dam displaced permitting the water to flow over the dam at approximately elevation 39, 2 ft. below the elevation designed for operation of the canal, and the supply of water to the mills."

"There are only two solutions to this problem, (1) repair the dam. (2) high water in the river, which of course, we cannot control. We again recommend that the dam be repaired by replacing the stones, grouting, and placing a concrete cap as shown on our drawing entitled "Repairs to Stone Dam across the Potomac River, Brookmont, Maryland, C. & O. Canal", No. NCP 110.4-13. These repairs should be made during the period of low water which we can normally expect during the latter part of July, August, and September. You will recall that the \$15,000 more or less which is the average annual allotment for the purpose of repairs to this dam was used for other projects in several previous fiscal years."

"The partial repairs made last fall by the Construction and Repair Division were estimated to have cost about \$6,000 (the Accounts Section is now determining this cost formally[])."

"Our Project Construction Program, NCP-M-24 covers a project for replacing the stones, grouting, and placing a concrete cap on the dam in the amount of \$119,000 for the entire length of the dam."

"Job Order No. 9775 has just been issued covering repairs which you have authorized Mr. Clark to perform immediately."

"This work should involve repairing the dam with stones procured from the farthest downstream edge of the rock. I am aware that this will, in general, involve double handling of the rocks, but as has become apparent from work last year utilizing stone within reach for one handling leaves the rebuilt section with less support to hold it in place. A further point in this reconstruction is that the large stones should be fitted together and chinked with smaller stone. A great deal of the work last year involved picking up large and small stones indiscriminately with a higher proportion of the smaller stone and dropping them onto the crest of the dam, and I feel greater care should be taken in placing the stones."

[1460-C&O-5] George E. Clark, Chief, Construction and Repair Division, National Capital Parks, to Harry T. Thompson, Assistant Superintendent, National Capital Parks, 3 August 1948 (Sustainability-Dams)

"With reference to Mr. Horne's memo dated 28 July 1948 on Little Falls Dam, Mr. Horne states, 'as has become apparent from the work last year utilizing stone within reach for one handling leave the rebuilt section with less support etc.'"

"This is incorrect in so far as the work that was done from the Virginia shore to within approximately 200' of Snake Island where considerable time was spent bringing up large stones from down stream. To have just used the stone within easy reach would have not only been senseless but a waste of money and even I, with my few years of practical engineering, would not have permitted it. Also large and small stones were not picked up indiscriminately with a higher proportion of smaller stones; but on the contrary, large stones were placed on the crest and backed up with what was available."

"My last inspection of the work on 6 November 1947 before high water caught us, showed a crest of over 12' in width to within approximately 200' or so of Snake Island. High water continued to interrupt the work from this point on the Snake Island. From this island to the feeder mouth or High Island, our main concern was to get the crane off the job because it was obvious that further work would not be possible. I will grant that this stretch is

not up to standard; but at the same time, Mr. Horne neglects to mention the terrific pressure from the ice which I feel sure was sufficient to have dislodge[d] any masonry. While I wasn't at the dam, I did spend a good part of one night hoping that the additional steel cables placed on the Symphony Barge would hold it against the moving ice and for awhile it looked doubtful."

"I still feel that the repairs to this dam do not offer any problem that cannot be handled by force account providing we pick the working season in the late summer and fall and it is hoped this year to carry out, within available funds, Plan 110.4-13. "Repairs to Stone Dam across the Potomac River, Brookmont, Maryland, C&O Canal."

[CF] The Evening Star (Washington, D.C.), 17 December 1948, A6 (Flood-December 1948)

"High Water Rolling Down Potomac After Drop at Cumberland" The Star reports high water farther up the river, but does not mention the canal.

#### 1949

[1460-C&O-5] Irving C. Root, Superintendent, National Capital Parks, to Colonel Henry C. Wolfe, District Engineer, Corps of Engineers, 13 June 1949 (Study-Floods-National Park Service)

"In accordance with Public Law 618, 80th Congress 2nd Session, approved June 10, 1948 we are preparing drawings entitled, Flood Conditions, Washington, D.C. to Cumberland, Md., C&O Canal Parkway Study, No. NCP 110-80-29.1, 2, 3, preliminary prints of which are being forwarded to you under separate cover."

"The data shown on these drawings is a compilation of data from your published reports, the U.S.G.S., C&O Canal, B&O R.R. and others. The primary information we wish to develop is the profile of the 100% annual probability of occurrence and the 20% annual probability of occurrence from Cumberland to Great Falls, with particular reference to certain proposed developed areas which we have indicated in crayon in the drawings."

"We have discussed our problem with your Mr. Birrell who advises us that some of this data is available in your records and the remainder can be compiled at an estimated cost of \$300 to \$400."

"We would very much appreciate your furnishing us with this data, and you are authorized to bill this office for the cost thereof not to exceed \$400 as a charge against Appropriation 14x1013.001, Parkways, National Park Service."

[CF] The Evening Star (Washington, D.C.), 19 June 1949, A1, A3 (Flood-June 1949)

"Dramatic Rescues Made on the Potomac and Shenandoah" Article reports floods on the Upper Potomac and its tributaries. No mention of flooding, except to note that people with cottages between the river and the canal were in danger.

[CF] The Evening Star (Washington, D.C.), 20 June 1949, A1-A2 (Flood-June 1949)

"Potomac Passes Flood Crest; 9 Dead, 12 Missing Upstream" The Star describes flooding upstream. It makes no mention of the canal, and indicates no flooding expected around Washington, D.C.

[1460-C&O-5] Robert C. Horne, Chief, Engineering Division, National Capital Parks, to Sutton T. Jett, Lincoln Museum, 22 June 1949 (Easements-Park Service)

"On Tuesday June 14, Ben Breeze and I had a conference with Mr. Birrell and Mr. Shore of the U.S. Engineers and Mr. Paye, Engineer for the City of Cumberland for coordination of the Flood Control Project. Among other things the following information was obtained."

"1. The U.S. Engineers are willing to give us a statement of the type of construction of the C&O Canal Dam which they will remove, together with cross-sections or pictures of the dam in cross-section during removal. They state they have no photographer other than individuals taking pictures with their own cameras and therefore cannot agree to furnish us with photographs of the dam and intake, etc. which you desired. It is requested that you arrange to take such photographs of the dam, intake lock, canal and other facilities which you desire."

"2. The new low water elevation in Wills Creek at the intake lock after completion of the Flood Control Project will be elevation 595 at approximate low water stage about 30 second feet. The top of the sill of the outer gates of the intake is elevation 603.99, and top of the sill of the outer gates of the river lock is elevation 603.88. You can readily see that the bottom of the canal at this point will therefore be some 8 ft. above the top of the water level in Wills Creek. The top of the C&O Canal Dam which is to be

removed is now approximately elevation 611.5."

"3. It is necessary that the Flood Control Dyke be carried across the intake. Of the two solutions we suggested (a) carrying the dyke around the intake and river lock permitting them to open out on to the river and of course flood during the high water, or, (b) construct a flat slab flood wall across the face of the stonework at the river end of the intake, the U.S. Engineers favored the second."

"4. It is necessary that a conduit be constructed to carry the stormwater from West Cumberland across the Wills Creek to the Pumping Station proposed on Canal property. The U.S. Engineers propose that this conduit should pass under Wills Creek, rise to the level of the sill of the river lock just in front of the lock, and then a 4 1/2 ft. x 4 ft. box conduit to pass through the lock resting on top of the sill. They propose filling the lock up to this 4 1/2 ft. depth leaving an earth surface. We did not indicate either approval or disapproval. They originally contemplated cutting through the timber crib underneath the lock which forms the bottom of the lock and supports the lock walls. You might be considering this matter particularly in view of an historical and public exhibit."

"5. We agreed to permit the use of the canal lands as Spoil Area and reiterated our refusal to permit the railroad occupation of the canal lands and discussed several changes in the Flood Control Project."

"Would you please review your thoughts on all matters pertaining to the Cumberland area and particularly the Flood Control Project and let me have the benefit of your advise so it will be available for future discussion."

[1460-C&O-5] Randle B. Truett and Sutton T. Jett, Lincoln Museum, to Robert C. Horne, Chief, Engineering Division, National Capital Parks, 30 June 1949 (E) (Easements-Park Service)

"We have read and considered your memorandum of June 22nd covering several points of discussion in a recent conference of Mr. Breeze and yourself with the U.S. and City of Cumberland Engineers. We wish to make the following comments on the points listed in your memorandum:"

"1. We feel that the National Capital Parks should accept the offer of the U.S. Engineers to provide a statement describing the type of construction of the Chesapeake and Ohio Canal dam which is to be removed, and also the cross-sections and pictures of the dam made during the process of removal. The U.S. Engineers should be asked to advise this Office when the work of demolition is to be begun so that we may be sure all photographs required for future museum development are available."

"3. [?] Since the low water level of Wills Creek is to be some 8 feet below the top of the sill of the outlet and feeder gates of the C&O Canal at this location, we assume no river water would stand in the lock except at times of freshet or flood. In view of this condition it appears to us that the dyke around the intake and river lock would be preferred to a flat slab flood control wall across the face of the old stone work. Such a treatment would make possible the revival of the old wooden lock gates, and if desired, the actual opening and closing of these gates might be undertaken as a part of the interpretive program at the terminus of the C&O Canal. We recommend that the dyke be constructed from a design prepared by the National Park Service, and that it be in keeping with the masonry work seen along the canal."

"4. It would seem preferable to have the storm water conduit passing from West Cumberland across Wills Creek to the Pumping Station placed below the level of the sill of the river lock rather than to occupy a box conduit 4 1/2 feet x 4 feet in the bottom of the lock itself. Such construction would preclude the possibility of operating the lock gates."

"5. "In view of the possible extensive park development in the Cumberland Basin area following the general lines recently discussed and shown in the study plans prepared by National Capital Parks, it is our opinion that nothing should be done in the Flood Control Project to preclude the proper marking and defining of the old canal basin at the level of the new fill which may be done by planting or some other type of development to be decided at a later date. It seems to us that the U.S. Engineers, who must now be engaged in searching land records, should be asked to cooperate in providing surveys and maps to facilitate this ultimate type of development. Their undertaking is a 'going project' operating with funds already appropriated; ours is in the study stage with very limited funds. We have neither the personnel nor money to make a definitive study of the property lines in their relationship with the remains of the old basin. Under any circumstances, we recommend that the U.S. Engineers be thoroughly acquainted with our plans and the problems incident thereto, and seek their cooperation in providing the best possible record before the fill is made."

[1460-C&O-5] P. Oswald Weber, Cumberland, to Irving C. Root, Superintendent, National Capital Parks, 4 July 1949 (Flood-June 1949)

"I am just getting around to tell You about the high water we experienced up here on the

18th last month, I traveled down to the Cumberland Outdoor Club property, and will say that it is almost unbelievable to think that billions of raindrops could cause water to rise a river to the extent that the Potomac did on that day, we walked over to the river along the run coming down from Panther ridge, which was not even muddy, to where it emptied into the river, the river then was up to the top of the banks, 30 minutes after we had to run towards the canal, in two hours the river raised 14 1/2 feet and overflowed the canal both Locks 61 and 62 about 6 inches, the only lucky thing was that the Wills creek, Evitts creek and Town creek stayed low only getting milky, had those streams been up to the point that they reached last week I know there would have been a terrible story about the Potomac valley . . . I suppose you know that the Three mile level washed out, Ike Long at head of Three mile level said that the South Branch came across the North branch like wall about three feet high, it certainly was lucky that all streams did not raise at the same time . . .

[1460-C&O-5] Irving C. Root, Superintendent, National Capital Parks, to P. Oswald Weber, Cumberland, 12 July 1949 (Flood-June 1949)

"We are pleased to acknowledge your letter of July 4, 1949 giving us such interesting information regarding the flood of the Potomac River particularly in the area of Lock No. 61. This information is very helpful to us in the light of our present investigation of the C&O Canal."

[1460-C&O-5] Colonel Henry C. Wolfe, District Engineer, Corps of Engineers, to Irving C. Root, Superintendent, National Capital Parks, 19 July 1949 (Study-Floods-National Park Service)

"Reference is made to your letter of June 13, 1949, requesting flow profiles of 100% and 20% annual probability of occurrence on the Potomac River from Cumberland to Great Falls, with particular reference to certain proposed development areas which were indicated on your drawings Nos. 110-80-29.1, 2 and 3."

"The 100% and 20% annual probability of occurrence flow lines for the reach of the Potomac River as requested, have been indicated on the inclosed profile drawings of this office, and numbered as follows: B-330-71-9.1, B-234-3-1.1, -2.1, -3.1, -4.1, and -5.1. The profiles were estimated from backwater profiles computed by this office, and are believed to be sufficiently accurate for your purposes. Additional high water elevations on the profiles in your areas of proposed development were determined for the two computed flows."

"If additional information or a discussion of the data submitted is desired, a conference may be arranged at your convenience."

"Your office will be billed at a later date for the cost incurred in compiling this data, as authorized in your letter, against Appropriations 14 x 1013.001, National Park Service."

[1460-C&O-5] George S. Humphrey, Vice President, Operation and Engineering, The Potomac Edison Company, to Irving C. Root, Superintendent, National Capital Parks, 3 August 1949 (Sustainability-Dams)

"Approximately one-half mile upstream from Dam No. 4 there are two spots where the earth has been almost washed away between the river and canal. I think it would be desirable for you or one of your representatives to look over the situation with us on the ground as soon as possible. Conditions are such that much greater damage would, probably be done by any future extensive rise in the river."

"From what I am told by one of our men who looked this situation over yesterday, it seems that something should be done as soon as possible."

[1460-C&O-5] T. Sutton Jett, Park Historian, to Robert C. Horne, Chief, Engineering Division, National Capital Parks, 12 August 1949 (Study-Floods-National Park Service)

Jett sends Horne a breakdown of the ordinary and extraordinary repair costs of the C&O Canal Company from 1850 to 1876, broken down by division. Unfortunately this report was not appended to the file copy. Jett adds at the end, "The two reports describing the damage of 1889 may be helpful in your study of those areas where flood damage was generally most severe."

[1460-C&O-5] George S. Humphrey, Vice President, Operation and Engineering, The Potomac Edison Company, to Irving C. Root, Superintendent, National Capital Parks, 23 August 1949 (Sustainability-Dams)

"I am very sorry that neither Mr. Byer nor I was here when Mr. Hayward stopped in yesterday."

"As to the questions Mr. Hayward left with us, I would advise that no wall has been built at the locks at Dam No. 5, or any other extensive alterations made to Dam No. 5 during the twenty-one years I have been with the company."

"As to performing the work necessary to preserve the pool level in case of washout of the bank between the river and Canal at Dam No. 4, as per my letter to you dated August 3, 1949, we would be glad to do this work, if you so desire, at our actual cost plus 15% to cover overhead."

"I presume this work would consist of constructing a wall between the stop-log abutments at the lock gate to the elevation of the crest of the dam, which would give protection against washouts at any point along the whole length of the canal upstream from the dam."

[1460-C&O-5] William G. Hayward, Civil Engineer, to Robert C. Horne, Chief, Engineering Division, 31 August 1949 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"An inspection of Dam No. 4 was made on August 11, 1949 in company with George S. Humphrey, Vice President of the Potomac Edison Company, Paul H. Byer, Mechanical Engineer for the power company and Henry G. Weeden of this office."

"As you recall, the actual 'outlet' from the canal to the slack water above Dam No. 4 is about a mile above the dam. The canal is protected from high water by a guard bank built to an elevation of approximately sixteen feet above the towpath grade. In line with the dam and extending across the canal is a masonry stop lock, the towpath of which has been built to the same height as the dam, namely 3207 M.S.L. The opening in the stop lock is now closed with timbers, that is the area above the towpath grade. However the canal chamber below the level of the towpath is blocked only by the debris and mud accumulations of the various floods."

"In the inspection of the guard bank extending above the dam and parallel to the canal, three major breaks in the bank were found. The guard bank at all three of these openings was only about four feet above the elevation of the crest of the dam and only about six to ten feet wide. Any freshet or flood that raises the river level more than about four feet therefore tops this earth bank and discharges water into the canal. Being of earth the bank is being cut back and soon, even at low water stage, the river will flow into the canal. When this condition occurs the only obstacle to the flow of water around the dam and thru the canal, is the debris at the stop lock previously referred to. The loss of water thru the canal would probably deplete available water for the hydro plant to such an extent that its operation would not be feasible."

"The several agreements between the Canal Company and the Power Company (and successors and assignees) provide that the rental of \$750 per year ceases whenever water is not available as a result of breaks. However the agreements do not require that the canal be repaired, but if repairs are not made, rental charges naturally cease."

"To repair the breaks in the guard bank would require from 6,000 to 8,000 cu. yds. of earth, hauled over rather difficult terrain. It was agreed on the grounds that the simplest solution, and also the permanent solution would be a concrete or masonry bulkhead constructed in the stop lock. This method has already been used at Dam No. 5, a wall having been built across the 'Outlet' lock to the same height as the dam itself. It is estimated that a reinforced concrete wall 14' thick, eight feet high and 19 feet long across the stop lock at Dam No. 4 would cost approximately \$800. This would involve 8 cu. yds. of reinforced concrete and 100 cu. yds. of earth protective coffer dam construction, together with miscellaneous work of removing debris."

"If it is decided that the work should be performed, it is suggested that the Potomac Edison Company be utilized, if possible, to act as contractor for this work. They are fundamentally interested in the work and are in a position to utilize local labor and equipment to good advantage. Access to the site for the construction of either a concrete or masonry bulkhead, would be relatively easy. Concrete from Hagerstown should not involve excessive costs and it is possible that some saving over the estimate might be made so as to bring the costs below the \$500 limit set for open market or unadvertised contract work."

"P.S. The Potomac Edison Company has just advised us that they would be willing to proceed with the work on a cost plus 15% basis per letter attached. Due to the emergency nature of the work, since failure of the small earth berm now remaining would flood the entire site of construction with the waters of the entire river, it is believed that such a cost plus contract would be legal, and it is recommended that we accept their offer immediately."

[1460-C&O-5] Robert C. Horne, Chief, Engineering Division, to Harry T. Thompson, Assistant Superintendent, 2 September 1949 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Transmitted herewith is a memorandum of August 31, 1949, subject Washout of Guard Bank at Dam No. 4, C&O Canal, to me from Mr. Hayward describing the conditions, called to our attention by the Potomac Edison Company. There is also attached a letter of August 23 from Potomac Edison Company offering to perform the work at actual cost plus 15% overhead which appears quite reasonable."

"A freshet on the Potomac River, even a small freshet much less a flood, we believe, will complete the washout of the guard bank and divert the flow of the Potomac River down the canal prism through the stop lock, thereby lowering the water level beyond the Dam No. 4

some eight (8) feet below the crest of the dam which in addition to the damage to the canal works and properties would preclude the operation of the Potomac Edison Company's power plant. It is relatively simple to construct a bulkhead in the stop lock prior to any such washout, but would be exceedingly difficult subsequent to such washout."

"We recommend that a short form contract be written with the Potomac Edison Company to construct such a wall in the 'Outlet' lock at the actual cost plus 15% in accordance with the Potomac Edison Company's letter of August 23, 1949; the cost not to exceed \$500 for open market or unadvertised contracts. The Potomac Edison Company should submit plans of the exact details of the work for approval prior to performing the work."

"We recommend that this work be performed immediately before the fall freshets wash through the guard wall."

[1460-C&O-5] George S. Humphrey, Vice President, Operation and Engineering, The Potomac Edison Company, to William G. Hayward, Civil Engineer, 27 September 1949 (Flood Damage Prevention-Proposed, Sustainability-Dams)

Humphrey recommended "after further study" that the repair of the Guard Wall at Dam No. 4 be done by a local contractor with better equipment than the power company. He had solicited bids from two contractors, and recommended the lower bidder, both for price and because he believed they were better qualified to do the work (the bid was \$2,495). Attached with this letter is a mechanical drawing of the proposed project.

[1460-C&O-5] Harry T. Thompson, Assistant Superintendent, to George E. Clark, Construction and Repair Division, 3 October 1949 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"You are hereby authorized and directed to proceed immediately on the work of installing timbers in the stop lock at Dam No. 4, C&O Canal. Recent floods have so eroded the guard bank that a more material failure is imminent. The work therefore should be pushed to final completion as soon as possible."

"It is suggested that an inspection be made immediately by you together with your Mr. MacCarthy and Mr. Hayward of the Engineering Division, to obtain the necessary measurements and to investigate working conditions and the possibilities of the salvage of existing timbers."

[1460-C&O-5] Harry T. Thompson, Assistant Superintendent, to George E. Clark, Construction and Repair Division, 14 October 1949 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Referring to the memorandum of October 3 regarding the installing of timbers in the stop lock at Dam No. 4, C&O Canal, and referring also to inspection made Friday October 7, the Engineering Division is agreeable to the completion of the work by park forces eliminating the installation of the temporary timbers referred to in the above memorandum. However, it is requested that you submit a cost estimate of this work together with a general description of your recommended methods of procedure for the installation of a concrete wall reinforced properly in lieu of timbers. Upon receipt of this estimate we will endeavor to obtain physical improvement funds for this work. In the meantime, you will obtain a job order and proceed with the work without further delay."

"We are enclosing a copy of the letter to the Potomac Edison Company for your information. It is felt that Mr. Humphrey will be willing to cooperate with you in this work and undoubtedly assist you in obtaining such local help as you might be authorized to procure."

[1460-C&O-5] Harry T. Thompson, Assistant Superintendent, to George S. Humphrey, Vice President, Operation and Engineering, The Potomac Edison Company, 14 October 1949 (Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed, Sustainability-Dams)

"We wish to acknowledge receipt of your letter of September 27 regarding closing portion of stop at Dam No. 4, C&O Canal. It is regretted that we cannot proceed with the awarding of an informal contract as the amount exceeds our legal limits. However, we have conferred with Chief of Construction and it is believed that we have worked out a satisfactory solution within our own force that will permit us to close the opening."

"We regret that we are unable to take advantage of your good work in obtaining the bids and working up the sketches, but will nevertheless proceed immediately to protect the dam and stop lock against the very possible failure of the present dyke that we inspected several months ago."

[1460-C&O-5] Robert C. Horne, Acting Assistant Superintendent, National Capital Parks, to H. J. Spelman, Division Engineer, Bureau of Public Roads, General Services Administration, 18 October 1949 (Flood Damage Prevention-Study)



"There is transmitted herewith one set of prints titled 'Flood Conditions, Washington, D.C. to Cumberland, Md., C&O Canal Parkway Survey', file number NCP-110-80-29-1, 2, and 3."

"Although these are preliminary prints as of October 17 they are essentially complete and supersede the earlier set which should be destroyed. You will note that considerable data has been added and that the theoretical operating water level of the canal has been adjusted to conform to the actual elevations of the various locks."

[1460-C&O-5] George E. Clark, Construction and Repair Division, to Robert C. Horne, Acting Assistant Superintendent, National Capital Parks, 24 October 1949 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Your recent memo on 'subject' dated 14 October 1949 requested an estimate of cost for the work proposed to be undertaken by this Division to close the lower part of the guard lock."

"After a field inspection, concrete was decided on. The dimensions of the opening are 18' in width by 8'3" high. This Division has in mind a reinforced concrete wall with a top width of 12', a bottom width of 18", 8'3" in height by 18' long, keyed into the existing slots in the masonry walls of the guard lock reinforced with 3/4" rods. These rods to be spaced 12" on centers. It is believed that 5 days would be required to do the job."

Clark estimated \$358.96 for materials and \$659.48 for labor (totaling \$1,018.44) as the cost of completing the project.

#### 1950

[1460-C&O-5] George E. Clark, Construction and Repair Division, to Robert C. Horne, Chief, Engineering Division, National Capital Parks, 3 January 1950 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"Mr. Dougherty is correct in his assumption. While work on the dam [No. 1] did start on 19 September, it consisted mostly of moving equipment to the site, bridging the feeder, some grading on Snake Island to permit hauling of concrete, setting of riprap to grade before pouring cap and hauling cement, sand and gravel to our mixing plant."

"First pour of concrete was 27 September of about 20 feet of cap. Work continued from Snake Island end from 27 September until 21 October; approximately 528 feet had been capped. Rising water over this 528 feet made backing of concrete trucks hazardous. Operations were shifted to Virginia end 23 October and continued from this end until completion 30 November."

"As stated by Mr. Dougherty, the change in the discharge measurement would have been gradual. Our progress averaged about 30 linear feet per day but the rise in the river was quite noticeable as the capping progressed and was approximately several inches deep on 21 October when operations were transferred to the Virginia end."

[1460-C&O-5] Robert C. Horne, Chief, Engineering Division, National Capital Parks, to District Engineer, Geological Survey, 5 January 1950 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"Reference is made to your letter of 23 December, 1949 requesting information on progress of the work on the Little Falls Dam at Brookmont, Maryland (Dam #1 C&O Canal)."

"Our reports show that work on the dam itself actually started on September 22 and on that day it consisted of replacing dislodged stones; that the work was 20% complete on October 12; was 85% complete on October 30, and was 100% complete on November 30."

[1460-C&O-5] George E. Clark, Construction and Repair Division, to Harry T. Thompson, Associate Superintendent, 23 February 1950 (Flood Damage Prevention-Proposed, Sustainability-Stoplocks)

"Attached hereto is a requisition for lumber to replace the existing planks in the Stop Lock located between Locks #16 and #17."

"The U.S. Engineers, Dalecarlia, are very much concerned over the condition of the existing planks in the Stop Lock which are badly deteriorated (they are approximately 13 years old) and they feel that in the event of a flood considerable damage might result to the D.C. Water Supply conduit which is located close to the berm side of the Canal in this vicinity."

[68A-3048] Merrill Bernard, Chief, Climatological and Hydrologic Services, Weather Bureau, Department of Commerce, to Richard Willson, Superintendent, City of Hagerstown, 9 March 1950 (Flood-March 1936)

This letter explains the causes of the great flood of March 1936.

"There was very little snow remaining in the Potomac Basin immediately prior to the severe floods of March 1936, even though the winter of 1935-36 was unusually cold and the snowfall was about twice normal. The only snow remaining on the ground on March 9, 1936,

was in the headwater areas where the water content of the snow above Cumberland, Maryland, ranged from 1-3 inches and on the South Branch of the Potomac above Petersburg, West Virginia above 1 inch. The snow on these areas was equivalent to above 0.3 inch over the basin above Washington, D.C."

"The heavy snow cover that had accumulated during the winter melted during the last few days of February and the 1st few days of March during which time the ice in the stream broke up. Two minor flood peaks resulted in the Potomac during this rise."

"The precipitation during the period from March 9-22, 1936, that caused the severe floods in the Potomac Basin was almost entirely in the form of rain, which averaged about 6 inches above Washington, D.C."

[CF] [LIB-PHP] Congress, House, Committee on Public Lands, Chesapeake and Ohio Canal Report, 81st Cong., 2d sess., House Document No. 687, p. 17. (Maintenance-Naivete, Study-Floods-National Park Service, Sustainability-General, Harper's Ferry-Sustainability)

Wishful thinking about the ability of man-made structures to withstand the river was not limited to the nineteenth century. This document contained a report in an appendix copied verbatim from an earlier report, "A Study of the Floods of the Potomac River Related to the Construction of a Parkway Along the Route of the Chesapeake and Ohio Canal," which was prepared under the Direction of Robert C. Horne, Chief, Engineering Division, and Henry G. Weeden, Civil Engineer, both of National Capital Parks.

The House document stated, the "report shows that only 8 miles of the entire towpath length is subject to annual floods and the study shows that the Parkway grade could easily be placed above annual flood at these places."

"The present towpath grade of the canal is practically all below the maximum probable flood and for most of the length of the canal is below the probable flood of every 5 years. This is not of importance or particular concern especially for a recreational parkway, since it means only that perhaps once in 5 years the road might be out of commission for a few hours or perhaps a day. A similar situation occurs on the Mt. Vernon Memorial Highway between Washington and Alexandria and on many roads in the Ohio Valley. In all such places it is considered adequate to design to stay above the annual flood. No other course is indeed possible, since keeping above the 5-year floods would be entirely impracticable from a cost standpoint."

"There is an impression that this canal property suffered to an unusual degree from flood damage throughout its history, and that its operation was finally discontinued because of heavy flood damage. The canal, from its location, was subject to damage from flood waters and that damage had to be repaired. However, the canal continued to operate after almost every other similar canal in the country had discontinued."

"Unusually heavy damages were the immediate reason for discontinuing the operation of the canal, but it was the unsurmountable competition of greatly superior transportation by the railroad at less cost which was the underlying cause of the abandonment of the canal."

"It is not believed that the danger of washouts due to floods represents a serious hazard to the use of the canal as a parkway. Although the canal between Great Falls and Cumberland has not been in use and has had no maintenance since 1925, or for a quarter of a century, yet today there is less than a half mile of the canal prism destroyed, and travel is possible on most of the towpath. A parkway with grassed slopes would be even less vulnerable to floods than a canal prism."

"Accordingly, it is concluded that interruption of traffic due to occasional floods along the canal would be of no importance, and that injury to the parkway itself by such floods would not be serious."

The main report identified at least two trouble spots on the river affecting the canal. The report stated (p. 8):

"Shepherdstown and Harpers Ferry have experienced the worst flood conditions along the entire route of the canal. During the flood of March 1936 the canal at Shepherdstown was inundated for 62 hours and at its peak the flood reached an elevation of 22 feet above the towpath."

"Past records indicate the most vulnerable section of the canal is at Harpers Ferry. The gradient of the river at this point is relatively steep and immediately below the confluence with the Shenandoah River the valley is reduced to a narrow gorge where it passes through the Blue Ridge Mountains. Excessive discharge from either the Shenandoah or the Potomac Rivers is impeded at this point causing local floods in this area. Records kept since 1889 show that on an average of every two years the elevation of this high water has equaled that of the towpath and has exceeded the towpath level by five feet on an average of every five years. During the 1889 and 1936 floods an elevation of 21 feet above the towpath was reached."

"During the operation of the canal a masonry and riprap wall of approximately 5 feet in height was maintained along the entire length of this section as a protection against the frequent floods. Since the abandonment of the canal this wall has been practically obliterated in many places."

[1460-C&O-5] Lillyer G. Norment, Sr., Washington, D.C., to Superintendent, National Capital Parks, 22 October 1950 (Maintenance-General)

"May I express myself as follows concerning one of the greatest landmarks concerning transportation in the United States, that should be preserved in a better condition than is being done at present."

"I walked from Chain Bridge to Lock No. 14 this afternoon and was shocked at the deplorable condition of the canal and locks as compared to the condition they were in a few years back, and not very far back at that. I suppose beyond lock No. 14 the canal and locks are in still worse condition, as that part was in bad shape a few years ago, due to floods, etc."

"However, until the last war the canal and locks from tide lock to Great Falls was restored to a fair state, but now it is in a bad condition. The signs giving the history of the canal and locks at each lock have rotted down. From Brookmont to Lock No. 14, the canal is almost dry. The locks are rotting down, and from lock No. 5 to Cabin John it is being filled up with stumps, logs, boulders and other debris due to the sewer project along side the canal."

"I just don't see why that part of the canal along this sewer project should be ruined beyond the poor condition it was in before they started the sewer job. Also if it is due to a lack of funds that other parts of the canal are being allowed to go to ruin, why should not a real effort be made to Congress for funds to preserve the canal for the purpose for which it was bought by the Government. Why bother to police the canal any more than some dried up creek in the mountains if it is to be neglected as it now is."

[1460-C&O-5] Harry T. Thompson, Associate Superintendent, to Lillyer G. Norment, Sr., Washington, D.C., 30 October 1950 (Maintenance-General)

"The National Capital Parks appreciates your interest in the canal, and regrets the conditions existing between locks No. 5 and No. 14 described in your letter. Unfortunately, the flood of 1942 destroyed the canal embankments in the Widewater area above Lock 14, and the funds required for extensive repairs necessary to restore this area have not been made available. As long as this condition exists it will not be possible to supply the continuous flow of water require to keep the canal between Locks 5 and 15 at the proper level."

"Through the cooperation of officials in the Corps of Engineers, some water is admitted to this section from the Washington Aqueduct, but this supply is erratic and is made available only at such times as it is convenient and practicable to do so. The lack of sufficient water in this section of the canal is largely responsible for its unkempt appearance. It is also true that the bulk of the maintenance funds are expended in the Georgetown - Lock 5 and the Great Falls - Seneca areas where public use is greatest."

"I have forwarded a copy of your letter to my maintenance staff with instructions to investigate the conditions you describe, and especially the sewer project above Lock #5."

#### 1951

[1460-C&O-5] Robert C. Horne, Chief, Engineering Division, National Capital Parks, to William G. Hayward, Civil Engineer, 21 August 1951 (Sustainability-Dams)

"Mr. Walters, NA7460, Ext. 533, who owns a cottage located on High Island called and informed me that when he visited his cottage last week end he observed that erosion of High Island at the end of Dam #1 has greatly increased and expressed his opinion that this eroded channel would break through High Island below the dam in the near future if not promptly corrected."

"Please look into this matter and determine what steps should be taken. If the conditions are as described by Mr. Walters, emergency repairs should be made immediately."

[1460-C&O-5] William G. Hayward, Civil Engineer, to Robert C. Horne, Chief, Engineering Division, National Capital Parks, 9 October 1951 (Sustainability-Dams)

"Referring to the attached memorandum regarding the erosion on High Island, C&O Canal, I visited the site Friday, October 5, with Mr. Walters. It is believed that at the present time no emergency exists. This dam made of bagged concrete has been placed across the eroded channel. This dam is about 40 feet long and possibly 4 feet wide and very stable and in my opinion good construction. However, the eroded channel beyond this bagged concrete revetment will continue to erode whenever more than about 3 feet of water goes over the concrete capping of the main dam across the river."

"To minimize the erosion in this channel it would appear necessary to place approximately 200 yards of earth fill. The earth fill being in turn about 3 feet higher than bagged cement revetment mention above. This earth fill would only be subject to capping or erosion possibly once a year or even less and with normal growth of grass it is believed that it would last for many years."

"However, it is very difficult to obtain 200 yards of earth for this work and unless Mr. G. E. Clark can see an easy way of procuring this 200 yards of material to place across the canal it would cost approximately \$5.00 a cubic yard to transport this material across the canal or the cost for the earth fill would possibly run around \$1,000,000.00."

"It is recommended that Mr. Clark keep in touch with the situation and if the erosion over the top of his revetment threatens to undermine this work he will of course, take the necessary measures to protect his work, and that if he has a cheap source of earth fill it would be desirable to place it in back of his revetment as the occasion arises."

[1460-C&O-5] George S. Humphrey, Vice President, Operation and Engineering, The Potomac Edison Company, to Irving C. Root, Superintendent, National Capital Parks, 12 October 1951 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Under date of July 8, 1947, you wrote me in regard to repairs needed to the gates to the Canal at Dam No. 5. I replied to your letter under date of November 10, 1947. I also discussed this with you in your office."

"During the four years intervening the gates have continued to deteriorate and are now in a very bad condition indeed, as may be noted from the attached photograph taken August 31, 1951."

"It would undoubtedly be considerably more expensive to make repairs now than would have been the case in 1947. It appears to us that the gates are now in such bad condition that they are apt to fail at any time and destroy the pool above the dam, except during periods of high water."

"If your people have not observed this condition recently, I would suggest that you have them do so just as soon as possible."

[1460-C&O-5] Harry T. Thompson, Associate Superintendent, to George E. Clark, Construction and Repair Division, 17 October 1951 (Sustainability-Dams)

"Transmitted herewith is Mr. Hayward's memorandum to me of October 9 titled 'Erosion on High Island, C&O Canal'. It is requested that you keep this location under observation and if and when earth is available in this area that the embankment described in Mr. Hayward's memorandum be constructed."

[1460-C&O-5] Harry T. Thompson, Associate Superintendent, National Capital Parks, to George S. Humphrey, Vice President, Operation and Engineering, The Potomac Edison Company, 19 November 1951 (Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed, Sustainability-Dams)

"Your letter of October 12 regarding the condition of the lock gate at Dam #5 on the Chesapeake and Ohio Canal has been received."

"We have made an extensive search and have been unable to find your letter of November 10, 1947 nor any record that such a letter was received. As you know, due to the limited appropriation provided by the Congress this Office has been extremely limited in the maintenance and repair of the upper section of the Canal, however, our Fiscal Section has set aside some funds for the purpose of providing for a bulkhead in the lock at the upper gate."

"It is expected that our forces will be able to schedule this work within the month."

#### 1952

[1460-C&O-5] Lorin A. Davis, Chief, Administrative Division, National Capital Parks, to Director, National Park Service, 20 March 1952 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"During December, 1951 it was determined that the gates to the canal at Dam No. 5, in Berkeley County, West Virginia, [?] had deteriorated to such a condition that they were apt to fail at any time and destroy the pool above the canal from which the Potomac Edison Company of Hagerstown, Md. takes water for the operation of a power station. Emergency repairs were made to prevent a complete break in the dam."

[1460-C&O-5] Harry T. Thompson, Acting Superintendent, National Capital Parks, to U.S. Engineers Office, Washington, D.C., 21 November 1952 (Easements-Park Service)

"Discussions of the Flood Control Project at Cumberland, Maryland, disclose that you had developed a new plan showing a scheme for the Western Maryland Railroad freight connection. We would appreciate three prints of this scheme for discussions of our staff of the future of the intake and lock of the C&O Canal."

"It appears that the Flood Control works and the Railroad relocation would be greatly simplified if this office would recede from our position that the intake and lock must be preserved. Some discussion with your staff revolved around a proposal to construct a model of the Cumberland Terminus of the C&O Canal in lieu of preserving these structures.

To assist us in consideration of this matter we thought perhaps you could add to a photograph of the intake and lock the Flood Control works as they would appear upon their completion. We would appreciate receiving several copies of such a photograph if it is possible to prepare it."

[CF] The Evening Star (Washington, D.C.), 23 November 1952, A1 (Flood-November 1952)

"5-Foot Flood Seen for Potomac After 3-Day 4.61-Inch Rain" Reports flood crest heading down the river, but no big damage expected. No mention of the canal.

[1460-C&O-5] Robert C. Horne, Chief, Engineering Division, to Harry T. Thompson, Associate Superintendent, National Capital Parks, 24 November 1952 (Easements-Park Service)

"I recently discussed with members of the staff of the Washington District, Corps of Engineers the conditions under which we might be persuaded to recede from our previous position that we desire to preserve the intake and inlet lock at the terminus at C&O Canal in Cumberland, Maryland."

Horne suggested building a table model, for historical interpretation purposes, in lieu of actually preserving these structures. He reasoned:

"(1) All remains of the C&O Canal terminal in Cumberland have been obliterated over the years except a part of the Canal prism, the Canal towpath, and the ruins of the abutments of the Consolidated Coal Company wharf which incidently is not on lands owned by the United States."

"(2) On March 29, 1946, Acting Secretary Chapman approved in the principle the Flood Control Project for the protection of Cumberland, Maryland, and Ridgely, West Virginia, and the Washington District, Corps of Engineers were so advised. The plans for the Flood Control Project contemplate dykes, walls and fills which will obliterate the remaining portions of the Canal prism and towpath in the 'ball park' area where the C&O Canal terminus previously existed and a distance of approximately 3/4 of a mile down-stream to the end of the dyke construction."

"(3) Earl Disque's plan of January 1949, File NCP 111-3, (used in the C&O Canal Report, House Document No. 687, 81st Congress, 2nd Sess[ion]) contemplates a Terminus in the 'ball park' area including a museum and headquarters building at the elevation of the flood control dyke. The intake and outlet lock are about 1,000-feet up-stream from the museum and are under the two main line tracks of the Western Maryland Railroad which cross just above the tops of the masonry wall largely obscuring them. The Flood Control Project requires the removal of the Western Maryland freight bridge across the Potomac River which connects the Western Maryland yards in Ridgely and the B&O Yards in Cumberland and a new connection from the Western Maryland main line on the north side of the river. Earl Disque's study of the new connection locates it across the top of the intake and inlet lock adjacent to present main line further obscuring the canal works and making access more hazardous. The Engineers are agreeable to Earl's solution, the Western Maryland Railroad view is not known."

"(4) In order to save the intake and inlet lock a retaining wall would be constructed across the river face to an elevation several feet above the present flood protection wall built on top of the locks. Such a wall would effectively block the view of the locks from the river and from the small park on the opposite side of Will's Creek."

(5) The completion of the Flood Control Project will lower the water level in the river at the intake gates to an elevation approximately 7-feet below the sills, some 15-feet below the present water level in the river which is controlled by the elevation of the C&O Canal dam (to be removed)."

"(6) The intake gates and the lock are constructed upon a timber mat approaching 100 years of age which has been continuously below water and saturated during this period. Exploration discloses that this timber mat is badly deteriorated to a condition where I doubt its ability to continue to support the walls very long even with the sub-soil unchanged. When the sub-soil and timber mat dry out from the lowering of the water in the river I would expect the timber mat to completely disintegrate and appreciable settlement of the intake and inlet lock to result. The masonry might collapse within a short time unless extensive stabilization were undertaken."

### 1953

[1460-C&O-5] George S. Humphrey, Vice President, Operation and Engineering, The Potomac

Edison Company, to Harry T. Thompson, Superintendent, National Capital Parks, 22 May 1953  
(Flood Damage Prevention-Proposed, Sustainability-Dams)

"During the past several years we have had several conversations and some correspondence in regard to condition of the lock gates and abutments at both Dam No. 4 and Dam No. 5."

"Our Power Department is again expressing the need for further immediate work at both of these dams."

"Dam No. 5" "They say only a small expense would be involved to make it relatively safe, if the work is done this summer."

"Dam No. 4"

"Conditions have deteriorated during the past three years. I am told that the situation there is very critical and getting worse by the month."

"I would suggest that you investigate conditions at both these dams so that you may have a full realization as to the situation as of this date."

[1460-C&O-5] Robert C. Horne, Chief, Engineering Division, to Harry T. Thompson, Associate Superintendent, National Capital Parks, 19 June 1953 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"On June 11, 1953, Mr. Hayward and I observed the conditions of Dams 4 and 5 and submit the following comments and recommendations:"

"DAM NO. 5"

"Just up-stream of the upper end of the inlet lock at Dam 5 a 'sink hole' with a whirl pool approximately 8-feet in diameter exists. At several places in the lock, down-stream of the upper gate, sufficient 'turbulence' or 'boils' exist to definitely indicate water entering either under or through the lock wall or the bottom of the lock."

"A stone wall connects the up-stream end of the inlet lock to the abutment of the Dam. Immediately adjacent to and up-stream of this wall there were two 'sink holes' which were dry at the time of our visit because the River being lower than the ground at the 'sink holes'. It is reported by Mrs. Hoffman, the tenant in the Lock House, that when the river is high enough to reach these 'sink holes' there is a whirl pool indicating flow through them under or through the above mentioned wall."

"The upper lock gates which hold the River from flowing through the locks are in a very bad structural condition. They have been refaced with planks so the facing is reasonably water tight, however, we doubt that the strength of the structural members is sufficient to withstand floods."

"Recommendations - Dam 5"

"It is recommended that the 'sink holes', 'turbulences' and 'boils' be eliminate by appropriate grouting and filling."

"Probing through the debris accumulated at the upper gate leads us to believe that a masonry wall has been constructed across the lock to the same elevation as the crest of the Dam. It is recommended that the debris be cleared and the existence and extent of this wall be determined. If found, we recommend that this wall be reinforced an extended upward to the top of the mule bridge abutments adjacent to the lock."

"It is estimated that the repairs recommended above at Dam 5 will cost between \$1,500 and \$2,000 depending upon the conditions uncovered as the work progresses."

"DAM NO. 4"

"The earth embankment from the Maryland abutment of Dam No. 4 to the stop lock continues to wash away from exposing more of the masonry core wall. Mr. George M. Groves, President, Western Maryland Sportsmen Club (residence: 117 East Washington Street, Hagerstown, Maryland; Phone, 1411-R) (club house is adjacent to the Dam and a new club house is under construction) states that water gets into the Canal through breaks in the tow path wall and overflows the core wall approximately twice a month. No doubt each time this occurs more the earth embankment is washed away. The earth embankment is also washed away between the stop lock and the hill side."

"Approximately 1,500 feet up-stream from the Dam and stop lock, the tow path flood wall between the Canal and the River is washed out in two places permitting the River to flow into the Canal approximately twice a month, noted above, through the gaps. Approximately a mile above the Dam and the Stop Lock another washed out section of the tow path flood wall exists immediately downstream of the inlet lock. The tow path flood wall between the Canal and the River from the Dam approximately a mile up-stream to the inlet lock consists of an earth embankment with its top approximately 16-feet above the elevation of the tow path. The washed out places can be reached with trucks, I believe, from the road ending

at Dam 5, if the tow path and/or the top of the embankment is cleared."

"Immediately behind the abutment of Dam 4 there is an area of earth fill which has sunk. It is reported that this sinking has been gradually taking place for a number of years. It is also reported, but not observed, that there is a large flow of water under and/or through the abutment and that it can be easily observed during very low water. The sinking of the ground behind the abutment would indicate that this flow is washing out the earth below causing the surface to sink."

"Several years ago our forces constructed a concrete wall in the Stop Lock to the elevation of the tow path replacing the rotted away stop logs. Stop logs are in place in the stop lock approximately to a height of 10-feet above the tow path. The top of the stop lock abutments is approximately 8-feet higher (a number of the stop logs are missing)."

#### "Recommendations - Dam 4"

"It is recommended that the wash outs in the earth embankment flood wall between the River and the Canal be repaired from Dam 4 to the inlet lock by compacted selected earth fill."

"It is recommended that the embankment from the abutment of the Dam to the stop lock on the embankment from the stop lock to the high ground on the berm side be restored after being cleared of the debris, underbrush, etc., and compacted selected earth fill placed."

"It is recommended that the flow through or under the abutment of the Dam be stopped by thorough grouting and other appropriate means."

"It is recommended that additional stop logs for the stop lock be made and installed in the stop log slot to the elevation of the stop log abutments."

"It is recommended that a pipe approximately, but not less than 12" in diameter, be placed through the concrete wall in the stop lock at approximately the elevation of the bottom of the Canal to drain the 4' to 6' of water that is now retained in the Canal above the Stop Lock until it seeps away or evaporates."

"It is estimate that the cost of the repairs recommended at Dam 4 will amount to between \$10,000 to \$15,000 depending to a large extent upon the conditions uncovered as the work progresses."

#### "General Recommendations"

"It is recommended that the work outlined above be carried out as soon as possible. As pointed out by the Potomac Edison Company, the situation is critical and it is impossible to judge the extent of the hidden damage which might cause a collapse in several years or even the next freshet."

[1460-C&O-5] From "Floyd," to Harry T. Thompson, Associate Superintendent, National Capital Parks, c. June 1953 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Mr. Kenner agreed that the Dam job was a rehabilitation project but wanted to keep the papers until Monday morning. The amount then would have to come out of the \$30,500 tentatively programmed for FY 1954 depending upon the importance of this item compared to other projects. He mentioned that you were going to talk with Mr. Wirth about a larger chunk of the Rehab. funds. Maybe this item would be an added reason for more money."

"I will let you know anything further when Mr. Kenner brings the papers back."

[1460-C&O-5] Harry T. Thompson, Associate Superintendent, National Capital Parks, to The Potomac Edison Company, 6 July 1953 (Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed, Sustainability-Dams)

"Reference is made to your letter of May 22, 1953, regarding the condition of the lock gates and abutments at Dam No. 4 and Dam No. 5 of the C&O Canal Parkway."

"Members of the Engineering staff have examine the conditions and recommend that corrective measures be undertaken to stabilize and improve the works at the locks and intakes. Unfortunately, however, the work on the Canal beyond the Metropolitan Area of Washington has been severely limited and I am doubtful that we can undertake to carry out the recommendations of the Engineering Division in the near future. We are again making an effort to obtain funds and if we are successful we propose to make the indicated repairs at these locations."

[1460-C&O-5] George S. Humphrey, Vice President, Operation and Engineering, The Potomac Edison Company, to Harry T. Thompson, Superintendent, National Capital Parks, 22 July 1953 (Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed, Sustainability-Dams)

"I have your letter of July 6, 1953, in reply to my letter to you dated May 22, regarding condition of the lock gates and abutments at Dam No. 4 and Dam No. 5, of the old C. & O."

Canal. I note that members of your engineering staff have examined the conditions mentioned, and apparently agree with us that corrective measures are badly needed."

"I note also your statement that because of limited funds you are quite doubtful that any improvements could be made in the near future."

"Conditions at Dam No. 4 are such that if nothing is done this year much more expensive repairs might well be necessary next year. By that time the entire river flow may by-pass the dam and the pool be very much lowered during the low water season."

"I want to suggest as one way to be sure to get repairs made this year would be to either allow us to make the repairs and withhold rental payments, amounting to \$750 per year at each of the two dams, No. 4 and No. 5; or, advance payments to you so that you could do the work with your own force, if you so prefer. This would enable you to have the work done this fall and avoid the probability of facing even much greater expense at some time in the future. The chance for greatly increased damage seems to be more for Dam No. 4 than for Dam No. 5, although Dam No. 5 is also badly in need of repairs. If the work is to be done before winter, it will, of course, be necessary to make plans and get the work started in the very near future."

"If you are not successful in your effort to obtain funds to make repairs at both locations, I would suggest that you use the rentals in either of the two methods suggested to at least take care of the repairs at Dam No. 4."

[1460-C&O-5] Harry T. Thompson, Associate Superintendent, National Capital Parks, to Director, National Park Service, 27 July 1953 (Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed, Sustainability-Dams)

"The attached letter sent to me by Mr. George S. Humphrey, Vice President of the Potomac Edison Company at Hagerstown, Maryland, explains their great concern for the source of water which we furnish to this company for their electric generation plants at Dams Nos. 4 and 5."

"You will recall that I made a special plea for \$17,000 which I hoped could be made available from historic structure funds some two weeks ago. Mr. Humphrey suggests that their company would be willing to pay for the repair of these dams if we could find a legal method of waiving their \$1500 per year rental fee. Mr. Knox tells me that this can not be done. Therefore, if the dams are to be repaired, as Mr. Horne and Mr. Hayward of this office and Mr. Humphrey of the Potomac Edison Company believe should be done, I am again appealing to you for assistance to have this work done as soon as possible."

[1460-C&O-5] Keith Neilson, Finance Officer, to Director, National Park Service, 30 July 1953 (Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed, Sustainability-Dams)

"There is \$30,000 included in the tentative 1954 rehabilitation program for National Capital Parks, but which is still subject to your review and approval. These funds could be made available for the repairs of the C&O Canal Dams. The only determination that needs to be made is whether the work rates a higher priority than of other NCP rehabilitation needs."

"Although Judge Knox is correct that the Service could not use the \$1,500 rental fees to repair the dams, there appears to be no reason why a new permit could not be negotiated to provide for a lower rental fee of say \$100 with the further provision that the company would repair and properly maintain the structures under the rental agreement to them. National Capital Parks might object to having the work done by the company rather than by its own forces because of the historical character of these structures. However, the permit could specify the quality and type of repairs to be accomplished and provide that all work would be done under the technical supervision and direction of the Service. Such an arrangement, of course, would relieve the Service of the cost of the necessary repairs. If for some reason the suggestion is not feasible, the rehabilitation funds available in 1954 could be used for the work."

[1460-C&O-5] Harry T. Thompson, Associate Superintendent, National Capital Parks, to George S. Humphrey, Vice President, Operation and Engineering, The Potomac Edison Company, 13 August 1953 (Flood Damage Prevention-Financing, Flood Damage Prevention-Proposed, Sustainability-Dams)

"Reference is made to your letter of June 22, 1953, proposing that the necessary repairs to Dams 4 and 5 be financed by your Company with reimbursement by the United States. The methods suggested by you would be contrary to law and, therefore, we could not consider them."

"As discussed with your office by phone several days ago, it is believed feasible to enter into a new contract which would provide for the repair and maintenance of the dams by your company. It is suggested that if your company is interested in pursuing the matter of a new contract along this line we could confer regarding the terms for such a contract."

"It is my hope that a solution to the problem can be found so that repairs may be effected in the near future."



[1460-C&O-5] Robert C. Horne, Chief, Engineering Division, to Harry T. Thompson, Associate Superintendent, National Capital Parks, 1 December 1953 (Widewater Restoration-1950s, Widewater-Sustainability)

"We have searched the files for the estimates of the cost of restoring the canal between Anglers Inn and Great Falls, the estimate prepared by Mr. G. E. Clark for the doing the minimum amount of repairing in order to maintain water in this portion of the canal, and the estimate of the cost for furnishing water to the canal below Anglers Inn by means of a pipe. We have not found this estimate covering the installation of the 24" pipe. However, the following are the results of our study:"

"1. In October 1942 immediately after the flood of that year an estimate was prepared of the cost of restoring the damaged portion of the C&O Canal. The estimated cost of the repairs from Lock No. 5 to Seneca, Maryland was \$140,000. As the greater part of this work would be in the Widewater Area, perhaps 75%, the cost of repairing this area would be approximately \$105,000 for the Widewater Area, or approximately \$150,000.00 at todays prices."

"2. Mr. Clark recently made a sketch of the damage to the canal between Anglers Inn and Lock 17 for the purpose of estimating the cost of the repairs necessary to provide an amount of water that would maintain approximately the same depth of water that was provided by the Washington Aqueduct through the 24 inch pipe at Anglers Inn. The following is an estimate of the cost of this work:

Earth fill	
20,000 C.Y. @ \$1.50 per C.Y. =	\$30,000.00
Dry Rubble Wall	
400 C.Y. @ 25.00 per C.Y. =	1,000.00
36" Corrugated Pipe	
100 C.Y. @ 5.00 per L.F. =	500.00
Total	\$31,500.00

The above cost are based on the work being performed by National Capital Parks Maintenance forces."

"3. The following is an estimate of the cost of providing water though a 24" corrugated iron pipe from lock 15 to the existing dam at Anglers Inn:

24 inch corrugated iron pipe	
5,500 L.F. @ \$3.42	\$18,810.00
Fittings	
230 @ 3.42 each	790.00
Total for pipe	\$19,600.00
Labor (installing pipe)	
5,500 L.F. @ 10.00 L.F.	55,000.00
Repairs above lock 15 earth fill	
250 C.Y. @ 2.00 C.Y.	500.00
Total	\$75,100.00

It would be very difficult to install the 5,500 L.F. of 24 inch pipe. The only access to the site is over the U.S. Engineer's road on the landward side and would have to be supported in trestles for part of its length."

"We concur in Mr. Clark's belief that the earth fill and other repairs can be made in accordance with the estimate using maintenance forces and equipment. The towpath will be restored to operation in accordance with drawing number NCP 110.3-1 to 29 inclusive. The core wall will remain and the damaged portions of the concrete apron at the fuse plug broken up and used as rip-rap."

"This repair work, when completed will relieve the National Capital Parks of dependence upon the Washington Aqueduct for water and will provide a walk to Great Falls thus opening up the entire area to recreational use."

#### 1954

[1460-C&O-5] Harry T. Thompson, Associate Superintendent, National Capital Parks, to Chief, Maintenance Branch, 1 February 1954 (Widewater Restoration-1950s, Widewater-Sustainability)

"It is requested that you proceed with the restoration of the damaged portions of the C&O Canal between Anglers Inn and Lock 15. The work is to be carried out in accordance with the attached brief specifications prepared by the Engineering Branch, and it is to be accomplished with the present maintenance forces and equipment."

"Upon completion of this work consideration should be given to the restoration between locks 15 and 17 in order to maintain water to its normal elevation in these areas."

"Likewise, consideration should be given to the restoration and extension of the embankment extending from the stop-lock riverward in order to provide more adequate protection for the restoration works."

"It is suggested that two or three 30" or 36" pipes be placed in the existing dam at Anglers Inn and the fill left in place in order to provide a vehicular crossing at this location. A barricade should be placed to exclude vehicles other than our Maintenance and Police activities."

[1460-C&O-5] Janet and Ralieggh Hansl, Washington, D.C., to Harry T. Thompson, Associate Superintendent, National Capital Parks, 3 March 1954 (Widewater Restoration-1950s)

"We took a walk two weeks ago up to Widewater and saw the work that you are undertaking there."

"The Park Police tell us that you are the guiding spirit behind this valuable contribution and we want to take this opportunity to congratulate you and the Park Service on this big job and to tell you how greatly it is appreciated."

[1460-C&O-5] Harry T. Thompson, Associate Superintendent, National Capital Parks, to Janet and Ralieggh Hansl, Washington, D.C., 8 March 1954 (Widewater Restoration-1950s)

"We appreciate your complimentary remarks on the work being done by National Capital Parks in the Widewater area of the C. & O. Canal."

"It is our hope to restore the tow path which was destroyed by the flood of 1942 along this section of the Canal."

[1460-C&O-5] C. W. Heine, Park Historian, to Chief, Public Use Branch, National Park Service, 13 April 1954 (Easements-Park Service, Sustainability-Dams)

"In the company of Messers George Harding, Abbie Rowe, Miss Gurney, and Corporal Hower of the U.S. Park Police, I traveled to Cumberland, Md., on Monday, April 12, 1954, to witness the breaching of Dam No. 8 of the C&O Canal. Mr. Dexter of the U.S. Army Engineers was in charge of the breaching of Dam No. 8, as part of a Flood Control project on the Potomac River specifically designed to relieve the flow of water from Wills Creek. For the blast, 300 sticks of dynamite at 40% power was used."

"The time of the blast was 3:09 p.m. Using a telephotic lens, photographer Abbie Rowe took a photograph at the exact moment of the blast. Several other shots were made before and the explosion. The blast was not effective. The Albrecht Company of Chicago, Illinois, had been obligated to breach the dam by a length of 65 feet. Only a relatively small amount of the stone dam (principally some of the front stones and wooden timbers) was removed by the blast--reflecting the tremendous durability of this old canal structure. A relatively small flow of water was emitted over the top of the stone dam where a layer of wooden timbers had been up-ended."

"According to Mr. Dexter, of the U.S. Army Engineers, the Albrecht Company will have to breach the dam by an opening of 65 feet. Nothing further was to be done on Monday, April 12th. Mr. Dexter discussed the probability that water east of the dam might have to be diverted and water below drained or lowered so that on the next blast the charge could emanate from a lower level of the stone dam. Power machinery, etc., may have to be brought into use. In addition deeper holes for the charges will have to be made. For the April 12th explosion, holes were bored into the dam wall 12 feet deep--this was the deepest hole which the Albrecht Company could make with its drills. However, from all indications the blast barely penetrated the thickness of the dam--again illustrating the craftsmanship of the old stone masons and the strong construction of some of the C&O Canal structures."

[1460-C&O-5] Robert C. Horne, Chief Engineer, National Capital Parks, "Construction and Maintenance of the C&O Canal Dam No. 1 Little Falls, Brookmont, Maryland," 27 July 1954 (Sustainability-Dams)

"It appears that the dams in the Potomac River required continuous maintenance during the operation of the Canal. The damage to the 'rubble or riprap dam' generally consisted of dislodging the upper stones by freshets and by the action of ice in the river. Likewise, on some occasions the dam was actually breached to considerable depth in addition to a general lowering of the height of the dam by reason of the dislodgement of the upper stones."

"A report of June 14, 1889 to the Circuit Court of Washington County by the C&O Canal describes the damage in these words: 'Dam NO. 1--This is a rubble dam opposite Lock 6 and as far as can be judged owing to the high state of the water is very much damaged'. A subsequent report estimates the damage of 'Dam No. 1--built of rubble stone 600 yards long will have to be raised 18 inches 200 perch stone at \$1.50 per perch placed on dam, \$3,000.00.' The Engineer's report of May 18, 1890 on the 'examination of the condition of the Canal and of the extent of the damage to it by the great freshet of May 1889' made by T. L. Patterson, Engr. to Receivers C & OC., and T. P. Kinsley, Civ. Engr. Mem. Am. Soc. C. Engr., reports 'At this point [the upper end of the Georgetown section which obtains its water from the Little Falls Dam], the water is received into the Georgetown towpath towpath has been repaired by the Georgetown Mill Owners."

"Indications are to the effect that the Georgetown section including Little Falls Dam were promptly repaired each time it was damaged in order to deliver water sold for power to

numerous Mills in Georgetown."

"The C&O Canal was acquired by the United States in 1938."

"During late summer and early fall when the River was at its lowest stages, in each of the years from 1938 to 1942, forces of the National Capital Parks under the supervision of George E. Clark, Chief Maintenance Division, worked at maintaining the dam. This work generally consisted of chinking up the dam by hand and, with an improvised floating drag line, dragging dislodged rock back onto the Dam. Five or six laborers were employed on this work from 1 to 2 months each year."

"It is recalled that Mr. G. L. Nicolson, Chief Engineer and General Manager, C&O Canal, 1891-1938, conferred with and called the undersigned and Mr. G. E. Clark many times during this period (and subsequently) pointing out the need for maintenance of the Little Falls Dam wherein he pointed out that this dam received continuous maintenance from the Canal Company and pointed out that the United States was not performing continuous maintenance to keep the Dam in as good condition as the Canal Company had and that he was concerned about the supply of water to the mills in Georgetown."

"The disastrous flood of October 1942 did substantial damage to the Little Falls Dam. The Dam was restored as a part of the work of Contract I-28p-1137, for the Repair and Restoration of the C&O Canal from the Potomac River Dam at Brookmont, Maryland to Georgetown, in the District of Columbia, by Corson and Gruman Company during the summer and fall of 1943 at a cost of \$22,176.00."

"During the fiscal year 1946, maintenance work was performed under the heading of repairs to the dam, Job. No. 9535, in the amount of \$379.02."

"During the summer and fall of 1944 the Dam was repaired by replacing the dislodged stones and the top stones were grouted into place for a 200' Section from Station 200 to Station 400 to determine if such a 'cap' would be successful in holding the stones in place, thereby avoiding the annual need for replacing the dislodged stones. This work was performed under Contract I-28p-1323, for Repairs to a Stone Dam across the Potomac River at Brookmont, Maryland, by McIlvaine and Burgess, at a cost of \$24,626.23, as shown on Drawing NCP 110.4-13."

"In the fall of 1947 forces of National Capital Parks replaced the dislodged stones at a cost of approximately \$6,000."

"The grouting of the top stones of the Dam into a 'cap' eliminated all damage to this 200' section of the Dam. A memorandum of July 28, 1948 from the Chief, Engineering Division to the Assistant Superintendent states, 'On July 22 I examined the condition of the dam from the shore and found that the water level behind the dam was approximately elevation 39, 2 feet below the designed elevation of the top of the dam (41.0') and that the top approximately 2 ft. of stones of the dam displaced permitting the water to flow over the dam at approximately elevation 39, 2 ft. below the elevation designed for operation of the canal and the supply of water to the mills.'"

"During the summer and fall of 1948 the dislodged stones were replaced on the entire dam and the top stones were grouted onto a 'cap' for 730' from High Island to Snake Island, Job Order 9775, at a cost of \$8,255.58 (F.Y. 1949)."

"During the summer and fall of 1949 the dislodged stones were again replaced in that portion of the dam from Snake Island to the Virginia Shore, 800', and the upper layer of rocks were grouted into a 'cap' at a cost of \$27,853.72 (F.Y. 1950)."

"This grouting of the upper layer of stones onto a cap has been successful and no dislodgement of stones or breaching of the dam has since occurred (with the exception of a minor wash-through on Snake Island, which became apparent in the fall of 1950, at a point where the Island was largely cobble and gravel)."

[1460-C&O-5] R. Nuzum, City Engineer, Cumberland, to Capital Park Service, Washington, D.C., 18 November 1954 (Flood-October 1954)

"This is to advise you that the most Westerly C. & O. Canal lock gates near the Western Maryland Railroad Station in Cumberland are badly rotted and in a poor state of repair."

"During the recent high water of October 15 and 16, water seeped through the gates and inundated the Cessna Lumber Company's property, causing considerable damage."

[1460-C&O-5] Private R. A. Fallin, to Chief, U.S. Park Police, 2 November 1954 (Flood-October 1954)

"During the recent high water the C&O Canal was filled with water from Lock #34 to Big Slack Water, the towpath being covered in some areas. The Canal was also filled with water in the Point of Rocks area with smaller amounts in all other areas. Several trees were felled as a result of Hurricane Hazel, among those blocking the towpath are located at the following areas: approximately one-tenth of a mile above Monocacy Aqueduct, a short distance downstream from Lock #44, just above Snyders Landing, and at the upper end of the Williamsport Water Works."

"The area from Dam #4 to Lock #41, a distance of approximately ten miles round trip, was patrolled on foot. There are three bad breaks in the towpath from Dam #4 to Outlet Lock #4. The area from Outlet Lock #4 to Lock #41 is very rough with dense undergrowth, making difficult walking. Numerous snakes were encountered in this area."

"The undersigned patrolled on foot the area from Falling Waters to the old Section House. The towpath in this area is in fairly good condition with the exception of two bad holes. There are small patches of dense undergrowth in some areas and several large trees across the towpath."

"The area from Lock #34 upstream to a point approximately two miles above Lock #35 can be patrolled on foot only. There is a bad break in the towpath just above Lock #34 and two bad breaks at the feeder Lock at Dam #3. There are no breaks in the two miles stretch above Lock #36, but the dense undergrowth make difficult traveling."

[1460-C&O-5] W. Drew Chick, Jr., Chief Park Naturalist, to Superintendent, National Capital Parks, 9 November 1954 (Easements-Park Service, Flood-October 1954, Flood Damage Prevention-Accomplished, Sustainability-Dams)

"On Sunday, November 7, I spoke at the annual dinner of the Western Maryland Sportsman's Club at their Clubhouse adjacent to Dam No. 4."

"After the meeting I was approached by Mr. George Grimes, 117 E. Washington Street, Hagerstown, Maryland, who is a vice president of the club. He asked me to accompany him down to the canal and stop lock to examine a crossing and to pass along a request to our engineers."

"I understand that, in accordance with a permit issued by this office to the Potomac Edison Company, represented by their Chief Engineer, a Mr. Brown, a number of changes and improvements in the canal property have been made."

"They have razed the superstructure of the old canal stop lock and have left only the deck and stringers spanning the canal at the top of the stone abutments."

"In addition, they have poured a concrete wall forming a dam across the canal between the stone abutments and have provided therein a vertical slit into which a piece of metal may be dropped to block the water. They have also built a concrete wall between the south abutment of the stop lock and their dam."

"In order to cross the canal with trucks and other equipment, they have placed a temporary clay fill. At the present time, water from the canal drains across the top of this fill through a shallow channel which is about 10 feet wide. Pedestrians may cross this channel on a plank."

"The flood waters which followed Hurricane Hazel did no damage to this crossing, but there was considerable washing on both sides of the stone abutments which form the stop lock. I was told that the stone foundation under the north abutment on the downstream side has been undermined."

"Flood waters washed away a great amount of fill which had been placed below the new concrete wall, connecting the south abutment of the stop lock with the dam. It will be necessary for the Potomac Edison Power Company to start work soon to repair the damage done by the flood." [From this last passage, can one presume that Potomac Edison had taken over maintenance of Dams 4 and 5 as the Park Service early proposed?] This will involve dumping of considerable stone and earth fill below their new dam. I was told that they plan to pour a concrete apron over the new fill to prevent it from being washed out again."

"The flood also washed away nearly all of the towpath for a distance of one hundred yards or so downstream from the stop lock."

"Of greatest concern to the club and to fishermen generally is the plan approved by this office, so they said, to remove the rest of the wooden portion of the stop lock. To do so would make it impossible for boat owners to cross flood waters coming down the canal in order to reach the towpath and their boats tied up in the river above Dam No. 4. It is their request that the existing fill placed by the Potomac Edison Power Company to take the trucks and equipment across the canal be allowed to remain with the present channel through it, which would effectively prevent vehicular crossing of the canal at this point. Foot bridges previously erected at this point have washed out with each high water, but the clay crossing which presently exists and which according to them would be removed when the Potomac Edison Power Company completed its work would serve them admirably."

"I agree that a crossing of the canal at this point is essential and it appears to me that the solution suggested by the club is a reasonable one. I made no commitments. I simply stated that I would call the matter to your attention when I returned."

[1460-C&O-5] Harry T. Thompson, Associate Superintendent, National Capital Parks, to George S. Humphrey, Vice President, Operation and Engineering, The Potomac Edison Company, 10 December 1954 (Flood-October 1954, Sustainability-Dams)

"We are advised that the flood following Hurricane Hazel has done certain damage to your

Company's work at Dam No. 4, C&O Canal. We would appreciate being advised as to the general extent of the damage and what in your opinion seems to be a desirable method of repair."

"As you recall after our inspection with Mr. Brown we requested that the timbers over the top of the stop lock should be removed as the ends were rotted to such an extent as to make the crossing dangerous. We also requested that the remainder of the fill that you placed across the Canal as an access to the work be removed. Inasmuch as you no doubt will restore the earth fill in order to repair the flood damage no action need be taken regarding the removal of the fill at this time. However, we feel that the wooden timbers over the stop lock are too rotted to be left in place and should be removed."

"Further action on this matter will be held pending receipt of information from you as to the damage by Hurricane Hazel and the repairs contemplated by you."

[1460-C&O-5] Harry T. Thompson, Associate Superintendent, National Capital Parks, to C. R. Nuzum, City Engineer, Cumberland, 10 December 1954 (Flood-October 1954)

"I am sorry to find that a reply to your letter of October 18, 1954, has been delayed this long while we have had consideration what should be and what could be done regarding the seepage through the gates of the C&O Canal locks during the high water near the Western Maryland Railroad Station in Cumberland, Maryland."

"It appears that the timbers, after long years of submergence, are deteriorating very rapidly since the breaching of the C&O Canal dam has lowered the water level at the lock gates. We are informally advised that it is now expected that that portion of the flood protection project, which will obviate the necessity of these gates for flood protection, will be constructed in the next several years. It is doubted that the rather expensive reconstruction of these gates should be undertaken at this time. It appears that the stop gate slots at the riverward face of both of these locks might very well be used to insert suitable planks to restrain the water of any flood which may occur before flood protection works are constructed at this location."

"We will be pleased to permit the City of Cumberland to install planks for this purpose. We shall be happy to know your opinion of this solution."

#### 1955

[1460-C&O-5] Harry T. Thompson, Associate Superintendent, National Capital Parks, to C. G. McVay, Manager of Power Production, The Potomac Edison Company, Hagerstown (Flood-October 1954, Flood Damage Prevention-Proposed, Sustainability-Dams)

"Your program of repair to Dams 4 and 5 on the C&O Canal as outlined in your letter of May 31 [not on file], is approved. However, on Item 4, at Dam No. 4, if it develops when you lower the towpath, that you find that sluicing the rock of the towpath with concrete might stabilize this portion of the flood spillway, it is requested that you do so."

[1460-C&O-5] George E. Clark, Chief, Maintenance Branch, to Harry T. Thompson, Associate Superintendent, National Capital Parks, 28 July 1955 (Easements-Park Service, Flood-July 1955, Flood Damage Prevention-Proposed, Widewater Restoration-1950s)

"Yesterday, 26 July, after several phone calls telling me that recent heavy down pours had caused the C. & O. Canal to run over the Towpath in 6 to 7 level in the vicinity of Sycamore Island and that future down pours could result in a bad washout, I made an inspection of the Lock 6 to 7 area of the Canal."

"As you probably know, the U.S. Engineers have completed the two Earth Dams across the Canal, just above Lock #6. To permit the water above the upper dam to supply the Canal below the lower dam and to Lock #5 they have installed a 12" pipe. This pipe is also supposed to take care of freshets or heavy down pours occurring in the Canal above the upper dam. The 6 to 7 level, as you probably know, is a long level and is fed not only by creeks but rapid run-off from the adjacent area, so that any heavy or prolonged rain can cause a sudden rise in its level. The by pass at Lock #6 would normally handle this sudden rise."

"The picture is further complicated by the fact that we are now getting water from Wide Water and all the levels from Wide Water down to Lock #6 have been building up, and should within the next few days be up to their normal levels--which I have always thought was our goal. In other words, as it stands now we are no longer dependent on the U.S. Engineers supply at Angler's Inn. However, the 12" pipe between these recently constructed dams is not anywhere near adequate enough to handle a sudden rise and something should be done immediately--otherwise we are going to have a washout."

"Two solutions are suggested:

(a) Somewhere above the upper dam construct a spill way similar to the so called Tumbling Dam just below Chain Bridge.

(b) Have the U.S. Engineers install immediately a larger pipe, at least 30" (I might mention that we required the Natural Gas Companies to install two 20")."

"Since I had no knowledge of our negotiations with the U.S. Engineers, I unthinkingly called Mr. J. C. Smith of the U.S. Engineers yesterday afternoon, whom I know quite well, to acquaint him with our recent flooded conditions at Sycamore Island. He had already investigated them and in our following conversation agreed that the existing 12" pipe was not, in his opinion, adequate to handle a sudden rise. We then discussed the Spillway idea which he thought was very good. We did not though, discuss who would build it."

"After talking with J. C. Smith, I made my inspection and I still feel that a larger pipe is the better solution, otherwise the water below the lower dam and Lock #5 is going to stagnate. That is, the Spillway would protect us in case of a sudden rise but the quantity of water going thru the 12" pipe is not, in my opinion, going to be sufficient to keep the area between the lower dam and Lock #5 properly flushed out."

"Later yesterday afternoon, I talked with Bob Horne and he felt that something should be done and he suggested that I call Mr. Dan Watt and insist on a larger pipe. I called Mr. Watt this morning (I also know him quite well) and he too is of the opinion, if I understood him correctly, that the 12" pipe is inadequate. But he very definitely said that there was nothing he could do about it. That anything done now would have to come from the Byron Bird level."

"I might say that there have been suggestions that we might relieve high water by opening draw down gates such as exist just above Lock #7. This is possible during day time operations but after 4:00 p.m. on Saturdays, Sundays and Holidays, it would result in considerable overtime. Also, with the suddenness of heavy showers now--the damage could be done before a man reached the gate."

"What should we do? Close down our supply at Wide Water and carry the minimum of water from Wide Water to their upper dam or keep our supply up and insist that the U.S. Engineers take the necessary correction measures?"

[1460-C&O-5] Harry T. Thompson, Associate Superintendent, National Capital Parks, to Robert C. Horne, Chief Engineer, National Capital Parks, 2 August 1955 (Flood-July 1955, Flood Damage Prevention-Proposed, Widewater Restoration-1950s)

"Mr. Thompson called and said to tell you that he had talked to Col. Bird regarding the problem at the Dam and the flooding of the canal. Col. Bird gave instructions for J. C. Smith to take care of the corrections of this measure. They are prepared to build the overflow and such other work that will take care of the canal."

"Bob Horne to follow up with J. C. Smith to be sure the matter is taken care of."

[CF] The Evening Star (Washington, D.C.), 19 August 1955, A1 (Flood-August 1955)

"Potomac Flood Grows; New Heat Wave on Way" The Star reports flooding on the Upper Potomac from Hurricane Diane, heading downstream. It makes no mention of the canal.

[CF] The Evening Star (Washington, D.C.), 20 August 1955, A1, A24 (Flood-August 1955)

"Potomac Due to Start Receding Here Today" The article reports flood news up and down the Potomac. It makes no mention of the canal.

[CF] The Evening Star (Washington, D.C.), 21 August 1955, A1, A21 (Flood-August 1955)

"Swollen Potomac Drops; Heat Wave to Continue" The Star discusses minor flood damage from the flood. It makes no mention of the canal.

[1460-C&O-5] Robert C. Horne, Chief Engineer, National Capital Parks, to the Files, 14 September 1955 (Easements-Park Service, Flood-July 1955, Flood Damage Prevention-Proposed, Widewater Restoration-1950s)

"In connection with the Corps of Engineers providing a overflow for the canal upstream of the construction area of their new dam and pumping station at Brookmont, Maryland, they submitted a plan titled 'Canal Overflow, Weir Through and Drain'. It should be noted that this plan is on the W. A. Datum. This plan was reviewed with Mr. Bartel and myself September 6, 1955 with Mr. J. C. Smith. It is determined by hydraulic computations that the weir of the new overflow should be 6 1/2" above the weir of the Lock 6 bypass channel in order to deliver adequate water to the Lock 5 to 6 level."

"Mr. J. C. Smith phoned yesterday to say that they had surveyed and determined that the weir of Lock 6 bypass was Elevation 50.85 W. A. Datum. It was also agreed that the top of the bar cage and screen of the new overflow would be raised to an elevation of approximately 51.9 W. A. Datum which is the elevation of the towpath adjacent to the site of its installation. Mr. J. C. Smith is going to revise their drawing and furnish us with three (3) copies of the revised drawing. The unrevised drawing that was discussed on September 6, has been assigned out Map File No. NCP 110.9-52."

"Mr. J. C. Smith agreed to make these revisions and immediately proceed with construction of the overflow. He will contact Mr. George Clark for agreement at the site for the exact location for the overflow. The approximate location recommended by the Corps of Engineers being approximately 1,000 feet upstream of the Little Falls Water Supply Dam site."

## 1956

[1460-C&O-5] Robert C. Horne, Acting Associate Superintendent, National Capital Parks, to the Director, National Park Service [?], 25 [?] July 1956 (Flood-July 1956, Sustainability-Towpath)

"The storm of July 20 caused extensive damage in Rock Creek Park and a washout of the towpath of the C&O Canal. It also may have contributed to a large rock slide into the Canal in the gorge just downstream of the Paw Paw Tunnel, which occurred on July 20."

"The peak of the flood reached Military Road crossing at approximately 11:00 a.m., Saturday, July 21. All roads in the valley were closed. By early Sunday afternoon all roads were cleared of mud and debris and all roads were opened to traffic except Beach Drive from Wise Road to Military Road and Sherrill Drive from 16th Street to Beach Drive."

"It is believed that the flood in Rock Creek approximated and perhaps exceeded the flood of August 25, 1933 which is the maximum on record."

### "C&O Canal"

"A section of the towpath approximately 100' feet long was washed out just upstream of Pennyfield's Lock. The work of repairing this break and restoring water to the Canal will proceed."

"A large rock slide occurred at approximately 11:30 a.m., Friday, July 20 about 150' downstream of the downstream end of the Paw Paw Tunnel. A portion of the rock slope on the towpath side of the gorge, excavated in rock to form the prism and towpath of the C&O Canal, slid, completely blocking the newly reconstructed towpath and a portion of the Canal prism. Fortunately, no one was hurt as the men were working in the tunnel because of the rain."

"Plans are being made to remove the rock and to determine the extent of scaling and other measures which will be necessary on the rock slope. This work will involve an additional expenditure above the amount previously estimated."

"A further report and appraisal of the costs of the damage will be prepared when the extent and cost is known."

## 1957

[1460-C&O-5] Robert E. Kloske, Program and Plans Officer, to Finance Officer, 20 February 1957 (Sustainability-Towpath)

"The components of cost included in repairing the recent break in the C&O Canal towpath at wide water are as follows;

Personnel Services	\$	2600.00	
Supplies & Materials	\$	4500.00	
Other Direct Expenses	\$	1500.00	
Facilitating Services	\$	350.00	
Equipment Operation	\$	6700.00	
Equipment Depreciation	\$	<u>2250.00</u>	
			\$17,900.00"

[1460-C&O-5] Harry T. Thompson, Assistant to the Director, to Irving Brant, Washington, D.C., 7 November 1957 (Flood Damage Prevention-Ordered, Sustainability-Towpath, Widewater-Sustainability)

"Mr. Conrad L. Wirth, our Director, phoned me to say that you had reported to him that the recently repaired towpath at the upper end of the Widewater area appeared to be near a break-through point and that something should be done about it. I promptly checked with our engineering and construction people and the Supervisor on the Canal, all of whom confirmed that there is a certain amount of sluffing on the water side of the towpath, which is to be expected."

"We have a foreman on this job, who is submitting a daily report. I am informed that the water was deliberately raised to its present level in order to thoroughly saturate the recently filled towpath, so that we could determine where weak spots might appear. We are periodically repairing those portions that have slumped into the Widewater area, covering the newly filled sections with stone riprap."

"Mr. Wirth asked that I let you know that we are aware of this problem and that we are not particularly concerned unless we should have a storm that might top the stop lock above Widewater; in which case I doubt if anything would save the Widewater fill in the future any more than it has in the past."

1958

[1460-C&O-5] Robert C. Horne, Chief, Division of Design and Construction, to Chief, Engineering Branch, 2 January 1958 (Flood-January 1958)

"Following a telephone report this morning by Mr. Hugo Habluetzel that the recent high water in the Potomac River had scoured out a considerable amount of the bank and is eroding the C&O Canal Towpath near the pumping station which is being constructed for the Rockville water supply, I called the City Manager of Rockville and passed this information on to him."

"I suggested to Mr. Markland that since Hugo seemed to think a bad situation was developing at this location, something should be done about it. He agreed that it sounded serious and stated he would have their resident engineer look at it, and report back to him. Mr. Markland will then get in touch with this Office. I suggested that he call Hugo and have him accompany the resident engineer on his inspection."

[1570-35] National Capital Parks Organization Manual For Emergency Flood Control For Predicted Stages of 9.0 to 26.0 Low Water Datum At Wisconsin Avenue Gauge, February 1958 (Flood Damage Prevention-Contingency Planning)

"For Predicted Flood Stage of 12.6 at Wisconsin Avenue Gauge"

"Maintenance Division"

"Drop stop logs in stop lock above C&O Canal lock 6. [16?]  
Secure C&O Canal barges and symphony barge at safe place."

"For Predicted Flood Stage of 16.0 at Wisconsin Avenue Gauge"

"Maintenance Division"

"When notified by Construction Branch, dewater Georgetown level of C&O Canal. Locks 1, 2, 3, and 4 to remain open during flood."

"Close paddles in feeder lock.  
Open spillway at Foundry Branch.  
Open spillway at Fletcher's."

"For Predicted Flood Stage of 19.0 to 26.0 at Wisconsin Avenue Gauge"

"Drop stop logs in stop lock above lock 16 C&O Canal.  
Secure C&O Canal barges and symphony barge at safe place.  
When notified by Construction Branch--dewater Georgetown level of C&O Canal.  
Locks 1, 2, 3, and 4 to remain open during flood.  
Close paddles in feeder lock at lock 5.  
Open spillway at Foundry Bridge.  
Open spillway at Fletchers."

[1460-C&O-5] Edwin M. Dale, Superintendent, C&O Canal National Historic Park Project, to Edward Kelly, Superintendent, National Capital Parks, 12 March 1958 (Flood Damage Prevention-Proposed, Sustainability-Culverts, Sustainability-Towpath)

"The purpose of this memorandum is to suggest and recommend that, in view of probabilities, Region Five and E.O.D.C. be invited and urged to actively participate in planning, supervision and surveys immediately needed in order to carry forward the projects for which funds are now available."

"The following basic items of maintenance and rehabilitation can profitably be accomplished. They are items which must be done in order to prevent further deterioration of the canal and to offer minimum public use facilities, thus reducing use impact on the undeveloped property. All items listed will facilitate accomplishment of final development."

- "1. Culverts. Minor tributary streams are carried under the canal bed in culverts. The original structures were rough stone masonry, mortar bound. Several of these structures have partially or entirely failed and the majority of those barrels still intact are partially or completely blocked by debris, soil, and stones. Rebuilding the damaged culverts and cleaning the plugged ones is a high priority project."

Needed: Professional determination as to advisability of using formed concrete, pre-cast concrete B & S pipe or corrugated metal to form culvert barrels."

- "2. Blowouts. There are about 36 major and about 18 minor breaks or blowouts, of the towpath and berm bank. Most of these are serious only during periods of high water but each successive rise of water further widens and/or deepens the towpath breaks, complicating control and eventual repairs. Berm bank failures result from



plugged culverts, are a source of considerable canal danger."

Needed: Professional advice as to effective use of available fill materials in bonding patching material to soil of existing banks. Most economical means of moving in fill materials which at some point will involve crossing watered sections of canal."

- "3. Towpath as a Trail. The towpath is overgrown for about 26 miles, interrupted by breaks in the bank at a number of places, larded over with deposits of alluvial soil for most of its length and elsewhere eroded to expose stones in the fill which creates hazardous footing for hikers and wheeled vehicles. The trail will require eradication of growth varying from weeds to tree sprouts and of which poison ivy may be the most troublesome, and thereafter brought up to a normal surface level, treaded and drained."

[CF] The Evening Star (Washington, D.C.), 7 May 1958, A29 (Flood-May 1958)

"Rains Swell River; Floods Held Unlikely" Article reports the Potomac at flood stage along the river, but no serious flooding expected. It makes no mention of the canal.

[CF] The Evening Star (Washington, D.C.), 8 May 1958, A2 (Flood-May 1958)

"Flood Threat Is Subsiding On Potomac" The Star reports the flood threat abating. It makes no mention of the canal.

[1460-C&O-5] Harry T. Thompson, Superintendent, National Capital Parks, to Director, National Park Service, 23 July 1958 (Easements-Park Service, Sustainability-Water Erosion)

"Recently two breaks in the C&O Canal have occurred which are presenting two separate repair problems to this Office."

"The first of these two breaks is located just north of the old Aqueduct Bridge in Georgetown and has received considerable publicity in the local press. Inspection of the site by members of this Office and the D.C. Division of Sanitary Engineering on July 18 brought out that the cause of this leak in the canal is due to a break in an old District of Columbia sewer which crosses the canal approximately 30 feet below the elevation of the towpath. The D.C. Division of Sanitary Engineering has agreed to begin immediate repairs to the sewer and our forces are preparing to restore the canal as soon as the repairs to the sewer have been completed. At the present time, the extent of the work required by this repair is not known, but indications are that the cost to this Office will be considerable and should properly be financed out of construction funds."

"The second break is located on the feeder canal at the northern tip of High Island where the canal's diversion dam is joined to the island. Recent high water in the Potomac River has topped the structure of the feeder canal and is rapidly eroding portions of the northern end of the island. Our preliminary estimates of cost to repair this break indicate that it will be a very sizeable project for which this Office has no funds currently available. Complete studies are expected to be available within the next week in order to determine the extent of the work necessary, together with an accurate estimate of its cost."

"At the present time, the feeder canal has sufficient water in it to continue feeding the Georgetown section of the canal. However, this is due to the fact that the Potomac River is still above normal level. If the water level in the river should drop in the near future, there will not be sufficient water to keep the Georgetown level of the canal up to normal. This presents two problems. As you know, the U.S. Corps of Engineers has a hydro inlet between Chain Bridge and the District line on the C&O Canal which they use to pump water from the canal to augment the supply from their conduits running from Great Falls to Dalecarlia. They are alerted to the situation which confronts us and are prepared to throw a temporary sandbag dam across the canal below their inlet to have available as much water as the feeder canal will deliver in case there should be need for it."

"In addition, our popular 'Canal Clipper' trips will have to be suspended until the two breaks have been repaired. This will undoubtedly result in some unfavorable publicity which this Office would like to avoid."

"A third problem which may present itself as a result of these breaks is the danger from a public health and odor standpoint that will occur if the Georgetown section of the canal remains relatively dry and stagnant water is allowed to stand any length of time."

"We are planning to proceed as expeditiously as possible with the repairs to the breaks in the canal in order that the least amount of harm will be done. As soon as we can supply you with detailed program for correcting the condition at High Island and accurate estimates of the cost of repairing both breaks, we will further advise you and suggest methods for providing funds to finance this work."

[1460-C&O-5] Harry T. Thompson, Superintendent, National Capital Parks, to Director,

National Park Service, 28 July 1958 (Easements-Park Service, Sustainability-Water Erosion)

"My memorandum to you of July 23, 1958, Subject--'Breaks in the C&O Canal,' explained the problems confronting this Office as a result of these breaks and stated that we would keep you advised of methods of repairing the Canal and financing the work."

"The break in the feeder canal at High Island has been studied by our engineers in conjunction with Bureau of Public Roads officials and the Bureau's contractor now doing the grading work for George Washington Memorial Parkway near Brookmont, Maryland. Their recommendation is that the Bureau's contractor be issued a work order to perform the work of making the repairs to the feeder canal as an addition to their present contract. An agreement has been reached for the approximate quantities required and unit prices. The estimate for the cost of the repairs is \$40,000. Officials of the Bureau of Public Roads have indicated that they are willing to have their contractor perform the work of repairing the break in the feeder canal if you notify them that they have the Service's approval to proceed. Accordingly, there is attached a letter to the Bureau of Public Roads for your signature which authorizes them to increase the amount of their contract for Project 100A1 in the amount of \$40,000."

[1460-C&O-5] Harry T. Thompson, Superintendent, National Capital Parks, to Assistant Commissioner of Operations, Bureau of Public Roads, 15 August 1958 (Easements-Park Service, Sustainability-Water Erosion)

"Director Wirth of the National Park Service advised you by letter of August 1, 1958, that it was the desire of the Service to have a break in the feeder canal of the Chesapeake and Ohio Canal at High Island, Maryland, repaired by your contractor for the George Washington Memorial Parkway, Project 100A1."

"This is to advise you that funds for financing this work have been set up by an adjustment to the Service's construction program. The program adjustment has transferred savings on the 1957 fiscal year project for Grading and Structures, D.C. Line to Carderock, R-11, in the amount of \$40,000 to C&O Canal, Emergency Repairs to Feeder Canal, High Island."

[CF] The Evening Star (Washington, D.C.), 6 September 1958, A24 (Sustainability-Towpath)

"Towpath Along C&O Canal Now Open Entire Length" Article announces the reopening of the park after "a summer program of maintenance . . . aimed at minimizing further damage to the historic features of the canal . . . Tree growth and debris was removed from masonry and locks, large areas of the canal bed were cleared of trees, foot bridges were erected, and many breaks in the towpath repaired."

[1460-C&O-5] Henry G. Weeden, Chief, Engineering Branch, to Chief, Division of Design and Construction, 24 September 1958 (Easements-Park Service, Sustainability-Water Erosion)

"Repair of the washout to the Feeder Canal was made by the Wright Contracting Company who are doing the grading work in George Washington Memorial Parkway in Maryland. Work on repairs to the Feeder Canal was started September 10th and completed September 17th. The Feeder Canal was bridged by using four lengths of 48" pipe and one length of 36" pipe. The water in the Georgetown level was kept as near to normal as possible but at times dropped as much as a foot below normal. There was very little interruption to the Wilkins-Roger Milling Company during this operation and no barge trips were cancelled that I have heard about."

## 1960

[1570-35] "Organization Manual for Emergency Flood Control For Predicted Stages of 9.0-26.0 Low Water Datum at Wisconsin Avenue Gauge," Region Six, National Park Service, c. 1960. (Flood Damage Prevention-Contingency Planning)

"For Predicted Flood of 12.6 at Wisconsin Avenue Gauge"

"Drop stop logs in stop lock above C&O Canal Lock 6.  
Secure C&O Canal barges and symphony barge at safe place."

"For Predicted Flood of 16.0 at Wisconsin Avenue Gauge"

"In addition to the duties for stage of 12.6 perform the following:"

Notify the following that the Georgetown level of the C&O Canal will be dewatered."

"Wilkins-Rodgers Milling Company"

"U.S. Engineers Office"

"Division of Facilities Maintenance"

"Dewater Georgetown level of C&O Canal, Locks 1, 2, 3, and 4 to remain open during flood."

"Close paddles in feeder lock.  
Open spillway at Foundry Branch.  
Open spillway at Fletchers."

"For Predicted Flood of 19.0 to 26.0 at Wisconsin Avenue Gauge"

"Drop stop logs in stop lock above Lock 16 C&O Canal .  
Secure C&O Canal barges and symphony barge at safe place.  
When notified dewater Georgetown level of C&O Canal.  
Locks 1, 2, 3, and 4 to remain open during flood.  
Close paddles in feeder lock at Lock 5.  
Open spillway at Foundry Branch.  
Open spillway at Fletchers."

[CF] The Morning Herald (Hagerstown), 2 April 1960, 1 (Flood-April 1960)

"River Falls Throughout Entire Day" Reports flood damage of a "nuisance variety."  
Hancock mentioned as a trouble spot. No mention of the canal.

[68A-3048] George A. Palmer, Assistant Regional Director, National Park Service, to Assistant Regional Director, 5 April 1960 (Flood-April 1960)

"Superintendent Dale telephoned that the Potomac was rising on Friday and reached a flood stage of 17.35 feet at Hancock and then receded. As a result of that flood, he and his staff estimated that they had lost 1000 yards of fill material that had been placed during the last two construction seasons."

"Today, April 5, as a result of the rains yesterday, the river went to 19.85 and the towpath along a great section of the Canal is under water. He will advise us of the estimated losses when the water recedes."

[CF] The Morning Herald (Hagerstown), 5 April 1960, 1 (Flood-April 1960)

"River Keeps Moving Up, But Rate of Rise Slows" The article discusses the threat of flooding from the rising Potomac and its tributaries.

[CF] The Morning Herald (Hagerstown), 18 April 1960, 1-2 (Flood-April 1960)

"Recent High Water Gives Information About Canal" The Morning Herald reports the recent high water has been a mixed blessing for the C&O Canal, not only causing damage (in particular the erosion of recently applied fill material, but also showing the continuing ability of the unwatered sections of the canal to hold water.

1961

[CF] The Evening Star (Washington, D.C.), 20 January 1961, A10 (Miscellaneous)

Editorial praising a proviso in President Eisenhower's proclamation declaring the C&O Canal a national monument. "The proviso makes it clear that Congress at any time may authorize use of the canal parkland for water-supply, flood-control 'or any other beneficial purpose.'"

[CF] The Evening Star (Washington, D.C.), 20 February 1961, B1 (Flood-February 1961)

"Upper Potomac Floods Expected to Be Slight" Article indicates damage expected around Seneca. It makes no mention of the canal.

[CF] The Evening Star (Washington, D.C.), 21 February 1961, D1 (Flood-February 1961)

"Potomac Spills Over Its Banks" The Star reports flooding at Seneca and higher up the river. It does not mention the canal.

[68A-3048] George A. Palmer, Assistant Regional Director, Region Five, National Park Service, Philadelphia, Pa., to Majorie A. James, Washington, D.C., 21 April 1961 (Flood-February 1961, Sustainability-Towpath)

"We acknowledge receipt of your letter of April 13 and this will serve as a preliminary

reply pending the receipt of detailed information from the C&O Canal National Monument. It is regrettable that your son and other members of his bicycle group did not find the towpath as useable as anticipated and we especially regret that a member of the group suffered an injury while travelling on one of the adjacent roads."

"As a general comment, we might point out that the towpath, the Canal, and its appurtenant structures had reached an advanced stage of deterioration when the National Park Service undertook basic stabilization and rehabilitation only several years ago on the section between Seneca and Cumberland. You realize, of course, that the Canal is subject to flooding from the Potomac River and we know that some sections of the towpath were washed out from that cause early this spring and that generally it has not been in good condition because of so much rain. The surface of the towpath is dirt and we cannot make it weatherproof without losing its historic nature. We can assure you that the Service is making every reasonable effort to restore the towpath and the Canal for public use including the development of campgrounds. We fully intend to press ahead with this work and hope it will soon be possible for your son and others to use the Canal in complete comfort and safety."

[68A-3048] Charles H. Blake, Acting Superintendent, C&O Canal National Monument, to Regional Director, Region Five, National Park Service, Philadelphia, Pa., 26 April 1961 (Flood-February 1961, Sustainability-Towpath)

"This is in reply to Acting Regional Director Palmer's April 21 memorandum regarding Mrs. Alan James' letter of April 13."

"Although flood damage was minimal this year, heavy snows and late winter rains made even foot travel on the towpath next to impossible until mid-April. In many places the towpath is still too wet for easy bike travel."

"The section of towpath from the outlet lock one mile above Dam 4 and extending upstream for approximately 3.5 miles, is the Big Slackwater. Canal boats traveled in the river in this section and the towpath is a 'shelf' built along rocky bluffs. Maintenance of the towpath in this area is difficult, largely due to water action and restricted quarters for equipment operation."

"The remainder of the towpath . . . is generally in satisfactory condition considering the weather factor involved. Of course, closer to Washington the canal has been restored as part of the National Capital Parks system and is in excellent condition as stated in Mrs. James' letter."

[68A-3048] Chesapeake and Ohio Canal, National Park Service pamphlet, c. 1961 (Miscellaneous)

"Widewater. Construction of the canal here differs from any other section of the Georgetown Division. [VERY IMPORTANT] By using an inactive river channel, blocked from the main stream by towpath embankments, the early canal engineers saved vast amounts of blasting and excavating. The extended width and increased depth of this flooded channel give Widewater the appearance of unruffled mountain lake, and the high rugged rock formations through which it passes lend added beauty and interest to the scene."

1962

[68A-3048] Edwin M. Dale, Superintendent, C&O Canal National Monument, Hagerstown, to Regional Director, National Park Service, 16 April 1962 (Study-Floods-National Park Service)

"Reference is to Mr. Savage's April 13 memorandum, subject 'Flood History.'"

"Enclosed is House Document No. 687, Chesapeake & Ohio Canal Report. Several copies of this Report are in the files of Division Chiefs at Region Five and we have a limited supply here. Particular reference is to Page 53 and the 3 sheets titled 'Flood Conditions,' Drawings NCP 110-80-29, in the map supplement of the Report. We have the blue prints of 'Flood Conditions' at a slightly larger scale, can supply as many prints as needed."

"The enclosed material will be supplemented with data on our flood experience material to be consolidated by the Park Engineer when he returns to duty from a brief leave period. Information contained in the 'Report' appears to be a fair summary of the situation as regards flood occurrence. Stability of banks and towpath can be obtained by application of modern methods at reasonable cost."

[68A-3048] George A. Palmer, Acting Regional Director, Northeast Region, National Park Service, Philadelphia, Pa., to Edwin M. Dale, Superintendent, C&O Canal National Monument, 9 November 1962 (Easements-Park Service)

"Your memorandum of November 8, relative to your discussion with Civil Defense Area Coordinator O'Keefe, has been received, and we appreciate having the details concerning this question."

"We agree that the Paw Paw Tunnel must be considered a 'Special Category' group of structures for fallout shelter purposes. We have no objection to a detailed study of the

tunnel for Civil Defense purposes by Colonel O'Keefe or his representatives. However, before a license is given to Colonel O'Keefe for the use of the tunnel as a shelter, we would like to have before us complete recommendations of the modifications which will be necessary to adapt it for this purpose, and your recommendations relative to the feasibility of all of the use and necessary changes which are proposed, including the history of floods in this particular section of the Canal."

[CF] [68A-3048] Edwin M. Dale, Superintendent, C&O Canal National Monument, Hagerstown, to George A. Palmer, Acting Regional Director, Northeast Region, National Park Service, Philadelphia, Pa., 23 November 1962 (Easements-Park Service, Flood-March 1936)

Memorandum indicating that Civil Defense officials planned to 'back off' for the time being the idea of using the Paw Paw Tunnel as a fall out shelter.

Dale promised Palmer, "You will be informed of any future developments. There is attached a sketch indicating dimensional data of the tunnel and elevation of the 1936 flood, only flood of record to top the towpath [at the Paw Paw Tunnel]."

#### 1963

[CF] The Evening Star (Washington, D.C.), 14 March 1963, A1 (Flood-March 1963)

"Potomac to Crest Tomorrow At Flood Stage" No serious flooding expected, according to the Star. It does not mention of the canal.

[CF] The Evening Star (Washington, D.C.), 22 March 1963, A1 (Flood-March 1963)

"Flooding Swamps Seneca" read the picture caption. The article goes on, "heavy spring rains in the Potomac River watershed have brought flooding in dozens of low-lying communities."

[68A-3048] Robert G. Hall, Chief, Eastern Office, Design and Construction, National Park Service, Philadelphia, Pa., to Regional Director, Northeast Region, 27 August 1963 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"The subject program [1964 Building and Utilities Program--C&O Canal] contains many items for stabilization, reconstruction and rehabilitation for various structures, and appurtenances along the canal. In most cases, the moneys set aside to accomplish an item are insufficient to complete it."

"As the majority of the projects programmed do not have approved PCP's or individual historic classification where structures are involved, we reviewed the program at a meeting with Superintendent Dale at the canal on August 15, 1963. Mr. Dale and Historian Miele represented the Park, and Landscape Architect Abbuehl and Architects Nutt and Franzen represented EODC."

"The recommendation of this group which is concurred in by this office, is that all B&U moneys with the exception of items for clearing and grubbing, \$15,400, and Campground and Picnic Area Development, \$25,600, be concentrated in the stabilization, reconstruction and repair at the Dam 4 complex. Our figures indicate this amount to be \$163,600."

"Inspection of the dam indicates a wide crack in the upstream side of the abutment and leakage of considerable volume through the abutment at level slightly above that of the river on the downstream side of the dam. These leaks have caused recent loss of fill material."

"It is apparent that the unstable condition of the abutment has existed for some time; however, although disintegration is slow, it is constant and should be corrected."

"As both Superintendent Dale and Architect Franzen, who have been close to the structural conditions of the canal for some time, feel that Dam 4 is the most critical of the structural problems, we believe that the \$163,600 should be concentrated here to make the necessary repairs to all structures in the area and restore those requiring restoration."

"It is quite possible that this project will not require the expenditure of all the \$163,600, in which case the remainder can be used to stabilize other structures where repairs are badly needed."

"A more accurate estimate of the cost of Dam 4 rehabilitation can be made when exploratory excavation, required to determine the extent of subsurface failure, has been completed."

"We hope you will concur with our recommendations and make the necessary program adjustments so that we can arrange with Superintendent Dale to complete the exploration excavation."

[CF] [68A-3048] Edwin M. Dale, Superintendent, C&O Canal National Monument, Hagerstown, to Regional Director, Northeast Region, National Park Service, 18 September 1963 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"We are in agreement with the program outlined in Chief, EODC, memorandum of August 27 and your reply of September 5 as previously indicated verbally though Mr. Christenson."

"Work Orders B-13 and B14 cover Rehabilitation of Canal structures, B-13 being for stabilization of Canal bed, banks and revetments and B-15 for locks, dams, and rip rap."

"We are enclosing herewith PCPs numbered B22, B23, B24, M3 and R8 all of which relate to features of the stabilization and restoration of the historic scene within the Dam 4 complex. B22 prepared by Park Engineer Blake contemplates some items with which I am not in agreement but all of the features of which are intended to restore the stop lock dike wall and stabilize the downstream masonry protection against flood waters. The first item listed involves the removal of the present fill from behind the abutment walls down to the crest of the dam level, the stated intention being to reveal the extent of voids created by water flowage through the fill. My objection to this action is that there is presently a firm bank between the wall and the missing portion of the stop lock dike, well stabilized and apparently impervious to passage of water. It seems to me that it would be better to leave the existing fill in place and proceed with the filling and pressure grouting which is contemplated under PCP B24. Thereafter, if a settling occurs, the fill required to maintain the level can be placed as needed in the course of normal maintenance rather than disturb the presently stable condition of this fill."

1964

[68A-3048] John J. Longworth, Civil Engineer, to Chief, Eastern Office, Design and Construction, National Park Service, Philadelphia, Pa., 6 January 1964 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Communications with Maintenance Engineer Golub, Northeast Region, and contractors who viewed the abutment on November 26, emphasize the need for further information on the extent of failure, abutment details, and soil conditions mentioned in the undersigned's report, of December 4."

"The abutment should be relieved of the loading caused by the fill and water behind it, after which the masonry can be grouted to reduce the flow of water."

"Several methods are available for reducing this abutment loading:"

"1. A row of sheet piling can be driven to water level, the area between the abutment and piling either drained and filled with reinforced concrete or large stone and grout to prevent further leakage and reinforce the wall below water level."

"2. A sheet piling system which is designed to take the fill loading could be placed behind the abutment. Fill below water level between the sheet piling and abutment would be replaced with large stone to prevent loss of fill."

"3. The fill behind the abutment could be partially replaced by earth filled binds designed to restrain the fill. Fill below water level between the abutment and binds would be replaced by large stone to prevent loss of fill."

"As preliminary to choosing any method, core borings with complete analysis should be taken on a contract basis. This would cost approximately \$5,000."

"The borings could be used to determine the depth and characteristics of the abutment and of the strata beneath it for design purposes and also to fill a void in the historical research data concerning the site."

"The investigation trench should be backfilled prior to the beginning of this work."

[68A-3048] Edwin M. Dale, Superintendent, C&O Canal National Monument, Hagerstown, to Mason Gigeous, Potomac Fish and Game Club, Williamsport, 4 March 1964 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"You requested 'the story' on the Dam 4 abutment wall situation. An outline of the problem follows . . . The dam abutment wall paralleling the Maryland shore shows signs of distress, movement and leakage. Measurements and recorded photographs indicate that failure is occurring at an accelerated rate and that unless deterioration is checked and the wall stabilized, total failure may occur at any time that added stress occurs, especially in event of a rise of water of flood proportions."

"First step [in stabilizing Dam 4] is to determine sub-surface conditions, in order to insure that stabilization method selected will fit actual rather than supposed, or guessed at, conditions. Drawdown of 6 1/2 feet last October revealed a spread of rubble extending outward from the wall and additional cracks in the wall below water level but did not expose the base of the wall. Later cross section trench revealed makeup of fill material behind the wall, shape of wall, slump (stability) characteristics of the fill material. Auger holes and water tests revealed the porosity of the fill material and indicated the route of water flowing through the wall and under the fill. Presently, core boring are being taken adjacent to and down through the wall to determine how and what material the wall is based. The drilling job should be completed by March 6 or 9, weather permitting, and the engineer's report of findings based on core samples and other data should then be available within two weeks. Thereafter, stabilization procedure will be determined. Drawing up specifications, advertising the job and awarding the contract will require a

minimum of three weeks. Enough time must be allowed to permit the successful bidder to move in and set up; this time will vary with the nature of the operation. Methods may include pressure grouting or use of sheet piling, or both. It is 'second guessing' to suggest a method until the engineer's reports are completed."

[CF] The Daily Mail (Hagerstown), 15 April 1964, 32 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Leak in Retaining Wall At Dam No. 4 Feared By Dale" Article describes fear that the leak could undermine the capacity of the dam to hold water effectively.

[CF] The Morning Herald (Hagerstown), 24 April 1964, 5 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"Dam No. Four And Its Leak" Two photographs, one from a distance, the other a close up showing the leak at Dam No. 4.

[68A-3048] "Invitation For Bids (Construction Contract)," 26 May 1964 (Flood Damage Prevention-Proposed, Sustainability-Dams)

#### "Description of work"

"The work to be performed shall be to furnish all labor, materials and equipment necessary to prepare the site, temporarily stop leakage through abutment, inject grout consisting of approx. 1200 sacks of portland cement with aggregates and admixtures for soil consolidation and furnish and satisfactorily place and/or construct the following approximate quantities: 250 LF of 4" tile underdrain; 12,000 CY of borrow; 1240 SY of stabilized turf; seed, fertilize and mulch 60,000 SF of work area; 695 SY of pointing and grouting of masonry surfaces; pneumatically apply mortar to 650 SY of masonry surface and 12 concrete wheel stops. Bidder shall furnish records of extent and completion of similar types of work performed with their bids."

[CF] The Morning Herald (Hagerstown), 24 July 1964, 24 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"Workmen to Draw Down Water On Dam No. Four To Permit Repair Job" Article mentions that unless the abutment wall to Dam No. 4 is repaired, "any flood which tops the wall will, in the opinion of the engineers, probably result in total failure. Repairs in such case would require several months and considerable expense."

[CF] The Daily Mail (Hagerstown), 1 August 1964, 16 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"Dam No. Four Work Ahead of Schedule"

[CF] The Daily Mail (Hagerstown), 6 August 1964, 28 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"Hard at Work" Photo of workmen spraying concrete at Dam No. 4.

[CF] The Daily Mail (Hagerstown), 8 August 1964, 18 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"Dam No. Four Condition is Even Worse Than Expected" Article indicates workers discovered the lime cement used in the construction of Dam No. 4 had dissolved over the decades, creating massive fissures inside the structure. Superintendent Dale mentioned that in his opinion the problem had been caught just in time, before it could cause much more serious damage.

[CF] John Lott, The Daily Mail (Hagerstown), 11 August 1964, 18 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"Work Proceeding at Dam 4 to Repair Damaged Wall" Article describes how the contractor is repairing the unexpected damage at Dam No. 4.

[CF] The Morning Herald (Hagerstown), 14 August 1964, 15 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"Workmen Pump Cement into Cracks of Abutment of Dam Four to Plug Leaks" A photo-story showing the repairs at Dam No. 4.

[68A-3048] Cornelius W. Heine, Assistant Regional Director, Conservation, Interpretation, and Use, National Park Service, to Robert L. Wiggins, Old Museum Village of Smith's Clove, Montroe, N.Y., 18 August 1964 (Maintenance-General, Renovation-1938-42)

"We hope that the enclosed account of the Chesapeake and Ohio Canal restoration and use

will assist you in your plans for the restoration work for the Delaware and Hudson Canal as mentioned in your letter of July 29 to Mr. Robert W. Andrews."

"On March 9, 1940 an award was given to Corson and Gruman Company, Contractors, for construction of additions to and replacement of existing canal structures, and performing other work for the restoration of the Chesapeake and Ohio Canal between Foundary Branch in the District of Columbia and Lock No 5 at Curtin, Maryland (Contract I-28P-34)."

"The restoration of the Chesapeake and Ohio Canal began soon after the waterway was purchased by the United States. In October 1938, two camps of the Civilian Conservation Corps began work on the canal, which had been inoperative since 1924. The full complement of men for each camp was about 125 men, but they averaged only 150 men combined during the nearly two years it took to accomplish this task. The section of the canal to be restored was the 23-mile stretch between Seneca, Maryland, and Georgetown, D.C. The CCC worked on roughly 15 miles of this project, with the balance of the work being done by private contractors. By the time the canal was reconstructed and opened--August 1940--the CCC alone had probably contributed between 45,000 and 65,000 man-days to the project, including work done along the canal not directly related to the restoration. This figure is of dubious value, however, because of the extent of the contract work is presently undetermined and because relatively little mechanized equipment was used."

"The initial plans for the reconstruction called for the channel of the canal to be excavated to the 6-foot original depth for a width of 30 on the bottom. The banks of the canal were rebuilt at a slope of 2 to 1. By November 1939, the Engineering Department of National Capital Parks decided that 14 feet of the cross section had to be to the depth of 6 feet."

"Although the present use of the reconstructed portions of the C & O. Canal is comparatively light in relation to its past activity, there are still recurrent problems of maintenance and repair. A staff of several men and trucks maintain the entire 23-mile section of the canal under the jurisdiction of the National Capital Region. Their duties include clearing debris from the locks daily, repairing small breaks in the towpath embankment, cutting grass along the towpath and in adjacent areas, and maintaining adequate water levels for the many users of the canal, both recreational and industrial. Muskrats, for example, have always been a danger to the banks of the canal, and their burrowing still causes washouts which drain the canal, sometimes for weeks at a time."

"As an indication of what problems may occur, recently some 40 feet of dry laid stone wall at one of the feeder canals gave way. It evidently arose entirely from natural deterioration, rather than from flooding or the like. The repair of this break required considerable time and money. Another recurrent problem is siltage from storm runoff and small streams that empty into the canal. The most improbable break, however, was when a hole appeared in the bottom of the canal in Georgetown. Several days were spent in plugging the hole with concrete, in place of the original puddled clay seal."

[68A-3048] M. Rumbaitis, Supervisory Civil Engineer, and H. Rubright, Civil Engineer, to Chief, to Chief, Eastern Office, Design and Construction, National Park Service, Philadelphia, Pa., 19 August 1964 (Flood Damage Prevention-Proposed, Sustainability-Dams)

"On August 7, 1964, a meeting was held at the work site in order to investigate and determine the extent of work required by the deteriorated condition of the abutment as revealed after excavation of the fill from the rear face."

"The investigation revealed that the vertical crack between the upstream wing wall and main abutment wall was more severe than anticipated. Also, the joint between the downstream wing wall and bank retaining wall was, in fact, not constructed continuously. Since it does not appear practical or necessary to tie the latter opening together with tie rods as called for on the contract drawings, we recommend that this joint be cleaned of all debris and loose material and a concrete seal poured to fill the joint in order to prevent seepage and loss of backfill material. The upstream wing wall will require a somewhat different arrangement and number of tie rods than is shown on the plans and the contractor has agreed to repair these areas accordingly. Additional cost for material will be paid for from Force Account Item, as set forth in the Bid Schedule."

"The nature of the cracks and bulges in the main abutment wall indicate differential movements of the masonry blocks within the wall itself and on the bedrock foundation as well. It seems doubtful that the work, as originally planned and contracted, will of itself insure no further movement. Therefore, we recommend that vertical holes be drilled from the top, through the masonry, and several feet into bedrock. Steel rods should be inserted for the full depth and the holes sealed by pressure grouting. The locations for the holes may best be determined in the field. A total of approximately 15 holes, at an average length of 40 feet should be adequate to do the job."

[CF] The Daily Mail (Hagerstown), 19 August 1964, 28 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"Over 100 Yards of Cement Pumped into Dam No. Four" Article indicates repairs taking longer than expected at Dam No. 4.

[CF] The Daily Mail (Hagerstown), 28 August 1964, 1 (Flood Damage Prevention-Accomplished, Sustainability-Dams)



"River Level Rising Behind Dam No. 4, But Still Low" Article reports on the continuing repairs at Dam No. 4.

[68A-3048] Edward A. Northrup, Project Engineer, Eastern Office, Design and Construction, National Park Service, Philadelphia, Pa., to Edwin M. Dale, Superintendent, C&O Canal National Monument, Hagerstown, 31 August 1964 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"As recommended by the Consultant Engineer who made the foundation inspection for the subject project, the work quantified for stabilization of Dam #4 were prepared."

"After excavation of the abutment backfill, it revealed a deteriorated condition more extensive than anticipated at the masonry walls and the bedrock under the the foundation as well."

"The pressure grouting for soil stabilization on back of the abutment could not be placed without stabilization and filling the voids in the rock fill in front of the abutment as well as the masonry walls."

"Our estimated quantity of 1,200 sacks of cement (Bid Item 8) could run as high as 3,000 sacks or 1,800 sacks over bid quantity. The unit bid price for the sack of cement is \$10 or a total overrun could be as high as \$18,000."

"The placing of pneumatically applied mortar to the masonry surfaces (Bid Item 7) resulted in a saving of \$7,000."

"The additional amount required to complete the work is \$11,000. This work is part of the stabilization project and there is no way to reduce the scope of the work and be within the limits of the contract amount."

[68A-3048] M. Rumbaitis, Coordinating Engineer, Eastern Office, Design and Construction, National Park Service, Philadelphia, Pa., to Chief Engineer, Eastern Office, Design and Construction, National Park Service, Philadelphia, Pa., 19 October 1964 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"On October 8 and 9, an inspection was made of the stabilization of Dam No. 4 abutment and resurfacing of towpath and the following was found:"

"The stabilization of the abutment is approximately 90 per cent complete. All fill is completed and slopes of fill are being topsoiled and seeded. The stabilized turf surface will follow."

"During the construction many unforeseen conditions were encountered, but due to the cooperation of the contractor and the Regional Program Office, the difficulties were solved and resulted in a first-class job. It is anticipated that in two or three weeks this project will be completed."

[68A-3048] Edwin M. Dale, Superintendent, C&O Canal National Monument, Hagerstown, to Regional Director, Northeast Region, 27 October 1964 (Flood Damage Prevention-Accomplished, Sustainability-Dams)

"The subject contract [the job to stabilize and fill the abutment of Dam #4] is nearing completion and, by arrangement with EODC representatives, final inspection has been tentatively set for November 5 at 11:00 a.m. We shall be pleased if you or your representatives could arrange to be present."

#### 1967

[CF] The Evening Star (Washington, D.C.), 7 March 1967, A3 (Flood-March 1967)

"Heavy Rains Swamp Roads, Cellars" Article describes flooding in Rock Creek and the North branch of the Potomac. No mention of the canal.

[CF] The Evening Star (Washington, D.C.), 8 March 1967, A6 (Flood-March 1967)

"Swollen Potomac to Crest Slightly Above Flood Stage" The Star indicates the Potomac is expected to crest slightly above flood stage in Washington, D.C. It makes no mention of the canal.

[72A-6215] W. Dean McClanahan, Superintendent, C&O Canal National Monument, Hagerstown, to the Director, 28 April 1967 (Flood-March 1967)

"Weather: At long last the rains came, but with them came the worst flooding in the Potomac Valley for 12 years. A total of 3.05 inches of rain fell during a four-day storm which started in the 4th and ended on the 7th. At Williamsport the river crested at 23.7 feet--0.7 feet above flood stage. Most of the canal from Oldtown to Seneca was inundated with a tremendous amount of damage being done by flood waters flowing over the towpath into the river. Another freshet occurred on the 15th and 16th with the river cresting at 13 feet. Three inches of snow was measured on the 20th and 21st."

"Fiscal: We have received funds in the amounts of \$72,000 to assist with flood damage to the towpath and structures; this allotment is broken down to \$23,000 for repair of major breaks, \$49,000 against B&U [buildings and utilities] Maintenance."

"Protection: Rangers spent considerable time along the canal inspecting and reporting damage caused by the flood."

"Maintenance: Following the flood, the full length of the canal was checked to determine extent of damage and cost of rehabilitation, and repair work was begun. This work is being accomplished by park forces, utilizing seasonal employees and equipment procured locally under rental agreements."

[72A-6215] W. Dean McClanahan, Superintendent, C&O Canal National Monument, Hagerstown, to the Regional Director, National Capital Region, 9 November 1967 (Study-Floods-National Park Service)

"In response to Assistant Regional Director Binnewies' memorandum of September 6 concerning Implementation of Executive Order 11296, pertaining to management of flood losses, we submit the following comments:"

"With respect to the Chesapeake and Ohio Canal National Monument, it should be recognized that practically the entire area lies within the flood plains of the Potomac River. In the most part, however, the canal and its engineering features would be subjected to flooding on an average of only once every ten to twelve years. While nothing can be done in regard to relocation of this entity, then fulfillment of our primary mission requires intensive stabilization and preservation of this historic relic to insure its continuance as part of our cultural heritage."

"Facilitating developments to accommodate public use of this area, whether within the realm of cultural appreciation or recreation, are necessary. Since such developments must, by necessity, relate to either the canal or the river, they will also be subjected to periodic flooding; and planning must take this into full account so that these facilities are designed to withstand flooding."

"Plant facilities as related to maintenance buildings or other aspects of operations can and should be located outside the flood plain to avoid flood losses. Our planning is following this concept."

"In the broad picture, river flood plains have their highest and best uses lying within the realm of recreation or agriculture. The C&O Canal, through accident of geography, has kept much of the Potomac River shoreline from becoming highly developed; and as a result, has been instrumental in holding urban and industrial flood losses in Western Maryland to a comparative low level. The proposed Potomac National River would extend this influence to the Virginia and West Virginia shorelines, would control future shoreline developments and associated flood losses, and would guarantee that flood plains along 190 miles of the Potomac River would be perpetually dedicated to their highest and best uses."

#### 1971

[CF] Paul W. Valentine, Washington Post, 1 June 1971, C3 (Flood-June 1971)

"Potomac May Near Flood Level" The Post reports the Potomac is expected to crest one foot below flood stage. It makes no mention of the canal.

#### 1972

[CF] J. Y. Smith and Donald P. Baker, Washington Post, 24 June 1972, A1, A12 (Flood-June 1972)

"Agnes Leaves Devastation Potomac Crests Record Damage" The article discusses the causes and effects of flooding around Washington, D.C. It makes no mention of the canal.

[79-770003] William R. Galloway, Safety Officer, to Chief, Division of Safety Management, 30 June 1972 (Flood-June 1972, Widewater-Sustainability)

"Safety Inspection of Flood damage to the C&O Canal, from Georgetown to Seneca, Maryland"

"On June 27, 28, and 29, in the company of John J. Curran, Chief, Division of Permits and Inspections; Frank Pridemore and Don Foster, representatives of the George Washington Memorial Parkway; and Hugh Miller, Historical Architect of the Washington Office, I

inspected the C&O Canal from Georgetown to Seneca, Maryland, for safety hazards."

"The Canal itself suffered tremendous devastation. The towpath has been broached in many areas. One stretch at Widewater has a break 400 feet long and 35 feet deep."

"The banks of the towpath have been eroded on both sides for long distances. The surface has been washed away making it hazardous for bikers and hikers alike. Numerous sinkholes are in evidence."

"Trees are down across the towpath and other trees have roots exposed and are leaning and in a weakened condition."

"Lockhouse 6 had water in the first floor which warped the floor boards. It appears that the foundation has been undermined by the swirling waters. The insulation on the main electrical cable is exposed and has a 6-inch split. This lockhouse had been restored and was occupied."

"Lockhouse 7, which was unoccupied, has also had the foundation undermined. Cracks appear in the north and south walls."

"Lockhouse 8 also unoccupied, had water on the first floor which warped the floor boards. There is a large sinkhole in the front of this building."

"These buildings should be examined by the Branch of Construction and Repair to determine if they are structurally sound."

"At Great Falls, Maryland, walkways have been washed away. The three bridges to the overlook were torn away. It is recommended that the area south of the tavern be closed to visitors until walkways have been resurfaced and a fence or other substantial barricade has been posted to warn the public of the inherent dangers."

"Some areas could be cleaned up and repaired in a short period of time. Water could be put in the canal at certain points for recreational activities such as canoeing and fishing."

"As these areas are upgraded and before they are opened for public use, a safety inspection should be made by this office."

[CF] Douglas Watson, Washington Post, 1 July 1972, A1, B1, B4 (Flood-June 1972)

"Flood Makes C&O Canal Park 'Major Disaster'" Article describes in a general way the damage to canal from the June 1972 flood. Precise damages were still being assessed, with the help of the C&O Canal Association.

[79-770003] Jack Hobbs, Safety Officer, to Chief, Division of Safety Management, 3 July 1972 (Flood-June 1972, Harper's Ferry-Sustainability)

"Inspection of the C&O Canal in the area of Antietam Battlefield and between Harpers Ferry and Williamsport"

"On June 27 and 28, Safety Officer Knowlton and the undersigned inspected the C&O Canal in the area of Antietam Battlefield and between Harpers Ferry and Williamsport with the following unsafe conditions noted:"

"Substantial portions of the towpath along the canal are washed out completely and are impassable for both vehicles and pedestrians. The towpath is totally missing in many large segments with unsafe walking surfaces, trees down, logs washed onto the towpath, into the recreation areas, and the entire canal area strewn with debris and silt. All pedestrian and vehicular traffic should be prohibited at this time."

"1. From the area of the confluence of the Potomac and Shenandoah Rivers near lock 33 in Harpers Ferry, Harpers Ferry Road parallels the canal. This roadway is limited to but one lane at several locations and abuts the canal in many areas, with the canal, from 8 feet to 16 feet below the roadway level, only several inches from the pavement. In this area, guardrails are needed as we understand that the roadway is within the boundaries of the canal, although it is maintained by state and county agencies. This is stressed for the safety of visitors, motorists, and bicycle riders who use the pavement, which is winding and not level. It is quite possible that the roadway, in this area, may be undermined by the high waters, with the collapse of the paving not improbable."

"At Lock 34, opposite Bolivar, West Virginia, a large washout, approximately 60 feet across, exists in the towpath with huge amounts of debris."

"2. At Dam 3, the guard bank has a huge washout approximately 100 feet long at the feeder lock, with the towpath washed out and undermined. This area is presently closed."

"The lock house in this area is badly deteriorated, and it is recommended that the old house be restored, enclosed with suitable barbed fencing, or removed. Presently, it is an attractive nuisance."

"Canal lock 36, as in many other locks inspected, has no guardrails to protect visitors. A fall in the locks might prove fatal, or substantial injuries might be expected. In many of the locks, some recreational facilities are provided which involve sports, and horseplay may be expected, which could easily result in falls into the locks, or persons could be pushed into the locks accidentally, leading to major injuries. It is recommended that guardrails be installed on all locks in such areas to protect the visitor. The towpath has several washouts and is impassible even for pedestrians. Visitors should be excluded until the debris, which is present everywhere can be removed and the area restored."

"3. At Dargan Bend Recreation Area, the footbridge is washed out and debris is scattered over the entire area, with the towpath weakened by flood waters. Visitors should be bared."

"4. Along Maryland Route 34, at Snavely's Ford, immediately below Burnside Bridge, Antietam Creek overflowed its banks, washing out the trails, and left the area covered with debris. The water appeared badly polluted. Visitors should be excluded at this time due to the pedestrian hazard."

"5. At Taylor's Landing, the footbridge is washed out, with debris, fallen trees, and logs, evident over the entire area."

"6. In the area of Dam 4, the entire macadam surface of the parking lot is broken up with large pieces of macadam scattered in such a way that vehicles cannot use the area, and pedestrians would have difficulty walking over it."

"The approaches to the winch house over the canal bed are washed out on both sides. The picnic area is washed out, the guard bank has a large break in it, and walking is hazardous. Toilets are washed away. The footbridge is also washed out. Damage in this area is considerable, and the hazards evident everywhere."

"7. Damage at Dam 5 consisted generally of washouts along the towpath, rendering the area hazardous for pedestrian use."

"8. One of the greatest hazards along the canal is the possibility of pollution and unsafe drinking water. The Antietam Park staff has removed the handles from a score or more of the hand pumps along the canal, which furnish drinking water for visitors in many areas of the canal. The safety precaution was taken and will continue in effect until the water can be tested for purity."

"Another hazard is the great amount of debris, fallen logs, trash, silt, etc., along the canal and recreational areas which makes the towpath and many adjacent areas unsafe for pedestrian use. In addition, numerous washouts interrupt the towpath and the guard banks which, with the possible undermining by flooding waters, makes them unsafe for pedestrian or bicycle use. The park has taken steps to secure these areas in order to prohibit pedestrians and bicycle use."

"However, the problems of excluding visitors completely from hazardous areas are considerable due to the numerous ways of entering the canal areas at many places."

"Typhoid shots have been given to personnel of Antietam Battlefield Park and the C&O Canal Park, and hip boots have been provided the employees for protection against snakes, which were noted in several instances during the inspection."

"9. It is believed that with so many hazards now existing along the entire length of the canal, that almost the entire area is unsafe for visitor use at this time. It is believed that until this debris, fallen trees, logs, rubbish, silt, etc.. and the potential pollution, can be remedied, that recreational use should be prohibited. It is recommended that appropriate areas be selected by the Superintendent of the C&O Canal for immediate restoration, and, as these selected areas are progressively cleaned up, that the visitors be permitted to use them after subsequent safety inspection."

[CF] Washington Post, 11 July 1972, C1, C3-C4 (Flood-June 1972)

"Area Slowly Cleaning Up Flood Debris" Article tallies damage from from the June 1972 flood. It mentions a repair estimate for the C&O Canal of \$5 million, within a total of \$8 million for parks under the jurisdiction of National Capital Parks.

[CF] A. W. Franzen, Architect, Harpers Ferry National Historical Park, to Joseph R. Prentice, Engineering Technician, National Capital Parks, 14 July 1972 (Flood-June 1972)

"C&O Canal Historic Structure's Flood Damage and Restoration Estimates" This memorandum provides an itemized listing of restoration and flood repair costs for various structures (aqueducts, culverts, locks, etc.) on the canal. The total cost listed for restoration is \$59,975,100 and flood repair, \$9,926,000. Appended is descriptive "Assessment of damage as June 30, 1972."

[CF] Montgomery County Sentinel, 31 August 1972, A1 (Flood-June 1972)

"Agnes Aftermath" Picture of the remains of the steel and concrete footpath at Great

Falls.

[CF] Preservation News, September 1972, 1, 6 (Flood-June 1972)

"Hurricane Agnes Innundates East Coast" Article describing damage to various historic landmarks on the East Coast from flooding caused by Hurricane Agnes. The C&O Canal is mentioned and there is a picture of the flooded canal.

[CF] Montgomery County Sentinel, 9 September 1972, (Flood-June 1972)

"Park Service Tips On Canal" Short article, aimed at canal users, describing badly damaged areas to avoid, and what facilities on the canal that are closed because of flood damage.

[CF] Washington [Evening Star's Sunday magazine], 17 September 1972, Cover, 4-5, 20, 23 (Flood-June 1972)

"The C&O Canal and the Job Ahead" Feature article on repairing the canal, with lots of pictures of flood damage.

[RF-PHP] "Fact Sheet: Storm Damage at the C&O Canal NHP," 20 September 1972 (Flood-June 1972)

"The winds, torrential rains, and floods caused by tropical storm Agnes in June 1972, devastated the historical park along its entire length. All of the main park features and ancillary features were affected in varying degrees--towpath, historic structures, bridges, campgrounds, and roads and trails. Destruction was total along some sections of the Canal."

The fact sheet provides an itemized description and estimates of the "proposed emergency reconstruction work." The total amount of the estimate was \$34,371,000.

[CF] E. J. Bachinski, Washington Post, 1 October 1972, E1-E2 (Flood Damage-Financing, Restoration-Post 1972)

"No Restoration Near for Mangled C&O Canal" Article describes the damage to the canal and the lack of funding to repair the damage. The park exhausted its annual maintenance budget making stopgap repairs.

[CF] Washington Post, 8 October 1972, D6 (Flood Damage-Financing, Restoration-Post 1972)

"Restoring a Ravaged Park" Editorial bemoans the ravaged condition of the C&O Canal after the Agnes flood and advocates a supplemental appropriation for repairs.

[CF] Black and White [Walt Whitman High School, Bethesda, Md.], 27 October 1972, 1 (Flood-June 1972, Flood Damage-Financing, Restoration-Post 1972)

"Future of C&O Canal rests upon Congress" Article discusses damage along the canal a bit, and the problems getting money for repairs from Congress. Mentions \$30 million as an estimate for repairing canal damage.

### 1973

[CF] Bruce W. Wood, Potomac Appalachian 1 (Spring 1973): 39-47 (Flood-June 1972, Restoration-Volunteers)

"The C&O Canal and Damage Caused by Tropical Storm Agnes, June 1972," Self-explanatory. Aimed at canal users.

[CF] Washington Post, 25 April 1973, ? (Flood-June 1972)

"Cancel One Canal" Photograph of the empty canal bed at Fletcher's boathouse.

[CF] Montgomery County Sentinel, 26 April 1973, ? (Flood-June 1972, Flood Damage-Financing, Restoration-Post 1972, Restoration-Volunteers)

"C&O Canal Still Lies Ravaged By Tropical Storm Agnes, Damage Set: \$34 Million, But Repairs: 10 Years" Article describes damage to the canal and contains photographs of flood damage. It mentions the financial problems in repairing the canal and indicates the immediate repair priority is the towpath.

[CF] Washington Post, 3 May 1973, A27 (Restoration-Post 1972)

Letter to the editor from Judy Toth of the C&O Canal Association bemoaning the lack of funding for repairs to the canal and praising the role of volunteers from the C&O Canal Association in clean-up and restoration activities.

[CF] Washington Post, 9 May 1973, A21 (Restoration-Post 1972)

Letter to the editor from William M. Lambe of Silver Spring advocating the use of volunteer military reserve units in the canal clean-up.

[CF] Washington Post, 15 September 1973, B3 (Restoration-Post 1972)

"Canal Repairs" Article mentions the National Park Service awarding a \$353,800 contract for the repair of the canal between Georgetown and Lock No. 5. It is the first major project to repair damage caused by the June 1972 flood.

[RF-PHP] Richard H. Huber, Restoration Team Leader, C&O Canal, to Director, National Capital Parks, 9 November 1973 (Restoration-Post 1972)

Proposal to restore Catoctin Creek Aqueduct. Estimated cost: \$4,000,000

[CF] Douglas Watson, Washington Post, 25 November 1973, D1-D2 (Flood Damage-Financing, Restoration-Post 1972)

"Quick Repair Ruled Out" Article indicates that the repair of the canal by the bicentennial has been ruled out by inadequate funding. It also mentions that the Catoctin Aqueduct, which had withstood the June 1972 flood had collapsed on October 31. The article also discusses funding realities and repair priorities. The park is torn between restoring the recreationally popular towpath and saving the weakened, but historically valuable aqueducts.

#### 1974

[RF-PHP] Richard H. Huber, Restoration Team Leader, C&O Canal, to Director, National Capital Parks, 30 January 1974 (Restoration-Post 1972)

Memorandum with subject "Partial Listing of Priorities" A description of construction priorities for fiscal year 1975 and "future years." Huber has prioritized masonry structures for repair over the towpath. He did so because, "Most of these [masonry] structures are water control devices, designed to handle or provide for the control of water, and unless they are re-established as such, damage from highwater and floods will continue to occur." Top on the list of Huber's priorities was to restore a stop lock on the Lock 16 level. Culverts and aqueducts also were high on the list for repair.

[CF] Washington Post, 9 March 1974, A16 (Restoration-Post 1972)

"A Walk Along the C&O Canal" Editorial uses the upcoming anniversary of the famous walk by Justice Douglas to make the point that the canal, damaged by neglect and the June 1972 flood, needed more repair and restoration work to insure its preservation.

[RF-PHP] "Summary of C&O Canal Funding and Progress," 19 March 1974 (Restoration-Post 1972, Harper's Ferry-Sustainability)

"Work performed to date includes the repairing of all breaks except one at Lock 34 in the section from Seneca to Cumberland, installation of protective railing on all aqueducts, took measures to control water which could cause damage to historic structure and general cleanup of area."

"Work performed and underway in the area below Seneca will result in the reconstruction of the area from Georgetown to Brookmont and permit rewatering of this section and also towpath continuity on to Great Falls will be provided. Also, some culvert and stoplock repairs are being made to reduce the possibility of further damage."

See also: "Project Priorities for FY 1975" [also dated, 19 March 1974]

[CF] Washington Post, 29 March 1974, A31 (Restoration-Post 1972)

"Temporary C&O Dam" Letter to the editor from J. Earl Langner of McLean advocates the rewatering of the canal in Georgetown by means of a temporary earthen dam which would hold back water flowing into the canal from local streams.

[RF-PHP] Director, National Capital Parks, to Superintendent, Antietam and C&O Canal Group, 5 April 1974 (Study-Floods-National Park Service)

The letter mentions a Development/Study Package Proposal (#221) "for a hydrologic study of the Potomac River drainage system as it affects the C&O Canal." Was this study ever done?

[RF-PHP] Deputy Director, National Capital Parks, to Richard H. Huber, Restoration Team Leader, C&O Canal, 11 April 1974 (Restoration-Post 1972)

Memorandum with subject, "Bicentennial Projects, C&O Canal." Gives approval for Huber's priorities for restoration to be accomplished by 1976. These are listed in the memorandum.

[CF] Washington Post, 2 May 1974, A22 (Restoration-Post 1972)

"A Milestone for the C&O Canal" Editorial advocates that "the pace of repairs should be stepped up" and supported NPS efforts to obtain additional funds for repair and restoration work.

[RF-PHP] Richard H. Huber, Restoration Team Leader, C&O Canal, to Director, National Capital Parks, 6 May 1974 (Restoration-Post 1972)

Memorandum with subject, "Tentative 1975 F. Y. Supplemental Construction Program, C&O Canal." Huber provides a list of supplemental restoration projects to consider if funds become available

[RF-PHP] Unattributed report with attachments, dated 6 May 1974, describing storm damage of June 1972; current status of repairs (as of 19 March 1974); revised estimate of money needed to complete repairs (as of 1 May 1974), now at \$44,454,700 (the increase attributed to inflation); and "a list of 20 projects which represent the next highest priorities beyond those in the 1975 budget." (Restoration-Post 1972)

[RF-PHP] Richard H. Huber, Restoration Team Leader, C&O Canal, to Manager, National Capital Team, 21 May 1974 (Restoration-Post 1972)

Memorandum with subject, "Restoration Team Activities thru May 17, 1974, C&O Canal National Historic Park."

[RF-PHP] Unattributed report on the status of the towpath, dated 20 June 1974 (Restoration-Post 1972)

[RF-PHP] Francis W. Wiles, Director of Budget, to the Files, 21 June 1974 (Flood Damage-Financing, Restoration-Post 1972)

Memorandum with attachments, documenting the Office of Management and Budget's denial of a \$10 million supplemental request for repair appropriations for FY 1975. Note: \$3 million already had been appropriated for repairs for FY 1975.

[RF-PHP] Unattributed report on information requested by the Office of Management and Budget, 1 August 1974 (Flood Damage-Financing, Restoration-Post 1972)

OMB had requested "a plan for restoring only the towpath and hiker-related areas of the park." The plan submitted included not only restoring "towpath and hiker-related areas," but also "built in safe guards, such as activating stop locks and waste weirs, which are designed to relieve pressure on the canal during periods of high water. Historically, breaks in the towpath in the past have occurred at low points and with the level restored to an even grade, any spillovers are spread over large sections and are less damaging."

[CF] Washington Post, 20 August 1974, C1 (Restoration-Post 1972)

"C&O Canal Restoration In '80's Seen" Short article indicates that a full restoration of the C&O Canal park was a decade away. Current restoration efforts were focused on the stretch of the canal between Georgetown and Seneca. The section between Georgetown and Brookmont already had been refilled with water.

[RF-PHP] Unattributed report on information requested by the Office of Management and Budget, 29 October 1974 (Restoration-Post 1972, Flood Damage Prevention-Proposed, Sustainability-Towpath)

Several very interesting comments in this report:

"Floodproofing We have found that the floodproofing features included in the original design and construction of the canal are adequate today. The problem is that these features have been allowed to deteriorate over the past 100 years where they do not function as their intended purpose. We are providing for these safeguards in those projects underway."

The report also asserted that only about a quarter of the damage in the \$44 million estimate was directly attributable to Hurricane Agnes in June 1972. The remainder reflected neglected maintenance on the canal since the early 1900s. The report contended the damage for Agnes could not be repaired without repairing this accumulated damage as well.

"Also, good judgment has dictated that the floodproofing features must be put back in those areas where repairs are made. These include stop locks, waste weirs, restoring towpath to historic grade to permit even overflow rather than concentrated overflow in low areas and the rebuilding of culverts."

[RF-PHP] C&O Canal National Historical Park, Expenditures as of December 4, 1974 (Restoration-Post 1972)

List of repair and stabilization projects, estimated cost, actual cost, surplus or deficit over estimate, and percentage of project completed.

[FAILOR] Annual Report 1974, Chesapeake and Ohio Canal National Historical Park, 20-22, iii-iv (Flood-June 1972, Restoration-Post 1972, Harper's Ferry-Sustainability, Sustainability-Culverts, Widewater-Sustainability)

pp. 20-21

"The towpath, the recreation resource upon which is imposed the greatest visitor activity, has received constant attention throughout the year. General repairs were started on the towpath between Locks 5 and 10, breaks are being filled in the Widewater sections near Mile 12 and from Lock 15 west to the Stop Lock above Lock 16. A bridge was constructed across a break above Lock 34 to eliminate the last detour in the Piedmont District caused by the 1972 flood. A 352 foot pedestrian bridge was completed across the spillway just east of Chain Bridge. Special attention was given to the canal prism from Georgetown to Lock 5 because of fluctuation of the water level caused excessive accumulation and visibility of trash. In December, a footbridge over Catoctin Creek was completed to provide continuity for hikers and bikers because of the collapse of the Catoctin Creek Aqueduct."

"The engineering feats manifested in the 75 lift locks are of worthy concern for future restoration. Immediate attention is required in several instances to avoid collapse of the masonry walls as a result of pressures from moving earth, The simplest and most enduring means of insuring preservation of some these locks is to fill them with earth and install an adequate drainage system to remove surface and ground water. This was done at Locks 48 and 54. Supportive repairs are being accomplished at Locks 15 and 16 and the Stop Lock on Level 16 was prepared for further in-depth contract work."

"The immensely important role that culverts play in protecting the towpath and providing good drainage throughout the canal system was supported by enormous amounts of day labor maintenance. Were it not for the culverts that provide the avenues of water drainage from nearby upland areas, the towpath would not remain the good hiking and biking facility it is today. Seven culverts received major improvements this year. The towpath over Little Catoctin was reinforced and water diversion dikes were installed around it. Drain pipe and diversion dikes were installed around Culverts 43 and 65 to prevent surface water from flowing through the top side of the culverts to prevent further deterioration until the culverts can be repaired. Muddy Branch Culvert has received extensive repairs with further repair scheduled. Culvert-Waste Weir 170 at Parkhead is in the process of being completely repaired. A complete renovation job is being done on Culvert 200 at Woodmont, which was about 50% complete at the end of the year."

"The steel and concrete footbridge to Olmstead Island at Great Falls, damaged by the 1972 flood, was removed to eliminate a dangerous safety hazard."

"Fly ash deposits which have accumulated over a period of years were removed from approximately one mile of canal east of Lock 27 at Dickerson. Repairs were made to the canal prism, including a culvert and restoration of the towpath. This work was accomplished by the Potomac Electric Power Company under a cooperative agreement with the National Park Service. This section is now rewateder."

pp. iii-iv

"Tropical Storm Agnes"

"A 25 year frequency flood occurred in June 1972 inflicting extensive damages on the lower 124 miles below Hancock, Maryland, with increased intensity of damage toward and in the Washington metropolitan area. Many sections of the towpath and park were closed during the 1972 season. Damages were intensified because of deteriorating conditions in many parts of the canal and neglect. The drainage of the canal system did not function because of silted structures, decaying conditions and inadequate maintenance. Total damages were estimated at \$34 million."

1975

[FAILOR] Office of Cooperative Activities, National Capital Parks, National Park Service, General Plan: Chesapeake an Ohio Canal National Historical Park, February 1975, 48- (Restoration-Post 1972, Sustainability-Aqueducts, Sustainability-Culverts, Harper's Ferry-Sustainability)

"The primary resource of the park is the physical remains of the Chesapeake and Ohio Canal - its bed, towpath, aqueducts, dams, culverts, locks, lockhouses and other associated structures or their ruins. The Paw Paw Tunnel and the Monocacy and Licking Aqueducts are particularly impressive remains and striking testimony to the skill of canal engineers and craftsmen who constructed this 184-mile transportation system."

"Since the canal ceased operations in 1924, little in the way of stabilization of the structures has taken place. During this period, when most of the canal has been dry, the structures have been subjected to freezing and thawing actions, and four major floods have occurred. The canal was rewateder from Violets Lock, 22 miles to Georgetown in the



1940's, and extensive work was accomplished on the towpath and miscellaneous structures from Seneca to Cumberland in the late 1950's. These two major efforts produced a continuous towpath which has not existed since the flood of 1936."

"Other major work which has been done on the canal structures includes the rebuilding of Dam 4 in 1936 by the Potomac Edison Company, the restoration of the Paw Paw Tunnel, the stabilization of the Antietam Aqueduct in 1962, and the emergency stabilization of the Seneca Aqueduct in 1972."

"The flood of 1972, generated by Tropical Storm Agnes, caused extensive damage from Hancock to Georgetown. The major destruction occurred in the 22-mile rewatered section and the one mile section below Dam 3 across from Harpers Ferry."

"The numerous breaks in the towpath prism, erosion of the clay liner in the canal bed and damage to the numerous historic structures have presented an enormous reconstruction project. The present objective on this section, as well as other flood-damaged areas, is to return the canal to its pre-Agnes condition. The cost of this undertaking has been estimated at \$34 million. These monies will not restore the canal or its structures to their original appearance or operating condition."

"Assuming that the recent flood damage is repaired to its pre-Agnes condition, the following is a general description of the historic structures on the canal."

"Of the 11 aqueducts along the canal, six will be stabilized by 1976, two are currently stabilized and the remaining three will be programmed for stabilization as soon as further study determines the extent of the necessary work."

"The two western arches of the Catoctin Aqueduct collapsed in October 1973. This aqueduct was poorly designed and constructed. Only extensive pier renewal and bracing could have saved the structure. The stones have been retrieved and stored in the canal and the remaining arch will be stabilized as a ruin. A footbridge has been placed upstream of the structure in order to maintain towpath continuity."

"Monocacy Aqueduct, the largest intact aqueduct remaining in the United States, requires resetting of the spandrel and pilaster face stones in a number of places as well as extensive internal work to stabilize the structure. Half of the capstones and wrought iron railing on the downstream side were removed by 1972 floods. They have been retrieved and stored pending replacement."

"Tonolway, Sideling Hill, Licking and Fifteen Mile Aqueducts are in fair condition but will receive major stabilization on the berm side of the arches where the wooden trunks placed in them about 50 years ago have rotted out, exposing the ringstones in the arch to severe weathering."

"Seneca Aqueduct is currently in a stabilized condition. The western arch collapsed during the freshet of September 1971, and the void was temporarily buttressed with steel. This avoided collapse of the remaining arches but is simply a holding action until restoration funds become available."

"Antietam Creek Aqueduct was stabilized 14 years ago and is currently in good condition."

"The berm parapet walls of Town Creek and Evitts Creek Aqueducts have fallen and both aqueducts above the arch are collapsing. The fallen stones are still adjacent to these aqueducts and can be salvaged for use in the future."

"Conococheague Aqueduct, which was partially stabilized in 1962, needs extensive repair on the berm (north) side. The berm parapet wall fell in 1920 when a canal boat collided with it. It was replaced in 1921 by a wooden wall which has rotted out. Some of the trouble can be traced to sections blasted out by Confederate troops in the Civil War."

"Of the 182 original culverts and square drains on the canal, 174 are still in place. The other eight were removed during the time the canal was in operation. Many of the remaining culverts need immediate attention to prevent failure from undermined foundations, cracked arches, and breaches in the inner part of the arches. The head and wing walls also need immediate maintenance. Over half of the culverts are badly silted or plugged and are hazards to the berm bank of the canal due to local flooding"

"Of the 50 locks above Seneca, 12 appear to be near the point of falling in. These include five rubble locks near Paw Paw Tunnel that were formerly faced with timbers, now rotted out."

"In other locks the lack of water in the canal has caused the timber footing to dry out and rot. This, coupled with frost action, has caused the walls of the locks to tilt toward the chambers. Of the 12 nearing collapse, the movement of the walls is in the order of 10 to 14 inches at the top."

In addition, all of the other locks above Seneca show movement of a few inches to 8 inches. The lock at Harpers Ferry has been buffeted by numerous high water stages, and the embankment has washed out, exposing the unprotected backing and the towpath wall."

"The tunnel at Paw Paw has been restored to good condition, but the deep cut approach on the north end is in bad condition, and large slides have occurred and can be expected at any time. A slide of about 15,000 cubic yards of shale in late 1968 all but blocked the north portal, carrying away part of the facade."

"At Point of Rocks and Catoctin Tunnels. the Baltimore and Ohio Railroad has encroached on the canal. Although the railroad has the right of easement at these points and can utilize portions of the canal as needed, considerable clearing and revetting is necessary at these points."

"Of the 56 original lock tender houses, 19 are in ruin and 11 are missing entirely. The 26 remaining houses, which are either wood frame, brick or masonry structures, are now in various states of repair and need immediate attention. Various mills, bridges, residential structures and other historic remains, foundations and 50 known archaeological sites also exist within the park boundaries. Numerous historic studies have been done by National Park Service historians as well as private individuals and universities. Further, most of the official records of the Canal Company have been retained in the U.S. Archives. All these will be valuable tools to historians of the future who will be addressing themselves to approximately 500 historic structures and sites and how they link together."

[RF-PHP] Richard H. Huber, Restoration Team Leader, C&O Canal, to Director, National Capital Parks, 24 March 1975 (Flood Damage Prevention-Proposed, Restoration-Post 1972)

Memorandum with subject, "Revised Partial Listing of Projects, C&O Canal National Historical Park." This is basically a listing of the construction priorities for the 1976 fiscal year. Huber comments, "As before, the revised list consists principally of major masonry structures, including most of those listed in the January 30, 1974 memorandum, and represents only a portion of the total resource that requires attention. Most of the structures listed are water control devices, designed to handle or provide for the control of water. Such structures shall always play a role in the retention of the C&O Canal and therefore must be maintained in an operational condition."

[RF-PHP] Richard H. Huber, Restoration Team Leader, C&O Canal, to Manager, Denver Service Center, 7 April 1975 (Flood Damage Prevention-Proposed, Restoration-Post 1972)

This memorandum proposes that the National Park Service spend \$40 million over ten years on a construction program "to bring the C&O Canal National Historic Park back to a stable condition."

[RF-PHP] William R. Failor, Superintendent, C&O Canal, to Richard H. Huber, Restoration Team Leader, C&O Canal, 14 April 1975 (Harper's Ferry-Sustainability, Warnings-Flood Vulnerabilty)

Memorandum with subject, "Revised Partial Listing of Projects, C&O Canal."

In the memo, Failor comments, "The Lock 33 area [around Harper's Ferry] is one of the most vulnerable areas to flooding along the entire canal."

[RF-PHP] Richard H. Huber, Restoration Team Leader, C&O Canal, to Director, National Capital Parks, 19 June 1975 (Restoration-Post 1972)

Memorandum with subject, "Revised Partial Listing of Project Priorities, C&O Canal National Historical Park."

[RF-PHP] William R. Failor, Superintendent, to the C&O Canal National Historical Park Commission, 12 July 1975 (Restoration-Post 1972)

Under the heading of maintenance, Failor describes the "repair and stabilization projects" underway. These projects are further outlined in an attached memo from Richard Huber.

[RF-PHP] C&O Canal National Historical Park, Expenditures as of August 8, 1975 (Flood Damage-Financing, Restoration-Post 1972)

List of repair and stabilization projects, estimated cost, actual cost, surplus or deficit over estimate, and percentage of project completed.

[RF-PHP] Summary of FY 75 C&O Canal Funding as of August 8, 1975 (Flood Damage-Financing, Restoration-Post 1972)

List of gross and net funding for listed repair and stabilization projects for FY 1975. Also list of "C&O Canal Projects that Need \$ to Complete."

[CF] Annual Report 1975, Chesapeake and Ohio Canal National Historical Park, 29-33 [p. 30 missing] , vii-viii (Flood-June 1972, Flood Damage-Financing, Restoration-Post 1972)

The section of the annual report on construction describes some of the major flood repair and restoration projects completed in 1975. Appendix E lists these construction projects, their cost and completion status.

## 1976

[RF-PHP] Richard H. Huber, Restoration Team Leader, C&O Canal, to Director, National Capital Parks, 30 January 1976 (Flood Damage-Financing, Restoration-Post 1972)

Memorandum with subject, "Proposed 1978 F.Y. Construction Program, C&O Canal National Historical Park." Prepared with the 10 year, \$4 million per year plan in mind. Proposes spending \$3,874,675.

[RF-PHP] Richard H. Huber, Restoration Team Leader, C&O Canal, to Director, National Capital Parks, 4 March 1976 (Flood Damage-Financing, Restoration-Post 1972)

Memorandum with subject, "Proposed 1978 F.Y. Construction Program, C&O Canal National Historical Park." Presents a smaller amount than the January proposal: \$1,351,580.

[CF] Bill Cauley, The News (Frederick), 11 October 1976, A7 (Flood-October 1976)

"Brunswick, Point of Rocks mopping up after flood" Article mentions the canal is closed and that officials were worried about the potential of the flood to destroy the repairs made since the 1972 flood.

[CF] Eric Wentworth and Robert Meyers, Washington Post, 12 October 1976, C1-C2 (Flood-October 1976)

"Swollen Potomac Rises 2 Feet Above Flood Level" Most of the article discusses the flood more generally, but the canal is mentioned. Several portions of towpath upstream from Washington, D.C. had flooded. They anticipated some erosion damage and one possible break between Locks 5 and 8, but it was too early for a more precise damage report.

[CF] [FAILOR] Annual Report 1976, Chesapeake and Ohio Canal National Historical Park, 20-21 (Flood-October 1976, Flood Damage Prevention-Accomplished, Sustainability-Bridges)

p. 20

"Numerous projects were accomplished providing historic preservation maintenance to hundreds of historic structures throughout the park. See Appendix 'A' for a listing of the historic structures."

"Dikes were installed in the canal prism at Sideling Hill Creek, Town Creek and Evitts Creek Aqueducts to divert runoff water from these historic structures into the streams they span. The historic waste weir at Town Creek, inactive for many years, was reactivated for this purpose. Culvert 115 at Mile 80.5 received extensive repairs to prevent further damage and deterioration. The large waste weirs at Mile 156.4 and 160.3 also received extensive repairs including stabilization and pointing of the masonry." Corrective drainage was necessary for many of the lockhouses repaired.

pp. 22-23

"Considerable repairs, potholing and surfacing continued along the 185-mile towpath. In many sections where stabilization projects were in process, the towpath surface received additional attention for approximately 20 miles. Bankrun gravel and shale are the only two materials now being used for resurfacing towpath. A complete survey and analysis was made of the towpath in cooperation with the C&O Canal Restoration Team. Thirty-three sections were identified to receive restoration and repairs for the entire 185 miles when funds are available."

"More than 100 foot and vehicle bridges received varying degrees of attention. Work included handrail or foot tread replacement, painting and structural repairs. Six foot bridges were replaced or removed due to high water."

"High spring waters caused accumulation of debris at numerous aqueducts and culverts that required removal. The flood of October 10-14 caused damages to some park resources, mainly towpath and debris. Out of the approximately \$70,000 damages which occurred, about \$53,000 of repairs yet remain. They are scheduled for completion in the spring of 1977."

"The only damage to previously constructed facilities was the loss of the Catoctin Creek Aqueduct footbridge at Mile 51.5 in the Piedmont District. This bridge maintained continuity to the towpath after the aqueduct collapsed in October 1973. The concrete beam structure was swept off its foundation and damaged beyond repair. Replacement of the structure is under study. Meanwhile, the re-establishment of the towpath detour has been necessary from Lock 25 at Lander via State Route 464 west to Brunswick, Maryland."

## 1977

[RF-PHP] J. L. Dunning, Acting Regional Director, National Capital Region, to Nancy C. Long, 8 June 1977 (Flood Damage-Financing, Flood Damage Prevention-Accomplished, Flood Damage Prevention-Financing)

Memorandum reviewing the progress of work on the fifty restoration priorities outlined by Richard Huber in his memorandum of 19 June 1975. Projects are either described as "In

Progress," or set for work in future fiscal years (annotated a copy of the memo). Many of the works are set for funding or possible funding under the "Land Heritage Program," which seems to be an initiative of the State of Maryland.

[RF-PHP] William R. Failor, Superintendent, C&O Canal, to Chief of Maintenance, C&O Canal, c. June 1977 (Flood Damage-Financing, Flood Damage Prevention-Accomplished, Flood Damage Prevention-Financing)

Memorandum with attachment entitled "Land Heritage Program Package Proposals C&O Canal National Historical Park." Contains description and estimates for restoration work proposed for funding under the Land Heritage Program.

#### 1978

[RF-PHP] FY 79 Briefing Statement, C&O Canal National Historical Park, 31 January 1978 (Flood Damage Prevention-Accomplished, Flood Damage Prevention-Proposed, Harper's Ferry-Sustainability, Restoration-Post 1972)

This documents summarizes in a very brief fashion repair and stabilization work done since the June 1972 flood. "Since 1972 we have stabilized 5 locks, 3 guard locks, 7 aqueducts, 10 culverts, a mule barn, 6 lockhouses, the Paw Paw Tunnel ravine, 2 major breaks in the towpath at Wide Water and rebuilt and resurfaced approximately 17 miles of towpath." It outlines priorities for further work to be done during the 1979 fiscal year. This includes a proposal for restoring flood control structures at Harper's Ferry.

[RF-PHP] 79 Budget Hearings, Draft Testimony, c. March 1978 (Flood Damage Prevention-Proposed)

This document outlines budget priorities for the C&O Canal National Historic Park. Among these were "to stabilize and restore the 185 mile towpath by repairing and rebuilding the surface to bring it up to its historic grade." Also mentioned: "The rehabilitation, repair, and rebuilding of the 162 culverts that carry drainage channels under the canal is important to the drainage system of the canal park and adjacent areas. Many of these areas are plugged with debris and have collapsed which causes damming of water and flooding during periods of high water."

[RF-PHP] Thomas N. Crellin, Acting Assistant Manager, National Capital Team to Acting Chief, C&O Canal Restoration Team, 15 June 1979 (Flood Damage Prevention-Accomplished)

Memorandum on "Status of FY 79 Projects," including four culverts each in the Palisades and Piedmont, and three culverts in Alleghany.

[RF-PHP] William R. Failor, Superintendent, C&O Canal, to William O. Doub, 18 July 1978 (Flood Damage Prevention-Proposed)

Attachments list ten "immediate needs for the park." Among these are "Stone spillway structures (water level control devices) east of Spring Gap, east of Paw Paw Tunnel, west of Dam 6, Big Pool and west of Dam 5."

[CF] Carrie Johnson, Washington Post, 26 October 1978, DC1, DC5 (Flood Damage Prevention-Ordered, Sustainability-Walls)

"Repairs Scheduled For C&O" Article describes a two-year, \$2.5 million restoration project along the canal to deal with accumulated damage to the canal in Georgetown, such as leakage and unstable retaining walls.

[CF] Annual Report 1978, Chesapeake and Ohio Canal National Historical Park, 34-37, vii-viii (Flood Damage Prevention-Financing, Restoration-Post 1972)

Describes a variety of construction projects on the canal, including those financed through Maryland's Land Heritage program. Most notable for the purposes of flood prevention were the culvert and towpath repairs of 1978 listed in Appendix E.

#### 1979

[CF] Martha M. Hamilton, Washington Post, 25 February 1979, C1-C2 (Flood-February 1979)

"Potomac Nears Flood Stage" High water caused by rain after a large blizzard. No mention of the canal.

[CF] Paul M. Valentine, Washington Post, 27 February 1979, C1, C6 (Flood-February 1979)

"Potomac Spills Over Its Banks; Traffic Snarled" Article mentions that "upstream, the river spilled over into the C&O Canal at Lock Six and Lock Seven near Glen Echo, surrounding at least one of the lock houses." There is a picture of the flood waters running around the lockhouse at Lock No. 7.

[CF] Washington Post, 27 February 1979, A19 (Restoration-Post 1972)

"Sharing the History of the C&O Canal" Op-Ed. piece by Carrie Johnson criticizes the restoration of the canal by the Park Service. It asserts that "the agency lacks the

millions of dollars, craftsmen, and the engineering lore to rebuild all the aqueducts precisely as they were. So it has settled for propping up the most rickety ones without trying to preserve or echo the canal's 19th-century style."

[RF-PHP] Ira J. Hutchinson, Director, National Park Service, to Assistant Secretary for Fish and Wildlife and Parks, Department of the Interior, 17 July 1979 (Restoration-Post 1972, Sustainability-General, Sustainability-Stoplocks)

Memorandum outlining the reasoning behind funding for restoration and maintenance of the C&O Canal National Historical Park. The Director outlines the essential problem. "Throughout much of its historic construction and operating period (1828-1924) natural disasters and shortages of funding limited the maintenance capability of the C&O Canal. That legacy compounded by subsequent neglect and flood damage has presented the National Park Service with a formidable preservation task." The restoration and maintenance priorities outlined included: the continuity of the towpath, preservation of culverts and stop locks, and the repair of walls and locks. Stop locks were a particular priority. "Stop locks were strategically located to divert damaging waters from major Potomac floods. Their restorations has been completed under some of the first projects to repair the destruction of Hurricane Agnes."

[RF-PHP] Regional Director, National Capitol Parks, to Superintendent, C&O Canal, 3 October 1979 (Restoration-Post 1972)

Memorandum outlining five-year plan for preservation projects in the C&O Canal National Historical Park, lasting from 1980 to 1984.

[CF] Annual Report 1979, Chesapeake and Ohio Canal National Historical Park, vii-xi (Flood-June 1972)

List of construction projects, some of them of a flood repair and prevention nature, including culvert and towpath repair.

#### 1980

[RF-PHP] Fiscal 1981 Budget Briefing Statement, Repairs, C&O Canal National Historical Park, 18 April 1980 (Restoration-Post 1972)

Memorandum outlines repair and stabilization for the 1981 fiscal year, none of them strongly flood related.

[RF-PHP] Regional Director, National Capital Region, to Honorable Michael D. Barnes, U.S. House of Representatives (Restoration-Post 1972)

A letter prompted by a complaint about the condition of the canal by a constituent of Representative Barnes. Mentions, "In 1982 the Administration instituted a five year Park Restoration and Improvement Program. This is intended to reduce the large back-log of maintenance and restoration projects that has built up over the years due to a lack of funds."

#### 1981

[CF] Paul Hodge, Washington Post, 1 October 1981, DC3 (Flood Damage Prevention-Ordered, Sustainability-Walls)

"Georgetown's C&O Canal is Refilled" Article announces the refilling of the canal in Georgetown after the restoration of its stone walls and locks there and the removal of 13,000 cubic yards of silt.

#### 1983

[CF] Elaine Lembo, Washington Post, 22 September 1983, MD3 (Restoration-Post 1972, Sustainability-Towpath)

"Cyclists Complain Shale Used to Repair Towpath Is A Hazard" Self-explanatory. Interesting counterpose to the Washington Post op-ed. piece of May 1979. The park gets criticized for being not historical enough in its restoration and then gets criticized in this article for being too historical.

#### 1984

[CF] Nancy Lewis, Washington Post, 16 February 1984, C1, C5 (Flood-February 1984)

"Potomac Floods 80 Miles of C&O Towpath" Article describes flooding along the canal and more generally in the Potomac basin.

[CF] R. H. Melton, Washington Post, 17 February 1984, B1, B6 (Flood-February 1984)

"Potomac Crests Higher Than Anytime Since '72" Article describes flooding along the canal and more generally in the Potomac basin. The flood endangered the Great Falls tavern.

[CF] R. H. Melton, Washington Post, 18 February 1984, B1-B2 (Flood-February 1984)

"Canal Path Heavily Damaged During 2 Days of Flooding" Article describes the damage to the canal from the flood of February 1984.

[CF] Richard Furno, Washington Post, 19 February 1984, C4 (Flood-February 1984)

"Flood damage" Map with article shows major points of damage along the canal. Photo shows damage at Lock No. 7.

[CF] Washington Post, 3 March 1984, B2 (Flood-February 1984)

"Towpath Damage Put at \$580,000" Article mentions 80 miles of the canal were eroded by the flood.

[CF] Phillip Pelligra, National Parks Magazine (May-June 1984): 34 (Flood-February 1984)

"C&O Canal Towpath Washed Out by Flooding" Short article on the flood of February 1984. With it is a nice overhead photograph of flood waters swirling around Lockhouse 7.

[CF] C&O Canal National Historical Park Flood Damage, 2/14-2/17/84, c. 1984 (Flood-February 1984)

Itemized list of damage from the February 1984 flood.

#### 1985

[CF] Washington Post, 14 February 1985, A1 (Flood-February 1985)

Picture on the front page of the Post shows soldiers from Fort Myer sandbagging around Great Falls Tavern. Caption indicates the river was expected to overflow its banks "at various points" along the Potomac.

[CF] Ruth Marcus and Susan Schmidt, Washington Post, 7 November 1985, A1, A40 (Flood-November 1985)

"Flooding in 3 States Raises Toll to 34" The Post provides a general description of flooding, including a brief note that the canal had been closed and that sandbagging was taking place around the Great Falls Tavern.

[CF] Karlyn Baker and John Ward Anderson, Washington Post, 8 November 1985, A1, A30-A31 (Flood-November 1985)

"Destructive Floods Hit D.C., Richmond" General description of flooding, with two paragraphs devoted to canal damage. Damage was expected at Locks 1 through 5, but especially at Lock 5 where the river channel narrows.

[CF] Karlyn Baker, Washington Post, 15 November 1985, C7 (Flood-November 1985)

"Canal, Towpath Flood Damage Set at \$9.3 Million" General description of damage to the canal and other NPS properties from the flood.

[CF] Cumberland Times-News, 16 November 1985, (Flood-November 1985)

"Park Service Posts Higher Damage Total" The article indicates the Park Service raised its estimate for damage from the November 1985 flood from \$6.3 to \$12 million. Of that, \$9.3 million consisted of damage to the C&O Canal.

[CF] Dick Stanton, Superintendent, C&O Canal Historical Park, 29 November 1985 (Flood-November 1985, Flood Damage Prevention-Proposed)

"The Flood of '85'" Stanton describes the damage from the November 1985 flood comparing it to damage from earlier floods, particularly the June 1972 deluge caused by Hurricane Agnes. On page three, Stanton indicates a new waste weir might be considered below Fletcher's boathouse (in response to a large blowout in the canal towpath near there) and other restoration work will take place.

[CF] Barbara Tufty, Audubon Naturalist News 11 (December 1985) (Flood-November 1985)

"C&O Canal Park weathers towpath flood" The article describes the damage to the canal with some attention to impact on the flora and fauna in the park. According to the Tufty, the canal withstood flooding better in 1985 than in 1972, because of the restoration work since then. The largest restoration task was clearing away the debris left by the flood waters from the towpath and culverts. This article is the first to mention the assistance of the Boy Scouts in the clean up effort.

#### 1986

[CF] Superintendent, C&O Canal, to Regional Director, National Capital Region, 10 January

1986 (Restoration-Post 1985)

"C&O Canal Clean-up Camporee" This memorandum describes Stanton's proposal to use boy scouts to clean up flood debris from the canal during the forthcoming summer. He estimates a savings of \$2 million in labor costs.

[CF] Richard L. Stanton, Superintendent, C&O Canal, 30 January 1986 (Restoration-Post 1985)

"Request for \$60,000 for National Park Service Volunteer Hats, C&O Canal Clean Up Camporee, June-July 1986" Stanton seeks funds for hats, as a reward and souvenir, for the boy scouts who will be cleaning the canal of flood debris.

[CF] Jim Gilford, Frederick Post, 12 February 1986 (Restoration-Post 1985)

"Helping clean up the canal" Article describes the flood damages and difficulties of the repair effort on the canal.

[CF] Tony Booth, Associate Director, Camping/Conservation Service, Boy Scouts of America, to Kenneth Davis, Northeast Region, Boy Scouts of America, 14 February 1986 (Restoration-Post 1985)

Booth requests Davis' support for the Boy Scout participation in the Camporee cleanup of the canal.

[CF] Ted Troxell, Cumberland Sunday Times, 2 March 1986 (Restoration-Post 1985)

"About 20,000 Scouts to Spearhead C&O Canal Park Cleanup" The article covers Stanton's official announcement of the Camporee cleanup.

[CF] Claudia Levy, Washington Post, 6 March 1986, MD1-MD2 (Restoration-Post 1985)

"Canal Repairs to Cause Closings: Much of C&O Park to Stay Shut This Year While Volunteers Remove Flood Debris" Levy describes the damage, coming repair efforts, and NPS officials make claims that post-1972 stabilization saved many of the aqueducts from being destroyed in the November 1985 flood.

[CF] Cumberland Times-News [?], 10 March 1986, editorial page (Restoration-Post 1985)

"Scouts Will Repair Flood Damage On C&O Canal" Editorial describes and praises the plan to use scouts to clean up flood debris.

[CF] Press Release, C&O Canal National Historic Park, 26 March 1986 (Restoration-Post 1985)

Announces that seventy percent of the canal will be closed for flood repair in 1986 and describes those areas of the canal open for public use.

[CF] Terry Headlee, Morning Herald (Hagerstown), 27 March 1986, A1, A10 (Restoration-Post 1985)

"Canal cleanup will take time" An article obviously based on the 26 March press release.

[CF] Marlo Barnhart, Daily Mail (Hagerstown), 27 March 1986 (Restoration-Post 1985)

"70% of canal towpath closed" Another article obviously based on the 26 March press release.

[CF] Dots 'N Dashes 2 (March 1986) (Restoration-Post 1985)

"Mason-Dixon Council Selected to Launch Nation-Wide Take Pride in America Project" Scout newsletter announces this Boy Scout council has been selected to launch the canal clean up on June 1.

[CF] Press Release, C&O Canal National Historic Park, 3 April 1986 (Restoration-Post 1985)

Announces the Boy Scout Camporee Clean Up.

[CF] Terry Headlee, Morning Herald (Hagerstown), 9 April 1986 (Restoration-Post 1985)

"Clearing the canal: Interior secretary to kick off volunteers' C&O efforts" Article reports the Secretary of the Interior, Donald Hodel, will kick off the Boy Scout Camporee Clean Up on June 1.

[CF] Bill Anderson, Herald-Mail (Hagerstown), 13 April 1986, D7 (Restoration-Post 1985)

"Cleaning the Canal: Scouts spearheading effort to repair flood damage" Anderson talks about the upcoming Camporee, with some discussion of the financial problems repairing the canal.

[CF] "Towpath Report," 15 April 1986 (Restoration-Post 1985)

Report indicating what areas of the canal towpath are open in 1986.

[CF] Morning Herald (Hagerstown), 1 May 1986, C7 (Restoration-Post 1985)

"Scouts rally for clean-up" Another article discussing the upcoming canal cleanup.

[CF] Matt Seiden, Baltimore Sun, 7 May 1986 (Restoration-Post 1985)

"C&O Canal, once a tribute to a visionary, is now an embarrassment to a nation" Columnist discusses the financial problems in repairing the canal. Despite needing \$10 million, the park had only received \$2 million.

[CF] Terry Headlee, Daily Mail (Hagerstown), 2 June 1986 (Restoration-Post 1985)

Canal cleanup: Interior Secretary kicks off Cleanup Camporee" Article on the kickoff of the Camporee, with a nice photo-up picture of Secretary Hodel helping to pick up debris.

[CF] Record Herald (Waynesboro, Pa.), 2 June 1986 (Restoration-Post 1985)

"Scouts helping with cleanup of flood-ravaged C&O Canal" Another article announcing the kickoff of the Camporee.

[CF] Cumberland Times-News, 2 June 1986 (Restoration-Post 1985)

Another picture of Secretary Hodel at the Camporee kick-off.

[CF] Cumberland Times-News, 3 June 1986 (Restoration-Post 1985)

"Secretary Hodel Starts Cleanup" Another article covering the start of the Camporee.

"Boy, Girl Scouts Show Canal Cleanup Spirit" Editorial praising the Camporee.

[CF] Richard L. Stanton, Superintendent, 17 July 1986 (Restoration-Post 1985)

"C&O Canal Cleanup Camporee One-Half Completed" Public announcement that the half-way point of the Camporee had been reached and the reopening of several sections of towpath had been made possible by the work of the scouts.

[CF] Lyle V. Harris, Washington Post, 31 July 1986, MD1 (Restoration-Post 1985)

"Park Service Calls the Scouts To Help Repair the C&O Canal" Harris describes the efforts of Boy Scouts to clear away debris on the towpath from the November 1985 flood.

[CF] Terry Headlee, Daily Mail (Hagerstown), 25 August 1986 (Restoration-Post 1985)

"Cleanup allows visitors to walk length of towpath" Article indicates that the cleanup of the canal has made possible the reopening of the canal towpath from Cumberland to Washington, D.C.

[CF] Washington Post, 28 August 1986, MD9 (Restoration-Post 1985)

"Towpath Reopens Ahead of Schedule" Park official credits the early reopening to the work by the Boy Scouts.

[CF] Dave Elliott, Morning Herald (Hagerstown), 29 October 1986 (Restoration-Post 1985)

"Boy Scouts prove to be nothing short of a miracle" Article praising the efforts of Boy Scouts in cleaning up the canal.

#### 1987

[CF] Washington Post, 6 April 1987, D8 (Restoration-Post 1985)

"C&O Canal Restoration to Resume" Article describes restoration priorities for repairing flood damage during the 1987 season.

[RF-PHP] Richard L. Stanton, Superintendent, C&O Canal, to Regional Director, National Capital Region, 13 April 1987 (Restoration-Post 1985)

In this memorandum, Stanton makes a plea for reassessment of funding in ligh of "accomplishing critical flood repair work." He itemizes the work, dividing it between



work to contracted out and done in house.

[RF-PHP] Manus J. Fish, Regional Director, National Capital Region, to Carrie Johnson, Chairman, C&O Canal National Historical Park Commission, 13 April 1987 (draft) (Restoration-Post 1985)

Fish informs Johnson that a \$2 million proposed recision of money earmarked for canal repairs had not gone through, and the money would be available for repair activity.

[RF-PHP] Senate Amendment to fund \$4 million for repairs along the C&O Canal, 11 June 1987 (Restoration-Post 1985)

This documents discusses the status of repairs of damage from the November 1985 flood and the areas in which the \$4 million would be disbursed. The number one item was to "bring the towpath back to historic grade. The towpath is now 2 to 3 feet below grade in many areas which will subject the resource to future flooding at a much lower water level."

#### 1988

[RF-PHP] C&O Canal National Historical Park, Fiscal 1989 Budget Briefing Statement, 9 January 1988 (Restoration-Post 1985)

Memorandum entitled, "FY 88 Add-on, C&O Canal Flood Damage." Reports on the status of repairs necessitated by the November 1985 flood. Discusses funding needs for further repairs.

#### 1989

[CF] Merrill J. Mattes, Landmarks of Liberty: A Report on the American Revolution Bicentennial Development Program of the National Park Service (Washington, D.C.: History Division, National Park Service, 1989), 16-29 (Flood-June 1972)

Description of the post-1972 flood restoration projects financed by bicentennial funds. They are listed from in ascending order based on their position of the canal. There is also a brief description of the of the history of the canal and of the C&O Canal Restoration Team.

[CF] Flood Emergency Plan: C&O Canal National Historical Park, 6 September 1990 (Flood Damage Prevention-Contingency Planning)

Contingency plan for the park to deal with flooding of the canal.

#### 1996

[CF] Anna Borgman, Washington Post, 21 January 1996, A1, A16 (Flood-January 1996)

"Raging Potomac Nears Crest" General report of flooding on the Potomac. Mentions the closure of the canal park because of high water.

[CF] Eugene L. Meyer, Washington Post, 25 January 1996, A1, A15 (Flood-January 1996)

"Damage May Close C&O Canal for Months" Article containing a preliminary description of damage to the canal.

[CF] Eugene L. Meyer, Washington Post, 31 January 1996, B1, B3 (Flood-January 1996)

"Canal's Popularity Releases a Flood of Offers to Help" Article on how people who use the canal are making donations, both in cash and kind, to help speed repairs.

[CF] Washington Post, 2 February 1996, A19, D3 (Flood-January 1996)

"We Can Rebuild the Canal" Secretary of the Interior Bruce Babbitt, in an op-ed. piece makes an impassioned plea for restoring the canal to Congress and the public

Eugene L. Meyer, "Firms Asked to Help Bail Out Canal" Secretary of the Interior Bruce Babbitt, invites corporations to help raise \$4 million for canal restoration to supplement the \$2 million appropriation from Congress.

[CF] Angus Phillips, Washington Post, 4 February 1996, D4 (Flood-January 1996)

"Maryland Could Take the Lead With a Path Into the Wilderness, and the Future" Among other things, this piece mentions the wide variety of people volunteering in the canal restoration.

[CF] Eugene L. Meyer, Washington Post, 6 February 1996, B1, B7 (Flood-January 1996)

"Canal Flood Tab Tallied" Meyer reports the estimate of damage for the canal likely to

exceed \$20 million. Also some additional description of damage to the waterway.

[CF] Eugene L. Meyer, Washington Post, 15 March 1996, D1, D5 (Flood-January 1996)

"Helping C&O With Mortar, Trowels, and the 'Net" Article on two volunteer masons working to restore Lock 6. They found out about the restoration project over the Internet.

[CF] Angus Phillips, Washington Post, 17 March 1996, D7 (Flood-January 1996)

"Storm Damage Leaves Fletcher's Boathouse in Limbo" Article on how the January 1996 flood affected the canal and fishing at Fletcher's Boathouse.

[CF] Angus Phillips, Washington Post, 24 March 1996, D10 (Flood-January 1996)

"Canal Restrictions Stir Up Troubled Waters" Article on how use restrictions in damaged areas, the selective enforcement thereof, and the park's repair priorities are frustrating some members of the public.

[CF] Kevin McManus, Washington Post, 29 March 1996, WW63-WW64 (Flood-January 1996)

"Taking the Towpath Less Traveled" Article indicates that the volume of repair volunteers has been so great the Park Service is beginning to turn people away. 140 of the 185 miles of towpath have been reopened to foot traffic. More complaints about the tardiness of the Park Service in repairing the damage.

[CF] Anna Borgman, Washington Post, 31 March 1996, D7 (Flood-January 1996)

"Trash and Treasures" Discusses the annual Potomac trash pickup. Volunteers could not get to a number of sites along the canal because of the devastation from the January flood.

[CF] Eugene L. Meyer, Washington Post, 11 April 1996, DC1, DC6 (Flood-January 1996, Harper's Ferry-Sustainability)

"Volunteers Put Canal On the Comeback Trail" Article concerning restoration on the canal, and the efforts of volunteers. One interesting comment was made by the park superintendent, Douglas D. Faris, that he was not sure that the Park Service would reconstruct the towpath around Harper's Ferry to its historic proportions because of the likely it would be wiped out in future floods.

[CF] Eugene L. Meyer, Washington Post, 19 April 1996, B1, B5 (Flood-January 1996)

"With Limited Funds, Park Service Ponders Priorities for C&O Canal" With \$2.5 in emergency appropriations from Congress and \$800,000 from private sources park officials mull over the sustainability of repairs in the face of future flooding, and how best to spend the limited funds they possess.

[CF] Eugene L. Meyer, Washington Post, 23 April 1996, A4 (Flood-January 1996)

Presidential Participation In C&O Park Cleanup Heavy With Symbolism" The President and Vice President briefly join the canal cleanup at Great Falls on Earth Day. Article mentions the towpath has been reopened between Georgetown and Great Falls.

[CF] Eugene L. Meyer, Washington Post, 15 August 1996, DC2 (Flood-January 1996)

"Show by Artists at D.C. Gallery Helps Fund C&O Canal Repairs" Artists with a show at a Georgetown gallery near the canal, donate 20 percent of the proceeds to canal repairs.

[CF] Amy Goldstein and Peter Maas, Washington Post, 9 September 1996, A1, A9 (Flood-September 1996)

"Area Feels the Force of a Raging Potomac" General report on flooding with parts on damage to canal. The new flood appears to have wiped out many of the repairs made after the January 1996 deluge.

[CF] David Montgomery and Anna Borgman, Washington Post, 10 September 1996, A1, A8 (Flood-September 1996)

"Potomac Peaks, Leaves a Mess" General article on flood damage. Mentions damage to the canal may not be as bad as initially feared. Federal officials call two 20-year floods in one year "unprecedented" in this century.

[CF] Eugene L. Meyer, Washington Post, 11 September 1996, C1, C3 (Flood-September 1996)

"Fran's Flood A Bit Kinder To C&O Park" Meyer indicates that damage is less extreme than the January flood and \$20 million of the \$24 million appropriated by Congress for the

January repairs is still unspent. He mentions the possibility of minimizing repairs on stretches of the canal most vulnerable to flood damage.

No Date

[CF] "Potomac River Floods" (Miscellaneous)

Contains a table summarizing the major floods on the Potomac river: year and month, season of year, cause, miscellaneous comments. Runs from 1748-1936.

[CF] "Major Floods On Potomac, 1748-1924" (Miscellaneous)

[CF] "Flood of '85" (Miscellaneous)

Unattributed newspaper clipping, with table summarizing the height of the crest and feet over flood stage for Paw Paw, Hancock, Williamsport, Sheperdstown, Harpers Ferry, and Point of Rocks for the floods of 1936, 1937, 1972, and 1985, along with the flood stage height for each location.

Contains a table summarizing the major floods on the Potomac river: year and month, years since last major flood, comments. Runs from 1748-1924. Also table summarizing by month and season when major floods occurred on the Potomac.

Abbreviations for Documents at the National Archives at College Park

[180]: Proceedings of the Stockholders, 1828-90, Chesapeake and Ohio Canal Company, Entry 180, Record Group 79, Records of the National Park Service

[182]: Proceedings of the President and Directors, 1828-90, Chesapeake and Ohio Canal Company, Entry 182, Record Group 79, Records of the National Park Service

[190]: Letters Received by the Office of the President and Directors, Chesapeake and Ohio Canal Company, Entry 190, Record Group 79, Records of the National Park Service

[191]: Letters Received, by President and Directors, 1873-80, Chesapeake and Ohio Canal Company, Entry 190, Record Group 79, Records of the National Park Service

[194]: Letters Sent, by the Office of the President & Directors, 1828-70, Chesapeake and Ohio Canal Company, Entry 194, Record Group 79, Records of the National Park Service

[196]: Letters Sent, by President & Directors, 1879-81, Chesapeake and Ohio Canal Company, Entry 196, Record Group 79, Records of the National Park Service

[202]: Correspondence of Office of Trustees, 1913-38, Chesapeake and Ohio Canal Company, Entry 202, Record Group 79, Records of the National Park Service

[207]: Letters Received By The Chief Engineer, 1834-52, Chesapeake and Ohio Canal Company, Entry 207, Record Group 79, Records of the National Park Service

[210]: Drafts of Letters Sent By the Chief Engineer, 1836-38, 1846-52, Chesapeake and Ohio Canal Company, Entry 210, Record Group 79, Records of the National Park Service

[211]: Letter Book of the Resident Engineer of the 1st Residency of the 1st Division, 1828-31, Chesapeake and Ohio Canal Company, Entry 211, Record Group 79, Records of the National Park Service

[214]: Records of Ellwood Morris, Principal Assistant Engineer, 1838-40 Chesapeake and Ohio Canal Company, Entry 214, Record Group 79, Records of the National Park Service

[320]: Printed Materials, 1816-1907, Chesapeake and Ohio Canal Company, Entry 320, Record Group 79, Records of the National Park Service.

[650-03]: National Park Service, Central Classified File, 1933-49, National Capital Parks, 650-03, Record Group 79, Records of the National Park Service.

Other Abbreviations

[1460-C&O-5] Administration, Protection and Maintenance File 1460/C&O-5, National Capital Parks, National Park Service, Washington National Records Center, Suitland, Md.

[68A-3048] Administrative Correspondence, 68A-3048, National Capital Region, National Park Service, Washington National Records Center, Suitland, Md.

[Brown] Brown et al. Trustees v. Chesapeake and Ohio Canal Company, Nos. 4191 and 4198

Equity, Circuit Court of Washington County, Hagerstown, Md.

[CF] Clipping File

[LIB-PHP] Library, Park Headquarters

[RF-PHP] Restoration File, Park Headquarters Papers

[UMCP] The Chesapeake and Ohio Canal Company Collection, Archives and Manuscripts Department, McKeldin Library, University of Maryland, College Park.

