Condition Survey Report (2011)
Springbank Dam

Prepared by:

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Revision Log

Revision #	Revised By	Date	Issue / Revision Description
0	GPM	January 27, 2012	Draft Condition Survey Report
1	GPM	June 1, 2012	Final Condition Survey Report

AECOM Signatures

Report Prepared By:

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Structural Engineer

Report Reviewed By:

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Senior Structural Engineer

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1. Introduction

The Springbank Dam is located in the City of London on the Thames River. Originally constructed in 1929, the dam was rehabilitated in 2008, including installation of new hydraulic gates. The dam consists of four gated bays, with spans of 14.94 m each. Earth fill embankments and retaining walls are located on both ends of the structure. The dam controls a total drainage area of 3,097 km^2. The structure has an overall clear span of 65.23 m.

This report summarizes the condition survey carried out at Springbank Dam, which was undertaken in November 1st and 2nd, 2011. Visual investigations above the water were carried out by AECOM, while the underwater investigation and depth soundings were completed by Watech Services.

A general overview photograph of Springbank Dam is provided in Figure 1 below. The photograph was taken downstream of the dam.

Figure 1 – General Overview of the Springbank Dam

2. Location of Structure

Springbank Dam is located on Thames River in the southwest end of the City of London. A key map is shown in Figure 2. An aerial view of the dam area is provided in Figure 3.

Figure 2 – Key Map

Figure 3 – Aerial View of Dam

3. Methodology

3.1 General

Inspection Team:	John Pucchio, P.Eng	Inspection Coordinator
	Gavan McDonald, P.Eng	Structural Engineer
	Sam Mansor, E.I.T	Structural Engineer-in-Training
	Watech Services Inc.	3-person Diving Crew
Inspection Dates:	November 1st & 2nd, 2011	
Weather:	Overcast with sunny breaks 6° C (Nov. 1), 11 ° C (Nov. 2)	
Water Flow:	Medium	
Water Clarity:	Poor	

The areas and locations of patches, spalls, delaminations, exposed reinforcing steel, honeycombing, wetness, scaling, cracking and other visually observed concrete defects were recorded. The surface deterioration survey was conducted on exposed concrete surfaces. The condition of underwater surfaces was completed tactual and visual means, where possible. Observations of non-structural elements that affect the overall site safety were obtained including material condition and performance of embankments, miscellaneous retaining structures, railing systems (off the dam), etc.

Soundings to establish sediment depths were completed on the upstream and downstream sides of the dam. They were obtained by survey rod and boat access. The relative elevation of water to the structure was dimensioned to established actual elevations of the sediment as required.

In addition to personal safety equipment (boots, hard hat and safety vests), the tools utilized for the survey included measuring tape (long and short), hammers, cameras, screwdriver, boats, aluminum ladder, binoculars, flashlights, crack gauges, note pads, clip boards, and marking chalk.

Standardized inspection forms have been developed for the current and future inspections. The inspection forms include a general information sheet and detailed conditional data for each element. The condition rating system is further discussed in the following section.

3.2 Rating System

A condition rating system similar to the Ministry of Transportation's (MTO) Ontario Structural Inspection Manual (OSIM) was utilized for the various structural elements. This approach will provide a good baseline of condition information that is repeatable and comparable for future investigations.

Similar to OSIM requirements, the estimated quantity (percentages) for each structure element was entered for the appropriate condition state (e.g., poor, fair, and good). Where applicable, a percentage was allotted to one or more

condition stages for each element (for example, 70% may register as a 'fair' rating and 30% may register as a 'poor' rating).

The rating system adopted for this investigation and associated descriptive component conditions are summarized below in Table 1.

Table 1: Rating System

RATING	DESCRIPTION OF COMPONENT CONDITION
Good	• Condition is similar to new condition. • Initial signs of surface defects may be visible. • No repairs are required for the foreseeable future.
Fair	• Element condition is acceptable and is generally functioning as intended. • Surface defects are visible. • Rehabilitation should be considered. • Ideal time to schedule repairs from an economic perspective.
Poor	• Severe and possibly numerous surface defects are visible. • Some presence of distress or deterioration may be evident. • Element may not be functioning as intended. • A high priority should be placed on rehabilitation or replacement. • The component may require continued observation until work is completed. • In some cases, the component may compromise safety.

4. Summary of Condition

4.1 General

The standardized inspection forms for Springbank Dam are found in Appendix A and photographs from the inspection are included in Appendix B. Drawings are provided in Appendix C. Drawing S1 shows the general layout of the dam structure. Where appropriate, similar element labels were used as per previous inspections. Drawing S2 and S3 show the depth sounds for the upstream and downstream sides of the dam, respectively. Drawings S4 to S10 illustrate the observed surface deflects. Appendix C contains an interpreted contour map of the river bottom (upstream and downstream) generated from the sounding points.

Although Watech's observations were incorporated in our forms and drawings, a copy of their report is provided in Appendix D.

The following table summarizes the general condition findings of Springbank Dam

Table 2: Condition Summary

GROUP	ELEMENT	Condition
Abutments and Wingwalls	Abutments	FAIR condition, with localized areas of POOR condition ➢ Poor condition noted due to very wide horizontal cracking near top of north abutment and concrete disintegration
	Wingwalls	FAIR condition
Piers	Piers	FAIR condition, with localized areas of POOR condition ➢ Poor condition noted due to localized severe concrete disintegration
Gains	Stop Log Gains	FAIR Condition with localized areas of POOR condition ➢ Coating system in poor condition ➢ Stop log gains no longer in service
Spillways and Stilling Basin	Stilling Basin	FAIR to GOOD condition
Bridge (Dam)	Wearing Surface	FAIR condition
	Slab (thin)	FAIR to GOOD condition
	Girders	FAIR to POOR condition of concrete encasement. Limited inspection of encased steel girders. ➢ Poor condition noted due to numerous wide cracks with severe efflorescence staining
	Expansion Joints	FAIR to POOR condition ➢ Poor condition noted due to deterioration of seal, and vegetation protruding through seal
	Railings Systems	GOOD condition

Waterways and Embankments	Waterways Retaining Walls	GOOD condition FAIR condition with areas of POOR condition ➢ Poor condition noted due to washout of fill material between blocks, resulting in fill depression at top of wall (north wall).

In general terms, Springbank Dam was considered to be in FAIR condition.

4.2 Limited Inspections

Limited inspection of the underwater elements due to poor visibility.

4.3 Sediment Samples

The most recent Dam Safety Assessment was completed in 2002 by Hatch Energy (formerly Acres International). A classification of LOW incremental hazard potential (IHP) was assigned to Springbank Dam.

In accordance with the (draft) Ontario Dam Inspection Guidelines, the minimum frequency for surveillance inspections is provided in Table 3.

Table 3: Frequency of Surveillance Inspections

Item	Frequency of Surveillance Inspections for Low IHP
Dam Safety Review [(a)]	Every 10 years
Routine Visual Inspection [(b)]	Annually
Scheduled Inspection [(c)]	Every 5 years
Special Inspection [(d)]	As required
Instrumentation	As per OMS Manual
Test Operations: Outlet Gates and other Mechanical Components	Annually

Notes:

(a) A Dam Safety Review (DSR) involves a review of available dam records (design and construction), field inspection and other detailed investigations. After the original review, dams with Very Low and Low Hazard Potential would be subject to a DSR every 10 years to determine whether a change in the IHP is warranted. Formal inundation studies may not be required.

(b) Frequency of the Routine Visual Inspection may be selected to suit seasonal restraints, and dam and site conditions. Routine Visual Inspections may be carried out by dam operating staff with knowledge of the structure (with training in visual inspections suggested). Documentation may be in the form of checklists. Monitoring programs and readings (movements, etc) that have been previously implemented should be measured at this time.

(c) Scheduled Inspections are intended to be thorough inspections performed by appropriate representatives of the Owner. Inspections should be carried out by Certified Engineering Technologists and/or Engineers with experience in dam inspections. Where dams are classified with an IHP higher than “Low”, the inspection should be undertaken by a Professional Engineer.

(d) Special inspections are completed following potentially damaging events (including earthquakes, significant floods, windstorms, etc).

4.4 Sediment Survey

Watercourse profile surveys undertaken during the inspection indicate no sediment build up on the downstream stilling basin slab, however three large rocks and some sand accumulation was noted at the stilling basin weir. Localized sand and stone deposits were noted upstream and downstream of the dam.

Appendix A

Inspection Forms

Upper Thames River Conservation Authority

Inventory Data:

Dam Name	Springbank Dam		
River Name	Thames River		
Structure Location	Southwest London		
Latitude	42.960451	Longitude	-81.325395
Dam Type	4-bay, hydraulic gate		
Watershed	North Thames River Watershed	Drainage Area	3,097 km^2
No. of Sluiceways	Four		
Dam Height	9.9 m (Top of deck to top of sill slab at upstream end. Note: sill elevation varies)		
Total Deck Length	68.580 (m)		
Deck Width	5.56 (m)		
Total Deck Area	381.3 (sq.m)	Direc. of Struc.	N-S
Clear Span Lengths	4 - 14.935 m spans (clear spans)		

Historical Data:

Year Built	1929		
Last Underwater Inspection		Last BridgeMaster Inspection	
Last Structural Inspection		Last Safety Assessment	2007

Inspection:

Inspection date:	November 1st and 2nd, 2011	
Weather:	Overcast with sunny breaks, 6 degrees C (Nov 1) and 11 degrees C (Nov 2)	
Water flow:	Medium	
Water clarity :	Poor	
Inspection team:		
	John Pucchio, P. Eng	Inspection Coordinator
	Gavan McDonald, P. Eng	Structural Engineer
	Sam Mansor, E.I.T	Structural E.I.T
	Watech Services Inc.	3-person Diving Crew

Springbank Dam

Field Inspection Information:		
Element:	Abutments	
Description:	Abutment Wall	
Location:	North abutment	
Material:	Concrete	
Condition:	40	% Good
	58	% Fair
	2	% Poor

Comments:
Generally fair to good condition with localized areas of poor condition. Numerous narrow to medium cracks, some with efflorescence staining. Poor condition noted due to one very wide (approx. 10 mm) horizontal crack near the top of the abutment, for the full length of the abutment wall. Severe concrete disintegration at the top of the upstream end of the pier. Medium to severe corrosion of the upstream steel armor angle with section loss noted. Newer steel plate covering at downstream end of pier (part of newer gate assembly) in good condition.

Performance Deficiencies: -

Recommended Work: - Concrete patch repair

Timing: 5-10 years

Special access recommend: No **Limited Inspection:** No

Field Inspection Information:		
Element:	Abutments	
Description:	Abutment Wall	
Location:	South abutment	
Material:	Concrete	
Condition:	40	% Good
	60	% Fair
	0	% Poor

Comments:
Generally in fair to good condition. Narrow to medium cracking with hairline cracking noted throughout. Medium corrosion of the upstream armor angle with section loss. Light spall noted underwater at the upstream end. Newer steel plate covering at downstream end of pier (part of newer gate assembly) in good condition.

Performance Deficiencies:

Recommended Work: - Concrete patch repair

Timing: 5-10 years

Special access recommend: No **Limited Inspection:** No

Field Inspection Information:		
Element:	Stop Log Gains	
Description:	Stop Log Gains	
Location:		
Material:	Steel	
Condition:	0	% Good
	100	% Fair
	0	% Poor

Comments:
Gains no longer functional following gate replacement in 2007/2008. Light to medium corrosion of remaining portions of steel gains, and loss of coating system.

Performance Deficiencies: -

Recommended Work: -

Timing: None

Special access recommend: No **Limited Inspection:** No

Springbank Dam

Field Inspection Information:		
Element:	Piers	
Description:	Pier 3	
Location:	South Pier	
Material:	Concrete	
Condition:	30	% Good
	70	% Fair
	0	% Poor

Comments:

Generally in fair to good condition. Narrow to medium cracking with efflorescence and wetness staining. Hairline cracking throughout. Light spall and corrosion/efflorescence staining at downstream end of pier. Light to medium spalling at/below the waterline at upstream end of pier. Medium to severe corrosion of upstream end armor angle with section loss.

Performance Deficiencies:

Recommended Work: - Concrete patch repair **Timing:** 5-10 years

Special access recommend: No **Limited Inspection:** No

Field Inspection Information:		
Element:	Piers	
Description:	Pier 2	
Location:	Centre Pier	
Material:	Concrete	
Condition:	30	% Good
	70	% Fair
	0	% Poor

Comments:

Generally in fair to good condition. Narrow to medium cracking, with efflorescence and wetness staining. Hairline cracking noted throughout. Medium spall and delaminations at the top of the upstream end of pier. A 300 mm long section of armor angle is missing below the water line at the upstream end of the pier. A medium spall is located at the missing section of angle. Medium corrosion of the upstream armor angle with section loss.

Performance Deficiencies:

Recommended Work: - Concrete patch repair **Timing:** 5-10 years

Special access recommend: No **Limited Inspection:** No

Field Inspection Information:		
Element:	Piers	
Description:	Pier 1	
Location:	North Pier	
Material:	Concrete	
Condition:	30	% Good
	69	% Fair
	1	% Poor

Comments:

Generally in fair to good condition. Narrow to medium cracking, with efflorescence and wetness staining. Hairline cracking noted throughout. Localized light to medium spall with exposed rebar. Poor condition noted due to severe disintegration at the top of the upstream end of the pier. Light spall noted below the waterline at the upstream end. Medium corrosion of the upstream armor angle with section loss.

Performance Deficiencies:

Recommended Work: - Concrete patch repair **Timing:** 5-10 years

Special access recommend: No **Limited Inspection:** No

Springbank Dam

Field Inspection Information:		
Element:	Wearing Surface	
Description:	Deck Surface	
Location:		
Material:	Concrete	
Condition:	40	% Good
	60	% Fair
	0	% Poor

Comments:
Generally in fair to good condition. Numerous narrow to wide cracks and previous concrete patches. Several light concrete spalls and delaminations. Areas of water pooling on the deck.

Performance Deficiencies:

Recommended Work: - Concrete patch repair **Timing:** 5-10 years

Special access recommend: No **Limited Inspection:** No

Field Inspection Information:		
Element:	Girders	
Description:	Steel girders encased in concrete	
Location:	East and West sides (2 girders)	
Material:	Concrete / steel	
Condition:	0	% Good
	75	% Fair
	25	% Poor

Comments:
Concrete generally in fair to poor condition (steel girders not visible). Narrow to wide cracking with efflorescence staining throughout. Hairline to narrow cracking with wetness staining throughout. Couple medium to severe spalls at east fascia above pier locations. Numerous light to severe spalls at west fascia. Numerous light to medium spalls at underside of girders with exposed wire mesh reinforcing. Old steel brackets (no longer in use) with medium corrosion attached to the west fascia. Locations of previously removed concrete was noted on the fascia over the north and south abutments. It appeared that the purpose of the removals was to accommodate the newer hydraulic gates.

Performance Deficiencies:

Recommended Work: - Concrete patch repair **Timing:** 5-10 years

Special access recommend: No **Limited Inspection:** No

Field Inspection Information:		
Element:	Slab (thin)	
Description:	Soffit	
Location:	North, South, and 2 centre bays	
Material:	Concrete	
Condition:	50	% Good
	50	% Fair
	0	% Poor

Comments:
Generally in fair to good condition. Severe concrete spall at previous patch location at the south span. Hairline to narrow cracking with wetness staining throughout.

Performance Deficiencies:

Recommended Work: - Concrete patch repair **Timing:** 5-10 years

Special access recommend: No **Limited Inspection:** No

Springbank Dam

Field Inspection Information:				
Element:	Expansion Joints			
Description:	Deck expansion joint seals			
Location:	Deck surface			
Material:	Joint sealant			
Condition:	0	% Good		
	70	% Fair		
	30	% Poor		
Comments:				
Generally fair to poor condition. Vegetation growing through seal in multiple locations.				
Performance Deficiencies:				
Recommended Work:	- Installation of expansion joint seals		**Timing:**	5-10 years
Special access recommend:	No		**Limited Inspection:**	No

Field Inspection Information:				
Element:	Barrier/Railing System			
Description:	Metal pedestrian deck railing			
Location:	East and west sides			
Material:	Steel			
Condition:	100	% Good		
	0	% Fair		
	0	% Poor		
Comments:				
Newer galvanized steel railing in good condition.				
Performance Deficiencies:	-			
Recommended Work:	-		**Timing:**	None
Special access recommend:	No		**Limited Inspection:**	No

Field Inspection Information:				
Element:	Wingwalls			
Description:	Northwest wingwall			
Location:	Northwest corner			
Material:	Concrete			
Condition:	100	% Good		
	0	% Fair		
	0	% Poor		
Comments:				
Newer cast in place concrete wingwall at northwest corner in good condition.				
Performance Deficiencies:	-			
Recommended Work:	-		**Timing:**	None
Special access recommend:	No		**Limited Inspection:**	No

Springbank Dam

Field Inspection Information:				
Element:	Wingwalls			
Description:	Southwest wingwall			
Location:	Southwest corner			
Material:	Concrete			
Condition:	30	% Good		
	70	% Fair		
	0	% Poor		
Comments:	Generally in fair to good condition. Numerous narrow to medium cracks with severe efflorescence staining. Hairline cracking throughout. Top of wingwall previously reconstructed. Newer Galvanized railing on top of wingwall in good condition.			
Performance Deficiencies:	-			
Recommended Work:	-		**Timing:**	None
Special access recommend:	No		**Limited Inspection:**	No

Field Inspection Information:				
Element:	Retaining Walls			
Description:	Sheet pile retaining wall			
Location:	Southeast embankment adjacent structure			
Material:	Steel			
Condition:	0	% Good		
	100	% Fair		
	0	% Poor		
Comments:	Generally fair condition. Medium corrosion throughout with section loss noted. Corrosion of bolt heads for tie backs noted. Limited inspection of tie backs.			
Performance Deficiencies:	Corrosion staining			
Recommended Work:	- Engineering study to inspect condition of steel sheet retaining wall - Replacement of waler bolts abd reinforcement of tie rod connections		**Timing:**	1-5 years
Special access recommend:	No		**Limited Inspection:**	Yes

Field Inspection Information:				
Element:	Retaining Walls			
Description:	Precast block retaining wall			
Location:	Northwest and Northeast embankments adjacent structure			
Material:	Concrete			
Condition:	0	% Good		
	97	% Fair		
	3	% Poor		
Comments:	Generally in fair condition. Noted vegetation growing between precast block units throughout. Washout of fill material noted with settlement of fill material at the top of the retaining walls. Medium to severe spall at the upstream side at/below the waterline with exposed rebar.			
Performance Deficiencies:	- Leakage / seepage - Vegetation growth			
Recommended Work:	- Erosion control - Remove vegetation on surface of retaining wall - Install French drain		**Timing:**	1-5 years
Special access recommend:	No		**Limited Inspection:**	Yes

Springbank Dam

Field Inspection Information:		
Element:	Stilling Basin (downstream)	
Description:	Sill, slab on grade	
Location:	Below dam, extending downstream	
Material:	Concrete	
Condition:	70	% Good
	30	% Fair
	0	% Poor

Comments:
Generally in fair to good condition. As noted in the underwater inspection, one area of severe concrete spalling/erosion (approx. 1.5 m long) on the sill at the downstream end of the southernmost pier. Limited inspection due to poor visibility under water.

Performance Deficiencies: -

Recommended Work: - **Timing:** None

Special access recommend: No **Limited Inspection:** Yes

Field Inspection Information:		
Element:	Baffle Wall	
Description:	Baffle blocks	
Location:	Top of sill	
Material:	Concrete	
Condition:	100	% Good
	0	% Fair
	0	% Poor

Comments:
Newer baffle blocks, part of 2007/2008 rehabilitation. No deficiencies noted during the underwater inspection. Limited inpsection due to poor visibility under water.

Performance Deficiencies: -

Recommended Work: - **Timing:** None

Special access recommend: No **Limited Inspection:** Yes

Field Inspection Information:		
Element:	Coating Systems	
Description:	Stop log gains	
Location:	Downstream end of piers/abutments	
Material:	Paint coating	
Condition:	0	% Good
	0	% Fair
	100	% Poor

Comments:
Coating system in poor condition. Total loss of coating. Stop log gains no longer functional.

Performance Deficiencies: -

Recommended Work: - **Timing:** None

Special access recommend: No **Limited Inspection:** No

Springbank Dam

Field Inspection Information:				
Element:	Waterways			
Description:				
Location:	Thames River			
Material:				
Condition:	100	% Good		
	0	% Fair		
	0	% Poor		
Comments:				
Waterway generally in good condition.				
Performance Deficiencies:	-			
Recommended Work:	-			**Timing:**
				None
Special access recommend:	No		**Limited Inspection:**	No

Field Inspection Information:				
Element:				
Description:				
Location:				
Material:				
Condition:		% Good		
		% Fair		
		% Poor		
Comments:				
Performance Deficiencies:				
Recommended Work:				**Timing:**
Special access recommend:			**Limited Inspection:**	

Field Inspection Information:				
Element:				
Description:				
Location:				
Material:				
Condition:		% Good		
		% Fair		
		% Poor		
Comments:				
Performance Deficiencies:				
Recommended Work:				**Timing:**
Special access recommend:			**Limited Inspection:**	

Appendix B

Site Photographs

Photo 1 – Upstream of dam

Photo 2 – Downstream of dam

Photo 3 – Looking upstream of the dam

Photo 4 – Looking downstream of the dam

Photo 5 – Deck, looking north

Photo 6 – Spalling at deck joints

Photo 7 – Vegetation growth in the expansion joint sealant

Photo 8 – Soffit of south span

Photo 9 – Close-up of spalling at south span

Photo 10 – Soffit of 2nd span from south end

Photo 11 – Soffit of 2nd span from north end

Photo 12 – Soffit of north span

Photo 13 – Northeast retaining wall

Photo 14 – Southeast steel sheet piling retaining wall

Photo 15 – Northwest retaining wall

Photo 16 – Southwest wingwall

Photo 17 – Upstream piers, looking north

Photo 18 – Upstream piers, looking south

Photo 19 – Downstream piers, looking north

Photo 20 - Downstream piers, looking south

Photo 21 – Typical pier condition, south elevation of south pier

Photo 22 – Severe scaling top of north pier, upstream side

Photo 23 – East side of deck, looking north

Photo 24 – West side of deck, looking north

Photo 25 – Erosion behind northwest retaining wall

Photo 26 – Erosion behind northwest retaining wall

Photo 27 – Erosion behind northeast retaining wall

Photo 28 – Vertical surface of southeast retaining wall

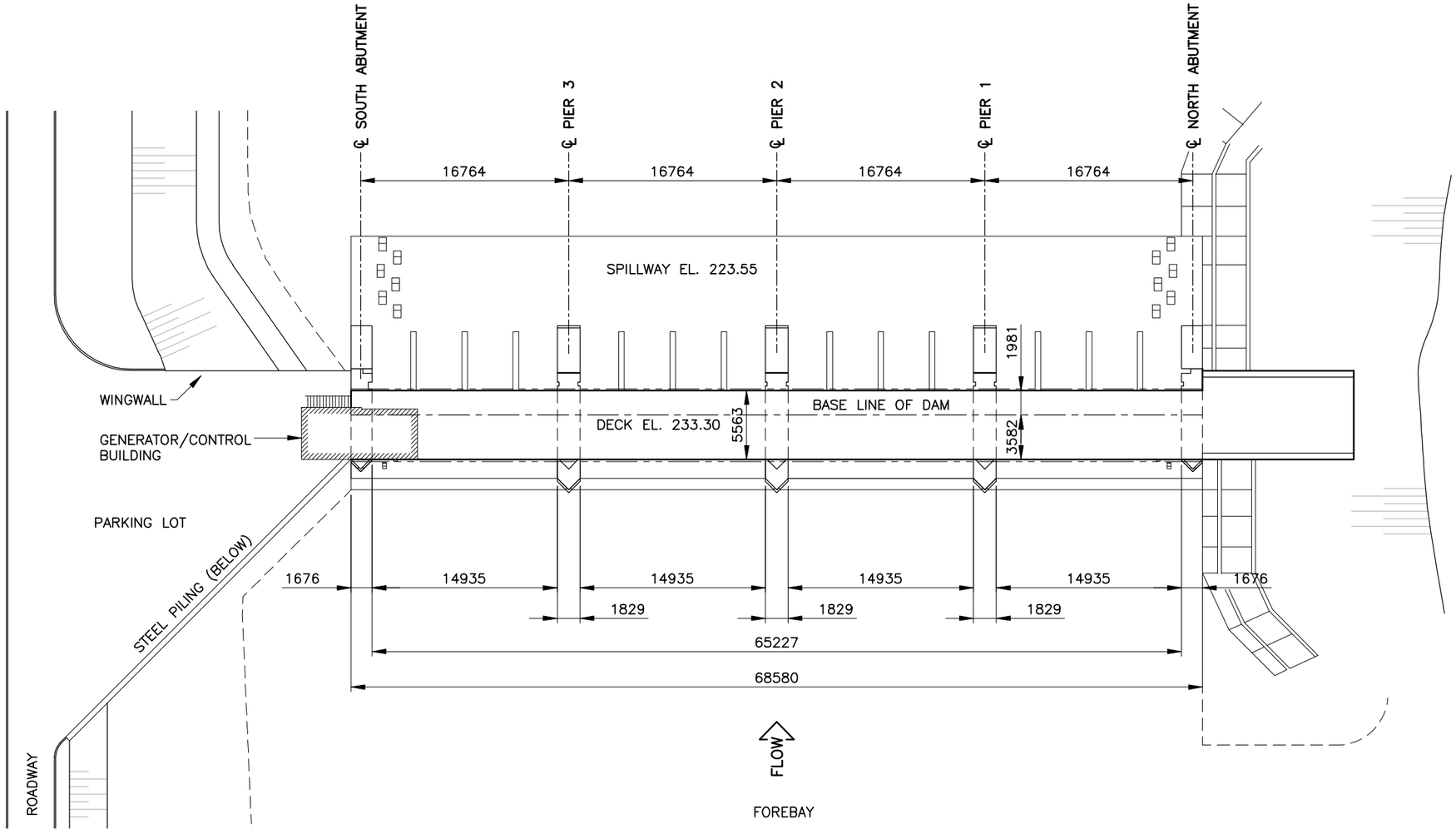
Photo 29 – Severe flaking of southeast retaining wall

Photo 30 – Southwest embankment

Appendix C

Drawings

REFERENCE NORTH



GENERAL NOTES :

1. DRAWINGS REPRODUCED FROM EXISTING DRAWINGS BY ACRES INTERNATIONAL, DATED JUNE 2007.
2. ELEVATIONS AND DIMENSIONS TAKEN FROM EXISTING DRAWINGS.
3. UNDERWATER INSPECTION CONDUCTED BY WATECH SERVICES INC., NOVEMBER 2011.

LEGEND :

- M — MEDIUM CRACK
- W — WIDE CRACK
- M — MEDIUM STAINED CRACK
- W — WIDE STAINED CRACK
- LIGHT SCALING
- MEDIUM SCALING
- SEVERE SCALING
- VERY SEVERE SCALING
- SURFACE RUST STAINS
- EXPOSED REINFORCING STEEL
- DELAMINATIONS
- SPALLS
- PATCHED SPALLS
- HONEYCOMBED AREAS
- WET AREAS

GENERAL LAYOUT PLAN

UPPER THAMES RIVER CONSERVATION AUTHORITY

AECOM
London, Ontario 519.673.0510

SPRINGBANK DAM

CONDITION SURVEY REPORT
GENERAL LAYOUT PLAN

DATE:	SCALE:	DWG NO.
MAY 2012	1 : 400	S1

DRAWING FILE: P:\60225568\000-CADD\Springbank Dam\SPRINGBANK-S1
DATE: 6/1/2012 11:14:35 AM

DOWNSTREAM PLAN

NOTE:
1. WATER LEVEL AT THE TIME OF THE SURVEY: ELEVATION 224.750 NOVEMBER 2011. (WATECH SERVICES)

LEGEND:
223.00 ● SOUNDINGS IN METERS

UPPER THAMES RIVER CONSERVATION AUTHORITY

AECOM
London, Ontario 519.673.0510

SPRINGBANK DAM

CONDITION SURVEY REPORT
DOWNSTREAM SOUNDINGS

DATE:	SCALE:	DWG NO.
MAY 2012	1 : 200	S2

DRAWING FILE: P:\60225556\000-CADD\Springbank Dam\SPRINGBANK-S2
DATE: 6/1/2012 11:14:53 AM

REFERENCE NORTH

GENERATOR/CONTROL BUILDING

℄ PIER 3

T/DECK EL. 233.30

℄ PIER 2

℄ PIER 1

222.95	222.95	222.95	222.65	223.35	222.95	223.35	223.85	
223.25	222.65	222.95	223.05	223.35	223.25	223.55	223.95	223.85
222.95	222.95	222.95	222.65	223.35	222.95	223.35	223.35	223.85
222.65	223.05	223.55	223.55	223.55	223.55	223.55	223.55	223.85

5000 (TYP.)

FLOW

FOREBAY

THAMES RIVER

UPSTREAM PLAN

NOTE:
1. WATER LEVEL AT THE TIME OF THE SURVEY: ELEVATION 224.750 NOVEMBER 2011. (WATECH SERVICES)

LEGEND:
223.00 ● SOUNDINGS IN METERS

UPPER THAMES RIVER CONSERVATION AUTHORITY

AECOM London, Ontario 519.673.0510

SPRINGBANK DAM

CONDITION SURVEY REPORT
UPSTREAM SOUNDINGS

DATE:	SCALE:	DWG NO.
MAY 2012	1 : 200	S3

DRAWING FILE: P:\60225556\000-CADD\Springbank Dam\SPRINGBANK-S3
DATE: 6/1/2012 11:15:14 AM

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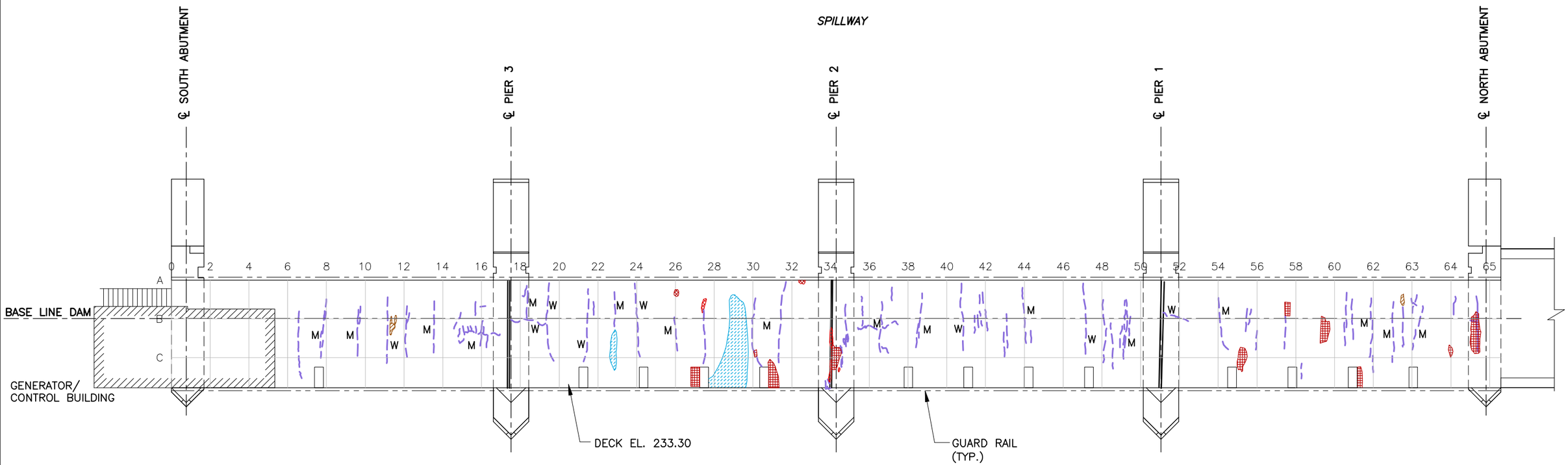

DECK PLAN

UPPER THAMES RIVER CONSERVATION AUTHORITY

AECOM
London, Ontario 519.673.0510

SPRINGBANK DAM

CONDITION SURVEY REPORT
DECK PLAN

DATE:	SCALE:	DWG NO.
MAY 2012	1 : 200	S4

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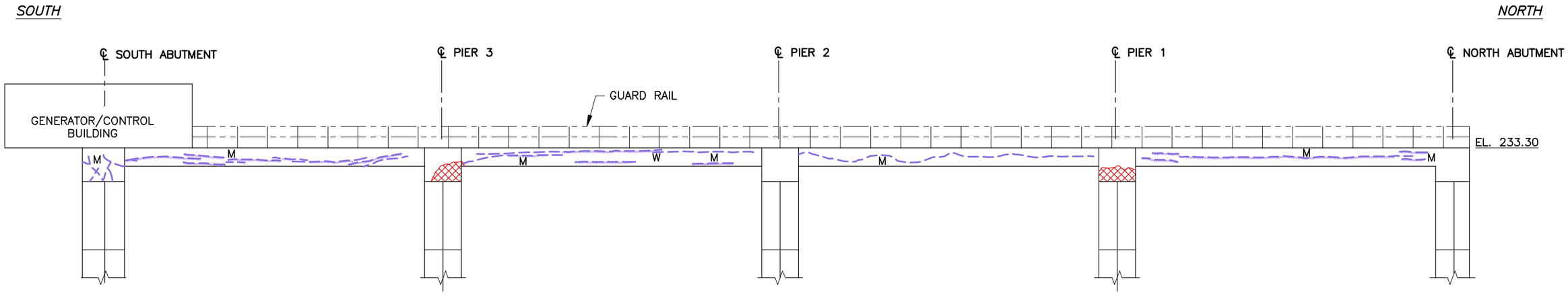
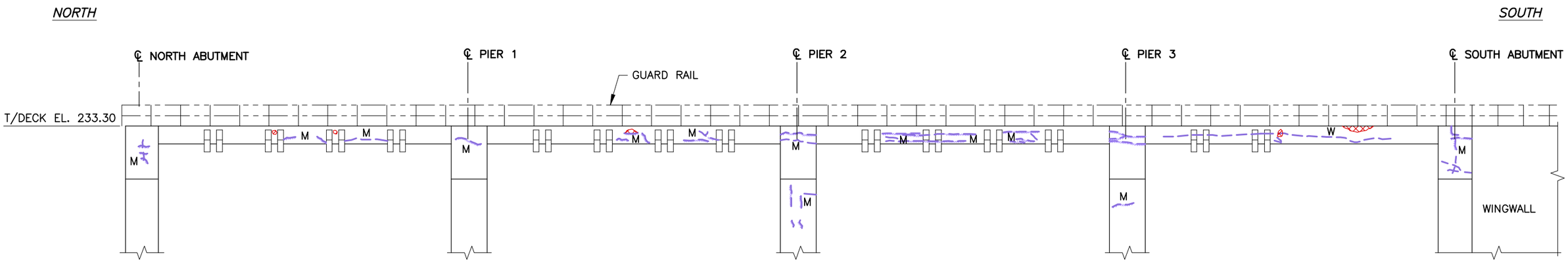
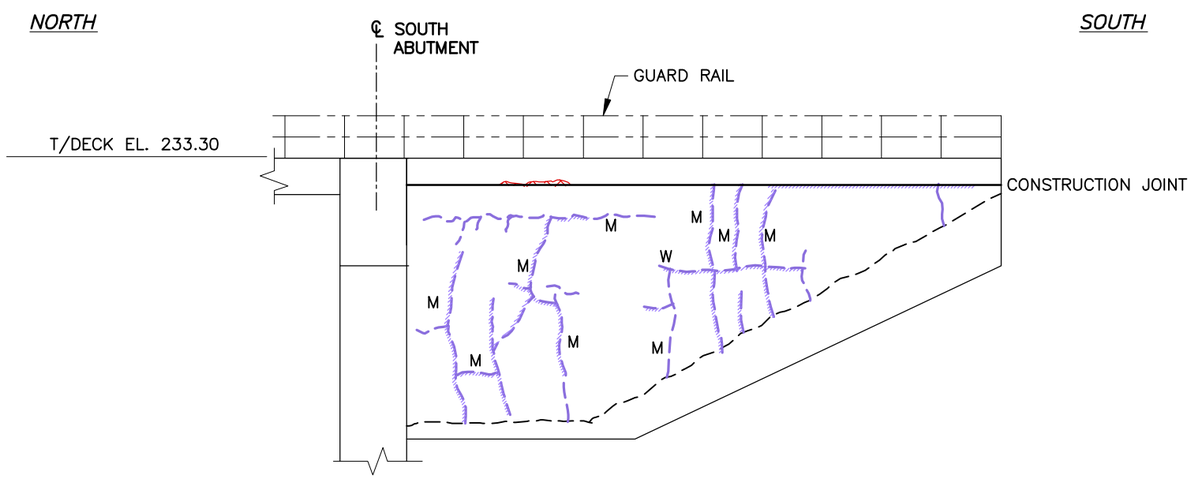


EAST ELEVATION
1 : 200



WEST ELEVATION
1 : 200



SOUTHWEST WINGWALL ELEVATION
1 : 75

UPPER THAMES RIVER CONSERVATION AUTHORITY

AECOM
London, Ontario 519.673.0510

SPRINGBANK DAM

CONDITION SURVEY REPORT
ELEVATIONS

DATE:	SCALE:	DWG NO.
MAY 2012	AS NOTED	S5

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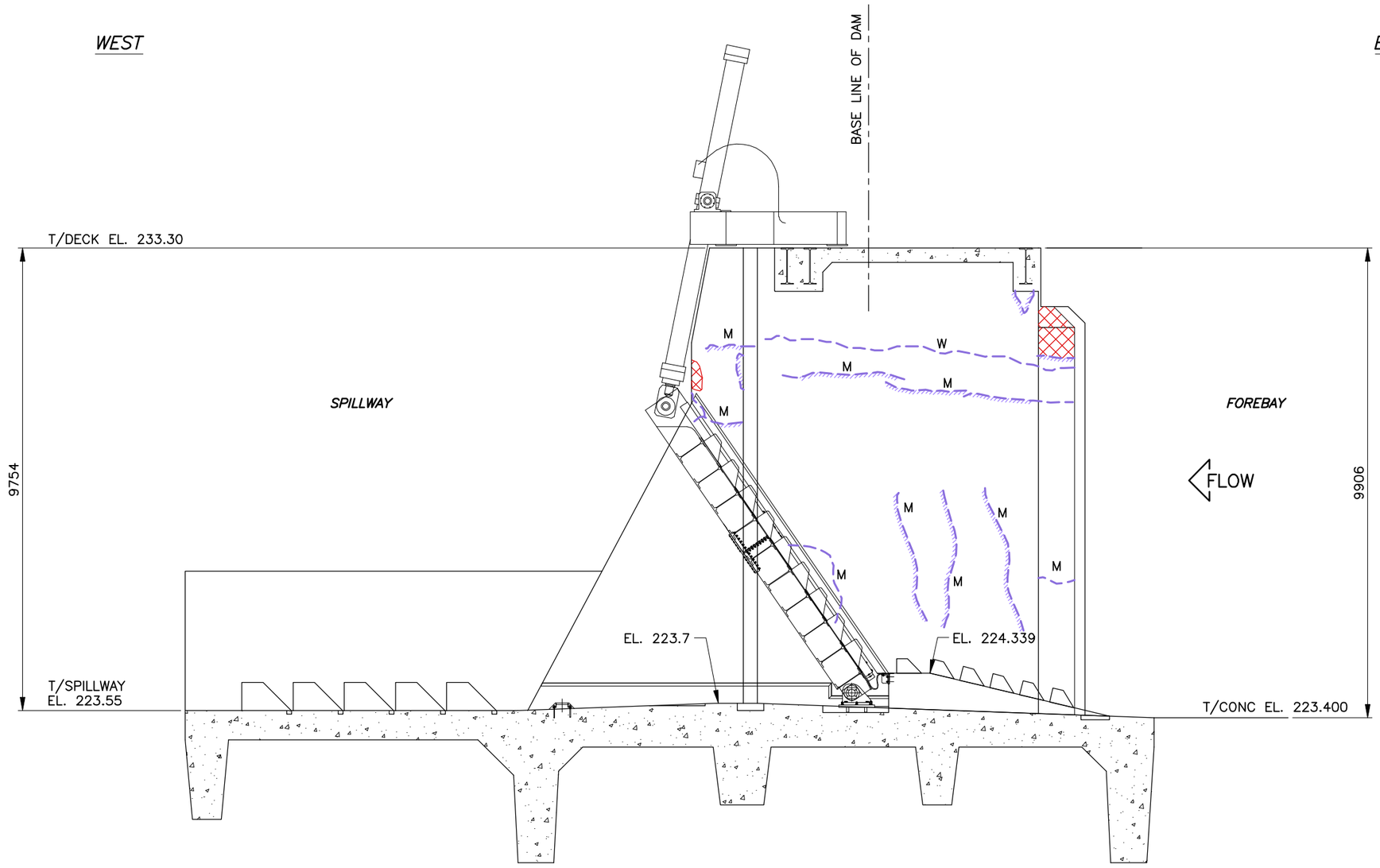
DATE: 6/1/2012 11:15:55 AM



NORTH ABUTMENT ELEVATION

NOTE :

HAIRLINE CRACKING THROUGHOUT.

UPPER THAMES RIVER CONSERVATION AUTHORITY

AECOM
London, Ontario 519.673.0510

SPRINGBANK DAM

CONDITION SURVEY REPORT
NORTH ABUTMENT ELEVATION

DATE:	SCALE:	DWG NO.
MAY 2012	1 : 100	S6

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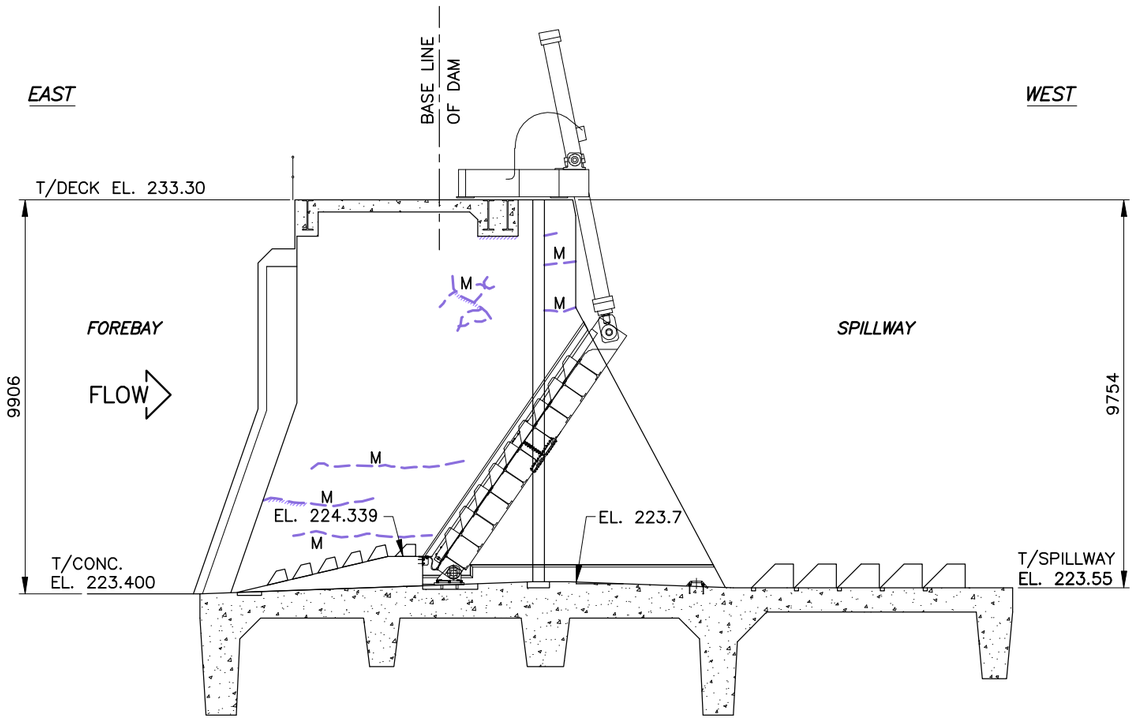
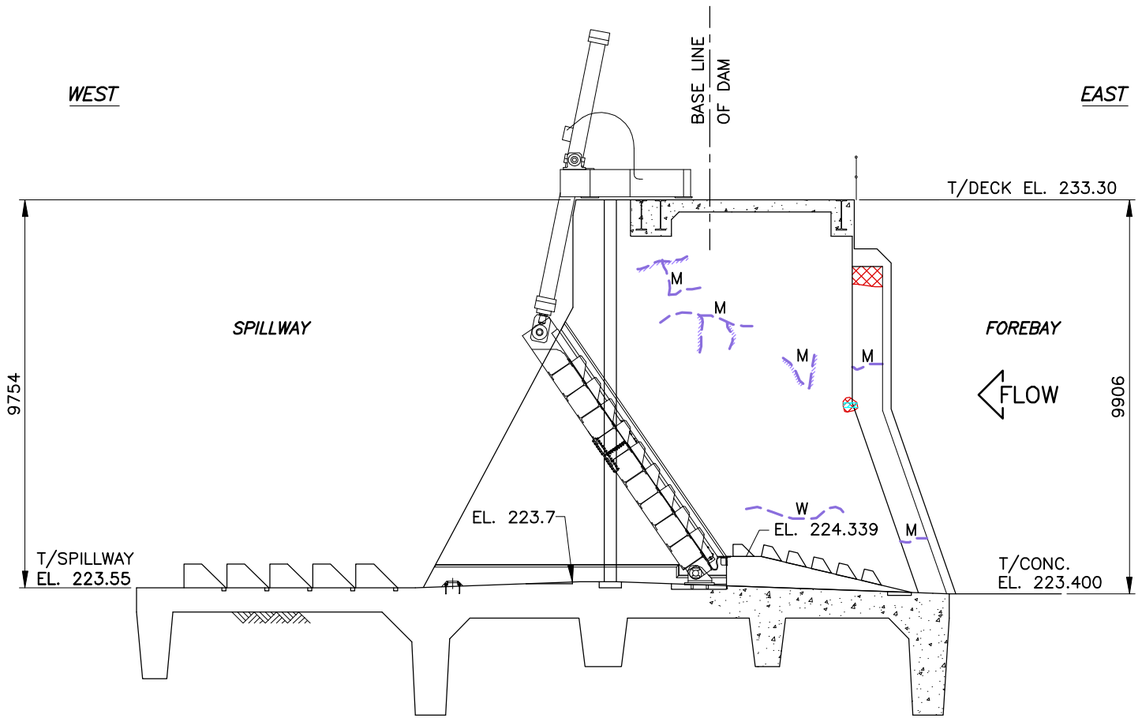


PIER 1 NORTH ELEVATION



PIER 1 SOUTH ELEVATION

NOTE :

HAIRLINE CRACKING THROUGHOUT.

UPPER THAMES RIVER CONSERVATION AUTHORITY

AECOM London, Ontario 519.673.0510

SPRINGBANK DAM

CONDITION SURVEY REPORT
PIER 1 ELEVATIONS

DATE:	SCALE:	DWG NO.
MAY 2012	1 :150	S7

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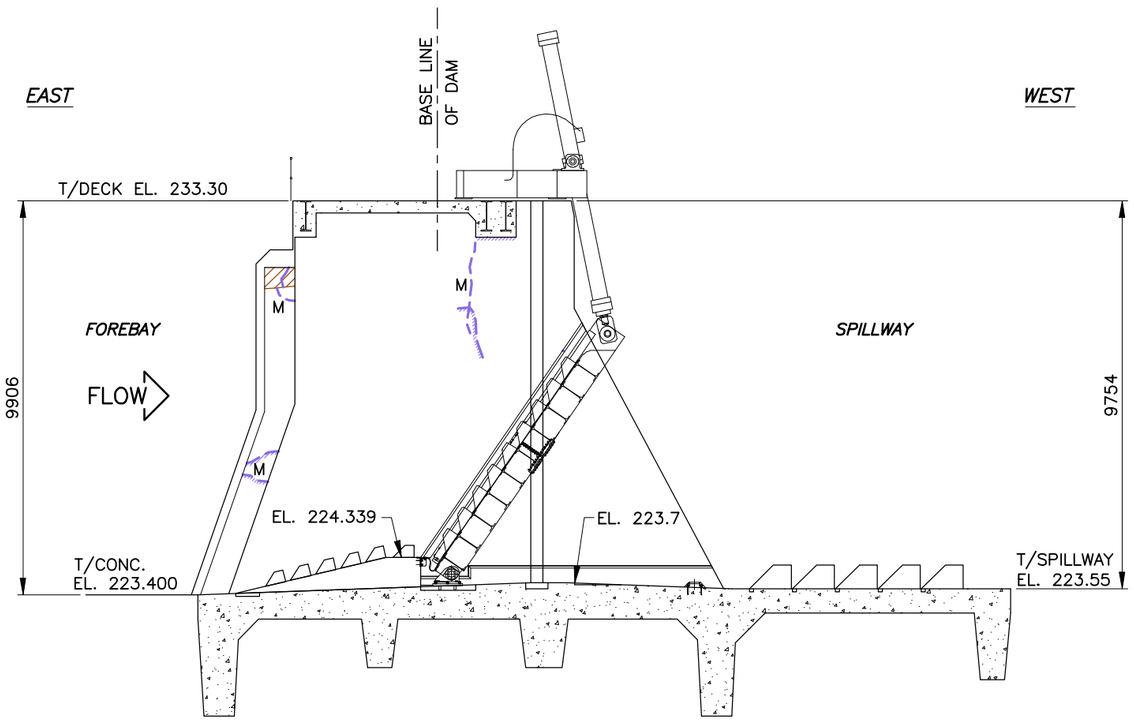
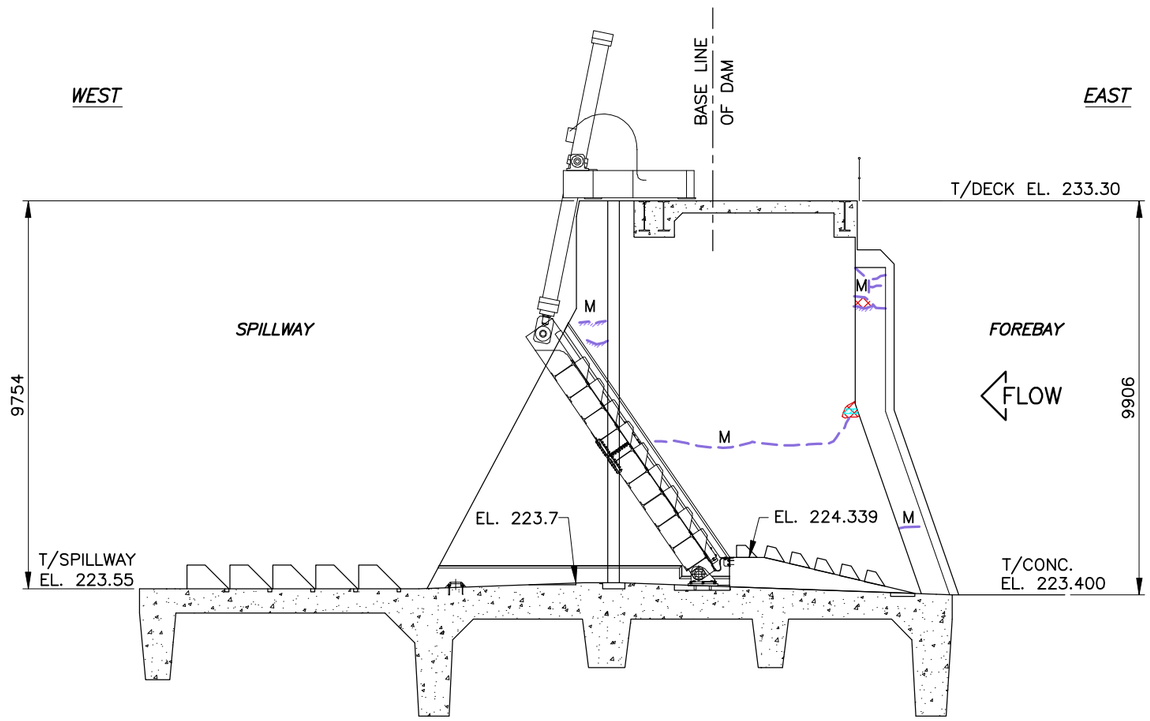
DATE: 6/1/2012 11:16:45 AM



PIER 2 NORTH ELEVATION



PIER 2 SOUTH ELEVATION

NOTE :

HAIRLINE CRACKING THROUGHOUT.

UPPER THAMES RIVER CONSERVATION AUTHORITY

AECOM
London, Ontario 519.673.0510

SPRINGBANK DAM

CONDITION SURVEY REPORT
PIER 2 ELEVATIONS

DATE:	SCALE:	DWG NO.
MAY 2012	1 : 150	S8

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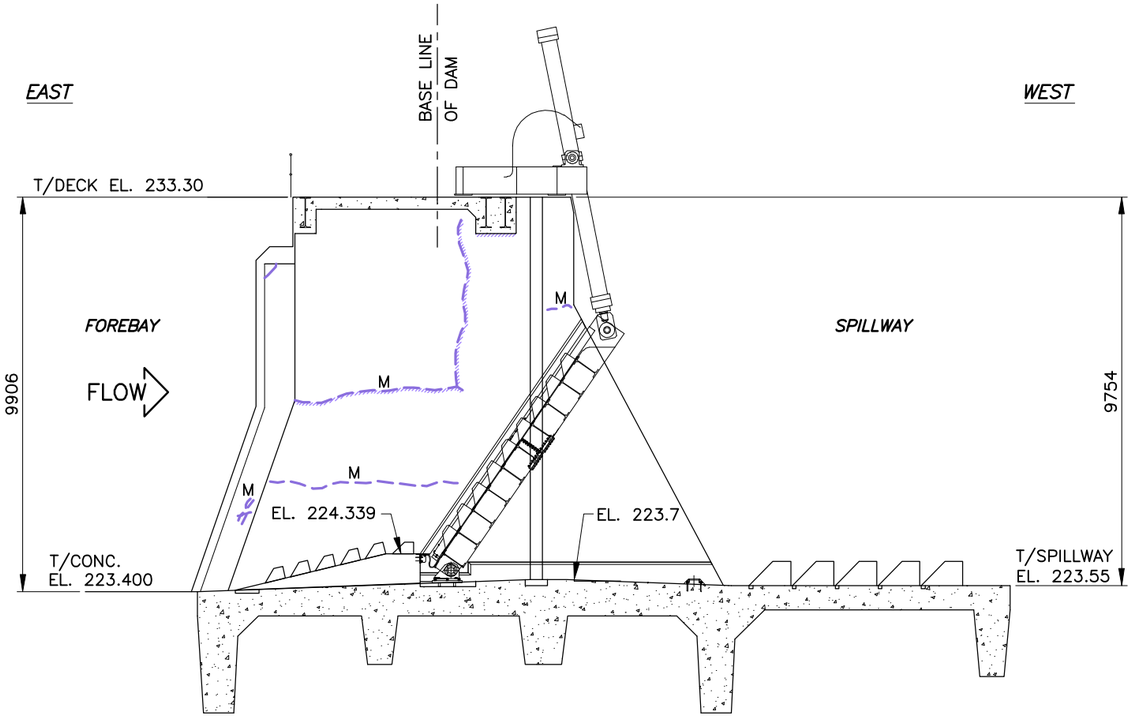
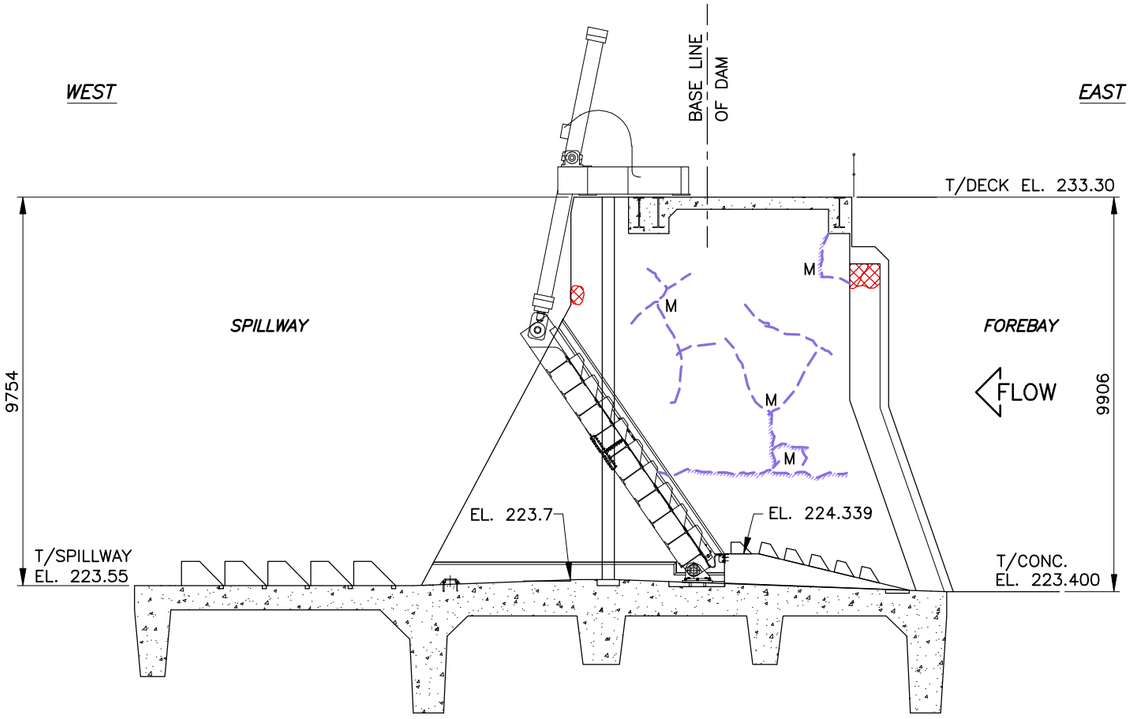
DATE: 6/1/2012 11:17:04 AM



PIER 3 NORTH ELEVATION



PIER 3 SOUTH ELEVATION

NOTE :

HAIRLINE CRACKING THROUGHOUT.

UPPER THAMES RIVER CONSERVATION AUTHORITY

AECOM
London, Ontario 519.673.0510

SPRINGBANK DAM

CONDITION SURVEY REPORT
PIER 3 ELEVATIONS

DATE:	SCALE:	DWG NO.
MAY 2012	1 : 150	S9

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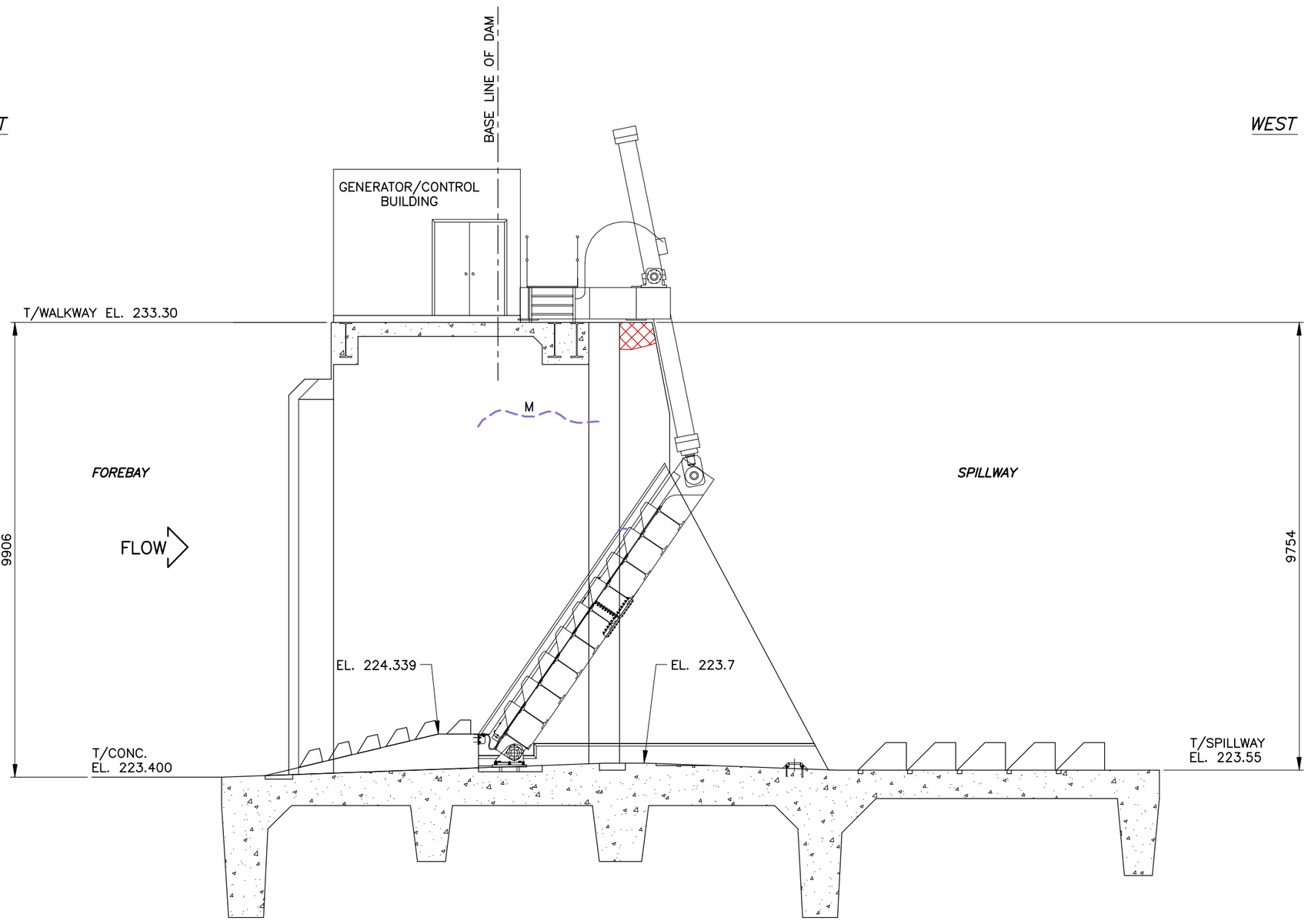


SOUTH ABUTMENT ELEVATION

NOTE :

HAIRLINE CRACKING THROUGHOUT.

UPPER THAMES RIVER CONSERVATION AUTHORITY

AECOM London, Ontario 519.673.0510

SPRINGBANK DAM

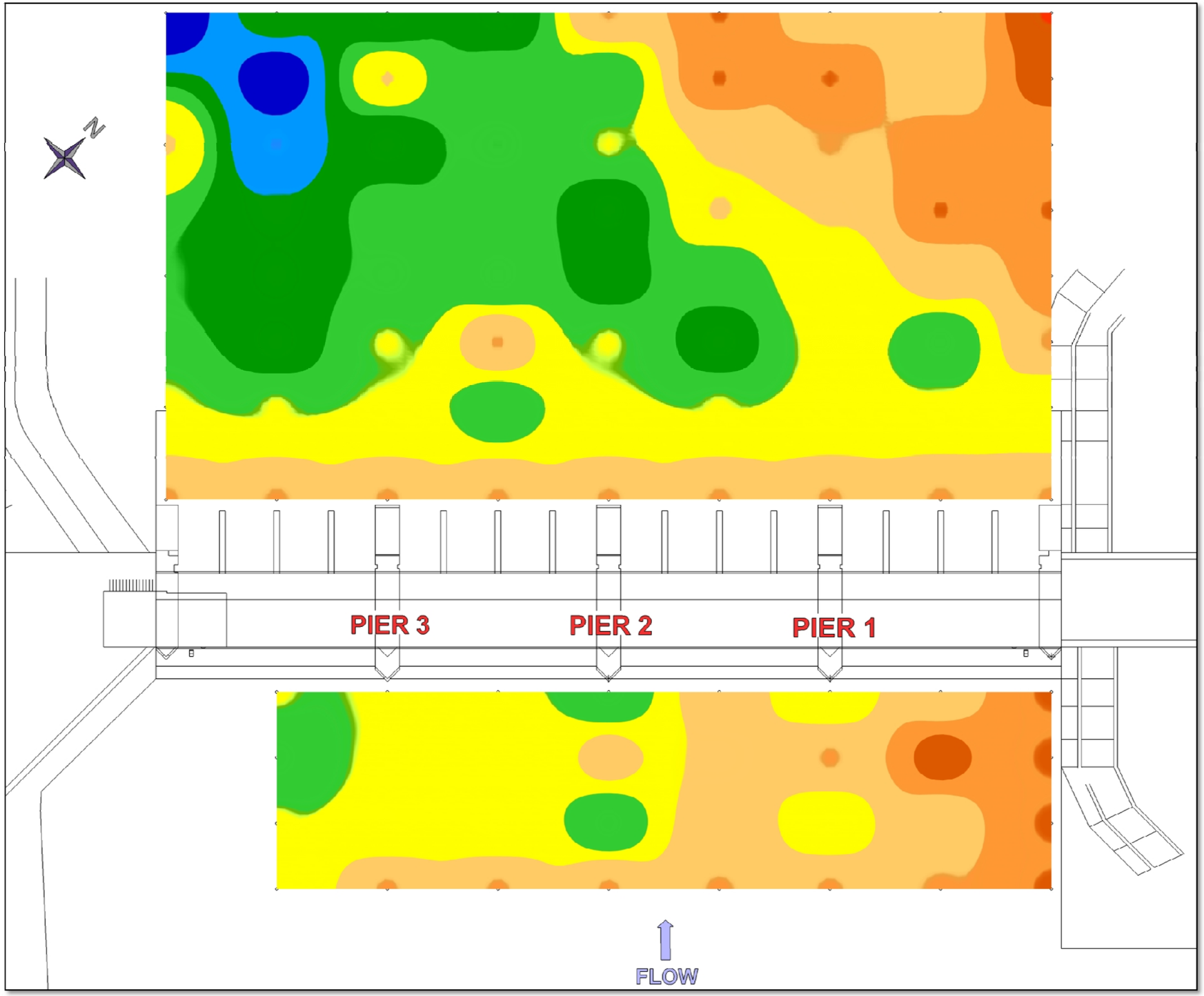
CONDITION SURVEY REPORT
SOUTH ABUTMENT ELEVATION

DATE:	SCALE:	DWG NO.
MAY 2012	1 : 100	S10

DRAWING FILE: P:\60225556\000-CADD\Springbank Dam\SPRINGBANK-S10
DATE: 6/1/2012 11:28:15 AM

Springbank Dam
Upstream and Downstream
Water Depth Contour Map

AECOM



Approximate Water Depth (Meters)

- 0.0
- 0.3
- 0.6
- 0.9
- 1.2
- 1.5
- 1.8
- 2.1
- 2.4
- 2.7
- 3.0 and lower

(N.T.S)

Appendix D

Watech Underwater Report

INSPECTION OF WATER CONTROL STRUCTURE
SPRINGBANK DAM
LONDON, ONTARIO

Prepared for:
Aecom/UTRCA

Prepared by:

WATECH SERVICES INC.
895 Valetta Street
London, Ontario
N6H 2Z4

November 2011 **WSI 11149**

TABLE OF CONTENTS

1. INTRODUCTION

WATECH SERVICES INC. was retained by Aecom on behalf of the Upper Thames River Conservation Authority to carry out an inspection of the water control structure known as the Springbank Dam in the City of London, Ontario.

The report details the results of our inspection findings and may be used as baseline reference and background information for future inspection and maintenance programs and to assist in future repair/reconstruction work.

2. INSPECTION

2.1. General

Inspection Team: 3 person crew

Location: London, Ontario

Date: November 1 and 2, 2011

Weather: Cloudy, 11^{O}C

The field inspection work was carried out by WATECH SERVICES INC. inspection team on November 1 and 2, 2011.

The inspection was carried out by a diver wading in the shallow water at the time of the inspection. A handheld digital underwater camera was used to provide above and below water documentation of the inspection results. The inspection diver was in constant voice communication with the surface personnel relaying the results of the investigation.

The water level at the time of the inspection work was 1.2 meters above the sill elevation.

3. OBSERVATIONS AND INSPECTION RESULTS

3.1 Dam Inspection

The dam is a concrete structure which has four (4) bays with remotely operated steel over-shot gates.

3.2 North Wingwalls

The upstream and downstream north wingwalls appear to be in generally good condition. No defects were noted in the new concrete of the downstream wingwall, and the transition between the new and old concrete is in good condition. On the upstream side, the second concrete block from the pier at the water level has cracked and rebar has been exposed (see Photographs 19 & 20).

3.3 South Wingwalls

The upstream south wingwall is comprised of a steel sheet pile wall. All steel sheet piling appears in fair to good condition, no damaged or split interlocks were noted. Rusting and pitting of the piling is evident. On the downstream side stone shoreline protection has been placed.

3.4 Piers

3.4.1 Pier 1

Pier 1 is in generally good condition. Some concrete spalling was noted just below the water level at the bullnose measuring approximately 150mm x 150mm x 15mm deep.

3.4.2 Pier 3

Pier 3 is in generally good condition. An area of concrete spalling was noted at the bottom of the galvanized steel plate measuring approximately 300mm x 15mm deep. The bullnose steel appears to be securely attached. Minor spalling was noted at the water level on the north face (see Photographs 8 & 9)

3.4.3 Pier 4

Pier 4 is in generally good condition. The steel nosing bullnose has undermined and a portion of steel approximately 300mm long is missing from the south side of the pier. The undermining extends 200mm away from the steel nosing and has up to 150mm of concrete loss.

3.4.4 Pier 5

Pier 5 is in generally good condition, a small area of minor concrete spalling was noted near the steel nosing plate.

3.4.5 Pier 6

Pier 6 is in generally good condition. No defects were noted during the inspection.

3.5 Concrete Sill

The concrete sill starts in line with the upstream nosing of the piers and extends approximately 5 meters beyond the piers on the downstream side. The concrete sill is in generally good condition, an area of concrete loss was noted at Pier 3 extending 1.5 meters north.

INSPECTION OF WATER CONTROL STRUCTURE
Springbank Dam
London, Ontario

November 2011

Photographs

WATECH SERVICES INC.
WSI 11154

PHOTO # 1

Upstream view of the Springbank Dam

PHOTO # 2

Downstream view of the Springbank Dam

PHOTO # 3

Pier 1 typical concrete condition

PHOTO # 4

Pier 1 typical concrete condition underwater

PHOTO # 5

Pier 3 typical concrete condition

PHOTO # 6

Pier 3 typical concrete condition

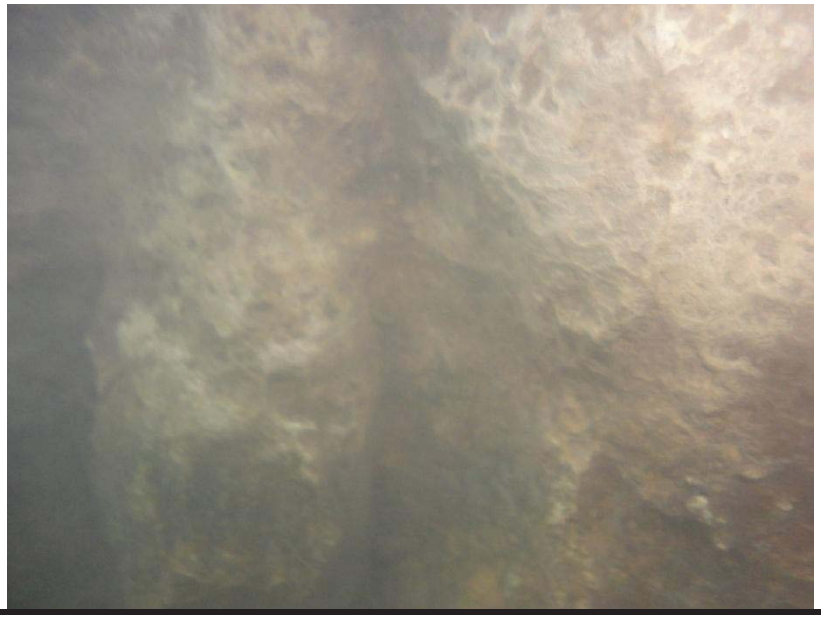


PHOTO # 7

Pier 3 typical concrete condition underwater

PHOTO # 8

Spalled corner on Pier 3 at the water level

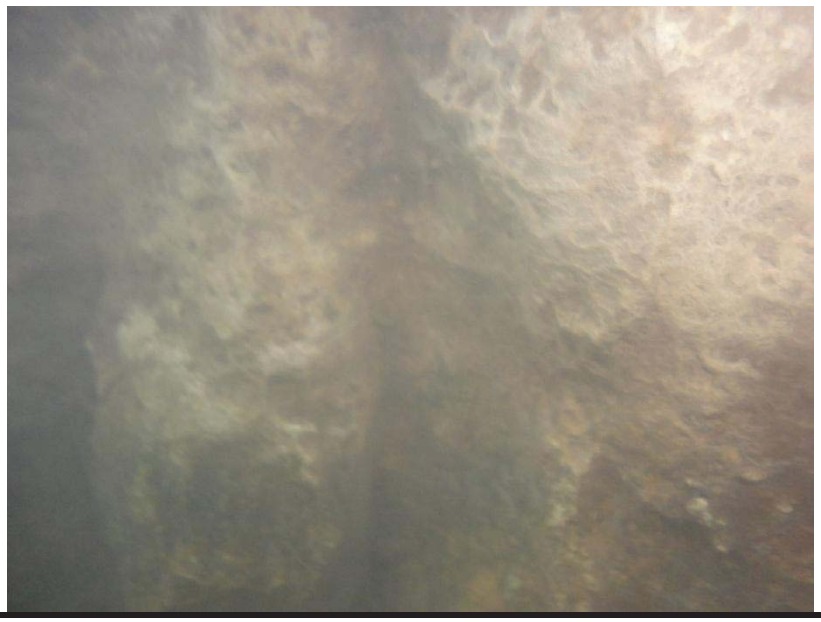


PHOTO # 9

Spalling on Pier 3 just below water level

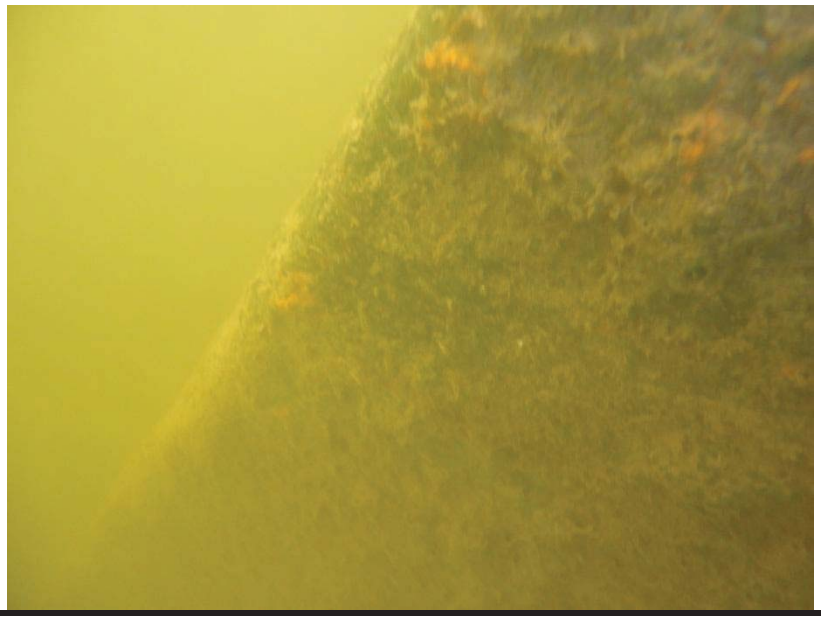
	PHOTO # 10 Pier 4 typical concrete condition
	PHOTO # 11 Pier 4 typical concrete condition underwater
	PHOTO # 12 Pier 4 concrete nosing at water level

PHOTO # 13

Pier 5 typical concrete condition underwater

PHOTO # 14

Pier 5 concrete condition near nosing, small area of spalling

PHOTO # 15

Pier 6 typical concrete condition at water level

PHOTO # 16

Pier 6 typical concrete condition underwater

PHOTO # 17

Typical condition of new concrete on the north wingwall

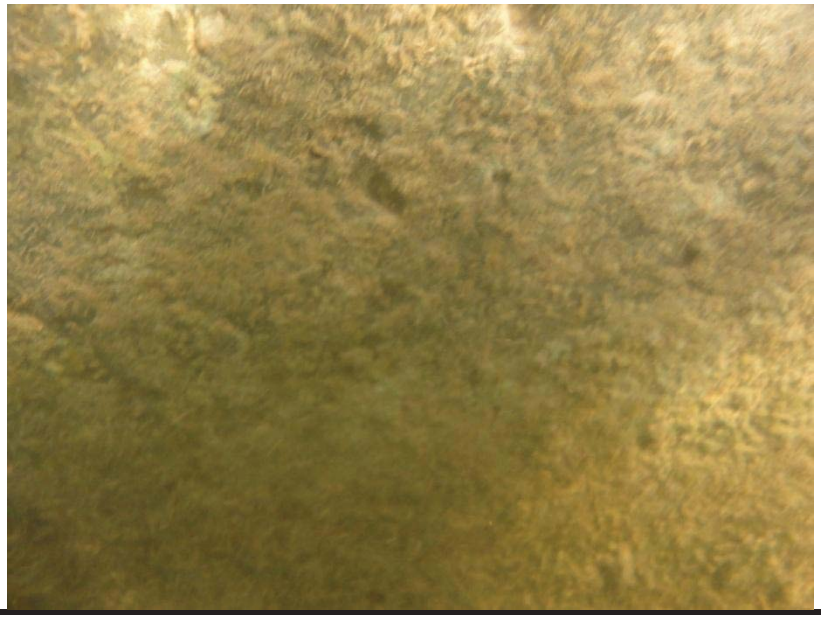


PHOTO # 18

Typical condition of new concrete on the north wingwall underwater

PHOTO # 19

Concrete loss on the north wingwall

PHOTO # 20

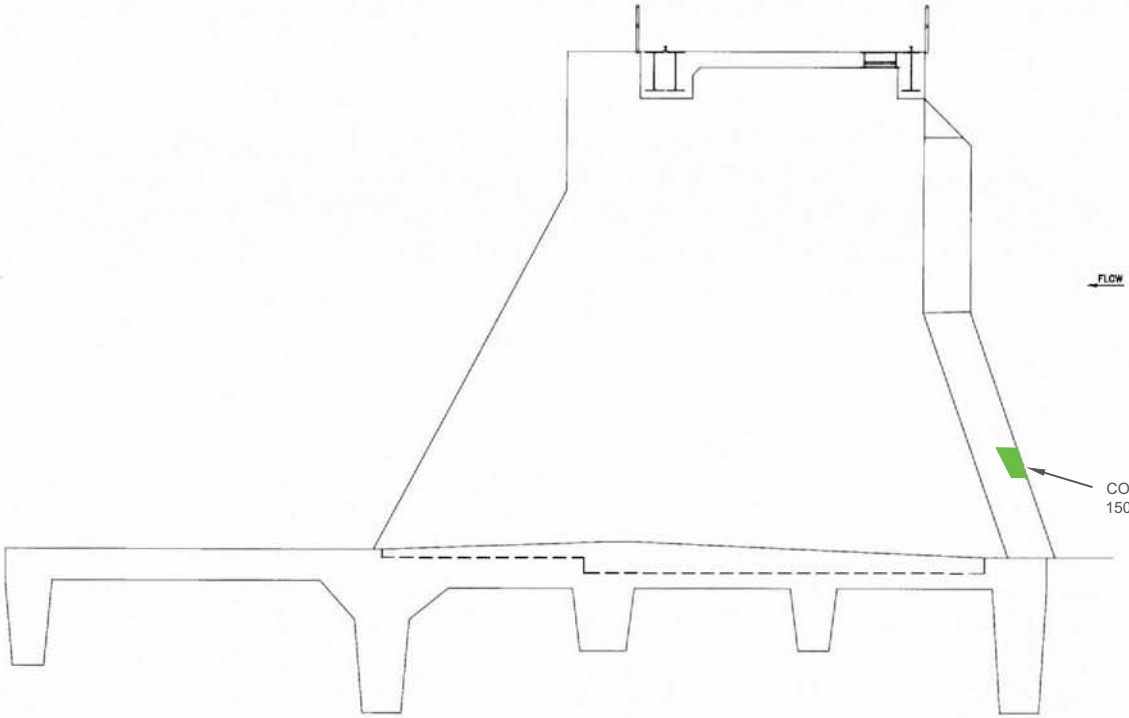
Concrete loss on the north wingwall underwater

INSPECTION OF WATER CONTROL STRUCTURE
Springbank Dam
London, Ontario

November 2011

Figures

WATECH SERVICES INC.
WSI 11154



NORTH END PIER 1 ELEAVTION

NOTES:

NO.	REVISION	DATE	INITIAL

APPROVED

UPPER THAMES RIVER
CONSERVATION AUTHORITY

SPRINGBANK DAM
REHABILITATION

NORTH END PIER 1 ELEVATION

CADD SYSTEM AutoCAD

SCALE: 1 : 50

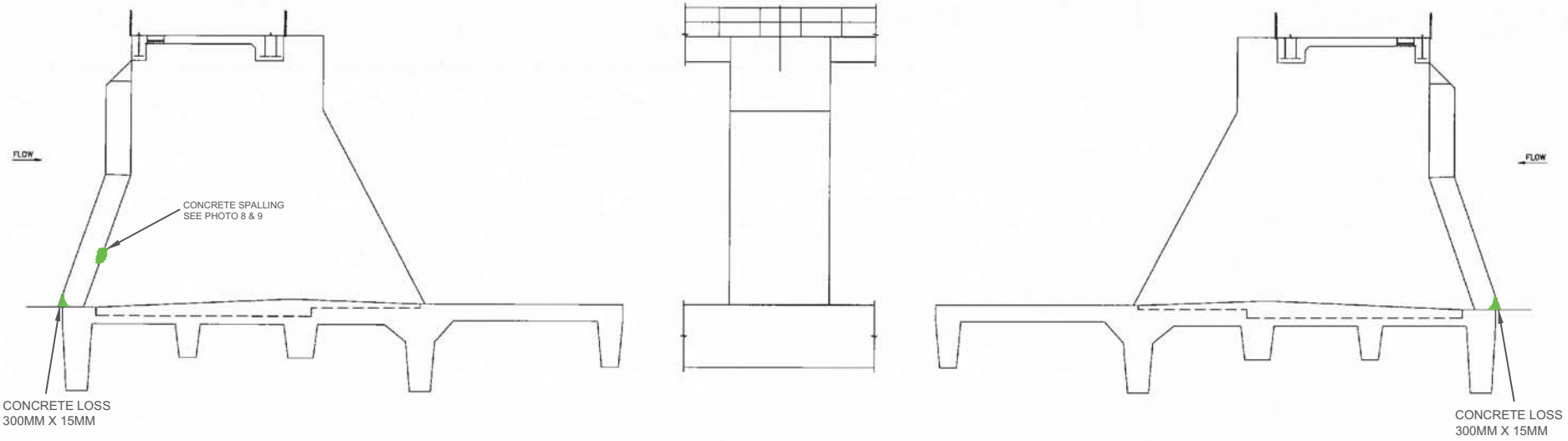
DATE:

SHEET NO.

DWG NO. A1 – S1

REV. A

CONTRACT



NORTH ELEVATION

WEST ELEVATION

SOUTH ELEVATION

NOTES:

NO.	REVISION	DATE	INITIAL

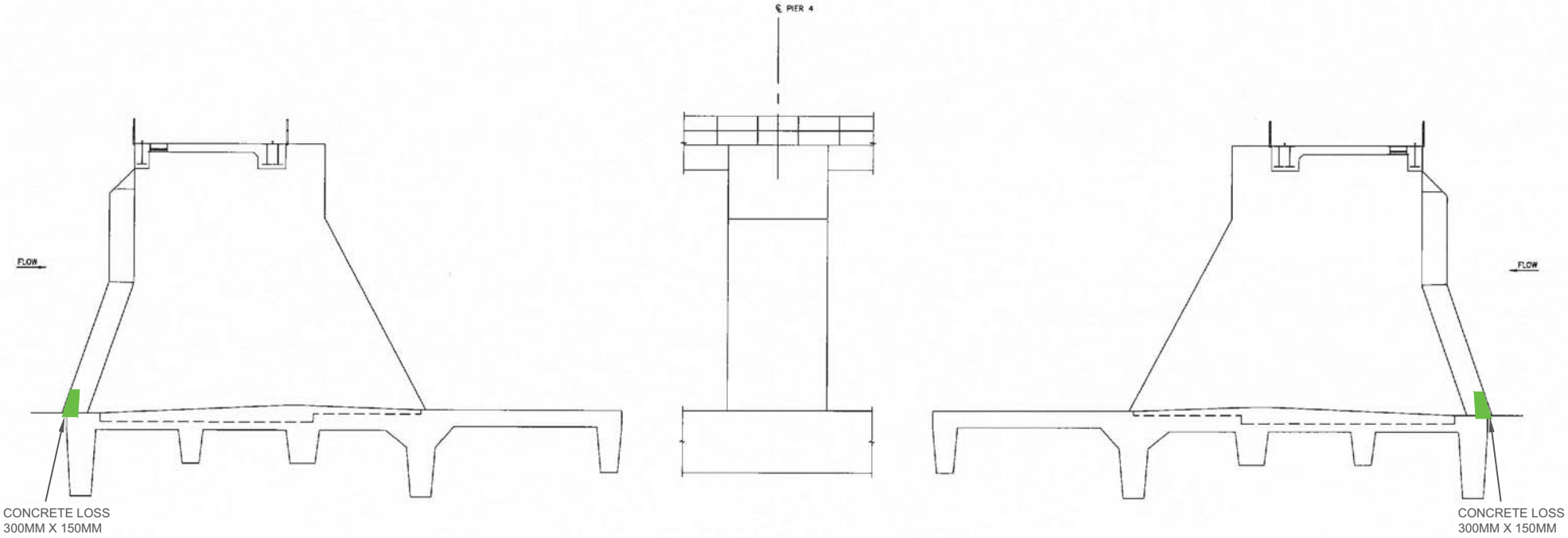
APPROVED

UPPER THAMES RIVER

SPRINGBANK DAM
REHABILITATION

PIER 3 ELEVATIONS

CADD SYSTEM AutoCAD	SCALE: 1 : 75	DATE:	SHEET NO.
	DWG NO. A1— S3	REV. A	CONTRACT



NORTH ELEVATION

WEST ELEVATION

SOUTH ELEVATION

NOTES:

NO.	REVISION	DATE	INITIAL

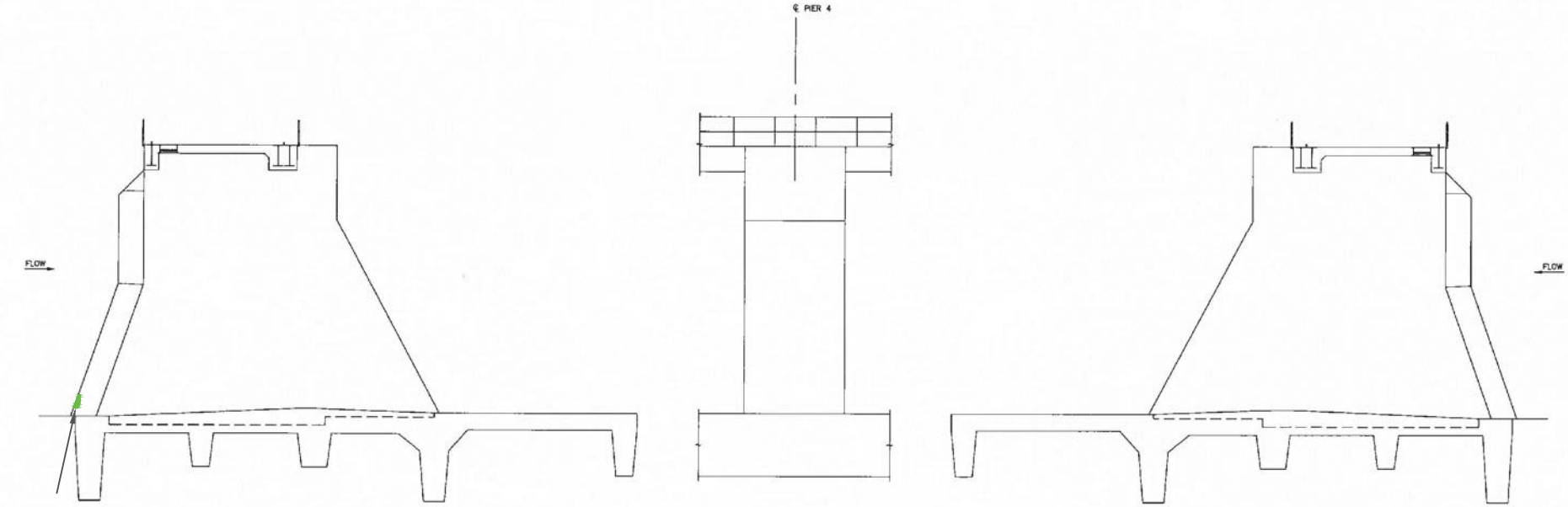
APPROVED

UPPER THAMES RIVER

SPRINGBANK DAM
REHABILITATION

PIER 4 ELEVATIONS

SCALE: 1 : 75	DATE:	SHEET NO.
CADD SYSTEM AutoCAD	DWG NO. A1 – S4	REV. A / CONTRACT



NORTH ELEVATION

WEST ELEVATION

SOUTH ELEVATION

NOTES:

NO.	REVISION	DATE	INITIAL

APPROVED

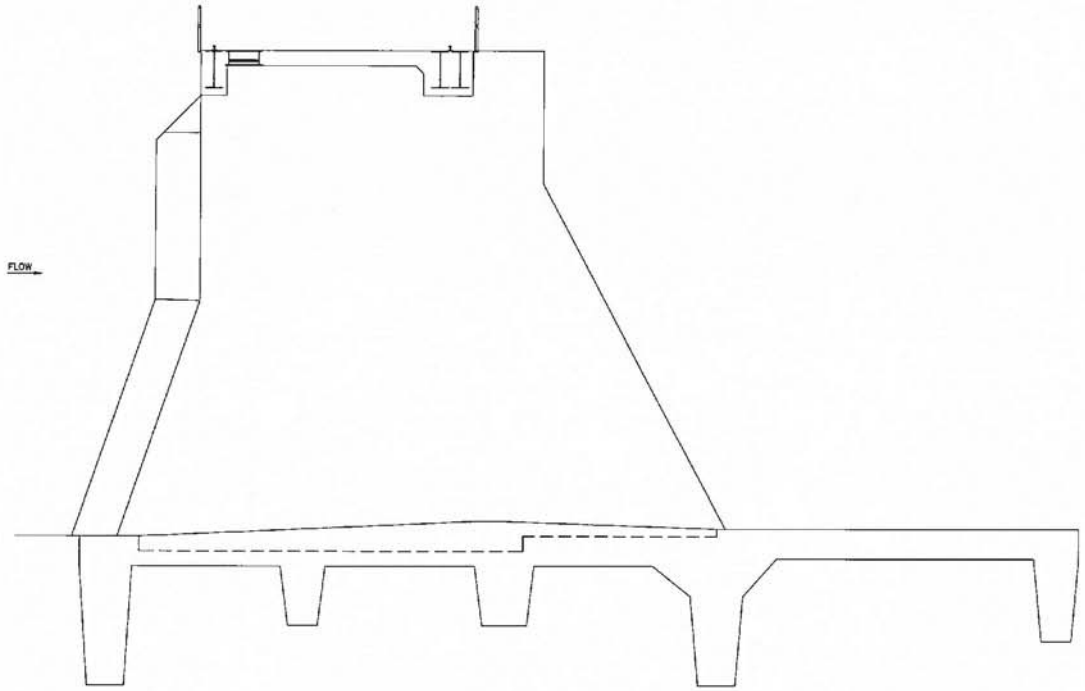
UPPER THAMES RIVER

SPRINGBANK DAM
REHABILITATION

PIER 5 ELEVATIONS

CADD SYSTEM AutoCAD	SCALE: 1 : 75	DATE: OCT. 2011	SHEET NO.
	DWG NO. A1– S4	REV. A	CONTRACT

NO DEFECTS NOTED



SOUTH END PIER 6 ELEAVTION

NOTES:

NO.	REVISION	DATE	INITIAL

APPROVED

UPPER THAMES RIVER

SPRINGBANK DAM
REHABILITATION

SOUTH END PIER 6 ELEVATION

	SCALE: 1 : 50	DATE:	SHEET NO.
CADD SYSTEM AutoCAD	DWG NO. A1 – S5	REV. A	CONTRACT