ATTACHMENT B

FEDERAL EMERGENCY MANAGEMENT AGENCY

HAZARD MITIGATION PROPOSAL (HMP)

~~WORKING DRAFT~~

DISASTER		APPLICANT	EMMIE/Project #	FIPS NO.	CATEGORY
DR - 4393	NC	City of Boiling Springs Lakes	68141	019-06760-00	D

SCOPE OF WORK:

Title: Dam Breaches, Upper Lake, and Sanford Lake
Damage Inventory: #222322 Upper Dam, and #222319 Sanford Dam/Alton Lennon Road
Address: Public Works Department, 200 Alton Lennon Road, Boiling Spring Lakes, North Carolina 28461
GPS Coordinates: Latitude: 34.046867 , Longitude -78.037507

(I) Damages Description & Dimensions (DDD):
The Boiling Spring Lakes (BSL) system consists of five lakes and associated earthen embankment dams. During Hurricane Florence in August 2018, this area received excessive rainfall which caused the Sanford Dam (SD) and the Upper Lake Dam (ULD) to suffer a catastrophic failure due to overtopping and embankment erosion that caused cascading failures at the other upstream dams. This mitigation proposal is limited to the damages at SD (DI#222319), and ULD (DI#222322). The spillways at the dams were severely undersized which caused the overtopping and eventual breach of all City dams.
Project Repair Cost DI#222322 and DI#222319 = $8,778,111.67 (CEF included)

(II) Hazard Mitigation Proposal (HMP) Scope of Work:
McGill Associates has provided a mitigation proposal for the damaged dams which increases the amount of water that can pass through the spillways. The new design will increase freeboard on both dams and increase the spillway capacity of SD by 3400 cfs and ULD by 608 cfs. The resulting design prevents overtopping which will improve the overall resilience of the dams and avoid future damage.
• Sanford Dam: install a positive cutoff wall into the foundation bedrock along the entire length of the dam, install cast-in-place (CIP) concrete riser structure and box culverts to replace the existing undersized, deteriorated spillway, and reconstruct the breached embankment.
• Upper Lake Dam: replace the existing undersized spillway with a CIP concrete riser structure and box culverts and reconstruct the breached embankment at the breach.
Net mitigation cost DI#222322 and DI#222319 = $7,256,297.45 (CEF included)

(III) Hazard Mitigation Ratio (HMR):
HMR = (7,256,297.45/8,778,111.67) x 100 = 82.66%

(IV) HMP Feasibility and Cost-Effectiveness: (100% rule - Appendix J)
This Hazard Mitigation proposal of **82.66%** is in accordance with Appendix J (100% rule) of the FEMA PA Program and Policy Guide - Mitigation Section and Appendix J – Section I. Drainage Structures; item A, B, C; - Section II. Transportation Facilities; items C, and D; - Section V. Water/Wastewater; item D. This Hazard Mitigation Proposal (HMP) is **82.66%** of the repair and restoration costs. This HMP is appropriate mitigation, it is technically feasible and is cost effective.

(V) Compliances and Assurances
This HMP is for estimating purposes only. If the site's final placement and configuration are different than the preliminary estimate, the Applicant should submit a change in scope request. This HMP is subject to further review prior to award. The Applicant is responsible for final design, placement, configuration, choice of contractors or vendors, permits and compliance with all regulatory codes and standards of the State of North Carolina. FEMA will pay only the incremental difference in cost between repairs and mitigation, and will not duplicate funding for repair or replacement of eligible work. Eligibility and funding for the mitigation at this site on this project will be subject to the compliance of all environmental laws, regulations, and executive orders applicable to the sites.

Prepared by: William Benoist, Mechanical Engineer and 406 HM Specialist, May 27, 2021

ESTIMATE OF WORK

ITEM	CODE	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
1		DI #222322 Upper Lake Dam (see attached)	1.00	LS	$350,961.73	$350,961.73
1		ULD Mitigation CEF (93%)	1.00	LS	$327,273.48	$327,273.48
2		DI #222319 Sanford Lake Dam (see attached)	1.00	LS	$4,024,590.44	$4,024,590.44
2		SD Mitigation CEF (93%)	1.00	LS	$2,553,471.80	$2,553,471.80

Total In-Kind Repair/Replacement Cost of Damaged Element(s)	$8,778,111.67	Total HMP Cost (Do Not Include in the PW)	$7,256,297.45
HMP Cost Effectiveness (% of Total Eligible Cost)	82.66%		
Eligibility	100% Rule		

TECHNICAL SPECIALIST FOR MITIGATION (SIGNATURE) William Benoist		Agency FEMA	Date 05/27/21
RECOMMENDED BY (SIGNATURE)	TITLE	Agency	Date
CONCURRENCE BY STATE INSPECTOR		Agency	Date
CONCURRENCE BY APPLICANT		Agency Boiling Spring Lakes	Date 6-1-21

NOTE: Signature by the Federal Inspector is not an approval of this work, and signature by the state and Local Representative is not a commitment to perform the work.

FEDERAL EMERGENCY MANAGEMENT AGENCY

HAZARD MITIGATION PROPOSAL (HMP) CONTINUATION

DISASTER	APPLICANT	PW REF NO.	FIPS NO.	CATEGORY
DR - 4393 NC	City of Boiling Springs Lakes	68141	019-06760-00	D

SCOPE OF WORK:

Notes:

1. McGill Associates performed the H&H analyses, which are described in the Preliminary Analysis Report (McGill, 2020)
2. Construction cost estimates for 222322, and 222319 are attached.
3. Spillway Capacity Chart (McGill)
4. The mitigation proposal estimates were generated using the Engineer's Opinion of Construction Cost for Sanford Dam. See attachment labeled *Copy of 2021-03-10 BSL 3 Schedules.xlsx Cost Estimate*
5. A Cost Estimating Format (CEF) has been created for this project, see attachment labeled *SP 68141 CEF DIs 222319 and 222322 only.*
6. All costs associated with this project have been validated, see attachment labeled *Sanford Dam FEMA Cost Estimate.xlsx, Upper Lake Dam FEMA Cost Estimate.xlsx, and SP 68141 FEMA-USACE Applicant Cost Validation - DIs 222319 and 222322 - with final CRC revs Feb 21.xlsx.*
7. The proposal mitigation description Information is mostly from the source of a design report provided by McGill Associates, P.A. and Schnabel Engineering South, P.C, which includes Hydrologic and Hydraulic (H&H) analyses and geotechnical/soil study, and based on a preliminary design drawing prepared by McGill Assoiciates, see attachment labeled68141 *DR4393 NC Design Report_Boiling Spring Lakes Dams BRUNS-001-002-003-012.pdf* and *BSL DR-4393 #68141Alternatives Drawings w Staging Areas.pdf*
8. Attachments for this HMP Scope of Work are located in Grants Manager.

DAM	Existing capacity to overtopping (no freeboard)		Design Storm capacity with freeboard			Capacity increase (cfs)
	Storm	Flow (cfs)	Storm	flow (cfs)	Freeboard (ft)	
Sanford Dam	100 - year	2025	0.5 PMP	5425	3.2	3400
North Lake Dam	10 - year	325	0.33 PMP	850.6	2.1	525.6
Upper Lake Dam	10 - year	333	0.33 PMP	941	1.2	608
Pine Lake Dam	0.33 pmp	316	0.33 PMP	316	3.3	0

TECHNICAL SPECIALIST FOR MITIGATION (SIGNATURE) William Benoist		Agency FEMA	Date 04/19/21
RECOMMENDED BY (SIGNATURE)	TITLE	Agency	Date
CONCURRENCE BY STATE INSPECTOR		Agency	Date
CONCURRENCE BY APPLICANT		Agency Boiling Spring Lakes	Date 6-1-21

NOTE: Signature by the Federal Inspector is not an approval of this work, and signature by the state and Local Representative is not a commitment to perform the work.

Engineer's 90% Opinion of Construction Cost
Sanford Dam (Improved Project)

Schedule of Work
Proposed Mitigation

Item	Bid Item Description	Estimated Quantity	Unit	Unit Price	Total
7	Replace Spillway, Demolition and Disposal of Existing Spillway Structure (2-20' reinforced walls @ 10 feet long and 2-20' reinforced walls @ 50 feet long)(SD-C-04-06)	120.00	LF	$ 50.73	$ 6,087.60
7	Replace Spillway, Demolition and Disposal of Existing Spillway Structure (2-6' reinforced walls @ 50 feet long and 1-5' wide x 6' reinforced wall @ 50 feet long)(SD-C-04-06)	350.00	LF	$ 15.27	$ 5,344.50
7	Replace Spillway, Demolition and Disposal of Existing Spillway Structure (1- 1 feet thick x 34 feet wide x 50 feet long slab)(SD-C-04-06)	3,400.00	SF	$ 0.86	$ 2,924.00
17	Replace Spillway, Cast-In-Place Reinforced Concrete, Walls (SD-S-02)	390.00	CY	$ 775.00	$ 302,250.00
18	Replace Spillway, Cast-In-Place Reinforced Concrete, Slabs (SD-S-02)	840.00	CY	$ 725.00	$ 609,000.00
19	Replace Spillway, Cast-In-Place Reinforced Mass Concrete, Slabs (SD-S-02)	970.00	CY	$ 725.00	$ 703,250.00
20	Replace Spillway, Cast-In-Place Reinforced Concrete, Culverts and Low Drain (SD-S-02)	545.00	CY	$ 775.00	$ 422,375.00
23	Replace Spillway, 4' wide x 4' long Low Drain Sluice Gate, frame and stem (SD-S-08)	1.00	EA	$ 45,400.00	$ 45,400.00
24	Replace Spillway, Walkway Grating (Aluminum)(SD-S-09)	44.00	SF	$ 28.75	$ 1,265.00
27	Chimney drain and blanket drain, Fine Drainfill (SD-B-23)	4,290.00	CY	$ 117.00	$ 501,930.00
28	Chimney drain and blanket drain, Coarse Drainfill (SD-B-23)	1,060.00	CY	$ 118.00	$ 125,080.00
31	Mixed-in-Place panels to prevent liquefaction during a seismic event (SD-B-20)	3,900.00	CY	$ 205.00	$ 799,500.00
33	Instrumentation to detect seepage and movement (SD-I-01-04)	1.00	Unit	$117,500.00	$ 117,500.00
34	Floating barrier system to prevent spillway clogging (SD-C-12)	350.00	LF	$ 385.71	$ 135,000.00
35	Riprap wave protection (SD-C-12), Class B	1,644.00	TN	$ 64.00	$ 105,216.00
36	Riprap wave protection (SD-C-12), Class 2	1,787.33	CY	$ 79.71	$ 142,468.34

DI # 222319 Mitigation Cost:	$ 4,024,590.44
CEF for Mitigation Cost:	$ 2,553,471.80
Mit cost including CEF:	$ 6,578,062.24

Engineer's Opinion of Construction Cost
Upper Lake Dam

Schedule of Work
Proposed Mitigation

Item	Bid Item Description	Estimated Quantity	Unit	Unit Price	Total	
7	Replace Spillway, Demolition and disposal of existing spillway structure (ULD-C-10-11) (2 - 36" pipes each @ 80 ft long w 6' risers)	172	LF	$ 28.84	$ 4,960.48	RSMeans G10202061830 and asbuilt drawings
20	Replace Spillway, Construction of an improved spillway components (ULD-S-01-12), Culverts and Low Drain	260	CY	$ 775.00	$201,500.00	Rhodes Pond bid tab
23	Replace Spillway, Low Drain Sluice Gate (ULD-S-07)	1	LS	$45,400.00	$ 45,400.00	Rhodes Pond bid tab
24	Replace Spillway, Grating (ULD-S-0	23	SF	$ 28.75	$ 661.25	RSMeans 05513100111
25	Replace Spillway, Low Drain Trash Rack (ULD-S-07)	1	LS	$ 7,000.00	$ 7,000.00	
27	Filter diaphragm for seepage control, Fine Drainfill (ULD-B-10)	50	CY	$ 117.00	$ 5,850.00	Rhodes Pond bid tab
28	Filter diaphragm for seepage control, Coarse Drainfill (ULD-B-10)	5	CY	$ 118.00	$ 590.00	Rhodes Pond bid tab
33	Instrumentation to detect seepage and movement (ULD-I-01)	1	LS	$ 4,000.00	$ 4,000.00	From previous job(s), supplier quotes, and RSMeans
34	Floating barrier system to prevent spillway clogging (ULD-C-11)	210	LF	$ 385.71	$ 81,000.00	Rhodes Pond bid tab

DI # 222322 Mitigation Cost:	$350,961.73
CEF for Mitigation Cost:	$327,273.48
Mit cost including CEF:	$678,235.21

FEDERAL EMERGENCY MANAGEMENT AGENCY

HAZARD MITIGATION PROPOSAL (HMP)

DISASTER	APPLICANT	EMMIE/Project #	FIPS NO.	CATEGORY
DR - 4393 NC	City of Boiling Springs Lakes	126563	019-06760-00	D

SCOPE OF WORK:

Title: Dam Breaches, North Lake, and Pine Lake **GPS Coordinates:** Latitude: 34.046867 , Longitude -78.037507
Damage Inventory: #222320 North Lake Dam, and #222321 Pine Lake Dam
Address: Public Works Department, 200 Alton Lennon Road, Boiling Spring Lakes, North Carolina 28461

(I) Damages Description & Dimensions (DDD):
The Boiling Spring Lakes (BSL) system consists of five lakes and associated earthen embankment dams. During Hurricane Florence in August 2018, this area received excessive rainfall which caused the North Lake Dam (NLD), and the Pine Lake Dam (PLD) to suffer a catastrophic failure due to overtopping and embankment erosion. This mitigation proposal is limited to the damages at NLD (DI#222320), and PLD (DI#222321). The spillways at the dams were severely undersized which caused the overtopping and eventual breach of all City dams.

The repair cost for NLD and PLD damages were assigned to project 78755, and project 126563. Project 78755 will supply funding for the road damages at the dam facilities, and project 126563 will supply funding for the damages to the earthen dams. The total repair cost will be the sum of damages on both projects because the damages occurred during the same storm event, and caused damages to the same facilities. Note that the applicant for project 78755 is NCDOT, and the applicant for project 126563 is the City of Boiling Springs Lakes.

Project Repair Cost for DI#222320 and DI#222321 =
NLD includes proj. 78755 and 126563 repair cost = total repair cost $423,215.94
PLD includes proj. 78755 and 126563 repair cost = total repair cost $1,938,985.20
Project Total repair cost = $2,362,201.14

(II) Hazard Mitigation Proposal (HMP) Scope of Work:
This mitigation proposal will remove the culverts from North Lake Dam and Pine Lake Dam that were installed after hurricane Florence. The NCDOT rebuilt the earthen embankment and upsized the drainage structure through the embankments as part of the repair for project 78755. This mitigation proposal for project 126563 will remove the larger culverts, headwalls, and wingwalls that were installed for project 78755 and replace them with box culverts and concrete walls that will allow the dams to control the water level for the lakes. At present, the larger drainage structure installed by NCDOT has eliminated the lakes on the upstream side of the dams. These culverts are too low to provide proper containment and proper function of the lake water level.

The proposed mitigation under DR-4393 #126563 which are DI #222320 – North Lake Dam and DI #222321 - Pine Lake Dam spillways that prevent overtopping and make the dams more resilient thereby avoiding dam failure should a similar event occur in the future. Below is a more detailed description of the proposed mitigation for each dam.

ESTIMATE OF WORK

ITEM	CODE	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
1		DI #222320 North Lake Dam (details attached)	1.00	LS	$378,664.00	$378,664.00
1		*Cost Estimate Format (CEF) funding	1.00	LS	$350,653.00	$350,653.00
2		DI #222321 Pine Lake Dam (details attached)	1.00	LS	$429,773.49	$429,773.49
2		*Cost Estimate Format (CEF) funding	1.00	LS	$389,479.51	$389,479.51

Total In-Kind Repair/Replacement Cost of Damaged Element(s)	$2,362,201.14	Total HMP Cost (Do Not Include in the PW)	$1,548,570.00
HMP Cost Effectiveness (% of Total Eligible Cost)	65.56%		
Eligibility	100% Rule		

TECHNICAL SPECIALIST FOR MITIGATION (SIGNATURE) William Benoist		Agency FEMA	Date 06/30/21
RECOMMENDED BY (SIGNATURE)	TITLE	Agency	Date
CONCURRENCE BY STATE INSPECTOR		Agency	Date
CONCURRENCE BY APPLICANT		Agency City of Boiling Spring Lakes	Date 07/02/21

NOTE: Signature by the Federal Inspector is not an approval of this work, and signature by the state and Local Representative is not a commitment to perform the work.

FEDERAL EMERGENCY MANAGEMENT AGENCY

HAZARD MITIGATION PROPOSAL (HMP) CONTINUATION

DISASTER	APPLICANT	PW REF NO.	FIPS NO.	CATEGORY
DR - 4393 NC	City of Boiling Springs Lakes	126563	019-06760-00	D

SCOPE OF WORK:

(III) continued

DI #222320 – North Lake Dam Mitigation

* Construction of an improved spillway including (NLD-S-01-13):
* Chimney drain and blanket drain for internal seepage control including (NLD-B-7)
* Floating barrier system to prevent spillway clogging (NLD-C-10)
* Riprap wave protection (NLD-C-10)

DI #222321 - Pine Lake Dam Mitigation

* Construction of an improved spillway components (PLD-S-01-13)
* Filter diaphragm for seepage control including (PLD-B-7)
* Floating barrier system to prevent spillway clogging (PLD-C-10)
* Riprap wave protection (PLD-C-10)

Mitigation cost for DI #222320 North Lake Dam (details attached) $378,664.00 plus CEF $350,653.00
Mitigation cost for DI #222321 Pine Lake Dam (details attached) $429,773.49 plus CEF $389,479.51
Total mitigation cost for Project 126563 = $1,548,570.00

(III) Hazard Mitigation Ratio (HMR):
HMR = (1,548,570.00/2,362,201.14) x 100 =65.56%

(IV) HMP Feasibility and Cost-Effectiveness: (100% rule - Appendix J)
This Hazard Mitigation proposal of **65.56%** is in accordance with Appendix J (100% rule) of the FEMA PA Program and Policy Guide - Mitigation Section and Appendix J – Section I. Drainage Structures; item A, B, C; - Section II. Transportation Facilities; items C, and D; - Section V. Water/Wastewater; item D. This Hazard Mitigation Proposal (HMP) is **65.56%** of the repair and restoration costs. This HMP is appropriate mitigation, it is technically feasible and is cost effective.

(V) Compliances and Assurances
This HMP is for estimating purposes only. If the site's final placement and configuration are different than the preliminary estimate, the Applicant should submit a change in scope request. This HMP is subject to further review prior to award. The Applicant is responsible for final design, placement, configuration, choice of contractors or vendors, permits and compliance with all regulatory codes and standards of the State of North Carolina. FEMA will pay only the incremental difference in cost between repairs and mitigation, and will not duplicate funding for repair or replacement of eligible work. Eligibility and funding for the mitigation at this site on this project will be subject to the compliance of all environmental laws, regulations, and executive orders applicable to the sites.

(VI) Notes:

1. McGill Associates performed the H&H analyses, which are described in the Preliminary Analysis Report (McGill, 2020)
2. Construction cost estimates for 222322, and 222319 are attached.
3. Spillway Capacity Chart (McGill)
4. The mitigation proposal estimates were generated using the Engineer's Opinion of Construction Cost for Sanford Dam. See attachment labeled *Copy of 2021-03-10 BSL 3 Schedules.xlsx Cost Estimate*
5. A Cost Estimating Format (CEF) has been created for this project, see attachment labeled *SP 68141 CEF DIs 222319 and 222322 only.*
6. All costs associated with this project have been validated, see attachment labeled *Sanford Dam FEMA Cost Estimate.xlsx, Upper Lake Dam FEMA Cost Estimate.xlsx, and SP 68141 FEMA-USACE Applicant Cost Validation - DIs 222319 and 222322 - with final CRC revs Feb 21.xlsx.*
7. The proposal mitigation description Information is mostly from the source of a design report provided by McGill Associates, P.A. and Schnabel Engineering South, P.C, which includes Hydrologic and Hydraulic (H&H) analyses and geotechnical/soil study, and based on a preliminary design drawing prepared by McGill Associates, see attachment labeled 68141 *DR4393 NC Design Report_Boiling Spring Lakes Dams BRUNS-001-002-003-012.pdf* and *BSL DR-4393 #68141Alternatives Drawings w Staging Areas.pdf*
8. Attachment files for this HMP Scope of Work are located in Grants Manager.

Prepared by: William Benoist, Mechanical Engineer and 406 HM Specialist, June 30, 2021

TECHNICAL SPECIALIST FOR MITIGATION (SIGNATURE) William Benoist		Agency FEMA	Date 06/30/21
RECOMMENDED BY (SIGNATURE)	TITLE	Agency	Date
CONCURRENCE BY STATE INSPECTOR		Agency	Date
CONCURRENCE BY APPLICANT		Agency City of Boiling Spring Lakes	Date 07/02/21

NOTE: Signature by the Federal Inspector is not an approval of this work, and signature by the state and Local Representative is not a commitment to perform the work.

Engineer's 90% Opinion of Construction Cost
North Lake Dam (mitigation)

Schedule of Work
Proposed Mitigation

Item	Bid Item Description	Est Qty	Unit	Unit Price	Total
17	Replace spillway, Cast-In-Place Reinforced Concrete, Weir Walls (NLD-S-1-13)	145.00	CY	$ 775.00	$112,375.00
20	Replace spillway, Cast-In-Place Reinforced Concrete, Culverts and low drain (NLD-S-1-13)	160.00	CY	$ 775.00	$124,000.00
23	Replace Spillway, 18" wide x 18" tall Low Drain Sluice Gate, frame and stem (NLD-S-8)	1.00	EA	$ 9,994.00	$ 9,994.00
24	Replace Spillway, Walkway Grating (Aluminum)(NLD-S-09)	16.00	SF	$ 28.75	$ 460.00
25	Replace Spillway, Low Drain Trash Rack (welded steel grate) (NLD-S-08)	4.50	SF	$ 14.29	$ 64.31
26	Replace spillway, Railing (NLD-S-13)	18.00	LF	$ 72.84	$ 1,311.12
27	Chimney drain and blanket drain, Fine Drainfill (NLD-B-7)	130.00	CY	$ 117.00	$ 15,210.00
28	Chimney drain and blanket drain, Coarse Drainfill (NLD-B-7)	10.00	CY	$ 118.00	$ 1,180.00
34	Floating barrier system to prevent spillway clogging (NLD-C-10)	200.00	LF	$ 350.00	$ 70,000.00
35	Slope Protection, Riprap, Class B (NLD-B-04&G-13)	429.01	CY	$ 79.71	$ 34,196.57
39	Slope Protection, Geotextile (Riprap) (NLD-B-04&G-13)	838.00	SY	$ 1.13	$ 946.94
40	Slope Protection, Riprap Bedding, #57 Washed Stone (NLD-B-04&G-13)	120.99	CY	$ 44.42	$ 5,374.27
51	Replace Spillway, Chain Link Fence (NLD-S-13)	129.00	LF	$ 27.54	$ 3,552.66

DI # 222320 Mitigation Cost $378,664.87

Engineer's 90% Opinion of Construction Cost
Pine Lake Dam

Schedule of Work
Proposed Mitigation

Item	Bid Item Description	Est Qty	Unit	Unit Price	Total
17	Replace spillway, Cast-In-Place Reinforced Concrete, Weir Walls (PLD-S-1-13)	85	CY	$ 775.00	$ 65,875.00
18	Replace spillway, Cast-In-Place Reinforced Concrete, inlet box Slabs (PLD-S-1-13)	180	CY	$ 750.00	$135,000.00
20	Replace spillway, Cast-In-Place Reinforced Concrete, Culverts and low drain (PLD-S-1-13) .	120	CY	$ 775.00	$ 93,000.00
23	Replace Spillway, 18" wide x 18" tall Low Drain Sluice Gate, frame and stem (PLD-S-8)	1	EA	$ 9,994.00	$ 9,994.00
24	Replace Spillway, Walkway Grating (Aluminum)(PLD-S-10)	13	SF	$ 28.75	$ 373.75
25	Replace Spillway, Low Drain Trash Rack (welded steel grate) (PLD-S-08)	5	SF	$ 14.29	$ 64.31
26	Replace spillway, Railing (PLD-S-13)	17	LF	$ 72.84	$ 1,238.28
27	Chimney drain and blanket drain, Fine Drainfill (PLD-B-07)	100	CY	$ 117.00	$ 11,700.00
28	Chimney drain and blanket drain, Coarse Drainfill (PLD-B-07)	10	CY	$ 118.00	$ 1,180.00
33	Instrumentation to detect seepage and movement (PLD-I-01)		LS	$ 4,000.00	$ -
34	Floating barrier system to prevent spillway clogging (PLD-C-10)	160	LF	$ 350.00	$ 56,000.00
35	Slope Protection, Riprap, Class B (PLD-B-04&G-13)	568	CY	$ 79.71	$ 45,242.81
39	Slope Protection, Geotextile (Riprap) (PLD-B-04&G-13)	1,003	SY	$ 1.13	$ 1,133.39
40	Slope Protection, Riprap Bedding, #57 Washed Stone (PLD-B-04&G-13)	144	CY	$ 44.42	$ 6,410.74
51	Replace Spillway, Chain Link Fence (PLD-S-13)	93	LF	$ 27.54	$ 2,561.22

DI # 222321 Mitigation Cost $429,773.49