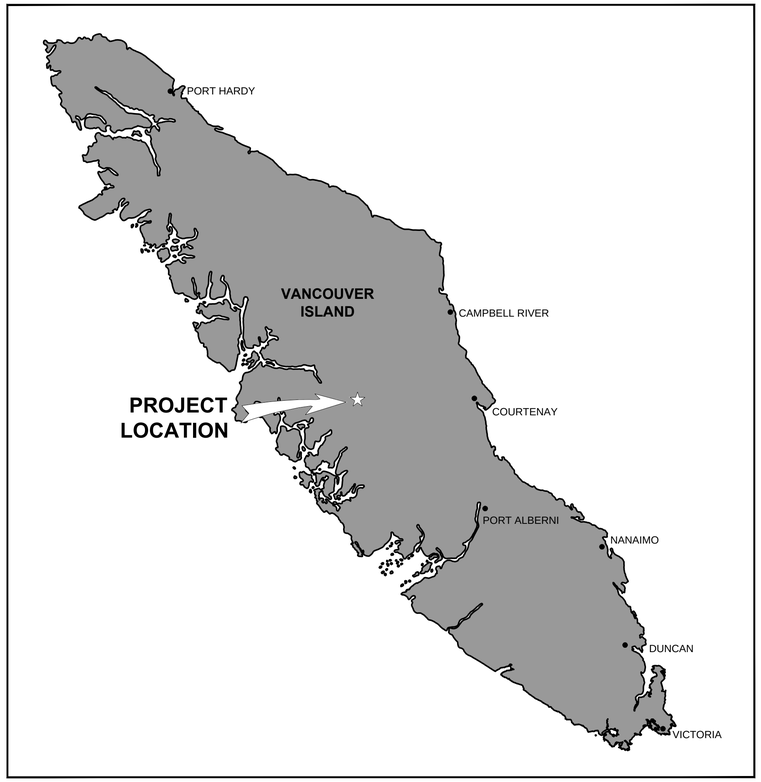
NYRSTAR - MYRA FALLS

MYRA FALLS
STOCKPILE LONG TERM WATER MANAGEMENT

LIST OF PROJECT DRAWINGS



PROJECT LOCATION

ISSUED FOR CONSTRUCTION

ISSUE DATE: 2017-11-15

amec foster wheeler

Set No.: _____

PROJECT NUMBER	DRAWING NUMBER	ISSUE/REVISION
NX14001L.2.400	C-0001	0

GENERAL NOTES

1. SURFACE TOPOGRAPHY FOR "EXISTING GROUND PRE 2015 CONSTRUCTION" SUPPLIED BY CLIENT ON MAY 22, 2015, ALONG WITH 2014 POST CONSTRUCTION SURVEYS SUPPLIED BY THE CLIENT ON 5 DECEMBER 2015, 2015 POST CONSTRUCTION SURVEYS SUPPLIED BY THE CLIENT ON 26 OCTOBER 2016 AND 2016 POST CONSTRUCTION SURVEYS SUPPLIED BY THE CLIENT ON 7 JANUARY 2017. UNDERDRAIN DIMENSIONS ARE APPROXIMATED FROM AS-BUILT INFORMATION PROVIDED BY CLIENT AS DOCUMENTED IN AMEC EARTH & ENVIRONMENTAL REPORT "MYRA FALLS TAILINGS STORAGE FACILITY 2011 CONSTRUCTION REPORT" IN APRIL 2012.
2. UTILITY INFORMATION SUPPLIED BY CLIENT ON 22 MAY 2015.
3. THIS SURVEY REFERENCE TO GEODETIC DATUM (CGVD28).
4. COORDINATES PROJECTED IN UTM ZONE 10.
5. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES UNLESS OTHERWISE NOTED. ELEVATIONS REPRESENT FINISHED GRADE ELEVATIONS UNLESS OTHERWISE NOTED.
6. LYNX SPRING DRAIN DESIGN REFERENCES:
   a. AMEC ENVIRONMENT AND INFRASTRUCTURE, 2013. "LYNX TAILINGS DISPOSAL FACILITY, CONCEPTUAL DESIGN FOR SEEPAGE INTERCEPTOR DRAIN, MYRA FALLS MINE, BC". LETTER REPORT TO NYRSTAR MYRA FALLS, 10 SEPTEMBER 2013.
   b. AMEC ENVIRONMENT AND INFRASTRUCTURE, 2014. "LYNX SPRINGS DRAIN CONSTRUCTION NOTES". DRAWINGS AND SPECIFICATIONS ISSUED FOR CONSTRUCTION TO NYRSTAR MYRA FALLS, 23 MAY 2014.
7. LYNX SPRINGS DRAIN AS-BUILT INFORMATION REFERENCES:
   a. AMEC FOSTER WHEELER ENVIRONMENT & INFRASTRUCTURE, 2015A. "MYRA FALLS TAILINGS STORAGE FACILITIES 2014 CONSTRUCTION REPORT". TECHNICAL REPORT, 31 MARCH 2015 AND 18 DRAWINGS.
   b. SPRINGS DRAIN 2014 AS-BUILT SURVEYS SUPPLIED BY MCELHANNEY ON 25 SEPTEMBER 2014.
8. OLD TDF DECANT PIPELINE REFERENCES:
   a. AMEC FOSTER WHEELER ENVIRONMENT & INFRASTRUCTURE, 2015C. "MYRA FALLS MINE SITE, OLD TAILINGS DISPOSAL FACILITY, DECANTS AND SPILLWAYS DETAILED DESIGN". TECHNICAL REPORT, 7 AUGUST 2015.
   b. SURFACE TOPOGRAPHY FOR "OLD TDF DECANT PIPELINE AND SURGE POND" BASED ON RE-ISSUED FOR CONSTRUCTION DRAWINGS, REVISION 2, ISSUED 08 JULY 2016, FILE NO. NX14001.
9. LYNX TDF DAM FACE CLOSURE COVER DESIGN REFERENCES:
   a. AMEC FOSTER WHEELER ENVIRONMENT & INFRASTRUCTURE, 2016B. NYRSTAR MYRA FALLS MINE - LYNX TDF DAM FACE CLOSURE COVER - PERMIT LEVEL DESIGN. REPORT, FILE NO. NX14001K.2, 16 DECEMBER, 2016.
   b. SURFACE TOPOGRAPHY FOR "ULTIMATE DAM, TOE DITCH AND ACCESS ROAD" BASED ON DESIGN DRAWINGS, REVISION B, ISSUED 15 DECEMBER 2016, FILE NO. NX14001K.2.
10. ALL DAM FOUNDATION SURFACES INDICATED ON THESE DRAWINGS REPRESENT INTERPRETATIONS OF AVAILABLE SUBSURFACE INFORMATION. ACTUAL FOUNDATION GEOMETRY WILL VARY.

ABBREVIATIONS

N	NORTHING	U/S	UPSTREAM
E	EASTING	D/S	DOWNSTREAM
APP	APPROXIMATE	c/w	COMPLETE WITH
STA	STATION	c/c	CENTER TO CENTER
EL	ELEVATION	HWL	HIGH WATER LEVEL
WL	WATER LEVEL	PWL	PERMANENT WATER LEVEL (NO FLOW)
PI	POINT OF INTERSECTION	NWL	NORMAL WATER LEVEL
BC	BEGINNING OF CURVE	SPMDD	STANDARD PROCTOR MOISTURE DRY DENSITY
EC	END OF CURVE	MH	MANHOLE
R	RADIUS	PAG	POTENTIALLY ACID GENERATING (WASTE ROCK)
CL	CENTERLINE	NON-PAG	NON POTENTIALLY ACID GENERATING (ROCK)
DIA	DIAMETER	LEB	LOWER EAST BORROW
MIN	MINIMUM		
TYP	TYPICAL		
THK	THICK		

MATERIAL HATCHING LEGEND

MATERIAL TYPE	SPECIFICATION	HATCH PATTERN
SPRINGS DRAIN MATERIALS		
DRAIN ROCK	DRAIN ROCK (NON-PAG)	
FILTER MATERIAL	COARSE FILTER (NON-PAG)	
	FINE FILTER (NON-PAG)	
DAM FILL/WASTE ROCK FILL	ZONE A (PAG) - COMMON FILL	
	ZONE J (PAG)	
BEDDING MATERIAL	LINER BEDDING (NON-PAG)	
OTHER MATERIALS		
GRAVEL MATERIAL	SELECT QUARRY RUN BLAST ROCK (NON-PAG)	
	CRUSHED GRAVEL	
RIPRAP	CLASS 10 RIPRAP (NON-PAG)	
GROWTH MEDIUM	TILL AND/OR TOPSOIL	
LOW-PERMEABILITY FILL	COMPACTED TILL	
EXISTING MATERIALS	UNDISTURBED GROUND	
	TAILINGS	
	BEDROCK	

LINETYPE LEGEND

ROAD

CREEK

POWERLINE (OVERHEAD/UNDERGROUND)

WATERLINE (UNDERGROUND)

UTILITY PIPELINE

EXISTING LINETYPES

PROPOSED LINETYPES

GEOMEMBRANE

GEOTEXTILE

DITCH FLOW

SYMBOL LEGEND

POWERPOLE

WATER BODY

CULVERT

EXISTING SYMBOLS

PROPOSED SYMBOLS

ELEVATION MARKER

DETAIL / SECTION MARKER
(Top # Denotes Detail / Section Number)
(Bottom # Denotes Reference Drawing Location

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REV	D	M	Y	ISSUE / REVISION DESCRIPTION	ENG.	APPR.
6						
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0	15	11	2017	ISSUED FOR CONSTRUCTION	JS	GS

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CLIENT: nyrstar

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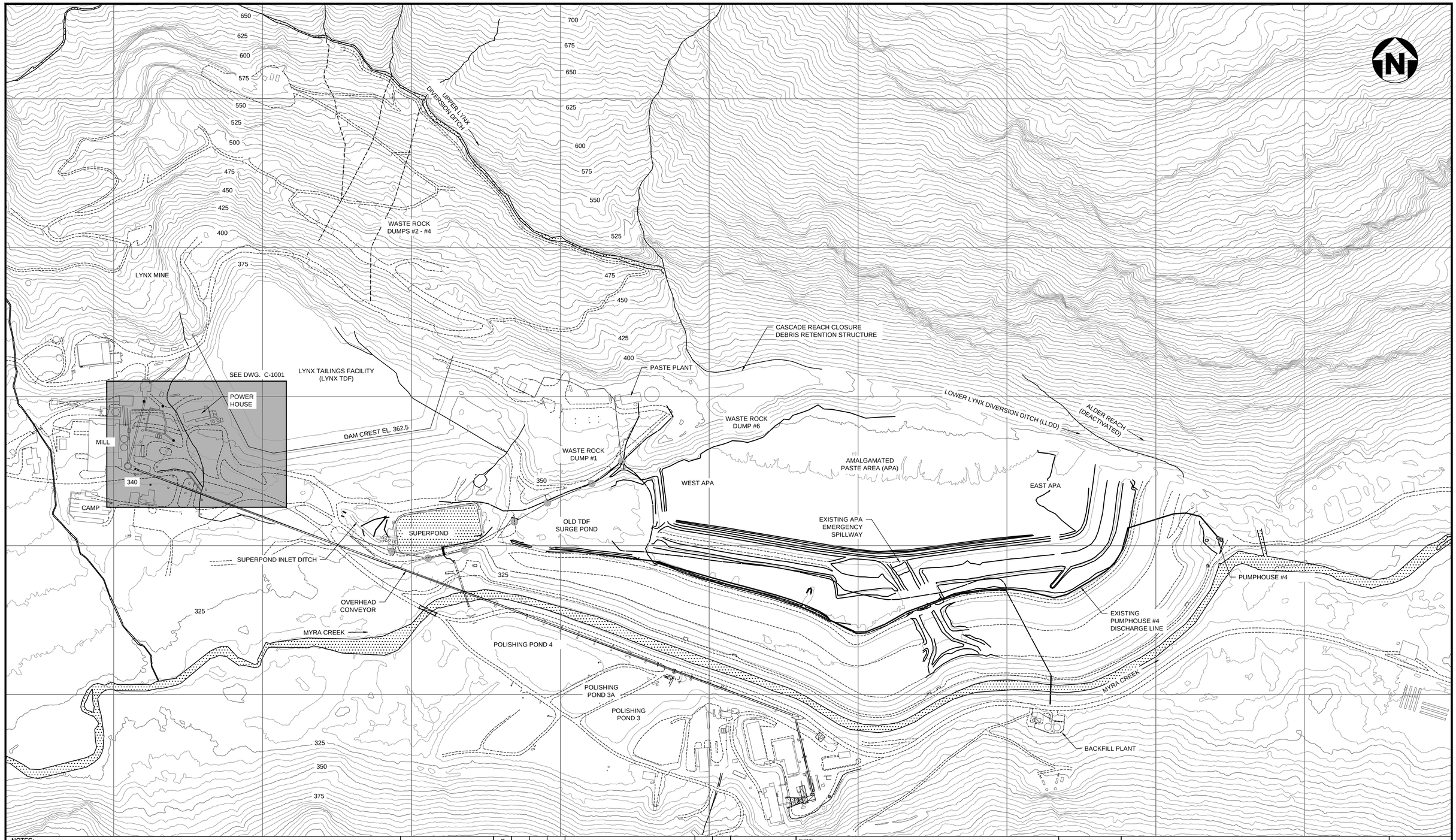
DRAWN BY: KL
CHECKED BY: HM
DATUM: NAD 83
PROJECTION: UTM Zone 10
SCALE: AS SHOWN

PROJECT: MYRA FALLS

TITLE: STOCKPILE LONG TERM WATER MANAGEMENT
GENERAL NOTES AND LEGENDS

DATE: 15 NOV 2017
PROJECT NO: NX14001L.2.400
REV. NO: 0
FIGURE NO: C-0002
SHEET NO: 1 of 1



NOTES:

1. CONTOUR INTERVAL IS 5m.
2. UPGRADE OF EXISTING DOWNSTREAM DITCHES AND CULVERTS ARE NOT IN CURRENT SCOPE.
3. STOCKPILE LOCATION PROVIDED BY NYRSTAR 1 JUNE 2017.
4. SURFACE TOPOGRAPHY PROVIDED BY NYRSTAR 22 MAY 2016.
5. ROAD EDGES BASED ON SITE OBSERVATIONS, NO CURRENT SURVEY AVAILABLE.

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REV	D	M	Y	ISSUE / REVISION DESCRIPTION	ENG.	APPR.
G						
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DRAWN BY:	KL
CHECKED BY:	HM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:3000

PROJECT: MYRA FALLS

TITLE: STOCKPILE LONG TERM WATER MANAGEMENT OVERALL SITE PLAN

DATE:	15 NOV 2017
PROJECT NO:	NX14001L.2.400
REV. NO:	0
FIGURE NO:	C-0003
SHEET NO:	1 of 1

1.GENERAL

1.1 NYRSTAR SHALL NOTIFY AMEC FOSTER WHEELER IMMEDIATELY OF DISCREPANCIES FOUND ON DRAWINGS OR ANY EXISTING CONDITIONS FOUND ON SITE WHICH CONFLICT WITH CONDITIONS AS SHOWN.

1.2 THE CONSTRUCTION DRAWINGS ARE FOR THE COMPLETED PROJECT. AMEC FOSTER WHEELER CAN PROVIDE ADVICE WITH RESPECT TO STABILITY DURING THE WORK; HOWEVER, ULTIMATE RESPONSIBILITY FOR WORKER SAFETY DURING CONSTRUCTION REMAINS THE RESPONSIBILITY OF NYRSTAR.

1.3 NOTIFY AMEC FOSTER WHEELER A MINIMUM OF 72 HOURS PRIOR TO ANY REQUIRED SITE REVIEWS OR INSPECTIONS.

1.4 NYRSTAR IS RESPONSIBLE FOR DETERMINATION OF POTENTIALLY ACID GENERATING (PAG) MATERIALS VERSUS NON-POTENTIALLY ACID GENERATING (NON-PAG) MATERIALS.

1.5 NYRSTAR IS RESPONSIBLE FOR ENVIRONMENTAL MONITORING AND COMPLIANCE DURING THE WORK.

1.6 "SITE ENGINEER" REFERS TO THE DESIGNATED ON-SITE ENGINEER REPRESENTATIVE OF AMEC FOSTER WHEELER.

2. SUBMITTALS

2.1 PRE-CONSTRUCTION:

2.1.1. TWO WEEKS PRIOR TO THE START OF WORK THE CONTRACTOR MUST SUBMIT:

a. CONSTRUCTION PLAN: DESCRIBING THE EQUIPMENT, METHODS, SEQUENCING, SCHEDULE AND COORDINATION FOR PLACEMENT, COMPACTION AND SURVEYING OF MATERIAL PLACEMENT.

b. PRE-CONSTRUCTION SURVEY OF THE WORK AREA.

c. COPIES OF QUALITY CONTROL TEST RESULTS OF FILL MATERIALS PRIOR TO DELIVERY OF IMPORTED MATERIALS TO SITE AND PRIOR TO USE OF MATERIALS GENERATED ON SITE.

2.2 SUBMITTALS DURING CONSTRUCTION:

2.2.1. ONCE A WEEK PRIOR TO THE CONSTRUCTION MEETING, CONTRACTOR MUST SUBMIT PROGRESS MAPS, SURVEY FILES OF THE SURFACES OF LIFTS PLACED TO DATE WITH RESPECT TO THE PRE-CONSTRUCTION SURVEY SURFACE AND PREVIOUS SURVEY SURFACES.

2.3 POST CONSTRUCTION SUBMITTALS:

2.3.1. UPON SUBSTANTIAL COMPLETION OF THE WORK THE FOLLOWING MUST BE SUBMITTED FOR REVIEW AND ACCEPTANCE:

a. AS-BUILT POST CONSTRUCTION SURVEY OF WORK AREA.

b. AS-BUILT COMPILATION SURVEY OF WEEKLY LIFT SURVEY SURFACES.

3. DRAWINGS

3.1 PROJECT DATUM IS NAD83(CSRS)3.0.0BC.1.NVI. ELEVATIONS ARE RELATIVE TO CGVD1928.

3.2 ALL DIMENSIONS SHOWN ON THE DRAWINGS ARE IN METERS UNLESS OTHERWISE STATED.

4. STANDARDS AND TOLERANCES

4.1 WORK TO BE COMPLETED BY QUALIFIED PERSONS.

4.2 FOR FINISHED FILL SURFACES, A DEVIATION MEASURED NORMAL TO THE EXCAVATED SURFACE WILL BE PERMITTED BETWEEN THE FINISHED EXCAVATED SURFACE AND THE LINES, GRADES AND ELEVATIONS SPECIFIED IN THE DRAWINGS, AS FOLLOWS.

SURFACE	TOLERANCE
PRE-CAST CONCRETE STRUCTURES SUBGRADE	PLUS OR MINUS 25 mm
PRE-CAST CONCRETE STRUCTURES INSIDE SLOPES	PLUS OR MINUS 50 mm
HDPE PIPE	PLUS OR MINUS 15 mm
HDPE PIPE PLUMB	1H:300V
TOP OF BERMS	0 TO PLUS 50 mm
CHANNEL BOTTOM	0 TO MINUS 50 mm

4.3 FOR FINISHED EXCAVATION SURFACES, A DEVIATION MEASURED NORMAL TO THE EXCAVATED SURFACE, AS FOLLOWS, WILL BE PERMITTED BETWEEN THE FINISHED EXCAVATED SURFACE AND THE LINES, GRADES AND ELEVATIONS SPECIFIED IN THE DRAWINGS.

SURFACE	HORIZONTAL AND VERTICAL TOLERANCE
PRE-CAST CONCRETE STRUCTURES SUBGRADE	PLUS OR MINUS 25 mm
PRE-CAST CONCRETE STRUCTURES INSIDE SLOPES	PLUS OR MINUS 50 mm
TOP OF BERMS	0 TO PLUS 50 mm
CHANNEL BOTTOM	0 TO MINUS 50 mm
CHANNEL INSIDE SLOPES	PLUS OR MINUS 50 mm

4.4 MATERIAL TESTING SHALL BE CARRIED OUT AS INDICATED IN THE SPECIFICATIONS USING CURRENT ASTM STANDARDS AS APPROVED BY THE GEOTECHNICAL ENGINEER.

4.5 THE FOLLOWING CODES AND STANDARDS APPLY TO THE WORK:

- ASTM D2216-10, STANDARD TEST METHODS FOR LABORATORY DETERMINATION OF WATER (MOISTURE) CONTENT OF SOIL AND ROCK BY MASS
- ASTM D6913-17, STANDARD TEST METHODS FOR PARTICLE-SIZE DISTRIBUTION (GRADATION) OF SOILS USING SIEVE ANALYSIS.
- ASTM C117-13, STANDARD TEST METHOD FOR MATERIALS FINER THAN 75-MM (NO. 200) SIEVE IN MINERAL AGGREGATES BY WASHING
- ASTM D6938-17, STANDARD TEST METHODS FOR IN-PLACE DENSITY AND WATER CONTENT OF SOIL AND SOIL-AGGREGATE BY NUCLEAR METHODS (SHALLOW DEPTH)

5. SURVEY

5.1 NYRSTAR WILL PROVIDE SURVEY BENCHMARKS WITH COORDINATES AND ELEVATIONS NEAR THE WORK AREAS.

5.2 ALL SURVEY INFORMATION SHALL BE DELIVERED IN UTM ZONE 10 COORDINATES AND GEODETIC DATUM.

5.3 SURVEY MUST BE PERFORMED BY A QUALIFIED PERSON.

5.4 SURVEY MUST HAVE AN ACCURACY OF ± 80 mm FOR PLAN LOCATIONS AND ± 30 mm FOR ELEVATIONS.

5.5 THE CONTRACTOR SHALL PROVIDE SURVEY CONTROL FOR THE WORK, SURVEY CONTROL INCLUDES:

5.5.1. LAYOUT OF WORK.

5.5.2. PRE-CONSTRUCTION SURVEY.

5.5.3. PREPARED SUB GRADE SURVEYS.

5.5.4. SURVEY TEMPORARY RAMPS OR FILL.

5.6 DEVIATIONS BETWEEN DESIGN AND FIELD LAYOUT MUST BE REPORTED TO THE SITE ENGINEER FOR REVIEW AND APPROVAL.

5.7 SURVEY DATA WILL BE REQUESTED BY THE SITE ENGINEER AS REQUIRED DURING CONSTRUCTION.

5.7.1. SURVEY DATA MUST BE PROVIDED WITHIN 2 WORKING DAYS OF REQUEST.

5.7.2. INTERIM SURVEY DATA MUST BE PROVIDED AS .CSV/.TXT POINT CLOUD FORMAT OR COMPILED .DXF OR .XML FORMAT.

5.7.3. SURVEY FILES SHALL CONSIST OF LABELED POINTS AND BREAKLINES.

5.7.4. SURVEY POINTS SHALL BE NAMED WITH THE NYRSTAR POINT CODE CONVENTION.

5.7.5. SURVEY SHALL INCLUDE AT A MINIMUM: TOP OF SLOPES, TOES OF SLOPES, INVERTS, CENTERLINES. ANY CHANGE IN SLOPE/GRADIENT MUST BE CAPTURED.

5.7.6. FINAL SURVEY DATA MUST BE PROVIDED IN COMPILED .DXF OR .XML FORMAT.

5.8 THE SITE ENGINEER MAY STOP WORK IF SURVEY CONTROL OR DOCUMENTATION IS INSUFFICIENT.

6. EXCAVATION

6.1 SEQUENCE, SCHEDULE, AND PERFORM EXCAVATION AND FILL PLACEMENT OPERATIONS TO MAKE THE BEST USE OF ALL EXCAVATED MATERIAL.

6.2 LOCATE AND PROTECT UTILITY LINES, SURVEY REFERENCE POINTS, INSTRUMENTATION, FENCING, AND OTHER FACILITIES.

6.3 REMOVE AND DISPOSE OF ALL SNOW, SURFACE ICE, AND EXCESS WATER PRIOR TO STARTING THE EXCAVATION.

6.4 EXCAVATION SLOPES INDICATED ON THE DRAWINGS SHALL NOT BE EXCEEDED. THE STEEPER EXCAVATION SLOPES SHALL BE CONFIRMED BY THE SITE ENGINEER.

6.5 THE LOCATION OF EXCAVATION STOCKPILES WILL BE ON SITE AS DEFINED BY THE OWNER OR SITE ENGINEER.

6.6 PROVIDE ALL EXCAVATIONS AT THE LOCATIONS, AND TO THE LINE, GRADES, SLOPES, AND ELEVATIONS SPECIFIED IN THE DRAWINGS.

6.7 PROTECT EXCAVATIONS THROUGHOUT THE WORK BY TEMPORARY SHORING, BRACING, OR OTHER SUITABLE METHODS, IF REQUIRED, TO PROVIDE SAFE WORKING CONDITIONS AND TO PREVENT CAVE-INS AND LOOSE SOIL FROM FALLING INTO THE EXCAVATIONS.

6.8 REMOVE BOULDERS, LOOSE ROCK, SOIL BLOCKS, AND OTHER FRAGMENTS THAT MAY SLIDE OR ROLL INTO EXCAVATED AREAS WHICH, IN THE OPINION OF THE CONTRACTOR, ARE UNSAFE OR APPEAR TO ENDANGER PERSONS, WORK, OR PROPERTY.

6.9 IN COLD WEATHER PROTECT EXCAVATED SURFACES, AGAINST WHICH FILL MATERIALS WILL BE PLACED, FROM FREEZING BY SEQUENCING STRIPPING TO MINIMIZE THE EXPOSED AREA, BY USING A TEMPORARY LAYER OF SOIL OR INSULATING MATERIALS, OR OTHER MEANS AUTHORIZED BY THE SITE ENGINEER. REMOVE PROTECTION ONLY WHEN THE CONTRACTOR IS READY TO PLACE FILL.

6.10 PROVIDE FINISHED EXCAVATION SURFACES THAT ARE SMOOTH, REGULAR, AND UNIFORM.

7. FILL PLACEMENT

7.1 FILL TO BE FREE OF ORGANICS, ROOTS, WOOD, TOPSOIL, ICE, OR OTHER DELETERIOUS MATERIALS.

TABLE 1: GRADATION SPECIFICATIONS FOR FILL MATERIALS

	CRUSHED GRAVEL (NON-PAG)	ZONE A (PAG)
MAXIMUM PARTICLE SIZE	19 mm	300 mm
MAXIMUM FRACTION > 150 mm	0%	40%
SIEVE SIZE (mm)	GRADATION OF FRACTION SMALLER THAN 150 mm PERCENT PASSING BY DRY WEIGHT	
150		100
75		
50		
38		40 - 100
25		
19	100	
13		
10	35 - 77	
5	15 - 55	0 - 55
2		
1	0 - 30	
0.4250		0 - 30
0.0750	0 - 12	0 - 20

7.2 PROVIDE A QUALITY CONTROL PROGRAM TO ENSURE THAT THE SPECIFIED REQUIREMENTS WILL BE CONSISTENTLY ATTAINED THROUGHOUT THE WORK.

7.3 TRANSPORT ONLY SUITABLE MATERIALS MEETING THE SPECIFICATIONS TO THE SITE.

7.4 THE SITE ENGINEER MAY PERFORM TESTING TO ASSURE CONFORMANCE TO THE SPECIFIED REQUIREMENTS ONLY AFTER THE MATERIALS HAVE BEEN PLACED.

7.5 THE SITE ENGINEER MAY REJECT FILL MATERIALS AT THE SOURCE, IN THE TRANSPORT VEHICLE, IN THE STOCKPILE, OR IN PLACE.

7.6 SAMPLES OF EARTHWORKS MATERIALS WILL BE TAKEN BY THE SITE ENGINEER FOR QUALITY ASSURANCE TESTING. THE FREQUENCY OF QUALITY ASSURANCE TESTING WILL BE AS DEEMED NECESSARY BY THE SITE ENGINEER. CO-OPERATE WITH THE SITE ENGINEER DURING SAMPLING AND TESTING. LOAD AND DISPOSE OF SAMPLED MATERIALS WHEN NO LONGER REQUIRED BY THE SITE ENGINEER.

7.7 DO NOT PLACE FILL MATERIAL ON ANY SURFACE UNTIL THE PREPARED SURFACE HAS BEEN INSPECTED BY THE SITE ENGINEER. RECTIFY ANY DEFECTS AS IDENTIFIED BY THE SITE ENGINEER.

7.8 SUSPEND FILL PLACEMENT OPERATIONS AT ANY TIME WHEN, IN THE OPINION OF THE SITE ENGINEER, WORK CANNOT BE PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS ON ACCOUNT OF RAIN, FLOODING, COLD WEATHER, OR OTHER UNSATISFACTORY CONDITIONS. SUSPEND FILL PLACEMENT OPERATIONS WHEN THE ATMOSPHERIC TEMPERATURE IS BELOW 0 C, UNLESS OTHERWISE AUTHORIZED BY THE SITE ENGINEER REPRESENTATIVE. IF NECESSARY, IN THE OPINION OF THE SITE ENGINEER, REMOVE AND REPLACE, OR RE-WORK ANY FILL MATERIAL OR FOUNDATION IMPACTED BY SUCH CONDITIONS.

7.9 COMMENCE PLACEMENT OF FILL MATERIALS AT THE LOWEST ELEVATION OF THE FOUNDATION, AND PROGRESS IN AN UPSLOPE DIRECTION.

7.10 CONDITION, RE-WORK, AND RE-COMPACT OR REMOVE AND REPLACE ANY PORTION OF THE FILL OR FOUNDATION THAT HAS SUFFERED A REDUCTION IN QUALITY DUE TO DRYING, FROST, RAIN, OR ANY OTHER REASON TO THE SPECIFIED REQUIREMENTS BEFORE PLACING SUCCEEDING LAYERS.

7.11 OVERBUILD FINAL FILL SLOPES AND THEN TRIM THEM TO THE LINES, GRADES, AND ELEVATIONS SPECIFIED IN THE DRAWINGS.

7.12 PLACE AND SPREAD FILL MATERIALS IN CONTINUOUS AND APPROXIMATELY HORIZONTAL LAYERS OF UNIFORM THICKNESS IN SUCH A MANNER AS TO PREVENT SEGREGATION AND STRATIFICATION AND TO OBTAIN A HOMOGENEOUS MASS.

7.13 ADD WATER TO THE FILL MATERIAL WHEN ITS MOISTURE CONTENT IS BELOW THAT SPECIFIED. USE METHODS THAT PERMIT WATER TO BE ADDED IN CONTROLLED AMOUNTS AND WHICH DO NOT CAUSE FINER MATERIALS TO BE WASHED OUT. WORK THE WATER INTO THE FILL MATERIAL UNTIL THE SPECIFIED MOISTURE CONTENT IS UNIFORMLY OBTAINED THROUGHOUT THE MATERIAL.

7.14 WHEN THE MOISTURE CONTENT OF THE FILL MATERIAL EXCEEDS THE SPECIFIED LIMITS, DRY THE FILL MATERIAL PRIOR TO COMPACTION BY SPREADING, DISCING, AND HARROWING THE FILL MATERIAL UNTIL THE SPECIFIED MOISTURE CONTENT IS UNIFORMLY OBTAINED THROUGHOUT THE MATERIAL.

7.15 LIFT THICKNESS, MOISTURE CONTENT LIMITS, AND COMPACTION REQUIREMENTS AND DENSITIES TO CONFORM TO THE FOLLOWING:

FILL MATERIAL	MAXIMUM LOOSE LIFT THICKNESS (mm)	MOISTURE CONTENT LIMITS (1)	MINIMUM NUMBER OF PASSES (2)	DENSITY LIMITS (3)
CRUSHED (ROAD) GRAVEL	50	-2% to +1%	2	≥95% SPMDD

(1) MOISTURE CONTENT RANGE ABOVE (+) OR BELOW (-) OPTIMUM MOISTURE CONTENT (ASTM D698). MOISTURE CONTENT AS DETERMINED BY ASTM D2216.

(2) A SINGLE PASS MEANS THE COMPLETE COVERAGE OF THE FILL LIFT, OVERLAP REQUIRED FOR COMPLETE COVERAGE WILL NOT BE CONSIDERED TO PROVIDE ANY PORTION OF A SUBSEQUENT OR PREVIOUS PASS. ACHIEVE BOTH SPECIFIED DENSITY AND THE SPECIFIED MINIMUM NUMBER OF PASSES WITH COMPACTION EQUIPMENT.

(3) STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD) AS DETERMINED BY ASTM D698. MAXIMUM VIBRATED DENSITY (MVD), AS DETERMINED BY ASTM D4253.

7.18 MINIMUM MATERIAL SAMPLING AND TESTING REQUIREMENTS ARE PRESENTED IN TABLE 3.

TABLE 3: MATERIAL SAMPLING AND TESTING

MATERIAL	T1	T2	T3	T4A/T4B
	1 PER (M3)	1 PER (M3)	NO. OF TESTS	1 PER
ZONE A (PAG)	1500 (OR AT LEAST 1 PER DAY)	1500		
CRUSHED GRAVEL (NON-PAG)	500	500	3 (UNDER STRUCTURE ONLY)	LIFT (UNDER STRUCTURE ONLY)

T1 SIEVE ANALYSIS (ASTM C136/C117)
T2 MOISTURE CONTENT (ASTM D2216)
T3 LABORATORY COMPACTION (ASTM D698)
T4A DENSITY BY NUCLEAR METHODS (ASTM D6938)
T4B MOISTURE CONTENT BY NUCLEAR METHODS (ASTM D3017)

8. HIGH DENSITY POLYETHYLENE PIPES

8.1 INSPECT EACH SHIPMENT OF MATERIAL AND TIMELY REPLACE ANY DAMAGED MATERIALS.

8.2 UNLOAD, HANDLE, AND STORE MATERIALS ACCORDING TO THE MANUFACTURER'S WRITTEN INSTRUCTIONS TO PREVENT DAMAGE TO THE PIPE.

8.3 GENERAL: HDPE PIPE, SHALL CONFORM TO ASTM D3350, ASTM D 4976, ASTM F667, ASTM F894, ASTM F2306, OR ASTM F2562 OR TO ANY OTHER REQUIREMENT SPECIFIED HEREIN FOR STORM WATER INSTALLATIONS

8.4 ALLOWABLE PIPE DIAMETERS FOR THIS SPECIFICATION SHALL BE BETWEEN EIGHT (8) INCHES TO FIFTY-FOUR (54) INCHES UNLESS APPROVED BY THE OWNER OR OWNER'S REPRESENTATIVE.

8.5 ALLOWABLE ASTM SPECIFICATIONS: ALL MATERIAL, MANUFACTURING OPERATIONS, TESTING, INSPECTION, AND MAKING OF HDPE PIPE SHALL CONFORM TO THE REQUIREMENTS OF THE APPROPRIATE ALLOWABLE ASTM STANDARD SPECIFICATIONS, LATEST REVISION THEREOF, LISTED IN ARTICLE REFERENCES.

8.6 MARKING:

8.6.1. THE FOLLOWING SHALL BE CLEARLY MARKED ON BOTH THE INTERIOR AND EXTERIOR SURFACE OF THE PIPE:

a) CLASS AND SIZE.

b) DATE OF MANUFACTURE.

c) NAME OR TRADEMARK OF MANUFACTURER.

d) DEFLECTION ANGLE FOR BENDS.

8.7 DIAMETER OF PIPE: THE DIAMETER INDICATED ON THE CONTRACT DOCUMENTS SHALL MEAN THE NOMINAL DIAMETER OF THE PIPE.

8.8 WALL THICKNESS AND CLASS OF PIPE:

8.8.1. THE WALL THICKNESS SHALL COMPLY WITH THE APPROPRIATE ASTM SPECIFICATION AND THE CLASS OF PIPE DESIGNATED ON THE CONTRACT DOCUMENTS.

8.8.2. HDPE PIPE SHALL HAVE A SMOOTH INTERIOR AND EXTERIOR. ALL 8-INCH THROUGH 54-INCH PIPE SHALL MEET THE REQUIREMENTS OF AASHTO M294 TYPE S. THE PIPE SHALL HAVE A FULL CIRCULAR CROSS-SECTION.

STAMP:

ORIGINAL SIGNED BY
GREG STANDEN, P.ENG

REV	D	M	Y	ISSUE / REVISION DESCRIPTION	ENG.	APPR.
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CLIENT: nyrstar

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TITLE: STOCKPILE LONG TERM WATER MANAGEMENT SPECIFICATIONS SHEETS 1 OF 3

DATE: 15 NOV 2017
PROJECT NO: NX14001L.2.400
REV. NO: 0
FIGURE NO: C-0004
SHEET NO: 1 of 1

8.8.3 PIPE AND FITTINGS SHALL BE MADE OF HIGH–DENSITY, HIGH–MOLECULAR WEIGHT POLYETHYLENE MATERIAL MEETING THE REQUIREMENTS OF CELL CLASSIFICATION 324420C OR HIGHER IN ACCORDANCE WITH ASTM D3350. CLEAN REWORK MATERIAL GENERATED BY THE MANUFACTURER'S OWN PRODUCTION MAY BE USED SO LONG AS THE PIPE OR FITTINGS PRODUCED MEET ALL THE REQUIREMENTS OF THIS SPECIFICATION.

8.9 THE GEOTECHNICAL ENGINEER WILL IDENTIFY UNSUITABLE BEARING SOILS WHEN ENCOUNTERED AT THE EARTH FOUNDATION LEVEL. PERFORM EXCAVATION, AS CLASSIFIED BY THE GEOTECHNICAL ENGINEER, TO REMOVE UNSUITABLE BEARING SOILS AND REPLACE WITH FILL MATERIALS AS DIRECTED BY THE ENGINEER.

8.10 COMPACT THE BASE OF THE EXCAVATION TO PROVIDE A FIRM FOUNDATION OF UNIFORM DENSITY BENEATH THE ENTIRE LENGTH OF THE PIPES AND STRUCTURES.

8.11 HDPE PIPE SHALL BE WELDED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS PRIOR TO INSTALLATION.

8.12 DO NOT COMMENCE FILL PLACEMENT UNTIL THE INSTALLED PIPES HAVE BEEN INSPECTED BY THE GEOTECHNICAL ENGINEER. RECTIFY DEFECTS, INCLUDING ANY IDENTIFIED BY THE GEOTECHNICAL ENGINEER.

8.13 PROVIDE THE FILL MATERIAL SPECIFIED IN THE CONTRACT DOCUMENTS, FULLY COMPACT HAUNCHES WITH APPROPRIATE HAND OPERATED EQUIPMENT AND ALL CORRUGATIONS SO THAT DIRECT AND CONTINUOUS CONTACT BETWEEN THE PIPE WALL AND THE FILL MATERIAL IS ATTAINED.

8.14 WITHIN 600 mm OF PIPES, REMOVE ROCKS LARGER THAN 80 mm IN DIAMETER, AND PLACE FILL MATERIAL IN LIFTS NOT EXCEEDING 100 mm IN THICKNESS. COMPACT EACH LIFT USING PNEUMATIC OR MECHANICAL HAND–TAMPING EQUIPMENT.

8.15 PREVENT DAMAGE TO PIPES DURING FILL PLACEMENT. DO NOT PERMIT COMPACTION EQUIPMENT TO COME INTO DIRECT CONTACT WITH THE PIPE.

8.16 BRING FILL AND COMPACTION LAYERS UP SIMULTANEOUSLY AND EVENLY ON BOTH SIDES OF THE PIPES. DO NOT ALLOW CONSTRUCTION EQUIPMENT TO PASS OVER THE PIPE UNTIL A MINIMUM COVER OF 600 mm, OR GREATER IF NECESSARY TO PREVENT DAMAGE TO THE PIPE, OF COMPACTED FILL HAS BEEN PLACED.

8.17 OPERATE COMPACTING EQUIPMENT PARALLEL TO THE LONGITUDINAL AXIS OF THE PIPE, UNTIL SUFFICIENT FILL HAS BEEN PLACED TO ALLOW CONSTRUCTION OF THE EMBANKMENT IN THE NORMAL MANNER.

8.18 PREVENT DISPLACEMENT OF THE PIPE DURING FILL PLACEMENT OPERATIONS OR THROUGH FLOATATION.

8.19 MAINTAIN THE INTERIOR OF THE PIPES FREE OF FOREIGN MATERIAL.

9. PRE–CAST MANHOLE

9.1 SHOP DRAWINGS OF PRE–CAST CONCRETE STRUCTURES, INCLUDING GRATINGS, LADDER RUNGS, TRASH RACKS AND ALL OTHER METAL FABRICATION AND CONNECTION DETAILS, AT LEAST 7 DAYS PRIOR TO FABRICATION. INDICATE ON THE SHOP DRAWINGS MATERIAL SPECIFICATIONS, DIMENSIONS AND ELEVATIONS. THE OWNER OR OWNER'S REPRESENTATIVE WILL REVIEW THE SHOP DRAWINGS WITHIN 2 DAYS EACH TIME THEY ARE SUBMITTED FOR REVIEW, UNTIL SUCH TIME AS THEY ARE APPROVED BY THE OWNER OR OWNER'S REPRESENTATIVE.

9.2 CERTIFIED COPIES OF RESULTS OF TESTS SPECIFIED IN ASTM C478M PRIOR TO DELIVERING ANY PRE–CAST CONCRETE STRUCTURES COMPONENTS TO THE SITE.

9.3 CONCRETE MIX DESIGN PACKAGE INTENDED TO BE USED SHALL INCLUDE THE FOLLOWING AS A MINIMUM AND WILL BE REVIEWED BY THE OWNER OR THE OWNER'S REPRESENTATIVE:

9.3.1. TEST DATA DEMONSTRATING CONFORMANCE OF THE PROPOSED MIX TO THE SPECIFIED PERFORMANCE REQUIREMENTS;

9.3.2. TYPE AND PROPORTIONING (IN PERCENTAGE) OF THE CEMENTING MATERIALS;

9.3.3. CLASS OF EXPOSURE (CONSIDER EXPOSURE TO CLASSES C–1 AND S–2, AND HIGHLY ACIDIC ENVIRONMENTS);

9.3.4. MAXIMUM WATER: CEMENTING MATERIALS RATIO;

9.3.5. MINIMUM COMPRESSIVE STRENGTH AT 7 AND 28 DAYS;

9.3.6. TYPE OF ADMIXTURES

9.3.7. METHOD OF TESTING TO VERIFY STRIPPING STRENGTH;

9.3.8. AIR CONTENT, SLUMP AND TEMPERATURE RANGE;

9.3.9. CURING METHOD;

9.3.10. FINE AND COARSE AGGREGATE GRADING CONFORMING TO TABLES 10 AND 11 OF CSA A23.1–14;

9.3.11. FINE AND COARSE AGGREGATES QUALITY CONFORMING TO TABLE 12 OF CSA A23.1–14;

9.3.12. AGGREGATE ALKALI–AGGREGATE REACTIVITY REPORTS AND MITIGATIVE MEASURES, AS APPROPRIATE;

9.3.13. PROPORTIONING OF FINE AND COARSE AGGREGATES IN PERCENTAGES;

9.3.14. PROPOSED CCIL CERTIFIED QUALITY CONTROL TESTING AGENCY;

9.3.15. PLANT QUALITY MANAGEMENT PLAN;

9.3.16. DETAILED WORK METHOD SPECIFIC TO THIS PROJECT TO INCLUDE INSPECTION & TEST PLAN (ITP) AND INSPECTION FORMS/CHECKLIST/SIGN OFF SHEETS PREPARED SPECIFIC TO THIS PROJECT;

9.3.17. REBAR MILL CERTIFICATE;

9.3.18. LATEST MILL CERTIFICATES FOR THE CEMENT AND OTHER CEMENTING MATERIALS;

9.3.19. PROPOSED PRECONSTRUCTION TRIALS AND MOCK–UPS (REQUIRED BEFORE PROCEEDING WITH THE MANUFACTURING OF PRECAST ELEMENTS FOR PERMANENT WORK).

9.4 PROVIDE PRECAST CONCRETE STRUCTURES IN ACCORDANCE WITH THE FOLLOWING STANDARDS (LATEST REVISION) EXCEPT WHERE SPECIFIED OTHERWISE.

9.5 NATIONAL BUILDING CODE OF CANADA (NBC)

9.6 AMERICAN CONCRETE INSTITUTES (ACI)

9.6.1. ACI 211.1 STANDARD PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL, HEAVYWEIGHT, AND MASS CONCRETE.

9.7 AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

9.7.1. ASTM A276 SPECIFICATION FOR STAINLESS STEEL BARS AND SHAPES.

9.7.2. ASTM A307 SPECIFICATIONS FOR CARBON STEEL BOLTS AND STUDS.

9.7.3. ASTM C260 STANDARD SPECIFICATION FOR AIR–ENTRAINING ADMIXTURES FOR CONCRETE.

9.7.4. ASTM C494 STANDARD SPECIFICATION FOR CHEMICAL ADMIXTURES FOR CONCRETE

9.8 CANADIAN GENERAL STANDARDS BOARD (CGSB)

9.8.1. CAN/CGSB–1.181 READY–MIXED ORGANIC ZINC–RICH COATING.

9.9 CANADIAN STANDARDS ASSOCIATION (CSA)

9.9.1. CAN/CSA–A3000 CEMENTITIOUS MATERIALS COMPENDIUM.

9.9.2. CAN/CSA–A23.1 CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION.

9.9.3. CAN/CSA–A23.2 METHODS OF TEST FOR CONCRETE.

9.9.4. CSA/A23.3 DESIGN OF CONCRETE STRUCTURES.

9.9.5. CAN/CSA–A 23.4 PRECAST CONCRETE – MATERIALS AND CONSTRUCTION.

9.9.6. CSA/G30.5 WELDED STEEL WIRE FABRIC FOR CONCRETE REINFORCEMENT.

9.9.7. CSA/G30.14 DEFORMED STEEL WIRE FOR CONCRETE REINFORCEMENT

9.9.8. CSA/G30.15 WELDED DEFORMED STEEL WIRE FABRIC FOR CONCRETE REINFORCEMENT.

9.9.9. CAN/CSA–G30.18 BILLET–STEEL BARS FOR CONCRETE REINFORCEMENT.

9.9.10. CSA–G40.20 GENERAL REQUIREMENTS FOR ROLLED OR WELDED STRUCTURAL QUALITY STEEL.

9.9.11. CSA–G40.21 STRUCTURAL QUALITY STEEL.

9.9.12. CAN/CSA–G164 HOT–DIP GALVANIZING OF IRREGULARLY SHAPED ARTICLES.

9.10 DURING MANUFACTURE, PERFORM THE FOLLOWING TESTS IN ACCORDANCE WITH CAN/CSA–A23.2 FOR FREQUENCY AND NUMBER OF TEST EACH DAY CONCRETE IS PLACED AS FOLLOWS.

9.10.1. CONCRETE COMPRESSIVE STRENGTH TESTS AT 28 DAYS FOR THE SPECIFIED STRENGTH (1 CYLINDER AT 7 DAYS AND 3 CYLINDERS AT 28 DAYS) FOR EACH CONCRETE MIX PLACED AT A MINIMUM FREQUENCY OF ONE SET PER DAY ON A RANDOMLY SELECTED LOAD. IN ADDITION COMPRESSIVE STRENGTH TESTING SHALL BE CONDUCTED TO VERIFY REQUIRED STRIPPING STRENGTH OF 25 MPa.

9.10.2. SLUMP AND AIR CONTESTS TESTS SHALL BE CONDUCTED PRIOR TO CASTING CONCRETE CYLINDERS.

9.11 DURING THE MANUFACTURING OF THE PRECAST SECTIONS, THE OWNER OR OWNER'S REPRESENTATIVE WILL OR MAY CONDUCT QUALITY ASSURANCE INSPECTIONS AND TESTING TO VERIFY THAT CONCRETE SECTIONS ARE PRODUCED TO THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THE FREQUENCY OF THESE INSPECTIONS AND TESTING WILL VARY DEPENDING ON QUALITY OF THE PRODUCTS AS WORK PROGRESSES. ASSISTANCE FOR CONDUCTING THESE INSPECTIONS AND TESTING SHALL BE PROVIDED AT ALL TIMES.

9.12 QUALITY AUDITS WILL OR MAY ALSO BE CONDUCTED BY THE OWNER OR OWNER'S REPRESENTATIVE TO ENSURE THAT PROJECT QUALITY MANAGEMENT PLAN AND INSPECTION & TESTING PLAN ARE BEING STRICTLY IMPLEMENTED AND THAT ALL QUALITY RECORDS ARE IN PLACE AND ARE KEPT IN ORDER.

9.13 INSPECT EACH SHIPMENT OF MATERIAL AND TIMELY REPLACE ANY DAMAGED MATERIAL.

9.14 HANDLE AND TRANSPORT LARGE PRECAST CONCRETE PANELS IN A VERTICAL POSITION.

9.15 HANDLE ALL PRECAST CONCRETE ELEMENTS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS, UTILIZING THE LIFTING DEVICES AND HOLES PROVIDED.

9.16 DESIGN PRECAST CONCRETE STRUCTURES IN ACCORDANCE WITH CSA–A23.3 AND CAN/CSA–A23.4 TO RESIST THE GOVERNING COMBINATION OF LOADS AND OTHER REQUIREMENTS AS SPECIFIED BELOW:

9.16.1. DEAD LOAD: DUE TO THE SELF–WEIGHT OF THE STRUCTURE. USE A MINIMUM LOAD FACTOR OF 1.25, AND WHERE REQUIRED INCLUDE AN IMPACT FACTOR DUE TO HANDLING.

9.16.2. EARTH LOAD: SATURATED UNIT WEIGHT OF BACKFILL OF 21 KN/M3 AND A LATERAL EARTH PRESSURE COEFFICIENT AT–REST OF 0.5. USE A MINIMUM LOAD FACTOR OF 1.25.

9.16.3. SURCHARGE LOAD: EQUIVALENT TO THE GREATER OF 300 mm OF EARTH SURCHARGE OR DUE TO THE COMPACTION EQUIPMENT TO BE USED FOR BACKFILLING. USE A MINIMUM LOAD FACTOR OF 1.5.

9.16.4. HYDROSTATIC LOADS: PHREATIC LEVEL AT THE FULL SUPPLY LEVEL OR AT THE TOP OF THE CONCRETE WITH WATER IN THE STRUCTURE OR THE STRUCTURE EMPTY. USE A MINIMUM LOAD FACTOR OF 1.25.

9.16.5. OCCUPANCY LIVE LOADS ON PLATFORMS: 4.8 KPa. USE A LOAD FACTOR OF MINIMUM 1.5.

9.16.6. OTHER LIVE LOADS: SNOW, WIND, AND EARTHQUAKE LOADS IN ACCORDANCE WITH THE NBC. USE A MINIMUM LOAD FACTOR OF 1.5.

9.16.7. PROVIDE SOLID WALLS OR SLABS HAVING A MINIMUM UNIFORM THICKNESS OF 150 mm.

9.16.8. PROVIDE A MINIMUM CONCRETE CLEAR COVER FOR REINFORCEMENT OF 50 mm.

9.16.9. DESIGN AND PROVIDE LIFTING HARDWARE AND HOLES IN EACH PRECAST CONCRETE ELEMENT.

9.16.10. CONCRETE REINFORCEMENT: BILLET–STEEL DEFORMED BARS IN ACCORDANCE WITH CAN/CSA G30.18 OR WELDED WIRE IN ACCORDANCE WITH CSA–G30.5, CSA–G30.14 AND CSA–G30.15.

9.17 STRUCTURAL STEEL: IN ACCORDANCE WITH CSA–G40.21, GRADE 400W WITH A MINIMUM ZINC COATING OF 610 G/M2 IN ACCORDANCE WITH CAN/CSA–G164.

9.18 CONNECTION BOLTS: GALVANIZED BOLTS IN ACCORDANCE WITH ASTM A307 AND STAINLESS STEEL BOLTS IN ACCORDANCE WITH ASTM A276 TYPE 304.

9.19 STAINLESS STEEL F–THIMBLE. IN ACCORDANCE WITH CSA–G40.21, GRADE 400W.

9.20 NON–SHRINK CEMENTITIOUS GROUT: SIKA GROUT 212, MASTERFLOW 713, OR STERNSON M–BED STANDARD.

9.21 PROPORTION CONCRETE MIXES IN ACCORDANCE WITH CAN/CSA A23.1 ALTERNATIVE 1 UNDER TABLE 5 OF CSA A23.1 AND CSA A23.2.

9.22 PROVIDE CONCRETE FOR THE PRECAST CONCRETE STRUCTURES IN ACCORDANCE WITH TABLE 4[NOTE: CONSIDER EXPOSURE TO ACIDIC, CHLORIDES AND SULPHATES ENVIRONMENTS(1)]:

TABLE 4: CONCRETE MIX

PROPERTY	REQUIREMENT	STANDARD OR TEST METHOD
CEMENT	TYPE GU OR GUB(1)	CAN/CSA–A3000
CLASS OF EXPOSURE	C1 AND S2	CAN/CSA–A23.1
MAXIMUM WATER/CEMENT RATIO	0.4	
MIN. COMPRESSIVE STRENGTH @ 7 DAYS	25 MPa	CAN/CSA–A23.2–14C
MIN. COMPRESSIVE STRENGTH @ 28 DAYS	35 MPa	CAN/CSA–A23.2–14C
NOMINAL MAXIMUM SIZE OF COARSE AGGREGATE	20 mm	CAN/CSA–A23.2–2A
SLUMP AT DISCHARGE	80 mm +/– 30 mm	CAN/CSA–A23.2–5C
AIR CONTENT	5% to 8%	CAN/CSA–A23.2–4C

NOTE (1) TYPE OF CEMENT AND SUPPLEMENTARY CEMENTING MATERIALS AND PROPORTIONING IN PERCENTAGES SHALL BE PROVIDED IN THE CONCRETE MIX DESIGN PACKAGE SUBMITTAL.

9.23 CONCRETE AGGREGATES: IN ACCORDANCE WITH CAN/CSA–A23.1, AND CONSISTING OF CLEAN, HARD, DENSE, DURABLE, AND UNCOATED SAND PARTICLES AND ROCK FRAGMENTS. AGGREGATES SHALL BE IN CONFORMANCE WITH TABLES 10, 11 AND 12 OF CSA A23.1.

9.24 WATER: CLEAN AND FREE FROM DETRIMENTAL AMOUNTS OF OIL, SILT, SOLUBLE CHLORIDES, ORGANIC MATTER, ACIDS, ALKALIS, AND OTHER DELETERIOUS SUBSTANCES, AND IN ACCORDANCE WITH CAN/CSA–A23.1.

9.25 AIR ENTRAINING ADMIXTURE: IN ACCORDANCE WITH ASTM C260.

9.26 CHEMICAL ADMIXTURE: IN ACCORDANCE WITH ASTM C 494.

9.27 OBTAIN THE OWNER'S AUTHORIZATION PRIOR TO USING ANY OTHER CHEMICAL ADMIXTURES. DO NOT USE CALCIUM CHLORIDE OR ANY ADMIXTURE FORMULATED WITH CALCIUM CHLORIDE.

9.28 INSTALL CONCRETE REINFORCEMENT AND OTHER EMBEDDED PARTS IN ACCORDANCE WITH CAN/CSA–A23.1.

9.29 PRODUCE, PLACE, CURE, AND FINISH CONCRETE IN ACCORDANCE WITH CAN/CSA–A23.1 AND CAN/CSA–A23.4, EXCEPT WHERE SPECIFIED OTHERWISE.

9.30 DO NOT REMOVE PRECAST CONCRETE COMPONENTS FROM THE CASTING FORM BED UNTIL THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 25 MPA.

9.31 CONTINUOUSLY MOIST CURE ALL PRECAST CONCRETE COMPONENTS AT A MINIMUM TEMPERATURE OF 5°C OR STEAM CURE UNTIL THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 25 MPA.

9.32 PROVIDE FINISHED CONCRETE SURFACES THAT ARE SMOOTH, HARD, AND UNIFORMLY TEXTURED, AND FREE OF SURFACE DEFECTS, IRREGULARITIES, AND OTHER IMPERFECTIONS.

9.33 THE OWNER OR OWNER'S REPRESENTATIVE WILL IDENTIFY UNSUITABLE BEARING SOILS WHEN ENCOUNTERED AT THE EARTH FOUNDATION LEVEL. PERFORM EXCAVATION, AS SPECIFIED IN THE CONTRACT DOCUMENTS, PERFORM STRUCTURE OVER–EXCAVATION TO REMOVE UNSUITABLE BEARING SOILS AND REPLACE WITH FILL MATERIALS AS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE.

9.34 COMPACT THE BASE OF THE EXCAVATION TO PROVIDE A FIRM FOUNDATION OF UNIFORM DENSITY BENEATH THE ENTIRE STRUCTURE.

9.35 ASSEMBLE THE PRECAST CONCRETE STRUCTURES IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.

9.36 APPLY A 25 mm DIAMETER BEAD OF JOINT SEALANT BETWEEN ALL CONNECTING PRECAST CONCRETE ELEMENTS TO FORM A WATERTIGHT JOINT. FILL ALL LIFTING HOLES OR UNUSED BOLT HOLES WITH NON_SHRINK CEMENTITIOUS GROUT.

9.37 COMMENCE BACKFILLING OPERATIONS ONLY AFTER THE OWNER HAS INSPECTED THE INSTALLATION. RECTIFY DEFECTS, INCLUDING ANY IDENTIFIED BY THE OWNER.

9.38 PLACE AND COMPACT FILL ADJACENT TO THE STRUCTURE AS SPECIFIED IN THE CONTRACT DOCUMENTS.

9.39 WITHIN 1000 mm OF THE STRUCTURE, REMOVE STONES LARGER THAN 80mm FROM THE FILL MATERIAL. PLACE FILL IN LIFTS NOT EXCEEDING 100 mm IN THICKNESS, AND COMPACT TO THE SPECIFIED DENSITY USING PNEUMATIC OR OTHER MECHANICAL HAND TAMPING EQUIPMENT.

9.40 COMPACT EACH LIFT OF FILL AT THE MOISTURE CONTENT AND TO THE DENSITY SPECIFIED IN SECTION 02331 – FILL PLACEMENT.

9.41 CLEAN THE STRUCTURE OF ANY ACCUMULATIONS OF SOIL AND DEBRIS.

9.42 REPLACE ANY ELEMENT THAT SUFFERS STRUCTURAL DAMAGE INCLUDING CRACKING OR OTHER DAMAGE THAT IN THE OPINION OF THE OWNER OR OWNER'S REPRESENTATIVE, COMPROMISES ITS STRENGTH, PERFORMANCE OR DURABILITY.

9.43 EXAMINE ALL CONCRETE SURFACES AND CLEARLY MARK OUT SPALLED OR OTHER AREAS TO BE REPAIRED. OBTAIN THE OWNER'S AUTHORIZATION OF THE DELINEATED REPAIR AREAS AND THE PROPOSED METHOD AND EQUIPMENT TO BE USED FOR THE REPAIRS PRIOR TO COMMENCING THE WORK.

9.44 COMPLETELY REMOVE ALL DAMAGED CONCRETE DOWN TO SOUND CONCRETE. REMOVE MICROFRACTURED SURFACES RESULTING FROM THE INITIAL CONCRETE REMOVAL PROCESS.

9.45 SAWCUT THE PERIMETER PERPENDICULAR TO THE SURFACE TO A MINIMUM DEPTH OF 25 mm. DO NOT USE ANY REPAIR METHOD THAT PRODUCES A FEATHEREDGE.

9.46 PRIOR TO PLACING REPAIR MORTAR, CLEAN AND DAMPEN THE SURFACES TO OBTAIN A SATURATED SURFACE DRY CONDITION EXCEPT WHERE THE REPAIR TECHNIQUE REQUIRES A DRY SURFACE.

9.47 PLACE THE POLYMERIZED CEMENTITIOUS MORTAR IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS. TREAT THE SURFACE OF THE CONCRETE TO BE REPAIRED WITH A COMPATIBLE ACRYLIC BONDING AGENT AS AUTHORIZED BY THE OWNER OR OWNER'S REPRESENTATIVE PRIOR TO MORTAR FILLING.

9.48 CONSTRUCT THE REPAIR AREA SLIGHTLY PROUD OF THE GENERAL SURFACE AND THEN GRIND IT TO MATCH.

9.49 FOLLOWING REPAIRS, PROMPTLY INITIATE CURING AND PROTECTION IN ACCORDANCE WITH CAN/CSA–A23.1.

9.50 PROVIDE COMPLETED REPAIR AREAS THAT ARE TIGHTLY BONDED TO THE UNDERLYING CONCRETE, AND ARE FREE OF SHRINKAGE CRACKS OR HOLLOW VOID AREAS.

9.51 REPAIR DAMAGED GALVANIZED SURFACES WITH A ZINC–RICH PAINT THAT IS IN ACCORDANCE WITH CAN/CGSB–1.181.

9.52 POWER TOOL CLEAN SURFACES TO BE REPAIRED TO A BRIGHT METAL SURFACE. APPLY MULTIPLE COATS OF ZINC–RICH PAINT IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS TO OBTAIN A MINIMUM DRY FILM THICKNESS OF 50 MICRONS OR GREATER WHERE REQUIRED BY THE PAINT MANUFACTURER.

10. RIPRAP

10.1 GRADATION OF RIPRAP SHALL NOT BE ALLOWED TO DEVIATE FROM THE SPECIFIED GRADATIONS IN TABLE 5.

TABLE 5: CLASS 500 KG PAG RIPRAP SPECIFICATIONS

		Class 10
Nominal Mass	Kg	**10**
Nominal Diameter	mm	**195**
0% heavier than:	Kg mm	**37** **300**
15% heavier than:	Kg mm	**30** **280**
50% heavier than:	Kg mm	**10** **195**
85% heavier than:	Kg mm	**1** **90**

1. Riprap rock sizes are based on a specific gravity of 2.64

10.1. RIPRAP SHALL BE SOUND, HARD, ANGULAR, DURABLE PARTICLES FREE FROM SILT, CLAY, SHALE, SANDSTONE, FLAKY PARTICLES, TOPSOIL, ORGANIC MATTER, AND OTHER DELETERIOUS MATERIALS.

10.2. DO NOT PLACE RIPRAP UNTIL THE RECEIVING SURFACES HAVE BEEN INSPECTED BY THE SITE ENGINEER. RECTIFY DEFECTS, INCLUDING ANY IDENTIFIED BY THE SITE ENGINEER.

10.3. PLACE RIPRAP OR RIPRAP BEDDING BY BACKHOE OR SIMILAR LIFTING EQUIPMENT. DO NOT END–DUMP AND PUSH RIPRAP AND RIPRAP BEDDING INTO PLACE.

10.4. RIPRAP SHALL BE PLACED WITH CARE AS TO NOT DAMAGE THE SUBGRADE OR GEOTEXTILE. ROCKS SHOULD NOT BE DROPPED FROM A HEIGHT GREATER THAN 300 MM.

10.5. PLACE RIPRAP OR RIPRAP BEDDING AT THE LOCATIONS, AND TO THE LINES, GRADES, AND ELEVATIONS SPECIFIED IN THE DRAWINGS.

10.6. SURFACES TO RECEIVE RIPRAP AND RIPRAP BEDDING MAY BE FROZEN, BUT REMOVE WATER, SNOW, ICE, FROZEN LUMPS, AND OTHER DELETERIOUS MATERIALS FROM RECEIVING SURFACES.

10.7. PLACE RIPRAP IN A CLOSELY PACKED ARRANGEMENT SUCH THAT SMALLER ROCKS FILL THE VOIDS BETWEEN LARGER ROCKS AND THERE ARE NO UNFILLED SPACES THAT WOULD PERMIT THE ESCAPE OF UNDERLYING LAYERS OF PLACED MATERIALS. INTERLOCK PARTICLES AND DRESS SLOPES AS REQUIRED.

10.8. DO NOT CAUSE SEGREGATION, PARTICLE DAMAGE, BREAKDOWN, OR EXCESSIVE DISPLACEMENT OF THE PREVIOUSLY PLACES RIPRAP. REPLACE OR REPAIR DAMAGED OR DISPLACED MATERIAL.

10.9. PLACE RIPRAP WITHIN A TOLERANCE OF +50 MM OF THE SPECIFIED THICKNESS AND WITHIN A TOLERANCE OF +50 MM OF THE SPECIFIED ELEVATION.

10.10. PLACE RIPRAP BEDDING MATERIAL TO WITHIN A TOLERANCE OF +50 MM OF THE SPECIFIED THICKNESS AND WITHIN A TOLERANCE OF +50 MM OF THE SPECIFIED ELEVATION.

STAMP:

ORIGINAL SIGNED BY
GREG STANDEN, P.ENG

REV	D	M	Y	ISSUE / REVISION DESCRIPTION	ENG.	APPR.
6						
5						
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3						
2						
1	15	11	2017	ISSUED FOR CONSTRUCTION	JS	GS

amec foster wheeler

CLIENT: nyrstar

Amec Foster Wheeler
Environment & Infrastructure
Suite 600 - 4445 Lougheed Highway, Burnaby, BC V5C 0E4
Tel: 1-604-294-3811 Fax: 1-604-294-4664

DRAWN BY: KL
CHECKED BY: HM
DATUM: NAD 83
PROJECTION: UTM Zone 10
SCALE: N/A

PROJECT: MYRA FALLS

TITLE: STOCKPILE LONG TERM WATER MANAGEMENT SPECIFICATIONS SHEETS 2 OF 3

DATE: 15 NOV 2017
PROJECT NO: NX14001L2.400
REV. NO: 0
FIGURE NO: C-0005
SHEET NO: 1 of 1

11. GEOTEXTILE

11.1. GEOTEXTILE SHALL BE NON-WOVEN, NEEDLE PUNCHED, COMPOSED OF A MINIMUM OF 85% POLYPROPYLENE OR POLYESTER POLYMERS, FORMULATED TO RESIST DETERIORATION BY ULTRAVIOLET EXPOSURE AND FREE OF MANUFACTURING DEFECTS, CUTS, TEARS, OR ANY OTHER PHYSICAL DAMAGE, THAT MEETS OR EXCEEDS THE FOLLOWING PHYSICAL PROPERTIES.

TABLE 6: MINIMUM REQUIREMENTS FOR GEOTEXTILE PROPERTIES

Property	LP12	LP16	Test Method
Puncture (N)	3,510	4,560	ASTM D6241
Grab Strength (N)	1,330	1,690	ASTM D4632
Grab Tensile Strength (N)	50	50	ASTM D4632
Trapezoidal Tear Strength (N)	511	623	ASTM D4533
Mullen Burst Strength (kPa)	4500	4500	ASTM D3786
Apparent Opening Size (μm)	150	150	ASTM D4751
Permittivity(sec-1)	0.8	0.7	ASTM D4491
Flow Rate (L/min/m2)	2,650	2,035	ASTM D4491

11.2. DO NOT PLACE GEOTEXTILE UNTIL THE PREPARED SUBGRADE SURFACES HAVE BEEN INSPECTED BY THE GEOTECHNICAL ENGINEER. RECTIFY ANY DEFECTS AS REQUIRED BY THE SITE ENGINEER.

11.3. PLACE THE GEOTEXTILE IN A SMOOTH, WRINKLE-FREE AND SLACK CONDITION TO CONFORM TO THE CONTOUR OF THE SUBGRADE WITHOUT BECOMING TAUT WHEN COVERED WITH THE SPECIFIED MATERIAL. WHERE REQUIRED TO CONFORM TO THE SUBGRADE, PROVIDE FOLDS IN THE GEOTEXTILE. FOLDS SHOULD BE ORIENTED IN THE DOWNSLOPE AND DOWNSTREAM DIRECTION.

11.4. DO NOT ALLOW ANY EQUIPMENT TO OPERATE DIRECTLY ON THE GEOTEXTILE OR ON OVERLYING MATERIAL (I.E. RIPRAP).

11.5. PLACE THE GEOTEXTILE WITH THE LONGITUDINAL SEAM PARALLEL TO THE UPSTREAM TO DOWNSTREAM OR LONGITUDINAL DIRECTION.

11.6. COVER THE GEOTEXTILE WITHIN 2 DAYS OF INSTALLATION WITH THE SPECIFIED MATERIAL.

12. EXECUTION

12.1. SITE PREPARATION

12.1.1. THE WORK AREA SHALL BE CLEARED OF STOCKPILED MATERIALS, LOOSE PILES, AND OTHER DELETERIOUS MATERIAL INCLUDING BOULDERS LARGER THAN 300 mm AND LOOSE MATERIAL ACCUMULATED ON OR AT THE TOES OF EXISTING SLOPES.

12.1.2. MATERIAL REMOVED FROM THE WORK AREA SHALL BE DISPOSED OF OR STOCKPILED IN AREAS DESIGNATED BY NYRSTAR. LOADS OF DIFFERENT TYPES OF MATERIAL SHALL BE DISPOSED OF OR STOCKPILED SEPARATELY.

12.1.3. THE EXISTING DAM CREST SHALL BE FULLY SCARIFIED TO A MINIMUM DEPTH OF 200 mm, EXCEPT WITHIN 1 M OF EXISTING VIBRATING WIRE CABLES. SCARIFICATION SHALL NOT BE CARRIED OUT WITHIN 1 M OF INSTRUMENTATION CABLES. THE FIRST LIFT OF FILL SHALL NOT BE THICKER THAN 450 mm LESS THE DEPTH OF SCARIFICATION. ALTERNATELY, REMOVE A MINIMUM OF 200 mm OF THE EXISTING SURFACE EXCEPT WITHIN 1 M OF INSTRUMENTATION CABLES. REMOVED FILL MAY BE REUSED PROVIDED IT MEETS MATERIAL SPECIFICATIONS.

13. PROTECTION OF WORK

13.0.1. DO NOT ALLOW WATER TO FLOW THROUGH OR POND IN THE WORK AREA.

13.0.2. MAINTAIN SLOPES AND GRADES SUCH THAT WATER DRAINS AWAY FROM WORK AREA.

13.0.3. IF WORK IS DAMAGED BY RAIN, PONDED WATER, SURFACE RUNOFF, FREEZING, DRYING OR CONSTRUCTION ACTIVITIES, THE DAMAGED MATERIAL MUST BE REMOVED AND REWORKED TO THE APPROVAL OF THE SITE ENGINEER.

13.0.4. AS NECESSARY, COVER FILL OR EXCAVATIONS WITH PLASTIC TO MINIMIZE DRYING OR WETTING.

13.0.5. AS NECESSARY, COVER FILL OR EXCAVATIONS WITH INSULATED TARPS OR TEMPORARY BACKFILL TO MINIMIZE FREEZING.

13.0.6. IF WORK IS TO BE STOPPED, LEAVE WORK AREA PROTECTED TO AVOID DAMAGE. PROTECTION MAY REQUIRE COMPACTION OF PLACED FILL AND SMOOTHENING AND GRADING OF SURFACES.

13.1. FULL TIME MONITORING BY THE SITE ENGINEER IS REQUIRED FOR WORK WITHIN 50 M OF THE TOE OF THE EXISTING DAM. COORDINATE WITH THE SITE ENGINEER TO SCHEDULE THIS WORK.

13.2. ACCESS RAMPS AND ROADS

13.2.1. THE CONTRACTOR MAY CONSTRUCT ACCESS RAMPS TO CARRY OUT THE WORK. ACCESS RAMPS MAY NOT HAVE CUT OR FILL SLOPES STEEPER THAN 1.5H:1V. ACCESS RAMPS WHICH REQUIRE CUTS INTO THE FINISHED RAISE GEOMETRY REQUIRE PRIOR APPROVAL BY THE GEOTECHNICAL ENGINEER.

13.2.2. ACCESS RAMPS MAY NOT BE COVERED IN THE COURSE OF THE WORK UNLESS THEY ARE BUILT ON APPROVED FOUNDATION OR APPROVED FILLS USING MATERIALS AND FILL PLACEMENT METHODS AS DESCRIBED HEREIN.

13.2.3. ACCESS RAMPS MUST BE REMOVED BY THE END OF THE CONSTRUCTION SEASON UNLESS THEY ARE BUILT USING MATERIALS AND FILL PLACEMENT METHODS AS DESCRIBED HEREIN.

14. QUALITY CONTROL

14.1. QUALITY CONTROL WILL CONSIST OF SURVEY CHECKS, VISUAL INSPECTION, FIELD TESTING, AND SAMPLING OF MATERIALS FOR LABORATORY TESTING.

14.2. THE CONTRACTOR WILL ASSIST THE ENGINEER(S) WITH FIELD TESTS AND THE COLLECTION OF MATERIAL SAMPLES, AS REQUIRED.

14.3. THE CONTRACTOR WILL COOPERATE WITH THE ENGINEER(S) DURING QUALITY CONTROL REVIEWS AND CORRECT DEFICIENCIES.

14.4. FILL MATERIALS WILL BE TESTED FOR DENSITY AND MOISTURE ACCORDING TO ASTM D6938-17. BACKSCATTER METHODS SHALL BE USED FOR ANY MATERIALS HAVING MORE THAN 35% RETAINED ON THE 19 mm SCREEN. INFORMATION GATHERED USING NUCLEAR METHODS SHALL BE CONSIDERED GUIDANCE IN JUDGING SUITABLE MOISTURE CONTENT AND COMPACTIVE EFFORT.

14.5. FILL MATERIALS SHALL BE SAMPLED OR INSPECTED PRIOR TO PLACEMENT. TESTING REQUIREMENTS SHALL BE SPECIFIED BY THE SITE ENGINEER.

14.6. FILL MATERIALS SHALL BE TESTED FOR GRADATION ACCORDING TO BY ASTM D6913-17 AND C117-13 AND MOISTURE CONTENT ACCORDING TO ASTM D2216-10.

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Amec Foster Wheeler
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Suite 600 - 4445 Lougheed Highway, Burnaby, BC V5C 0E4
Tel: 1-604-294-3811 Fax: 1-604-294-4664

DRAWN BY: KL
CHECKED BY: HM
DATUM: NAD 83
PROJECTION: UTM Zone 10
SCALE: N/A

PROJECT: MYRA FALLS

TITLE: STOCKPILE LONG TERM WATER MANAGEMENT
SPECIFICATIONS
SHEETS 3 OF 3

DATE: 15 NOV 2017
PROJECT NO: NX14001L.2.400
REV. NO: 0
FIGURE NO: C-0005
SHEET NO: 1 of 1

311500

311750

5494750

1 / 1002

C / 2001

2 / 1002

1m WIDE FLAT BOTTOM DITCH
SEE TYPICAL SECTION

EXIST. DITCH

0+977.10

610mm (24") HDPE PIPE

355

INTERIM SPILLWAY

HEAD WALL, SEE DWG. C-2003 FOR DETAILS

CULVERT TO BE REMOVED BY CLOSURE SPILLWAY WORKS (TYP)

1+000

1+020

MH#1
SEE DWG C-2002
FOR DETAILS

MH#2
SEE DWG C-2002
FOR DETAILS

POWER HOUSE

EXIST. DITCH

LYNX TAILINGS DISPOSAL FACILITY (LYNX TDF)

PROPOSED STOCKPILE FOOTPRINT

350

LIMIT OF TRENCH EXCAVATION (TYP)

CONCEPTUAL CLOSURE SPILLWAY ALIGNMENT

1+040

1+060

1+080

1+100

1+120

1+140

810mm (32") HDPE DR17 PIPE

FRENCH DRAIN CONNECTS TO MH#3

350

MH#3
SEE DWG C-2002
FOR DETAILS

345

EXISTING DAM CREST (EL 356.8 m)

355

350

345

340

APPROXII STOCKPILE EXPANSION

EXIST. DITCH

ROAD CROSSING SEE TYPICAL SECTION

B / 2001

345

EXIST. DITCH

PIPELINE OUTFALL
SEE DWG C-2004
FOR LOCATION DETAILS

FUTURE 810mm (32") HDPE PIPE CROSSING SPILLWAY CHANNEL. SEE NOTE 2

EXISTING CULVERTS TO BE REMOVED BY CLOSURE SPILLWAY WORKS (TYP)

340

EXIST. DITCH

CONCEPTUAL CLOSURE SPILLWAY ALIGNMENT

PLAN
1:500

0m 5 10 15 20 25
1:500

NOTE:
1. CONTOUR INTERVAL IS 1.0m.
2. APPROXIMATE PROPOSED CLOSURE SPILLWAY CROSSING LOCATION. DETAILED DESIGN OF CROSSING TO BE CARRIED OUT IN CONJUNCTION WITH CLOSURE SPILLWAY.

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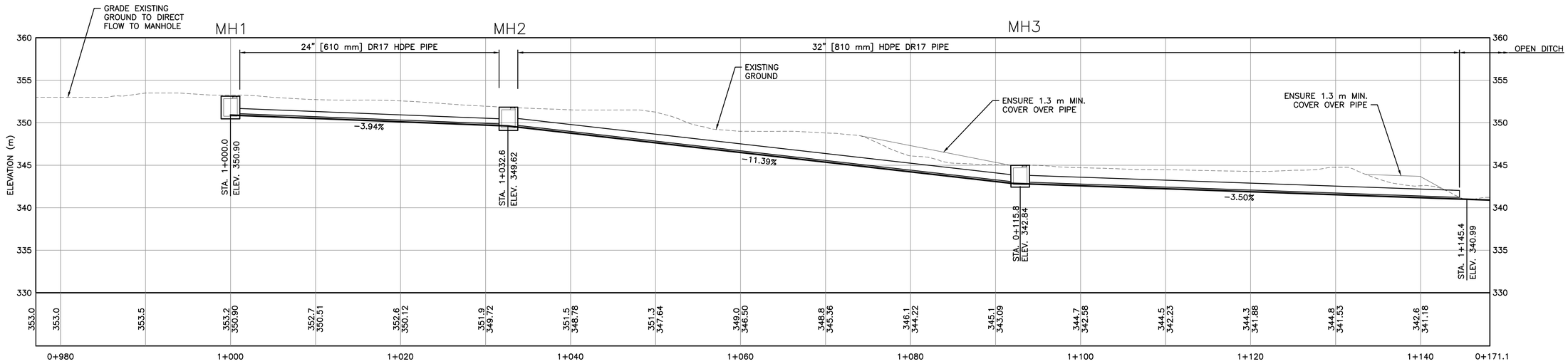
DATUM: NAD 83
PROJECTION: UTM Zone 10
SCALE: 1:500

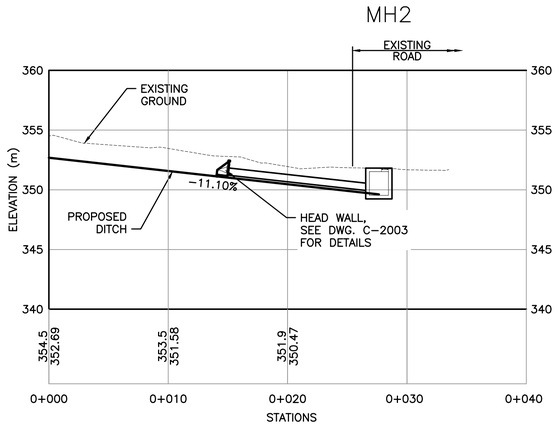
PROJECT: MYRA FALLS

TITLE: STOCKPILE LONG TERM WATER MANAGEMENT GENERAL ARRANGEMENT PLAN

DATE: 15 NOV 2017
PROJECT NO: NX14001L.2.400
REV. NO: 0
FIGURE NO: C-1001
SHEET NO: 1 of 1



HDPE PIPE AND MANHOLE PROFILE (1/1001)



OPEN DITCH PROFILE (2/1001)

0m 2.5 5 7.5 10 12.5
1:250

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DATUM: NAD 83
PROJECTION: UTM Zone 10
SCALE: AS SHOWN

PROJECT: MYRA FALLS

TITLE: STOCKPILE LONG TERM WATER MANAGEMENT PROFILES

DATE: 15 NOV 2017
PROJECT NO: NX14001
REV. NO: 0
FIGURE NO: C-1002
SHEET NO: 1 of 1

P:\CAD\CIV\C-1002.dwg – C-1002 – Nov. 15, 2017 5:29pm – kevin.lin

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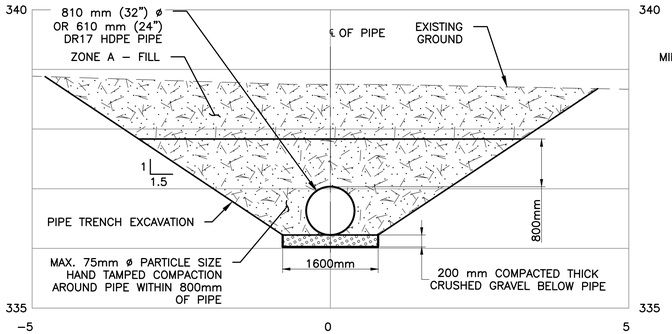
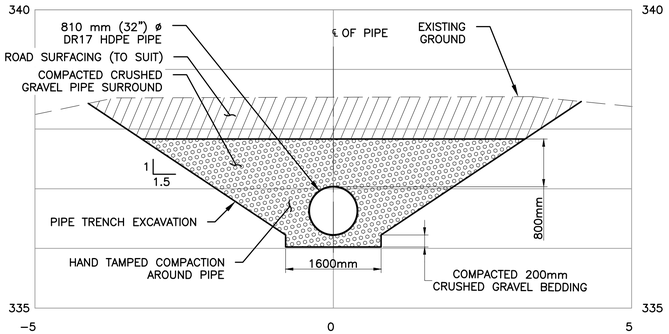


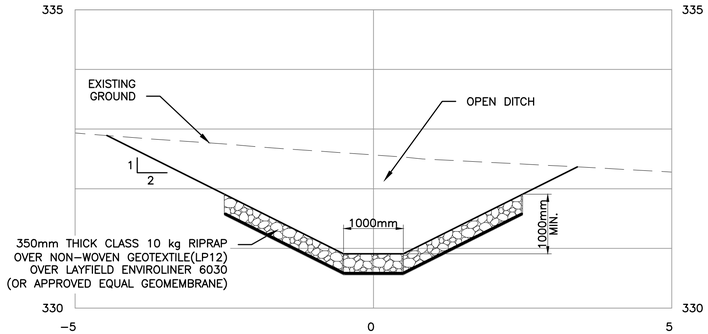
GENERAL BACKFILL

SECTION A 1:50 — 1001



ROAD CROSSING

SECTION B 1:50 — 1001



OPEN DITCH

SECTION C 1:50 — 1001

0m 0.5 1 1.5 2 2.5
1:50

NOTE:
1 -

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SCALE: AS SHOWN

PROJECT: MYRA FALLS

TITLE: STOCKPILE LONG TERM WATER MANAGEMENT
TYPICAL SECTIONS

DATE: 15 NOV 2017
PROJECT NO: NX14001L.2.400
REV. NO: 0
FIGURE NO: C-2001
SHEET NO: 1 of 1

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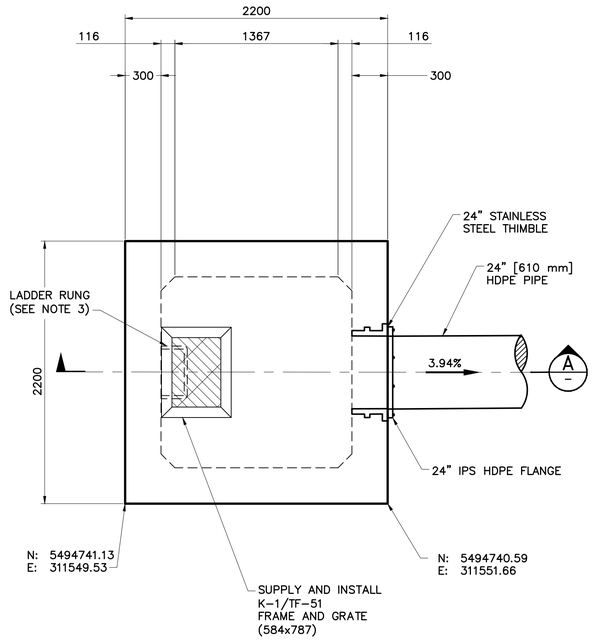
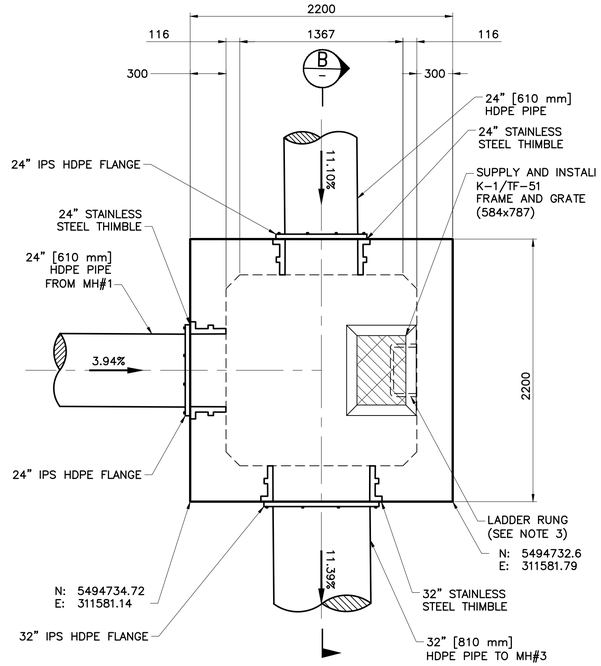
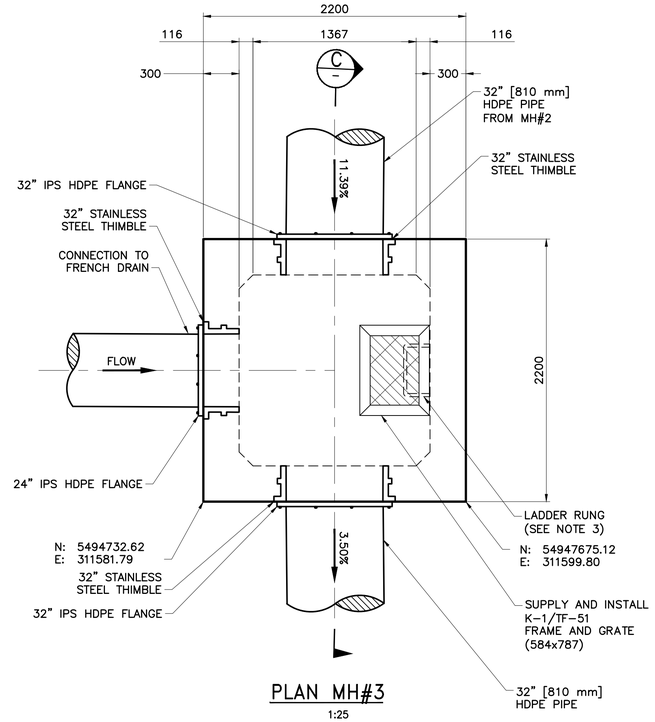


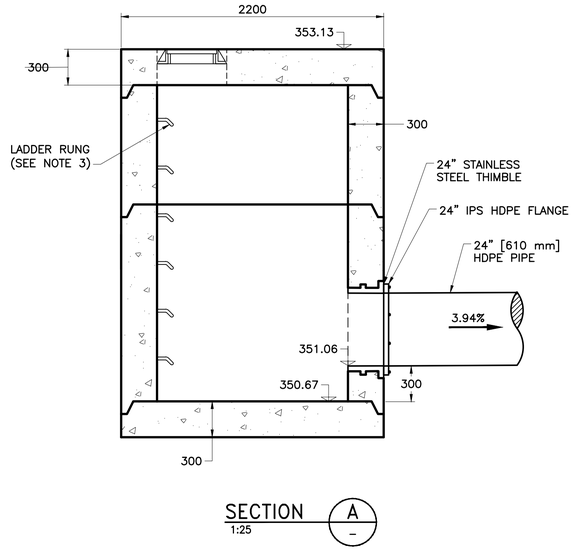
PLAN MH#1
1:25



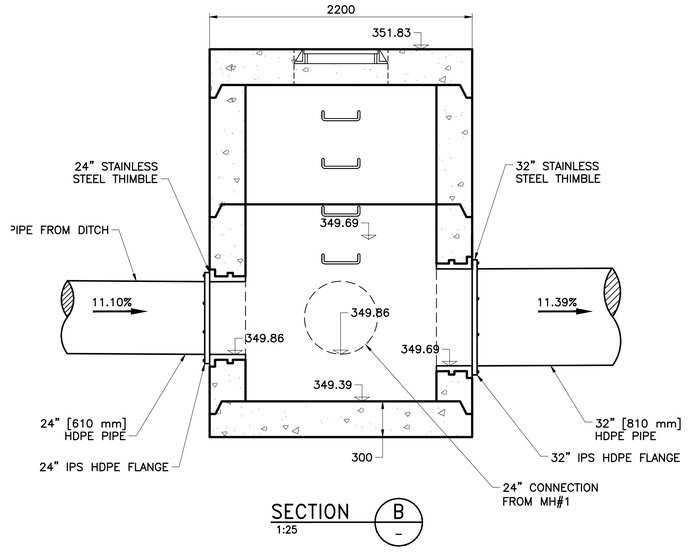
PLAN MH#2
1:25



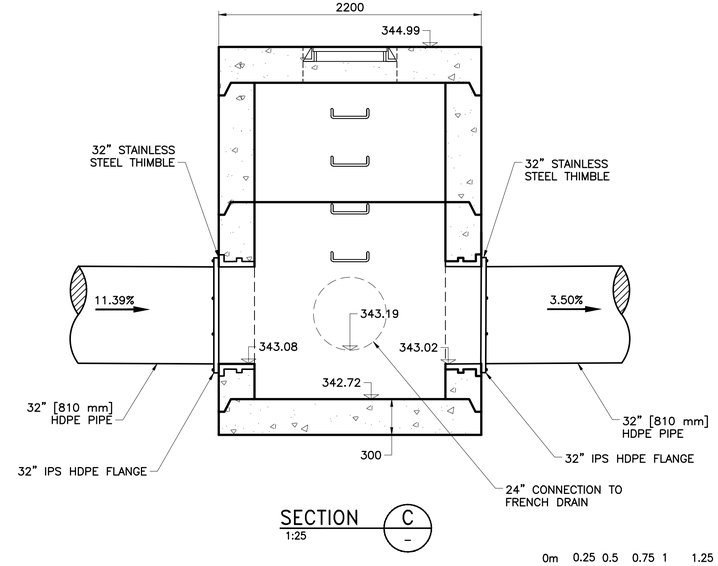
PLAN MH#3
1:25



SECTION A
1:25



SECTION B
1:25



SECTION C
1:25

0m 0.25 0.5 0.75 1 1.25
1:25

NOTES:

1. ALL ELEVATIONS ARE IN METERS AND ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. REFER TO DRAWING C-002, FOR CONSTRUCTION NOTES AND DRAWING C-004, FOR SPECIFICATIONS.
3. USE POLYETHYLENE COATED ALUMINUM TUBING LADDER RUNG; CONFORMING TO ASTM C478 AND AS SUPPLIED BY MSU MISSISSAUGA LTD. OR LAFARGE CANADA LTD.

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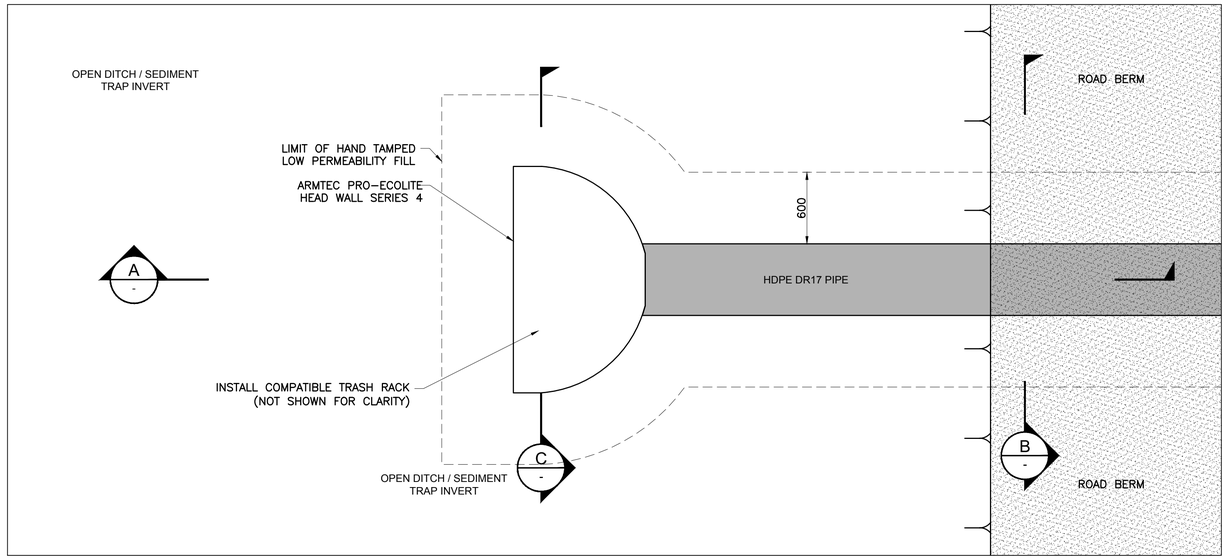
PROJECT: MYRA FALLS

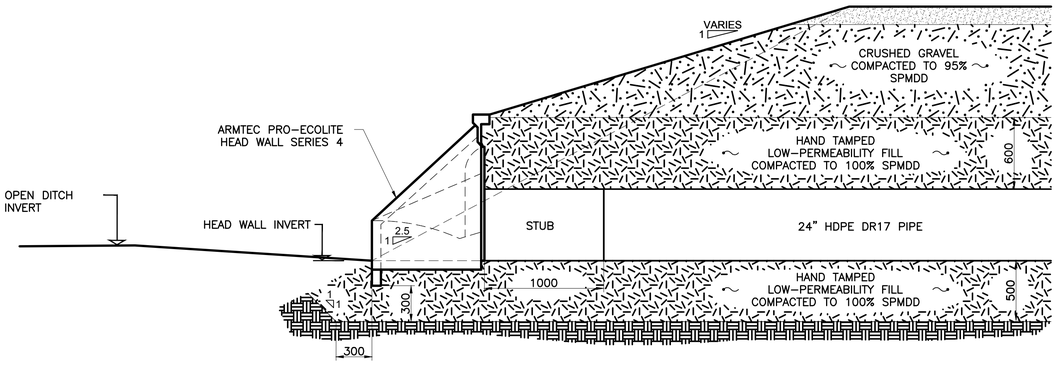
TITLE: STOCKPILE LONG TERM WATER MANAGEMENT
MANHOLE
PLAN AND SECTIONS

DATE: 14 NOV 2017
PROJECT NO: NX14001L.2.400
REV. NO: 0
FIGURE NO: C-2002
SHEET NO: 1 of 1



PLAN – HEAD WALL / TRASH RACK / SLUICE GATE

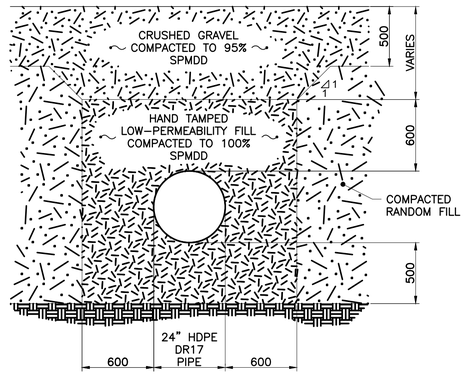
1:25



SECTION A

1:25

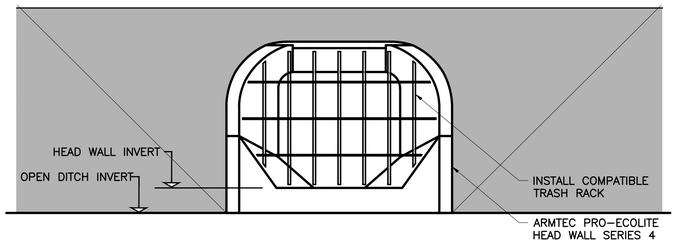
HEAD WALL (EARTHWORKS)



SECTION B

1:25

HEAD WALL (EARTHWORKS)



SECTION C

1:25

HEAD WALL
(FRONT ELEVATION)

0m 0.25 0.5 0.75 1 1.25

1:25

NOTE:
1 -

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SCALE: AS SHOWN

PROJECT: MYRA FALLS

TITLE: STOCKPILE LONG TERM WATER MANAGEMENT
HEAD WALL
PLAN AND TYPICAL SECTIONS

DATE: 14 NOV 2017
PROJECT NO: NX14001L.2.400
REV. NO: 0
FIGURE NO: C-2003
SHEET NO: 1 of 1

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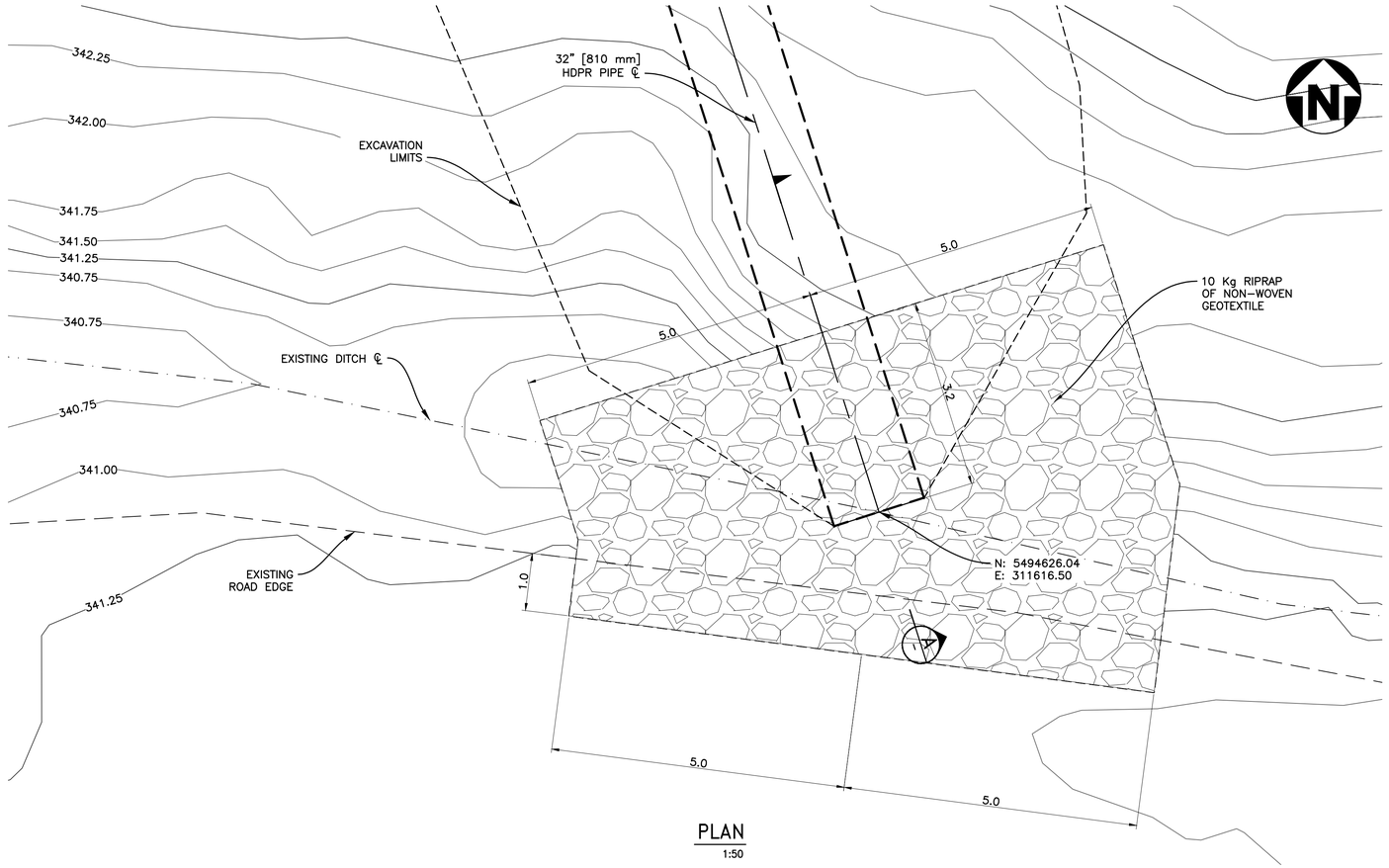
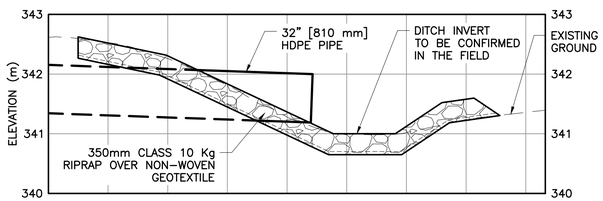


PLAN
1:50



SECTION A
1:50

0m 0.5 1 1.5 2 2.5
1:50

NOTE:
1. CONTOUR INTERVAL IS 0.25 m.

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SCALE: 1:500

PROJECT: MYRA FALLS

TITLE: STOCKPILE LONG TERM WATER MANAGEMENT
PIPE OUTLET
PLAN AND SECTION

DATE: 15 NOV 2017
PROJECT NO: NX14001L.2.400
REV. NO: 0
FIGURE NO: C-2004
SHEET NO: 1 of 1