INSPECTION REPORT

PANTHER POND DAM

MEMA NO. 122

Prepared for:

Department of Inland Fisheries and Wildlife
Augusta, Maine

Prepared by:

Kleinschmidt

Falmouth, Maine
www.KleinschmidtGroup.com

March 2020

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DEPARTMENT OF INLAND FISHERIES AND WILDLIFE
AUGUSTA, MAINE

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INSPECTION REPORT

PANTHER POND DAM

DEPARTMENT OF INLAND FISHERIES AND WILDLIFE
AUGUSTA, MAINE

1.0 PURPOSE

This inspection report presents the findings of the engineering consultant inspection and options analysis for repair or replacement of the Panther Pond Dam (Dam). The dam was inspected at the request of the Department of Inland Fisheries and Wildlife (IF&W). IF&W reported that the concrete structure may be quickly deteriorating and nearing the end of its life expectancy. The inspection was conducted by Mr. Nicholas M. Ciomei, P.E. and Mr. Eric Turgeon, P.E of Kleinschmidt Associates (Kleinschmidt).

All elevations noted in this report refer to the National Geodetic Vertical Datum of 1929 (NGVD29). Historic documentation available for the site included drawings referencing a local survey datum that requires a subtraction of 3.41 feet to obtain the NGVD29 datum. Elevation on the drawings included in Appendix A have been identified as NGVD29 or Local Datum as appropriate.

2.0 BACKGROUND

2.1 GENERAL DESCRIPTION

The Panther Pond Dam (Dam) is a recreational dam located in the Town of Raymond. The Dam impounds Panther Pond with a surface area of approximately 1,440 acres. The dam is a 13-foot-high, 40-foot-long, mass gravity spillway structure reportedly founded on a firm clay. The dam has two 15-foot-wide uncontrolled overflow spillways. The spillways are split by a 4-foot-wide sluice gate that is used to control the pond's water surface elevation. Downstream of the spillways and sluiceway is an unreinforced concrete apron. The apron prevents spillway and sluiceway flows from scouring the foundation at the toe of the dam, reported to be a combination of firm clays, glacial till, and boulders. The mass gravity structure is abutted by two approximately 80-foot-long earth abutments/embankments.

According to a June 17, 2017 inspection report letter from the Maine Emergency Management Agency (MEMA), the dam impounds approximately 5,700 acre-feet at normal pool. The Dam discharges into the Panther Run River and eventually Sebago Lake through a culvert under Route35, a mile downstream of the Dam.

2.2 CONSTRUCTION HISTORY

The dam in its current state is believed to have been constructed in 1925, although there is evidence of the fish hatchery operating at this location prior to 1925, suggesting there was a dam of some type in place prior to 1925. In 1982, the upstream face of the dam was reinforced with sheet pile located 2 feet upstream of the dam. The 2-foot gap between the sheetpile and the dam's upstream face was filled with concrete. Deteriorating concrete surfaces of the dam were repaired in 1990. The fish hatchery intake pipe near the right abutment was repaired in 2011. Miscellaneous, undated repairs had been done to the structure over its history.

2.3 HAZARD CLASSIFICATION

The Dam was classified as a Significant Potential Hazard dam until the June 17, 2017 letter which reclassified the structure to a Low Potential Hazard structure. There are upstream constrictions from the remnants of a concrete block structure and the Mill Street Bridge. Due to the flow restrictions, as well as shallow depths in these areas, it is unlikely that a dam failure would result in significant breach flows and corresponding downstream impacts.

2.4 HYDROLOGY AND HYDRAULICS

No new hydrology or hydraulic studies were completed as part of this report. A summary of critical hydrologic and hydraulic information provided to Kleinschmidt by IF&W is included below:

TABLE 2-1 PANTHER POND FLOOD RECURRENCE ELEVATIONS

Maximum Flood Probability	Lake Elevation at Dam (feet, NGVD29)
10-Year	278.3
50-Year	278.9
100-Year	279.0
500-Year	279.2

Note: Above values were obtained from the Phase 1 Exploration and Investigation Report, Panther Pond Rehabilitation, by T.Y. Lin International/Hunter-Ballew Associates, August 1986.

TABLE 2-2 PANTHER POND SPILLWAY FLOWS

Flow Condition (assuming closed sluicegate)	Lake Elevation at Dam (feet, NGVD29)	Flow (cfs)
10-Year	278.3	40.3
50-Year	278.9	86.5
100-Year	279.0	112.5
500-Year	279.2	140.7
Point of Overtopping	289.9	278.4

Note: Above values were obtained from the Phase 1 Exploration and Investigation Report, Panther Pond Rehabilitation, by T.Y. Lin International/Hunter-Ballew Associates, August 1986. The report states these values are rough approximations and should be re-evaluated as part of any significant reworking of the dam.

3.0 INSPECTION

The inspection of the Dam was conducted on December 5, 2019, by Mr. Nicholas M. Ciomei and Mr. Eric Turgeon of Kleinschmidt and accompanied by Mr. Richard Parker, Director of Engineering, and Mr. Stephen Tremblay from the IF&W. The weather was cold but sunny during the inspection with temperatures in the 40's. The inspection started at about 11:00 a.m. at the Dam. References to left and right are from the point of view of someone looking downstream.

Section 4 of this report discusses the options available for this project, including a complete replacement of the dam. This section, in order to provide recommendations alongside visual observations of the site, includes recommendations only for repair of the dam. Section 4 and 5 of this report provide additional details and recommendations regarding significant repairs, modifications, or replacement of the Dam.

3.1 RESERVOIR

The reservoir immediately upstream of the dam is a meandering channel that passes through a natural constriction and remnants of a concrete block structure (Photos 1 and 2) approximately 450 feet upstream of the dam and Mill Street Bridge (Photos 3 and 4) immediately upstream of the dam. The upstream constriction and bridge offer potential locations for cofferdam installation in the event dewatering of the dam is necessary for repair or replacement of the dam. The short spans and depths of water in the two locations would reduce cofferdam costs if water control or other construction techniques at the dam are not sufficient.

The Mill Street Bridge abutments tie into the left and right dam abutments, as well as the fish hatchery intake (Photo 5). The fish hatchery intake is protected by a steel grate to prevent large debris from entering the pipe. Photo 6 shows the fishway intake during repairs in 2011. The inspection noted that the pipe intake is located just below the normal water surface elevation, and therefore, the inspection team was not able to verify the condition of the intake. Above water portions of the steel grate and concrete surrounding the intake appear to be in satisfactory condition and do no require repair or replacement at this time.

3.2 LEFT ABUTMENT

The Dam's left abutment consists of an earthen embankment that appears to be natural grade and built-up embankment for the Mill Street roadway (Photos 7 and 8). The earthen section of the abutment appears to be in satisfactory overall condition. The inspection did not note any signs of instability, settlement, wet spots or seepage. The embankment does have low lying and mid-sized brush that can make access and visual inspection difficult. It is recommended that vegetation on water retaining structures and within 20 feet of the toe be cleared. If left uncleared, visual inspection of the embankment can be difficult and leave deficiencies unnoticed. Large root systems can penetrate the embankment, creating paths of least resistance for seepage or blow over and loss of section width due to the root ball.

The embankment at the left overflow spillway interface is retained by concrete retaining walls at the Mill Street Bridge, Dam, and downstream apron (Photos 9 and 10). The left abutment at the interface with the downstream side of the left overflow spillway section's crest has significant loss of concrete and exposed aggregate. It is recommended that the concrete wall in this location be repaired by returning the wall to its original condition to prevent further loss of the retaining wall. If left in current condition, overtopping flows over the left spillway section could eventually erode through the wall and provide a concentrated flow path and eventual erosion of the downstream face of the left embankment.

3.3 LEFT AND RIGHT OVERFLOW SPILLWAYS

The left and right overflow spillways were found to be in poor overall condition. The actual overflow and downstream face of the gravity spillway structure was found to be in satisfactory condition, with only minor spalling and cracking of surface concrete (Photos 11 and 12). The sides of each spillway section where they abut the sluiceway structure have areas of concentrated concrete degradation due to flows impacting the sluiceway walls at the joints (Photos 13 and 14). Concrete at the intersection between left and right sluiceway walls and left and right spillway sections should be repaired by returning the walls to their original dimensions to prevent further loss of sound concrete. Additional concrete loss could expose embedded steel in the concrete, if present, or result in significant section loss that could result in loss of structural integrity of the concrete.

The crest of the spillways and upstream 2-foot-thick concrete added to the project in 1982 appears to be in good overall condition (Photo 15). However, the upstream sheet pilling installed in 1982 with the concrete is in poor condition with significant corrosion through the sheet piling near the normal water line and separation from the 2-foot-thick concrete sections (Photo 16). The steel sheet piling condition below the water surface elevation is not known at this time and may still provide protection to the downstream concrete and act as a cut-off wall for seepage below the concrete dam. It is recommended before any repairs or modifications are design or made to the dam, that an assessment of the steel sheet piling be made. The findings from the assessment will allow for an informed approach to returning the sheet pilling to an acceptable condition.

If the assessment of the steel sheet pilling finds the submerged portions of the steel are in satisfactory condition, consideration should be given to repairing or replacing the steel sheet piling above and at the waterline. This repair will not only provide protection to spillway concrete from debris impact and freeze/thaw cycles, but also help to prevent any seepage between the existing sheet piling along the concrete interface that could then travel below the dam. It is not known whether the existing separated portion of the sheet pilling upstream of the right overflow spillway has rotated or not, but this area could currently allow reservoir water to bypass the seepage cut-off the pilling is providing. Kleinschmidt recommends at a minimum that the sheet pilling at and above the waterline be either replaced or reinforced with new sheet pilling and re-anchored as necessary to the existing concrete.

In order to reduce operational needs at the site and provide tighter control of the reservoir, a potential modification to the site would be to cut down the crest of the overflow spillways to match a desired maximum reservoir water surface elevation. The modification would ensure any flows above the desired elevation, assuming the desired maximum is lower than the current spillway fixed crests, are immediately passed over the dam without operator intervention. This would increase spillway capacity at the site and prevent risk of upstream landowners being flooded during high flow events. If no additional control other than a fixed maximum pond elevation is all that is desired at the dam, then the sluicegate structure could be removed entirely and reconstructed to match the new crest and downstream face of the overflow spillways.

3.4 SLUICEWAY

The sluiceway was found to be in unsatisfactory overall condition. The vertical lift gate controlling the flows at the Dam and upstream trashrack and grates were found to be in good condition (Photo 17). As discussed in Section 3.3 above, the upstream faces of the sluiceway's concrete piers are in poor condition, as well as the sluiceway operator's concrete slab (Photos 17, 18, and 19). Additionally, the interior portions of both piers near the reservoir water line have deteriorated to the point that steel reinforcing has been exposed (Photos 20 and 21). The sluiceway gate's concrete side slots have significant concrete deterioration from typical flows, leakage flows around the gate, and normal gate operation. It is recommended that the interior portions of the sluiceway piers be resurfaced to the original condition to prevent further loss of sound concrete and negative impacts to operation of the sluice gate.

In addition to modifying the fixed spillway crest elevation to reduce operational needs, consideration should be given to demolishing the existing sluiceway gate structure. The current gate structure requires repairs to ensure future operation. In lieu of repairs, costs could be diverted to reconstructing the demolished sluicegate structure to act as a stoplog controlled structure. The stoplogs could be set and adjusted to allow desired flows and pond elevations, with minimal operator intervention throughout the year and lower maintenance costs compared to the sluicegate structure.

3.5 RIGHT ABUTMENT

The right abutment consists of an earthen embankment that appears to be natural grade and built-up embankment for the Mill Street roadway, similar to the left abutment (Photo 22). The embankment portion of the right abutment is in good overall condition. The inspection did not note any signs of instability, settlement, wet spots or seepage. The right abutment embankment is also the location of the fishway building's access road, which is maintained and kept free of vegetation (Photo 23).

The embankment at the right overflow spillway interface is retained by concrete retaining walls at the Mill Street Bridge, Dam, and downstream apron (Photos 24 and 25). The concrete retaining wall between the bridge and dam is in good overall condition. A concrete cutoff wall extending off the Dam and into the right abutment embankment was observed to have a small sinkhole formed just upstream of the wall (Photo 26). The sinkhole reportedly has been monitored by operating personnel and filled in with small stone when necessary. The sinkhole appears to be active. Additionally, downstream of the cutoff wall, the right spillway overflow and apron retaining wall is experiencing erosion and loss of soil from seepage flows (Photos 27 and 28). The sinkhole, seepage erosion, and additional seepage in the downstream apron/toe stone masonry wall (discussed in Section 3.6 below) are all indicators of a potential internal erosion event occurring through the Dam's right abutment. This area was excavated, with perforated pipe installed, and backfilled to address historic seepage issues in 2011 (Photo 29). It appears that the issues were not fully or adequately addressed during the 2011 repair. Seepage daylights at the end of the retaining wall and onto the right spillway apron.

The significant seepage issues through the right abutment requires additional information in order to properly diagnose any on-going issues that could threaten the integrity or service life of the Dam. If left unchecked, a soil pipe could form over time, increasing in size as soil is transported by seepage from within the abutment to the downstream tailrace. Without intervention, this could lead to an eventual collapse of the right abutment embankment, structural failure of the right abutment concrete retaining walls due to loss of soil support, and potential loss of the reservoir. As repairs in 2011 downstream of the right abutment cutoff wall did not perform as intended, consideration should be given to addressing issues at the source of seepage entering the Dam's embankment.

It is recommended, during periods of low flow and normal reservoir elevations, that dye testing upstream of the dam within the reservoir be completed. The area of focus should be between the bridge and dam along the right abutment, as well as upstream of the right overflow spillway. Dye testing is a low-cost approach to determine the location of seepage entering the right abutment embankment from the reservoir. Mapping the location of seepage into the abutment would provide locations for sealing off the upstream end of seepage paths to reduce or eliminate the current seepage issues.

3.6 SPILLWAY APRON & TOE

The spillway apron for the Dam was found to be in good overall condition. The inspection team did not note significant cracking or settlement along the entire length of the unreinforced concrete slab. Some minor cracking and surface erosion, specifically along the sluiceway bottom channel where flows pass most frequent, was noted (Photos 30, 31, and 32). These minor items do not require attention at this time. Some vegetation was noted in slab construction joints and cracks. Though not an issue at this time, consideration should be given to managing the vegetation so medium to large sized brush do not begin to establish themselves. The root systems of medium to large vegetation could separate joints or worsen cracks if left unmaintained.

The downstream end of the apron has experienced concrete loss and appears rough; however, it remains in good overall condition and continues to perform its original design intent of preventing downstream toe scour (Photo 33). The downstream toe area consists of what appears to be a sandy gravel mix that is susceptible to scour; however, the apron and steel piling cut-off wall below the apron and the toe appear to be performing as intended (Photo 34). There are no signs of detrimental scour actively occurring at the toe, nor need for repairs to the Dam's toe at this time.

3.7 RECOMMENDATIONS

The following summarizes recommendations generated from the Dam inspection. Each recommendation has been listed in order of priority and level of effort/cost required to address the recommendation.

<u>Priority 1 - Repairs</u>

1. Perform initial and routine vegetation control on the following locations:
    a. Right abutment embankment downstream slope
    b. Spillway apron
2. Complete concrete resurfacing on the following locations. This includes demolition of concrete in areas to be resurfaced down to sound concrete and doweling in new resurfaced concrete into existing sound concrete.
    a. Left abutment retaining wall
    b. Shared interface between the sluiceway walls and left and right spillways
    c. Sluiceway walls (upstream and interior faces, sluicegate guides, operator deck)
3. Perform an assessment of the submerged portions of the upstream steel sheet pile cut-off wall. The results of this assessment will govern next steps regarding repairs to the sheet pile cut-off wall.
4. Perform dye testing along the upstream face of the right half of the dam and right abutment retaining wall. The results of this test will govern next steps regarding seepage in the right abutment.

Priority 2 - Modifications

1. At a minimum, repair the steel sheet pile cut-off wall along the upstream face of the dam.
    a. This would include either replacing or repairing the damaged, corroded, and displaced sections of the sheet pilling at and above the normal water line.
    b. The new sheet pilling will protect the existing concrete from damage from debris and exposure to normal weather cycles, potentially prevent seepage from bypassing the cut-off wall, and extend the lifespan of the project.
    c. The extent of the repair below the normal water line will be determined based on the assessment made in Priority 1 Recommendation #3.
2. Demolition of the overflow spillway crests down to the desired maximum water surface elevation.
3. Demolition of the sluiceway structure. The demolished structure would then be reconstructed as a stoplog structure to allow for operational flexibility of the reservoir below the normal maximum water surface elevation or reconstructed to match the overflow spillway crests to eliminate operator intervention for the Dam.

4.0 OPTIONS ANALYSIS

This report investigated four options for the Dam: do-nothing, repair the dam, perform modifications and repairs, and complete replacement of the dam. The below table includes a brief summary of the results of the investigation and Kleinschmidt's opinion of probable costs (OPC):

TABLE 4-1 OPTIONS ANALYSIS SUMMARY OF RESULTS

Option	Conclusion	OPC
1: Do-Nothing	Not Recommended	$0
2: Repairs	Recommend for Consideration	$150,000 – 250,000
3: Modifications and Repair	Recommend for Consideration	$500,000 – 700,000
4: Complete Replacement	Not Recommended	$2,000,000 – 4,000,000

The below subsections provide a more detailed summary of our investigation into each of the four options along with Kleinschmidt's OPC. The OPC for each option is a Class 5 level estimate as defined by the Association for the Advancement of Cost Engineering. The Class 5 estimate is a conceptual level estimate given the conceptual nature of the four options investigated for the Dam. The Class 5 estimate includes costs for the design, permitting, and construction associated with each option. Class 5 estimates can typically range between -50% for the low range to +100% for the high range. The relative range of these estimates should be strongly considered or investigated in more detail before pursing each option.

4.1 OPTION 1: DO-NOTHING

Based on the site inspection and discussions with IF&W staff, the do-nothing approach does not appear to be a feasible option. The do-nothing approach was included to assure a complete report and investigation into all options. The approach results in zero costs to IF&W in the immediate future; however, future costs for maintaining the structure due to inaction now will result in a potential exponential increase in overall costs. In order to ensure the site continues to perform as intended for all stakeholders (local municipality, recreational users, reservoir rim property owners, and IF&W), action to address deficiencies outlined in this report will be necessary. Doing nothing will continue to reduce the operational capabilities of the site and could result in reservoir and flow fluctuations, or eventual loss of the reservoir.

4.2 Option 2: Repairs

Repairing the Dam appears to be both necessary and a cost-effective approach to addressing condition recommendations. Completing the Priority 1 repairs summarized in Section 3 of this report would address existing operator safety concerns, improve both the appearance and life-expectancy of the Dam, and increase water control and sluiceway performance. The repairs, mostly limited to surficial concrete resurfacing above water, would also include repairs to the sluicegate, which would require either a drawdown of the reservoir or a cofferdam upstream of the gate. This would result in non-negligible increased design, permitting, and construction costs. This option does not include repairs to the upstream face of the Dam, particularly the sheet piling, or other Priority 2 repairs as they are covered below in Option 3: Modification and Repairs. The total cost estimate, including design, permitting, and construction costs, for this option is $150,000-250,000.

4.3 Option 3: Modifications and Repairs

Option 3 includes the Priority 1 repairs estimated for Option 2 above, as well as the Priority 2 modifications summarized in Section 3 of this report. The modifications include reconstructing the sluiceway to act as a stoplog structure rather than a vertical lift gate, demolition of the existing overflow spillway crest down to the desired maximum reservoir water surface elevation and repair or replacement of the sheet pile cut-off wall on the upstream face of the Dam and right abutment. The proposed modifications will reduce the need to operate the site to manage flows and reservoir operations with a fixed crest weir while still allowing some flexibility with the stoplog structure, if desired. Additionally, the repaired or replaced sheet pile cut-off wall will increase the Dam's life expectancy by replacing or reinforcing the ineffective portions of the existing sheet pile. The total cost estimate, including design, permitting, and construction costs, for this option is $350,000-550,000.

This option and estimate does not include additional modifications to address seepage concerns, other than modifications to the sheet pile wall near the right abutment. Prior to performing an underwater assessment and dye testing, the extent of potential repairs to the right abutment are not known at this time. Repairs to the right abutment to address seepage can range from do-nothing to an extensive rebuild of the abutment based on findings from the investigations.

4.4 OPTION 4: COMPLETE REPLACEMENT

The site inspection indicated that the dam does not require a complete replacement at this time based on is performance history and current condition of the structure. Although there were many deficiencies noted with condition of the structure, the conditions are mostly surficial and do not require major repairs that would make replacement of the Dam a feasible option. Kleinschmidt estimates the total cost for a replacement dam, located downstream of the existing Dam, to be on the order of $2 - 4 million. This option would utilize the existing Dam as a cofferdam and water control structure during construction. The area downstream of the existing Dam, on the left and right riverbanks, is relatively flat compared to the location of the current Dam and would require significant earthwork to tie the dam back into high ground. Construction of a new dam upstream of the existing Dam would also pose increased construction costs as a cofferdam and water controls would need to be put in place. In addition to significant construction costs, this option would result in the highest design and permitting costs.

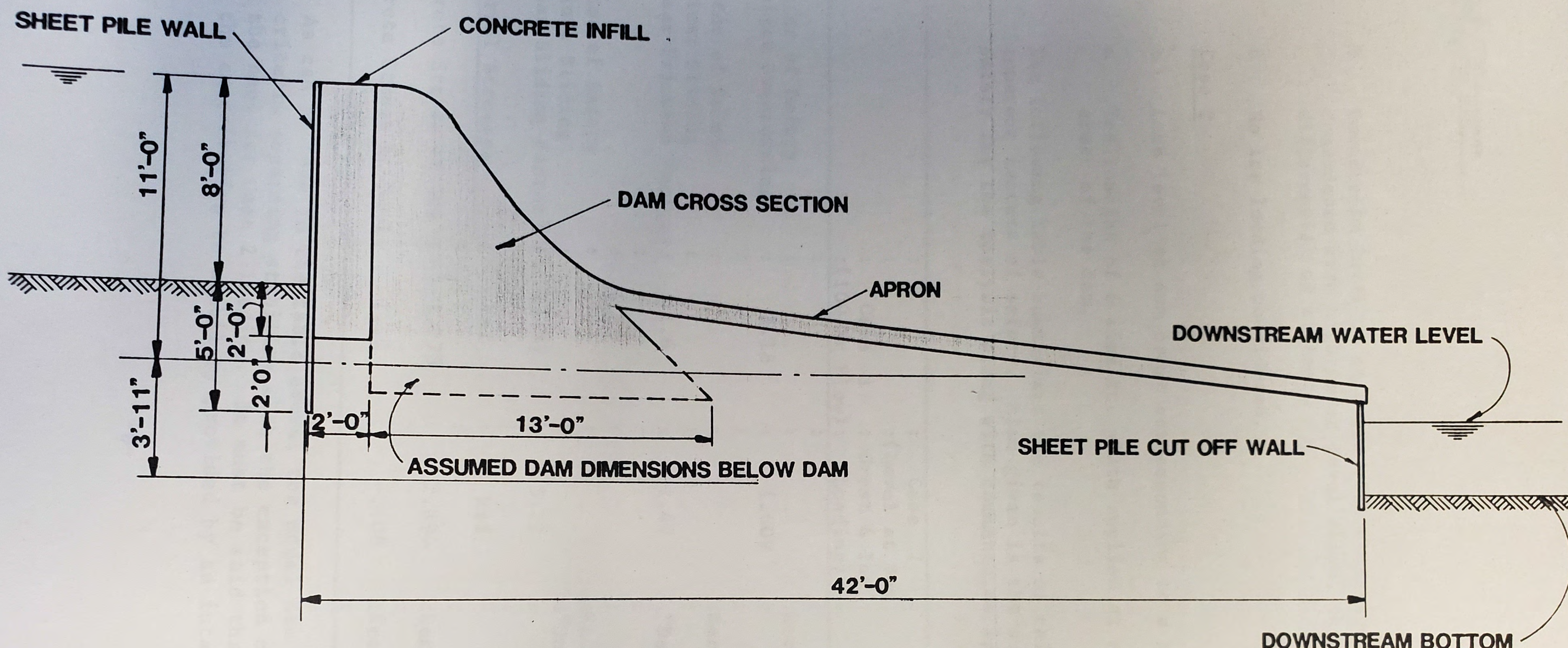
4.5 RECOMMENDATION

Based on the site inspection and recommendations from the site inspection detailed in Section 3 of this report, as well as the options analysis completed above, Kleinschmidt recommends the following:

1. We do not recommend pursuing Options 1 or 4.
    a. Option 1 will result in further degradation of the Dam and result in more costly repairs in the future or a potential dam breach.
    b. Option 4 is not cost-effective nor appropriate at this time given the current condition of the Dam. The existing structure, with a more moderate investment, will result in an extended lifespan.
2. The steel sheet pile cut-off wall underwater assessment and dye testing for seepage through the right abutment be performed prior to any repair, modification, or replacement steps be taken.
3. Option 3 should be revised to include conceptual level costs for additional repairs or modifications required based on the findings of the underwater assessment and dye testing.

4. Option 2 and the revised Option 3 should be considered by IF&W for execution.
    a. Option 2 is a cost-effective solution to address existing concrete condition issues at the site assuming the top half steel sheet pile cut-off wall is not required to prevent seepage and assuming the right abutment seepage does not pose a safety risk to the Dam. This option also does not address existing operational concerns at the Dam.
    b. Option 3, while more expensive than Option 2 and pending additional costs based on the results of recommended investigations, is a more comprehensive solution. Option 3 will address all identified condition issues, reduce operational needs, satisfy upstream property owners, and significantly extend the lifespan of the Dam.

FIGURES



PANTHER POND DAM CROSS-SECTION

NOT TO SCALE

PANTHER POND DAM
CROSS-SECTION

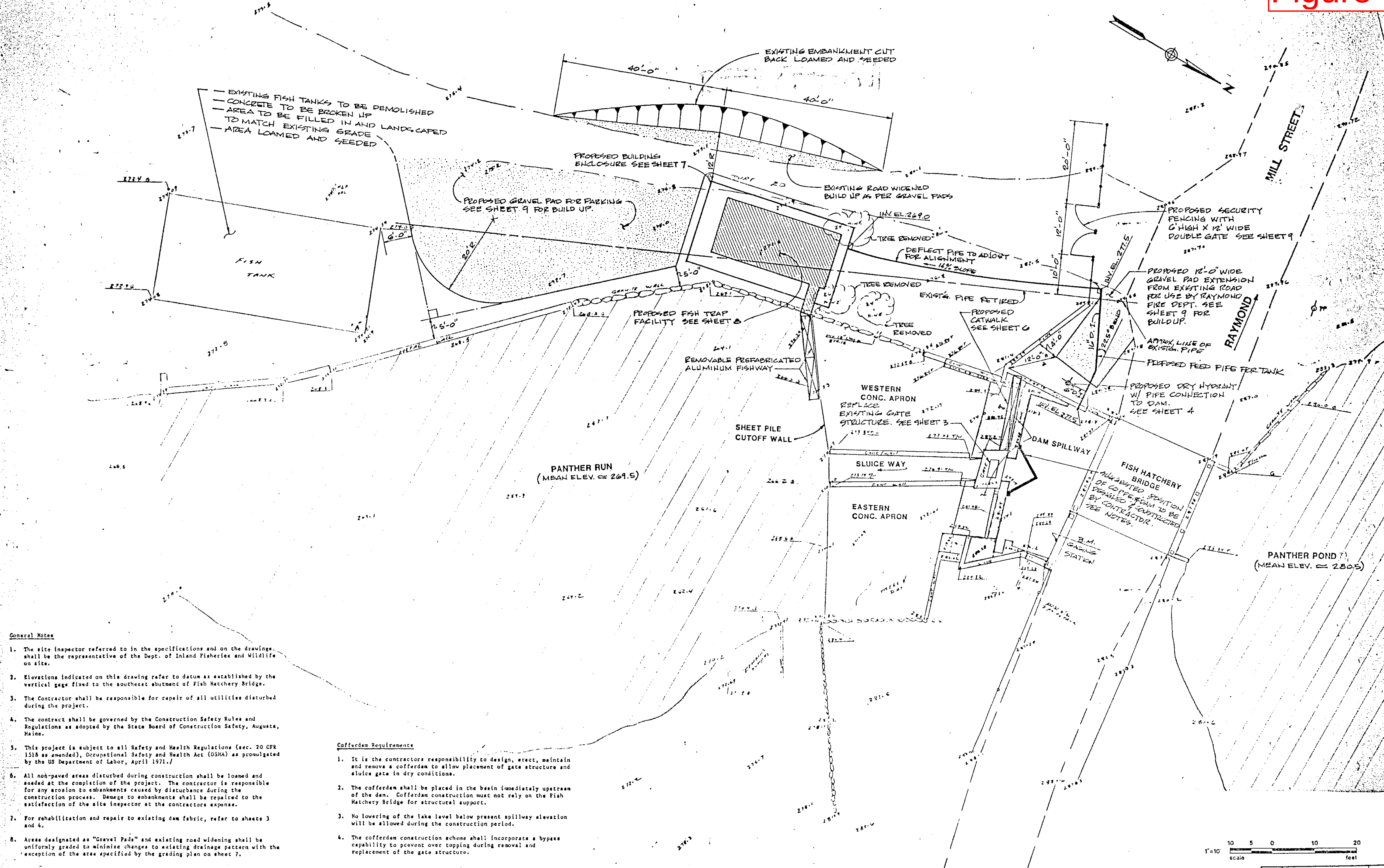
Figure 1

JULY 1986

Figure 2

Bridge abutment
Panther Brook
Bridge abutment
Screen
9'-5"
See Detail
Pipeline to pools
Note: Datum from M.S.H.C. Plan # 50-66.
275.8
275.4
274.9
273.5
274.6
274.8
275.8
274.8
Bottom elevations
276.4
275.7
274.3
273.7
273.8
275.5
276.1
276.6
Top Sp'wy. - elev. 281.3
Top Gateworks Elev. 287.3
281.3
Batter
Batter
PLAN VIEW OF DAM
Scale - 1/4"=1'-0"
Sluice
Screen
3 1/2"
5 1/2"
3 1/2"
2 1/2"
NOTCH DETAIL
Scale - 3"=1'-0"
10'-0"
9'-5"
3 1/2"
3 1/2"
Conc. Bridge Abut.
Oak Screen
7'-6"
Conc. Abut. wall
SCREEN ELEVATION
Scale - 1/4"=1'-0"
9'-9"
2"
Oak Slats
3/4"
3/4"
7'-6"
1/2" rods @ 2'-0" o.c.
1/2" Rods @ 2' o.c. (use 3/4" pipe sleeves)
2'-0"
SCREEN DETAIL
Scale - 3"=1'-0"
10'
8"
6"
12'
6'
Panther Brook
PLAN
Top Bank
10'±
6'±
Top Bank
7'±
Stream bed
ELEVATION
OLD DAM BETWEEN ROAD & PANTHER POND
Scale - 1/4"=1'-0"
Rec'd TYLI 1/27/86 MG
STATE OF MAINE CLAYTON G. GRANT 852 REGISTERED LAND SURVEYOR
ENGINEER'S SEAL
APPROVED FOR DEPT. OF HEALTH & WELFARE
APPROVED FOR BUREAU OF PUBLIC IMPROVEMENTS
APPROVED FOR DEPT. OF INSURANCE
PROJECT NO. 2063
SHEET 1 OF 2
STATE OF MAINE
DEPARTMENT OF INLAND FISHERIES AND GAME
AUGUSTA, MAINE
ELEVATIONS & DETAILS
PANTHER POND DAM
RAYMOND, MAINE
Drawn by: C.G.G.
Appr'd by:
Date: 12-15-70
Scale: AS NOTED
No. 70-24
NO. DATE DESCRIPTION APPR'D
REVISIONS

Figure 3



General Notes

1. The site inspector referred to in the specifications and on the drawings shall be the representative of the Dept. of Inland Fisheries and Wildlife on site.

2. Elevations indicated on this drawing refer to datum as established by the vertical gage fixed to the southeast abutment of Fish Hatchery Bridge.

3. The Contractor shall be responsible for repair of all utilities disturbed during the project.

4. The contract shall be governed by the Construction Safety Rules and Regulations as adopted by the State Board of Construction Safety, Augusta, Maine.

5. This project is subject to all Safety and Health Regulations (sec. 20 CFR 1518 as amended), Occupational Safety and Health Act (OSHA) as promulgated by the US Department of Labor, April 1971./

6. All non-paved areas disturbed during construction shall be loamed and seeded at the completion of the project. The contractor is responsible for any erosion to embankments caused by disturbance during the construction process. Damage to embankments shall be repaired to the satisfaction of the site inspector at the contractors expense.

7. For rehabilitation and repair to existing dam fabric, refer to sheets 3 and 4.

8. Areas designated as "Gravel Pads" and existing road widening shall be uniformly graded to minimize changes to existing drainage pattern with the exception of the area specified by the grading plan on sheet 7.

Cofferdam Requirements

1. It is the contractors responsibility to design, erect, maintain and remove a cofferdam to allow placement of gate structure and sluice gate in dry conditions.

2. The cofferdam shall be placed in the basin immediately upstream of the dam. Cofferdam construction must not rely on the Fish Hatchery Bridge for structural support.

3. No lowering of the lake level below present spillway elevation will be allowed during the construction period.

4. The cofferdam construction scheme shall incorporate a bypass capability to prevent over topping during removal and replacement of the gate structure.

NO	REVISION	DATE

PROJECT Nº 50936.00 DESIGN DRAWN E.C.P. CHECKED

T.Y. LIN INTERNATIONAL / HUNTER-BALLEW ASSOCIATES
5 Fundy Road
Falmouth, Maine 04105

Issued For	Date	By

SHEET TITLE: SITE PLAN

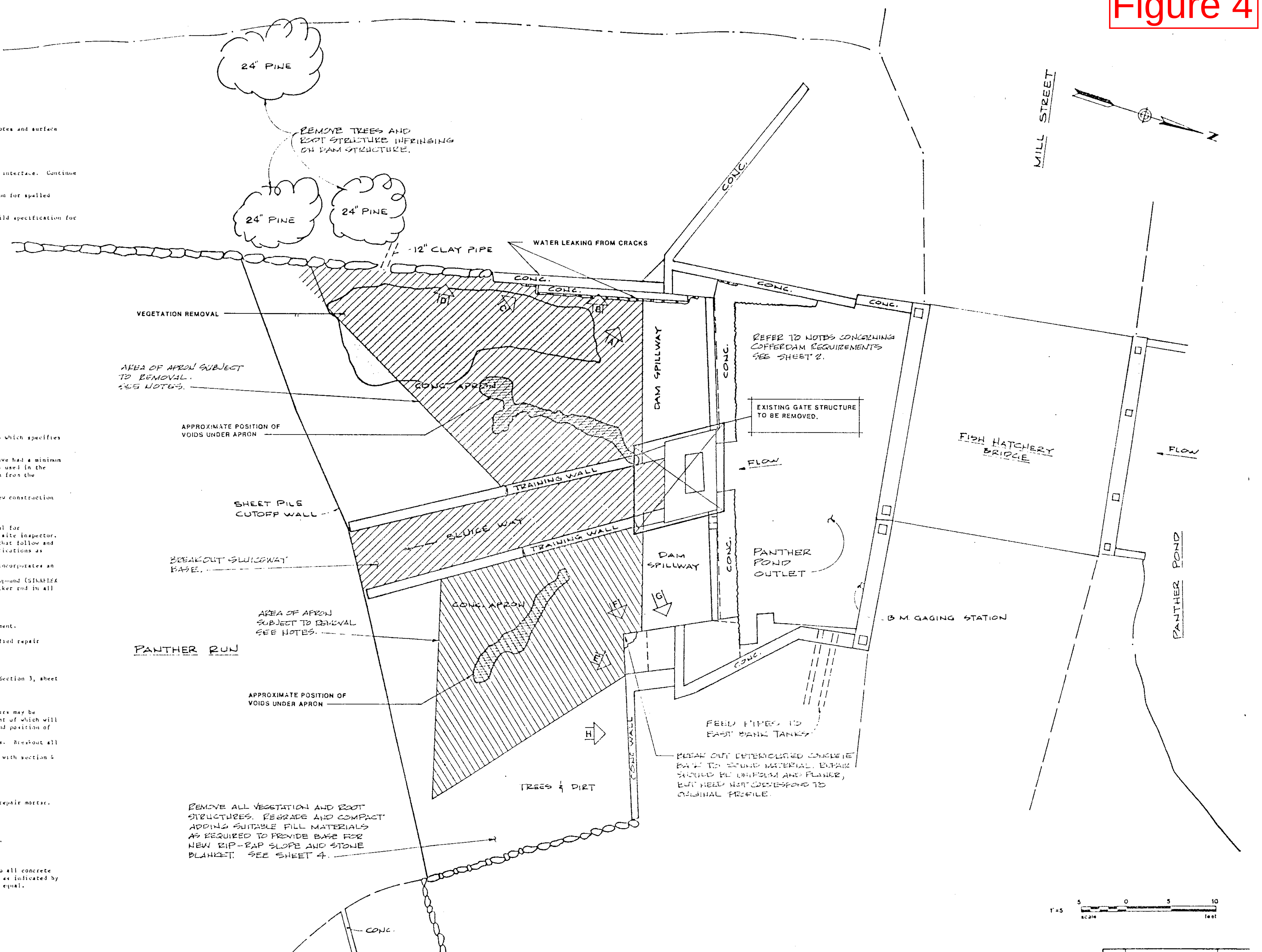
PROJECT: DEPARTMENT OF INLAND FISHERIES AND WILDLIFE
PANTHER POND DAM

SHEET Nº 2

Figure 4

KEY

- Limit of concrete rehabilitation. Refer to general notes and surface preparation.
- Location of major crack.
- A — Loose/uneven concrete to be removed at spillway/apron interface. Continue preparation as per apron repair on Drawing #4.
- B — Spalled concrete above wall. Use rebuild specification for spalled concrete area repair.
- C — Spalled concrete ON FACE OF EXIST CONC wall. Use rebuild specification for spalled concrete area repair.
- D — Reposition granite blocks out of line.
- E — As per C
- F — As per C
- G — As per C
- H — AS PER C



General Notes

1. This drawing should be used in conjunction with Drawing #4 which specifies structural rehabilitation to the dam structure.

2. The contractor engaged in concrete rehabilitation shall have had a minimum of 3 years' experience in this type of work. All products used in the repair process shall be supported by written documentation from the manufacturer in accordance with the specifications.

3. Surface Preparation: Provide to both rehabilitated and new construction areas as applicable.
   a. Remove vegetation and loose surface debris
   b. No chemical cleaning will be allowed, due to potential for environmental pollution, without the approval of the site inspector.
   c. Breakout damaged structure as outlined in the notes that follow and on the drawings and make repairs and structural modifications as required.
   d. Water blast all surfaces with a water blaster which incorporates an abrasive compound to the cleaning jet.
   e. Sawcut cracks and apply a urethane flexible joint compound (SIKAFLEX 1A or approved equal) to a primed surface. Place backer rod in all cracks with widths of 1/4" or greater.

4. Spalled Concrete Repair
   a. Remove damaged concrete using "needle scaling" equipment.
   b. Prepare surface in accordance with note 3.
   c. Build up to an approved profile using a polymer modified repair mortar (SIKATOP 122, 123 or an approved equal).

5. Sluiceway area. (See shaded area this sheet)
   a. Remove damaged material and build up as required in Section 3, sheet 4.

6. Apron areas. (See shaded areas this sheet)
   a. The area shaded indicates the general area that repairs may be required. Only local repairs are required, the extent of which will be determined as vegetation and debris are removed and position of voids are established.
   b. Breakout damaged areas and remove all root structures. Breakout all concrete above voided areas.
   c. Place subgrade and reinforced concrete in accordance with section 4 sheet 4.

7. Spillways
   a. "Needle scale" surface.
   b. Build up to uniform surface with a polymer modified repair mortar. (SIKATOP 122, 123 or an approved equal).

8. Major crack as indicated on this sheet.
   a. Repair crack with an approved epoxy injection system.

9. General Surface Coat.
   a. Apply a coat of cement based polymer repair mortar to all concrete surfaces within the limit of concrete rehabilitation as indicated by shading this sheet. Use SIKA-TOP 144 or an approved equal.

NO	REVISION	DATE

TY/IN INTERNATIONAL — HUNTER-BALLEW ASSOCIATES

Issued For	Date	By

SHEET TITLE: CONCRETE REHABILITATION AND DEMOLITION

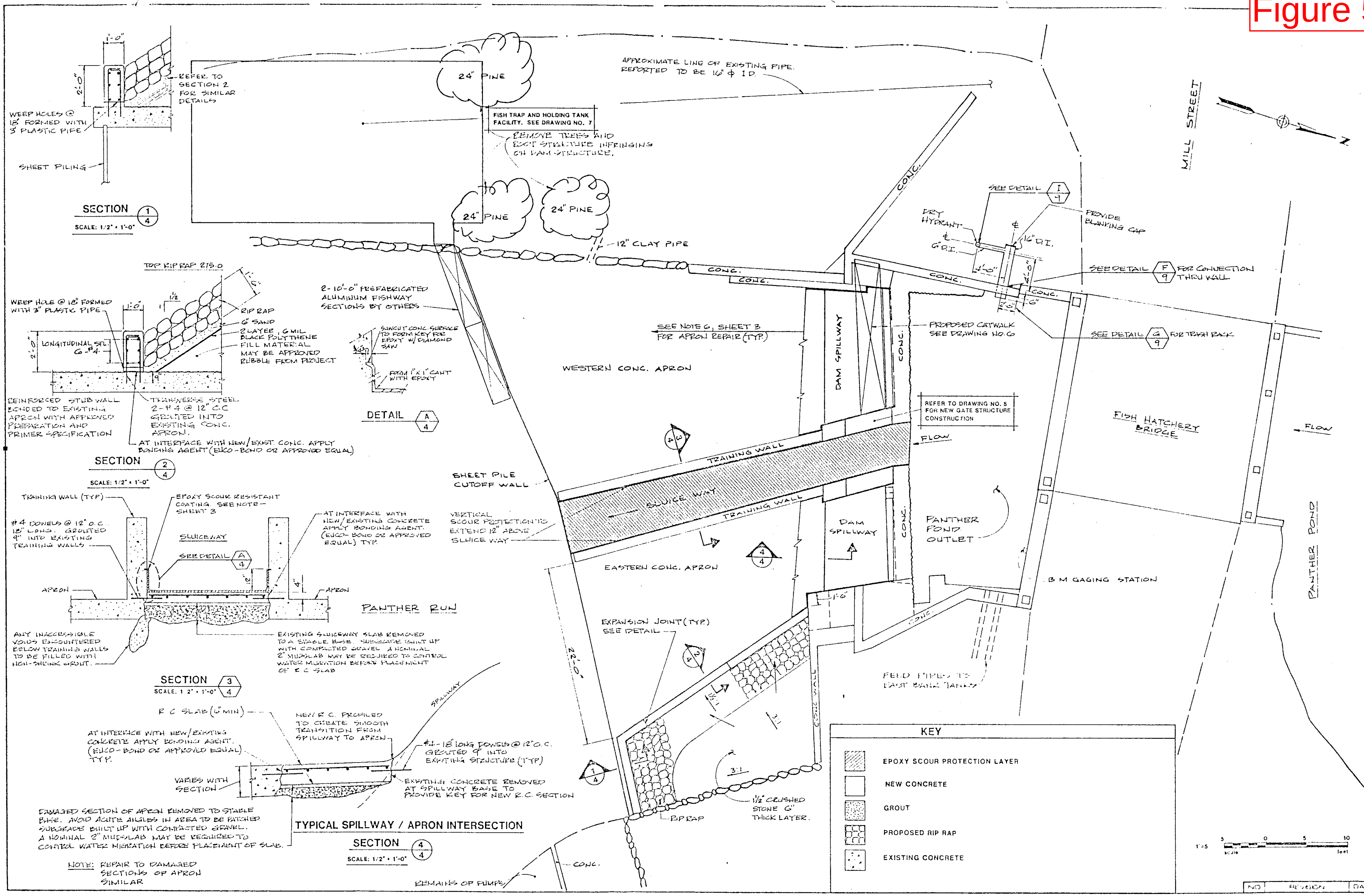
PROJECT: DEPARTMENT OF INLAND FISHERIES AND WILDLIFE — PANTHER POND DAM

SHEET No: 3

PROJECT No: 50936.00

DESIGN / DRAWN: E.G.P. / CHECKED

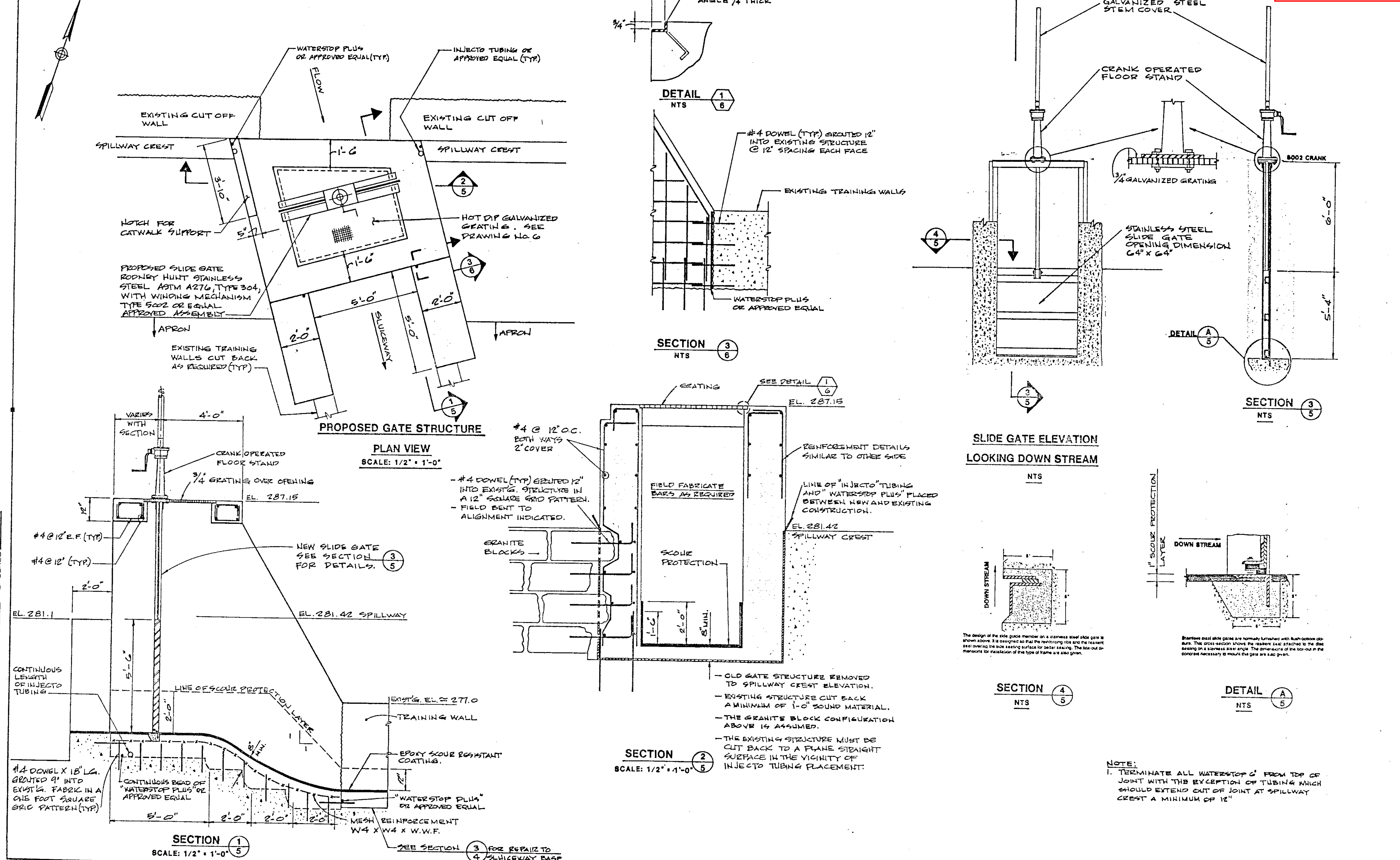
Figure 5



T.Y. LIN INTERNATIONAL / HUNTER-BALLEW ASSOCIATES	SHEET TITLE: STRUCTURAL ADDITION TO DAM	SHEET No
	PROJECT: DEPARTMENT OF INLAND FISHERIES AND WILDLIFE — PANTHER POND DAM	4

PROJECT No 50936.00

Figure 6



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5 Fundy Road
Falmouth, Maine 04105

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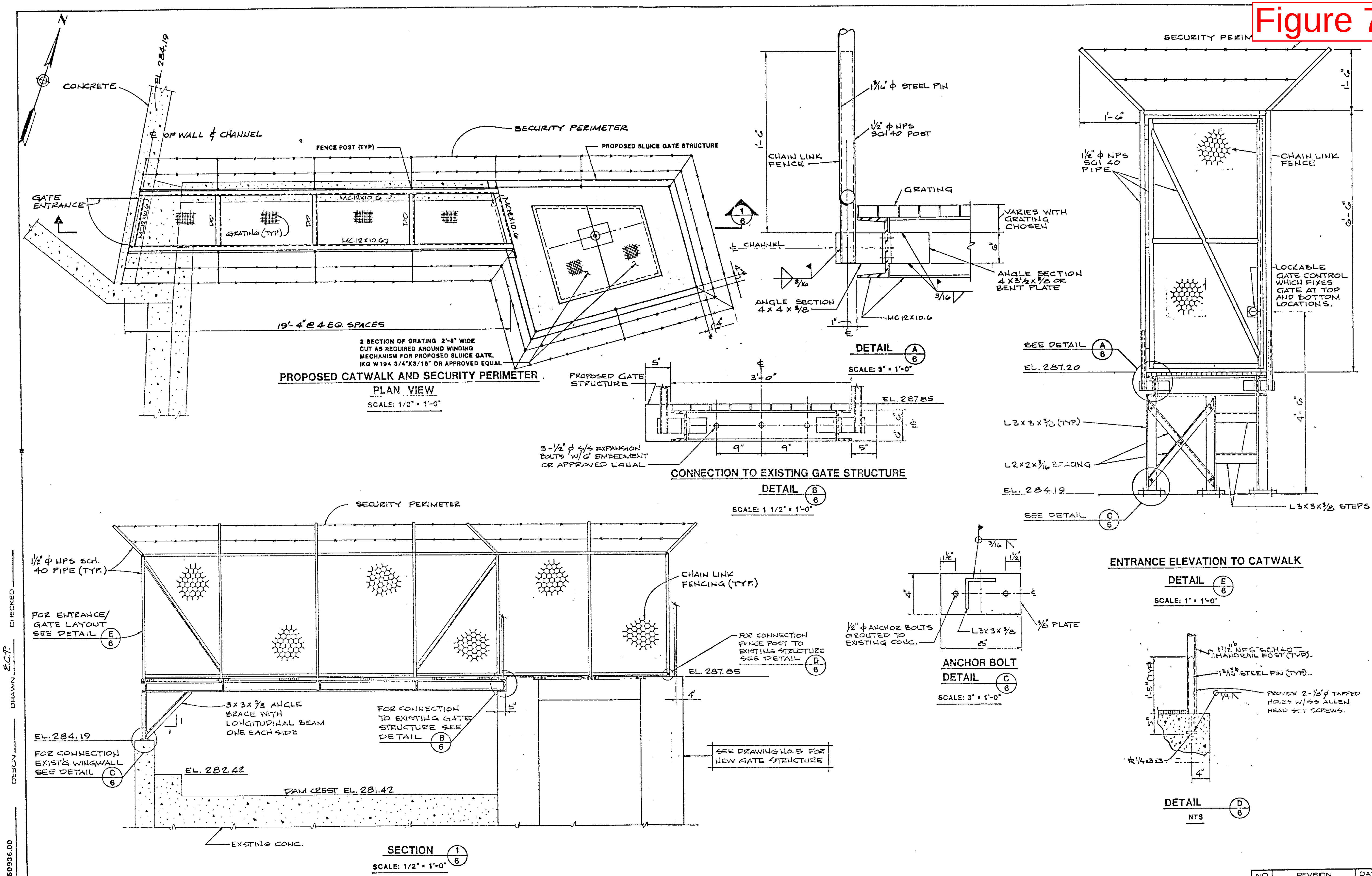
SHEET TITLE: REPLACEMENT GATE STRUCTURE

PROJECT: DEPARTMENT OF INLAND FISHERIES AND WILDLIFE
PANTHER POND DAM

SHEET No 5

Figure 7



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5 Fundy Road
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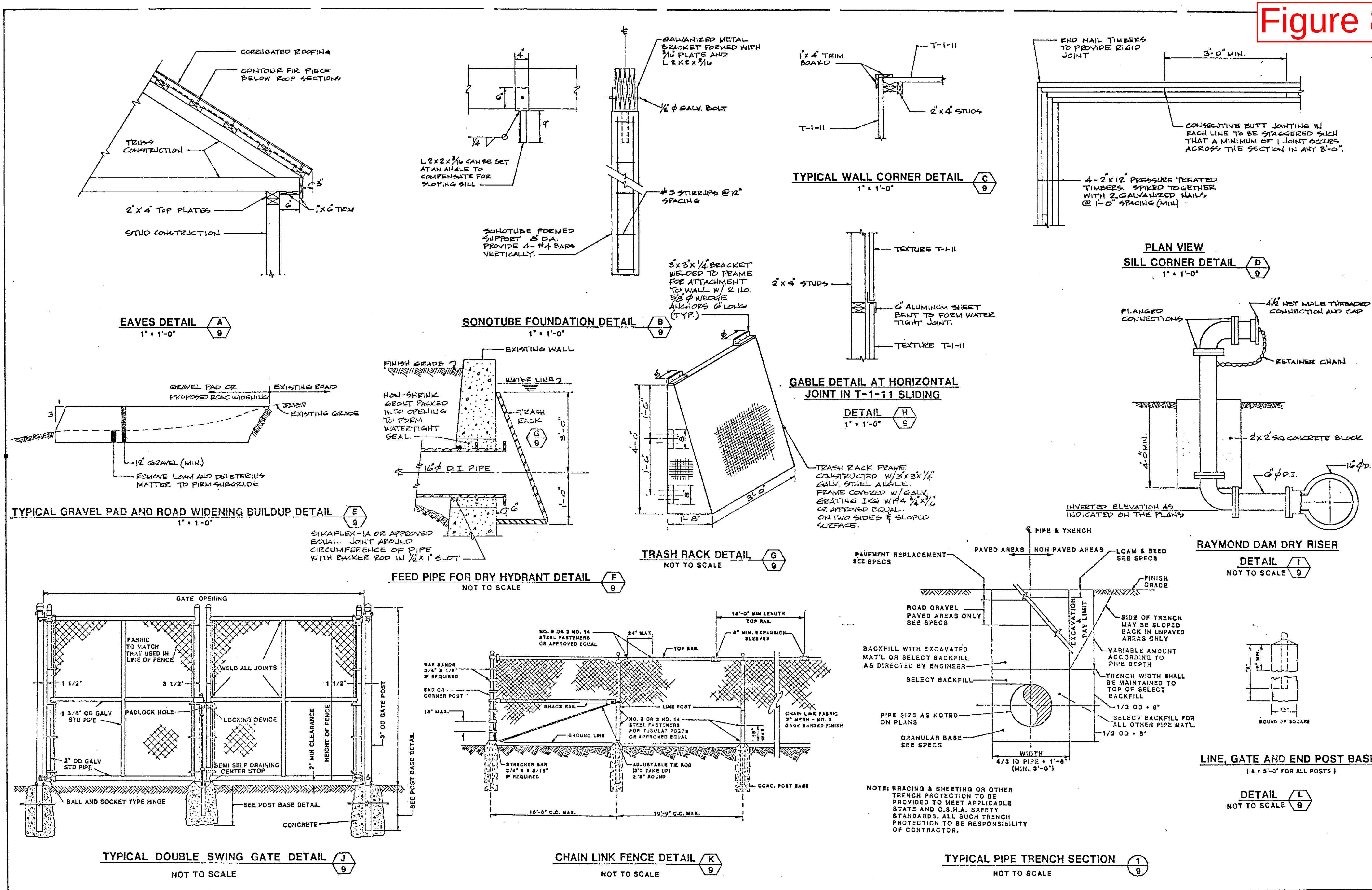
SHEET TITLE: CATWALK FOR SLUICE GATE OPERATION

PROJECT: DEPARTMENT OF INLAND FISHERIES AND WILDLIFE
PANTHER POND DAM

SHEET Nº 6

Figure 8



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SHEET TITLE: MISCELLANEOUS DETAILS

PROJECT: DEPARTMENT OF INLAND FISHERIES AND WILDLIFE
PANTHER POND DAM

SHEET Nº 9

APPENDIX A

INSPECTION PHOTOGRAPHS

PHOTO 1: CONCRETE BLOCK STRUCTURE LOOKING BACK TOWARDS DAM.

PHOTO 2: RESERVOIR UPSTREAM OF CONCRETE BLOCK STRUCTURE.

PHOTO 3: MILL STREET BRIDGE UPSTREAM OF DAM.

PHOTO 4: DOWNSTREAM SIDE OF MILL STREET BRIDGE.

Photo 5: Fishway Intake Grate.

Photo 6: Fishway Intake during Repairs in 2011.

PHOTO 7: MILL STREET BRIDGE AND LEFT ABUTMENT.

PHOTO 8: LEFT ABUTMENT EMBANKMENT DOWNSTREAM FACE.


PHOTO 9: LEFT ABUTMENT CONCRETE RETAINING WALL.


PHOTO 10: CONCRETE DEGRADATION TO LEFT ABUTMENT RETAINING WALL.

PHOTO 11: DOWNSTREAM FACE OF THE LEFT OVERFLOW SPILLWAY.

PHOTO 12: DOWNSTREAM FACE OF THE RIGHT OVERFLOW SPILLWAY.

PHOTO 13: CONCRETE DEGRADATION ALONG LEFT SPILLWAY AND SLUICEWAY INTERFACE.

PHOTO 14: CONCRETE DEGRADATION ALONG RIGHT SPILLWAY AND SLUICEWAY INTERFACE.

PHOTO 15: 2 FT THICK CONCRETE AND STEEL PILING.

PHOTO 16: STEEL PILING CORROSION AND SEPARATION.

PHOTO 17: SLUICEWAY VERTICAL LIFT GATE AND CONCRETE DEGRADATION.

PHOTO 18: CONCRETE DEGRADATION TO LEFT SLUICEWAY WALL.

PHOTO 19: CONCRETE DEGRADATION TO RIGHT SLUICEWAY WALL.

PHOTO 20: EXPOSED REINFORCING STEEL IN LEFT SLUICEWAY WALL.

PHOTO 21: EXPOSED REINFORCING STEEL IN RIGHT SLUICEWAY WALL.

PHOTO 22: MILL STREET BRIDGE AND RIGHT ABUTMENT EMBANKMENT.

PHOTO 23: FISHWAY BUILDING AND ACCESS ROAD (UNDER SNOW COVER).

PHOTO 24: RIGHT ABUTMENT RETAINING WALL UPSTREAM OF DAM.

PHOTO 25: RIGHT ABUTMENT RETAINING WALL DOWNSTREAM OF DAM.

PHOTO 26: SINKHOLE UPSTREAM OF RIGHT ABUTMENT CUTOFF WALL.

PHOTO 27: SEEPAGE AND LOSS OF SOIL ALONG RIGHT ABUTMENT DOWNSTREAM RETAINING WALL (1).

PHOTO 28: SEEPAGE AND LOSS OF SOIL ALONG RIGHT ABUTMENT DOWNSTREAM RETAINING WALL (2).

PHOTO 29: REPAIR IN 2011 DOWNSTREAM OF RIGHT ABUTMENT CUTOFF WALL.

PHOTO 30: APRON DOWNSTREAM OF LEFT OVERFLOW SPILLWAY.

PHOTO 31: APRON DOWNSTREAM OF RIGHT OVERFLOW SPILLWAY.

PHOTO 32: SLUICEWAY CHANNEL DOWNSTREAM OF GATE.

PHOTO 33: DOWNSTREAM TOE OF SPILLWAY APRON.

PHOTO 34: STEEL PILING BELOW END OF SPILLWAY APRON.