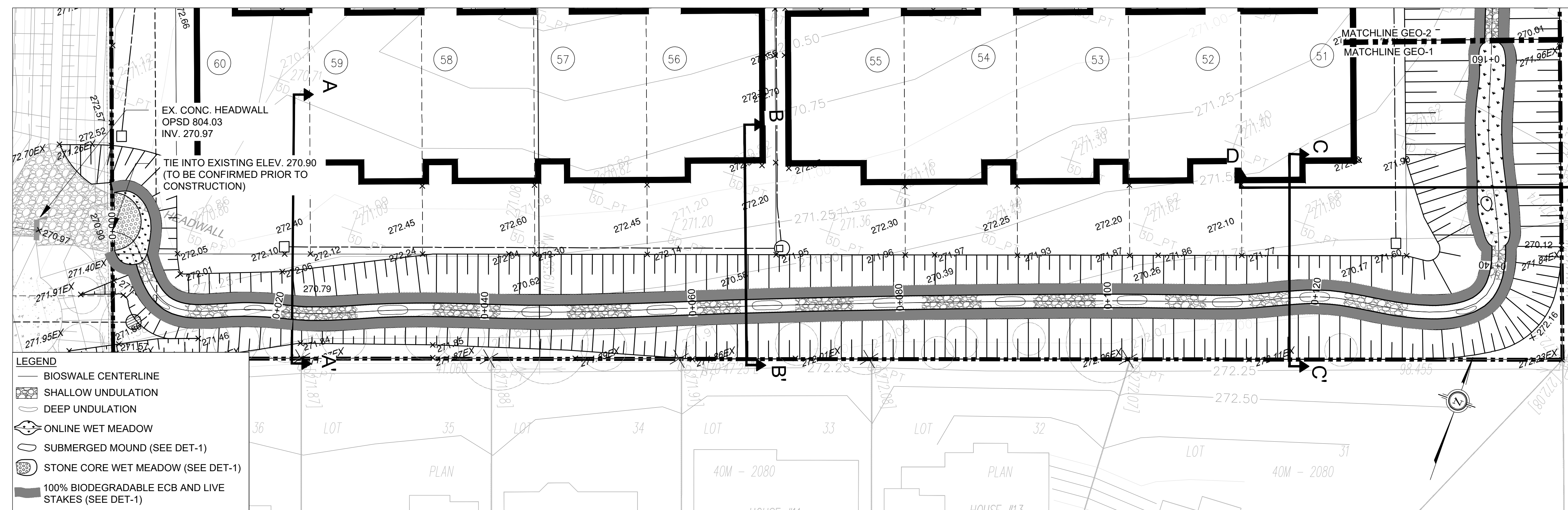
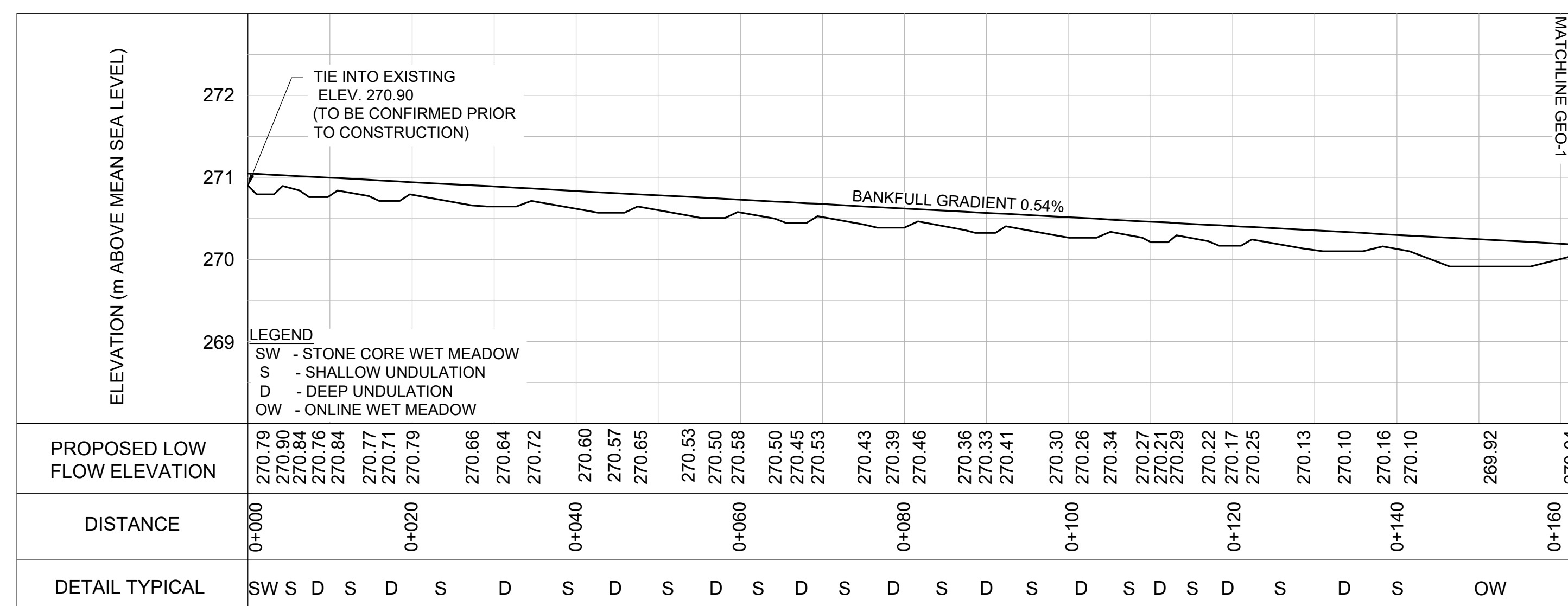


KEY MAP  
N.T.S.



PLANFORM  
1:250



PROFILE  
H = 1:500; V=1:50

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1. ALL CONSTRUCTION EQUIPMENT AND MATERIALS (IMPORTED OR EXCAVATED) MUST BE STORED AT LEAST 30 m AWAY FROM ANY WATERBODY IN A STABLE AREA ABOVE THE ACTIVE FLOODPLAIN, OR IN A DESIGNATED STAGING/STORAGE AREA.
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3. STOCKPILES MUST BE LOCATED OUTSIDE THE ISOLATED WORK AREAS.
4. STABILIZE STOCKPILED SOILS THAT ARE STORED FOR PROLONGED PERIODS WITH THE APPLICATION OF A NURSE CROP AT A RATE OF 60 KG/HA.
5. STABILIZE TEMPORARILY OR PERMANENTLY ANY DISTURBED AREAS AS WORK PROGRESSES, OR SOON AS CONDITIONS ALLOW - ON SOILS THAT WILL BE EXPOSED FOR PROLONG PERIODS, TEMPORARILY INSTALL A BIODEGRADABLE EROSION CONTROL BLANKET ON EXPOSED SOILS, OR APPLY A NURSE CROP AT A RATE OF 60 KG/HA.
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DELETERIOUS SUBSTANCE CONTROL/SPILL MANAGEMENT

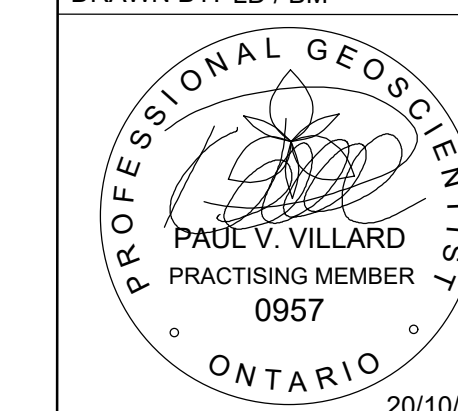
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DESIGNED BY: PV	CHECKED BY: PV
DRAWN BY: LD / BM	DATE: OCTOBER 27, 2020



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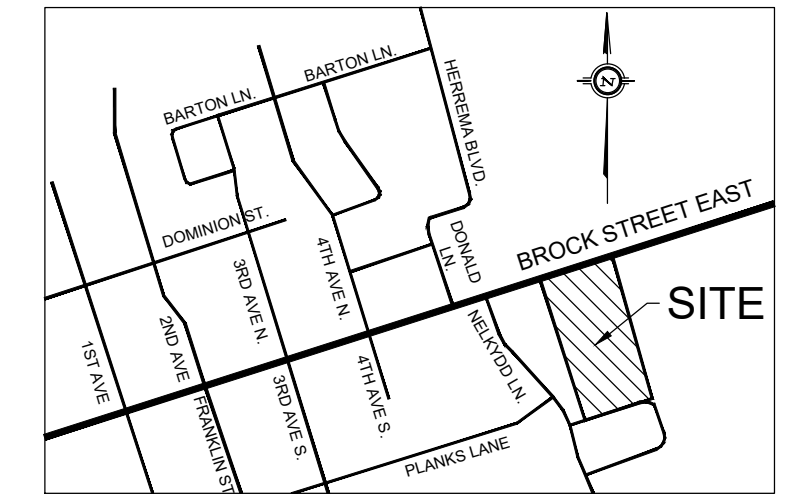
226 BROCK STREET EAST  
WESTLANE DEVELOPMENT GROUP LTD.

BIOSWALE DESIGN  
PLANFORM AND PROFILE

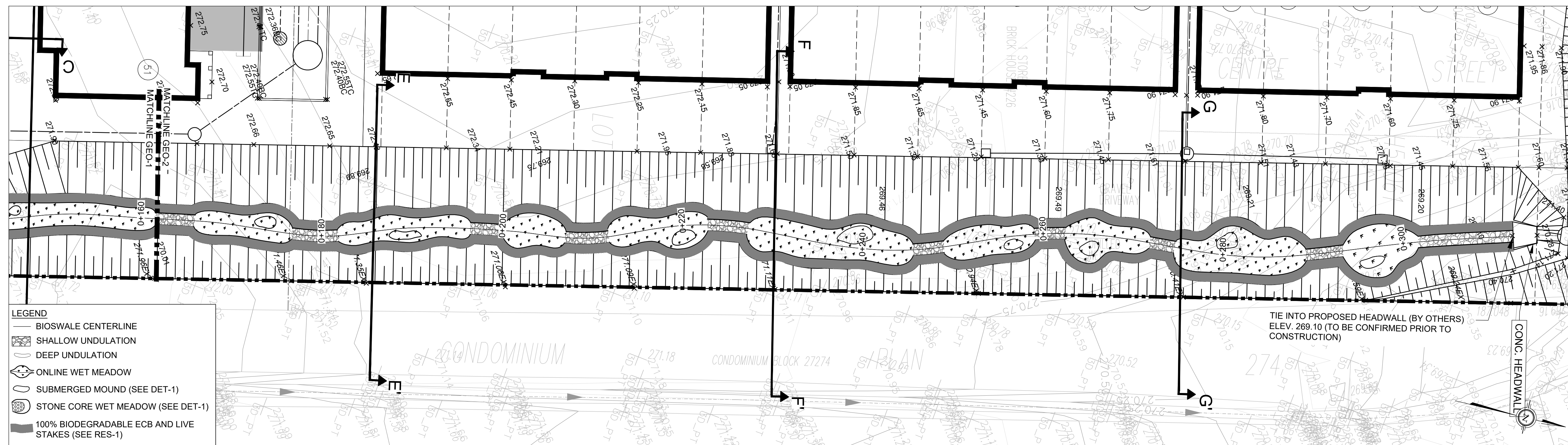
NOT FOR CONSTRUCTION

PROJECT No.: 20094	DRAWING No.: GEO-1
SCALE: AS NOTED	SHEET 1 OF 6





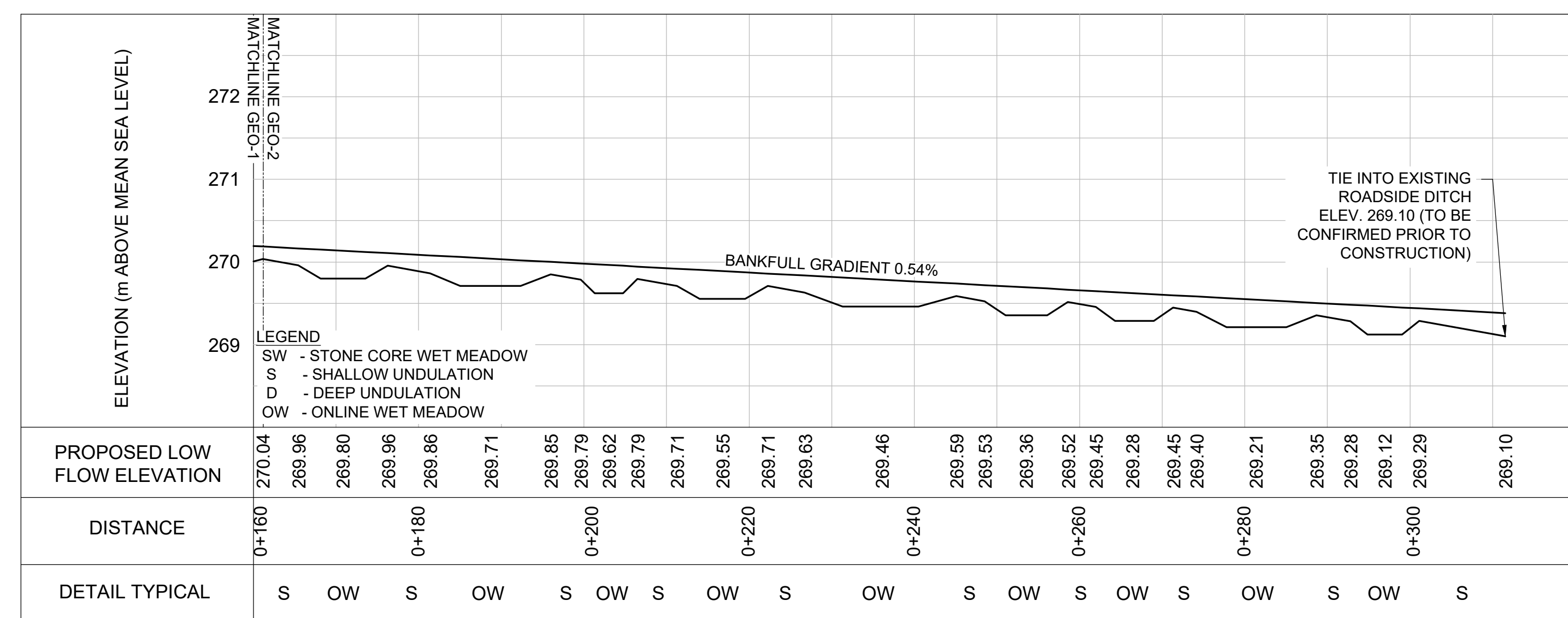
KEY MAP  
N.T.S.



- LEGEND**
- BIOSWALE CENTERLINE
  - SHALLOW UNDULATION
  - DEEP UNDULATION
  - ONLINE WET MEADOW
  - SUBMERGED MOUND (SEE DET-1)
  - STONE CORE WET MEADOW (SEE DET-1)
  - 100% BIODEGRADABLE ECB AND LIVE STAKES (SEE RES-1)

TIE INTO PROPOSED HEADWALL (BY OTHERS)  
ELEV. 269.10 (TO BE CONFIRMED PRIOR TO CONSTRUCTION)

PLANFORM  
1:250



PROFILE  
H = 1:500; V=1:50

PROPOSED LOW FLOW ELEVATION	270.04	269.96	269.80	269.96	269.86	269.71	269.85	269.79	269.62	269.79	269.71	269.55	269.71	269.63	269.46	269.59	269.53	269.36	269.52	269.45	269.28	269.45	269.40	269.21	269.35	269.28	269.12	269.29	269.10
DISTANCE	0+160			0+180			0+200				0+220			0+240				0+260				0+280				0+300			
DETAIL TYPICAL	S	OW	S	OW	S	OW	S	OW	S	OW	S	OW	S	OW	S	OW	S	OW	S	OW	S	OW	S	OW	S	OW	S	OW	

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DESIGNED BY: PV CHECKED BY: PV  
DRAWN BY: LD / BM DATE: OCTOBER 27, 2020

20/10/27

Geomorphology  
Earth Science  
Observations

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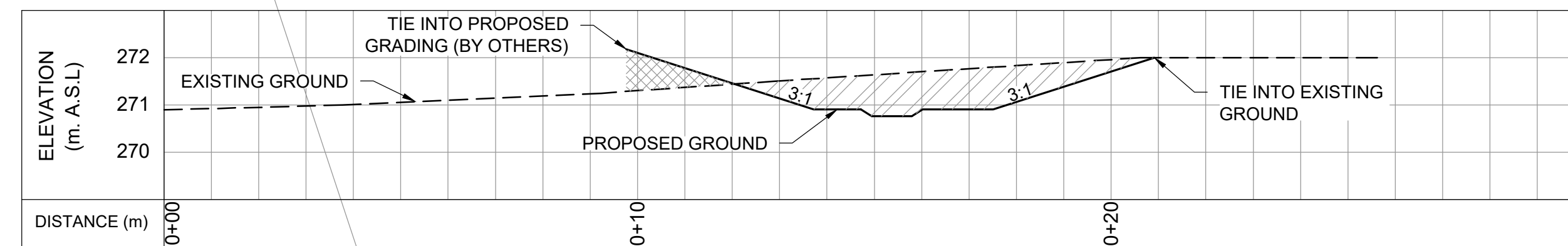
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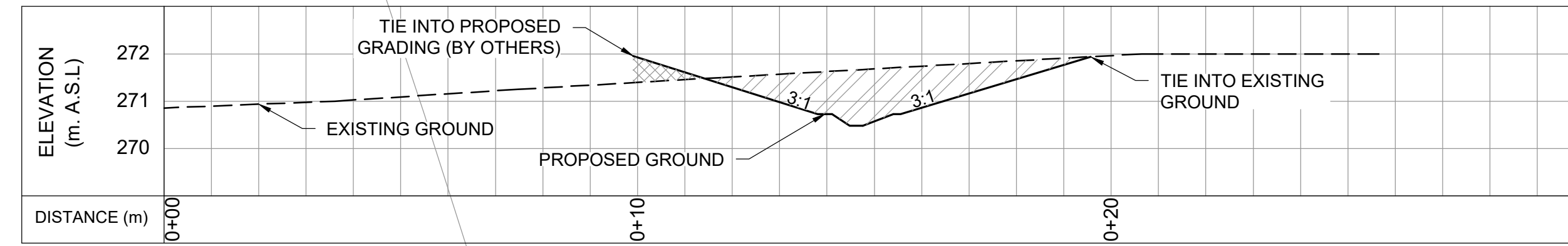
BIOSWALE DESIGN  
PLANFORM AND PROFILE

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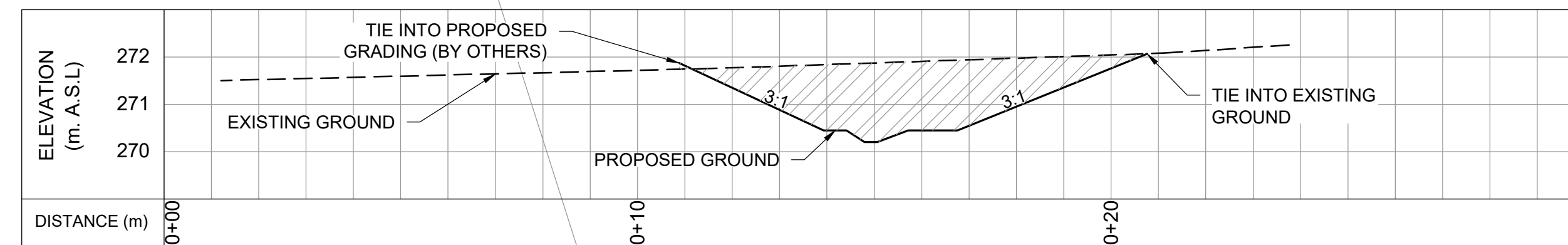




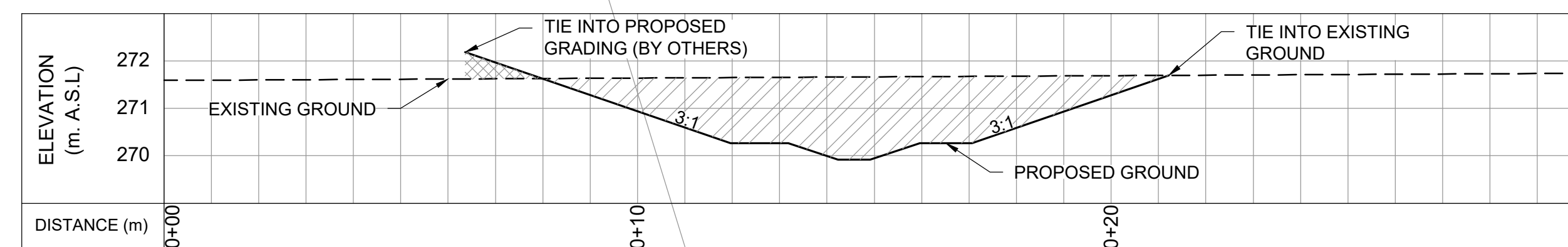
CROSS SECTION A-A'



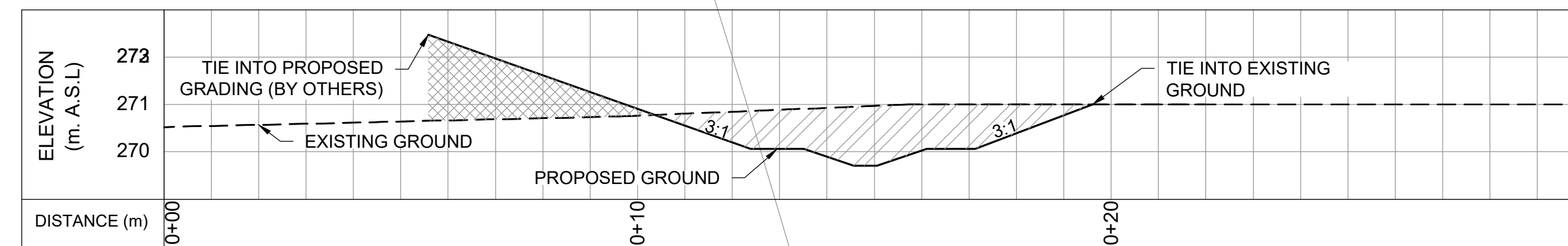
CROSS SECTION B-B'



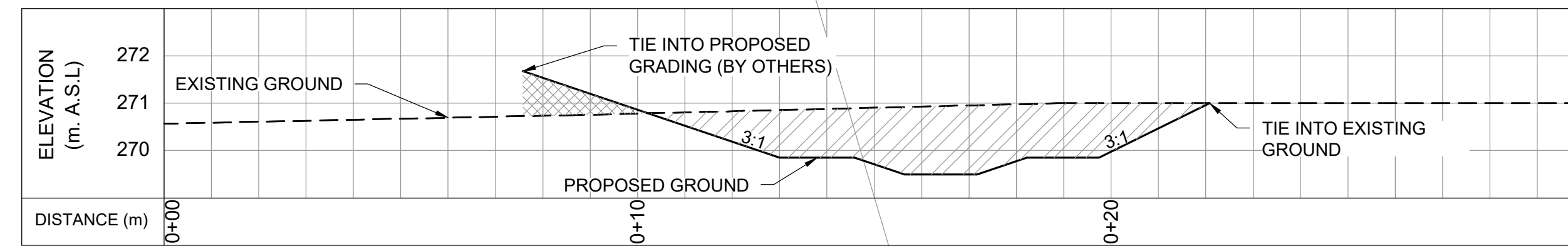
CROSS SECTION C-C'



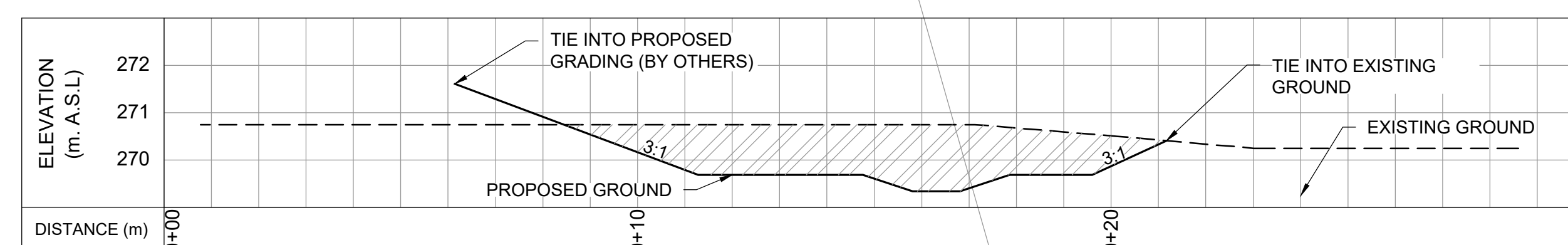
CROSS SECTION D-D'



CROSS SECTION E-E'



CROSS SECTION F-F'



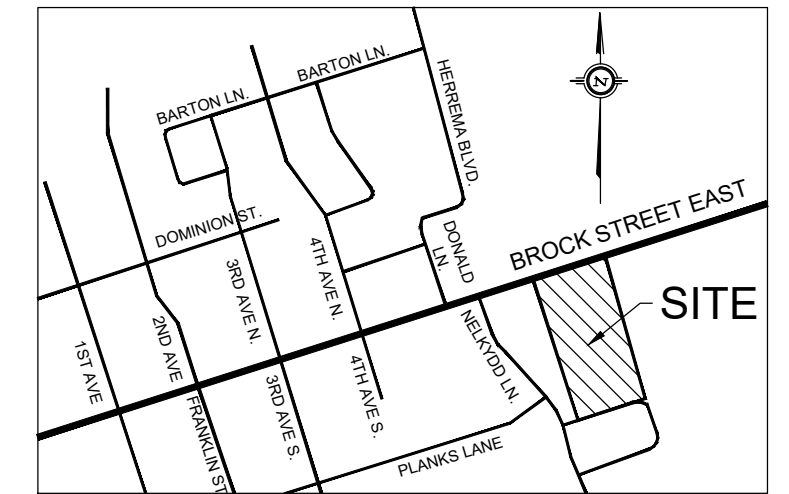
CROSS SECTION G-G'

**LEGEND**  
 AREA TO CUT  
 AREA TO FILL

**CROSS SECTIONS**

H=1:100

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DESIGNED BY: PV      CHECKED BY: PV

DRAWN BY: LD / BM      DATE: OCTOBER 27, 2020

PAUL V. VILLARD  
PRACTISING MEMBER  
0957  
ONTARIO  
20/10/27

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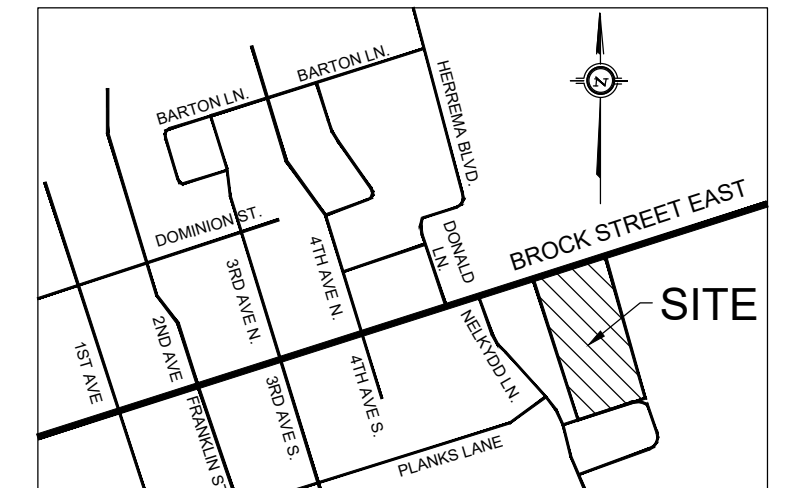
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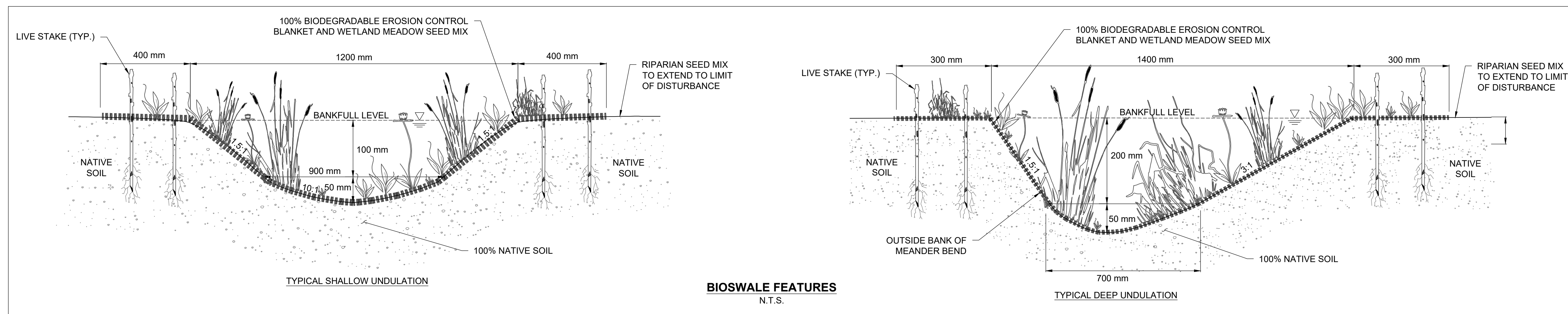
PROJECT No.: 20094	DRAWING No.: XS-1
SCALE: AS NOTED	SHEET 3 OF 6

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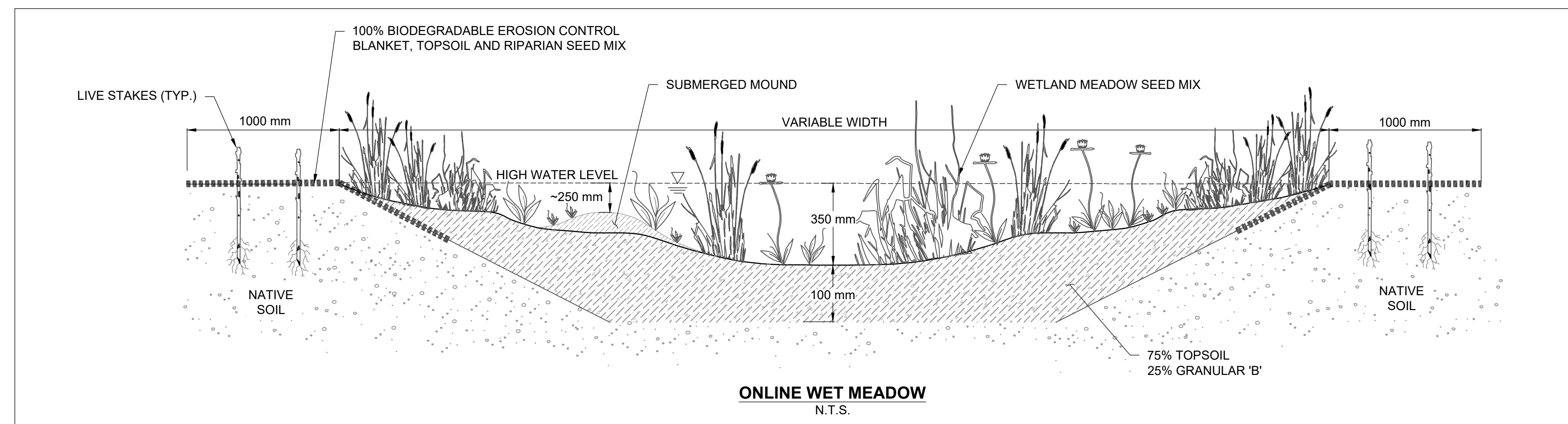




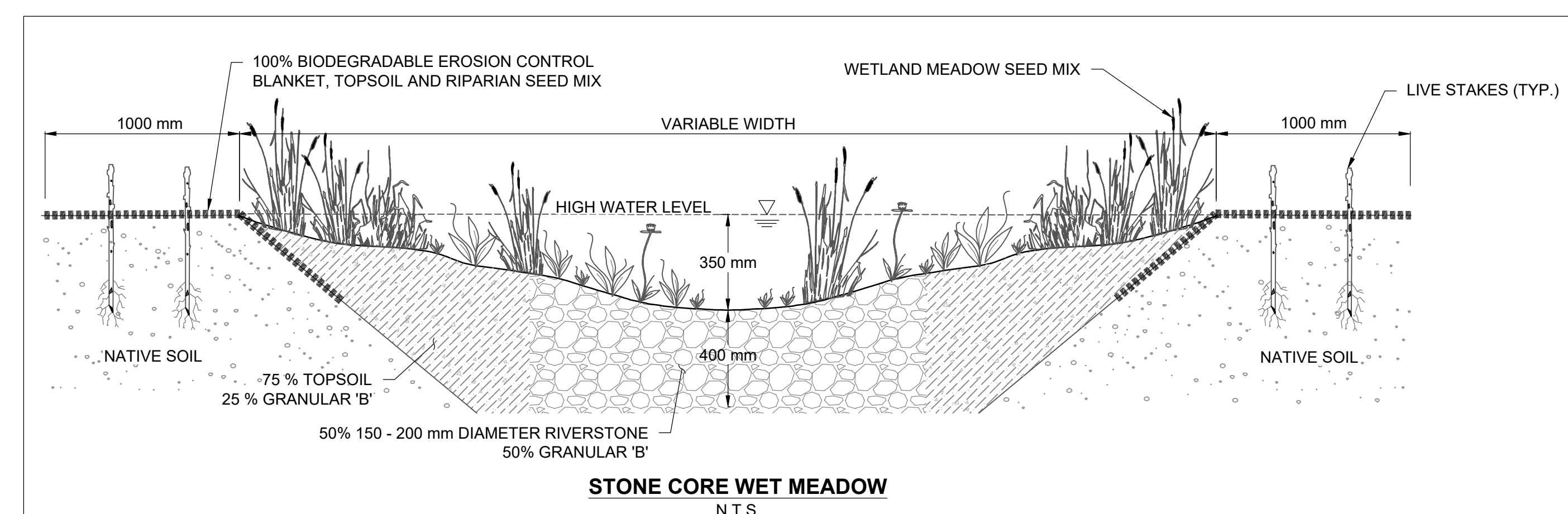
**KEY MAP**  
N.T.S.



**BIOSWALE FEATURES**  
N.T.S.



**ONLINE WET MEADOW**  
N.T.S.



**STONE CORE WET MEADOW**  
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1. ALL CONSTRUCTION EQUIPMENT AND MATERIALS (IMPORTED OR EXCAVATED) MUST BE STORED AT LEAST 30 m AWAY FROM ANY WATERBODY IN A STABLE AREA ABOVE THE ACTIVE FLOODPLAIN, OR IN A DESIGNATED STAGING/STORAGE AREA.
2. IN THE EVENT OF AN UNEXPECTED STORM, ALL UNFIXED ITEMS THAT HAVE THE POTENTIAL TO CAUSE A SPILL OR AN OBSTRUCTION TO FLOW MUST BE MOVED TO A STABLE AREA ABOVE ACTIVE FLOODPLAIN.
3. STOCKPILES MUST BE LOCATED OUTSIDE THE ISOLATED WORK AREAS.
4. STABILIZE STOCKPILED SOILS THAT ARE STORED FOR PROLONGED PERIODS WITH THE APPLICATION OF A NURSE CROP AT A RATE OF 60 kg/ha.
5. STABILIZE, TEMPORARILY OR PERMANENTLY, ANY DISTURBED AREAS AS WORK PROGRESSES, OR SOON AS CONDITIONS ALLOW. ON SOILS THAT WILL BE EXPOSED FOR PROLONG PERIODS, TEMPORARILY INSTALL A BIODEGRADABLE EROSION CONTROL BLANKET ON EXPOSED SOILS, OR APPLY A NURSE CROP AT A RATE OF 60 kg/ha.
6. MINIMIZE THE AREA OF DISTURBANCE TO THE EXTENT POSSIBLE.
7. ALL VEGETATION ADJACENT TO THE WORK AREA, MUST BE PROTECTED AND DELINEATED WITH CONSTRUCTION FENCING OR TREE PROTECTION BARRIERS.
8. ALL GRADIES IN THE AREA REGULATED BY THE CONSERVATION AUTHORITY MUST BE MAINTAINED OR MATCHED, UNLESS OTHERWISE AUTHORIZED IN THE APPLICABLE PERMIT.

**EROSION AND SEDIMENT CONTROL**

1. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES MUST BE INSTALLED PRIOR TO START OF WORKS.
2. SEDIMENT CONTROLS MUST BE INSPECTED DAILY TO ENSURE THAT THEY ARE IN GOOD REPAIR AND FUNCTIONING AS INTENDED.
3. EROSION AND SEDIMENT CONTROLS MUST BE MAINTAINED DURING CONSTRUCTION, AND ANY REQUIRED REPAIRS OR REPLACEMENTS MUST BE COMPLETED WITHIN 24 HOURS AFTER THEY HAVE BEEN IDENTIFIED DURING THE MONITORING.
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2. ENSURE EQUIPMENT AND MACHINERY ARE IN GOOD OPERATING CONDITION (POWER WASHED), FREE OF LEAKS, EXCESS OIL AND GREASE.
3. NO EQUIPMENT REFUELLING OR SERVICING SHOULD BE UNDERTAKEN WITHIN 30 m OF ANY WATERCOURSE OR SURFACE WATER DRAINAGE.
4. A SPILL CONTAINMENT KIT MUST BE READILY ACCESSIBLE ON SITE IN THE EVENT OF A RELEASE OF A DELETERIOUS SUBSTANCE TO THE ENVIRONMENT. ON-SITE STAFF MUST BE TRAINED IN ITS USE.
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	DATE	BY	REVISIONS
DESIGNED BY: PV		CHECKED BY: PV	
DRAWN BY: LD / BM		DATE: OCTOBER 27, 2020	

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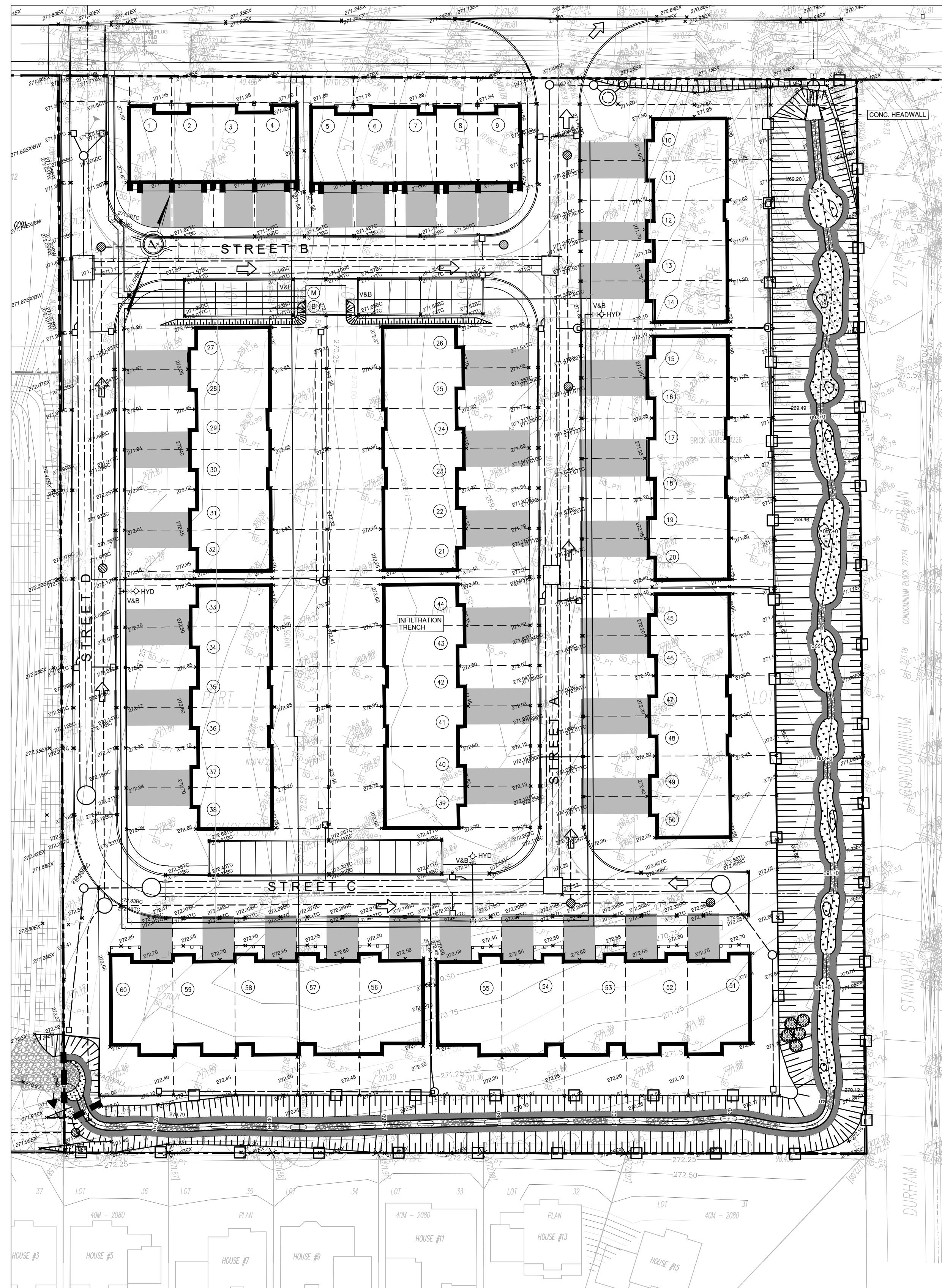
**226 BROCK STREET EAST**  
**WESTLANE DEVELOPMENT GROUP LTD.**

**BIOSWALE DESIGN RESTORATION DETAILS**

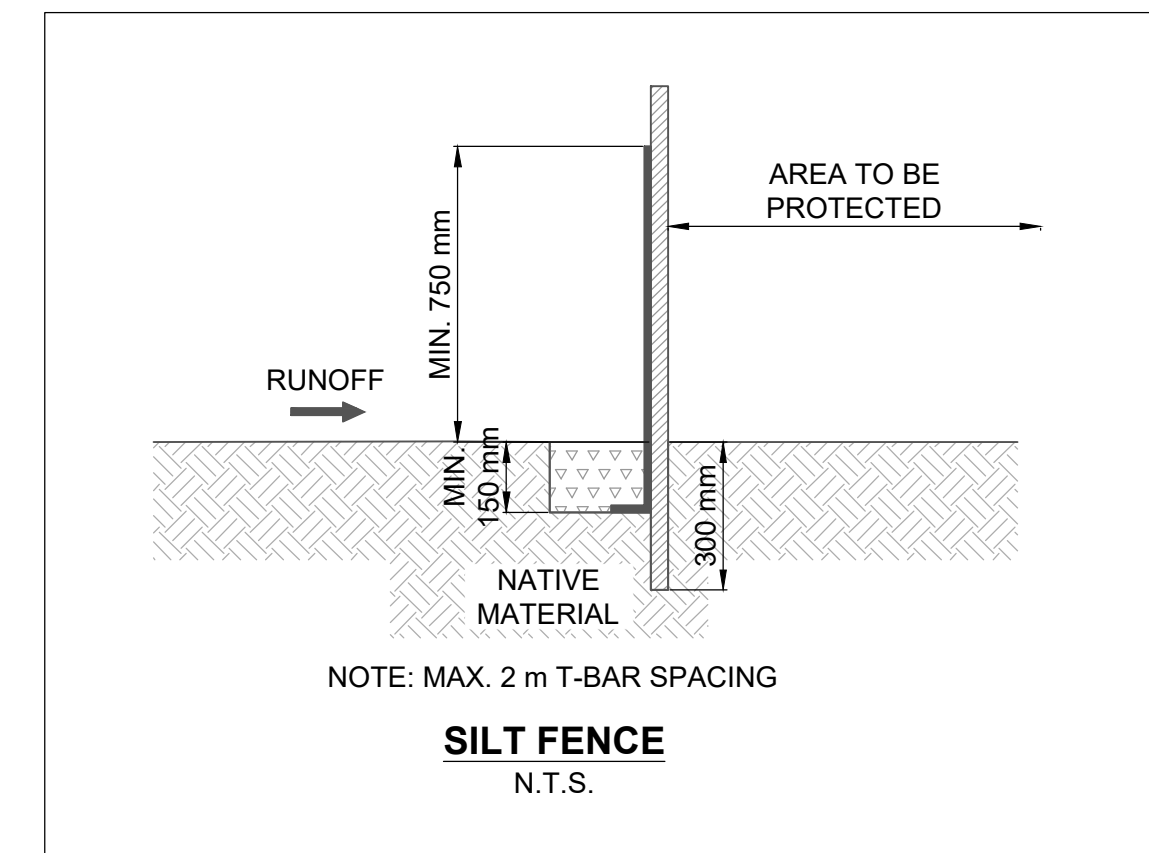
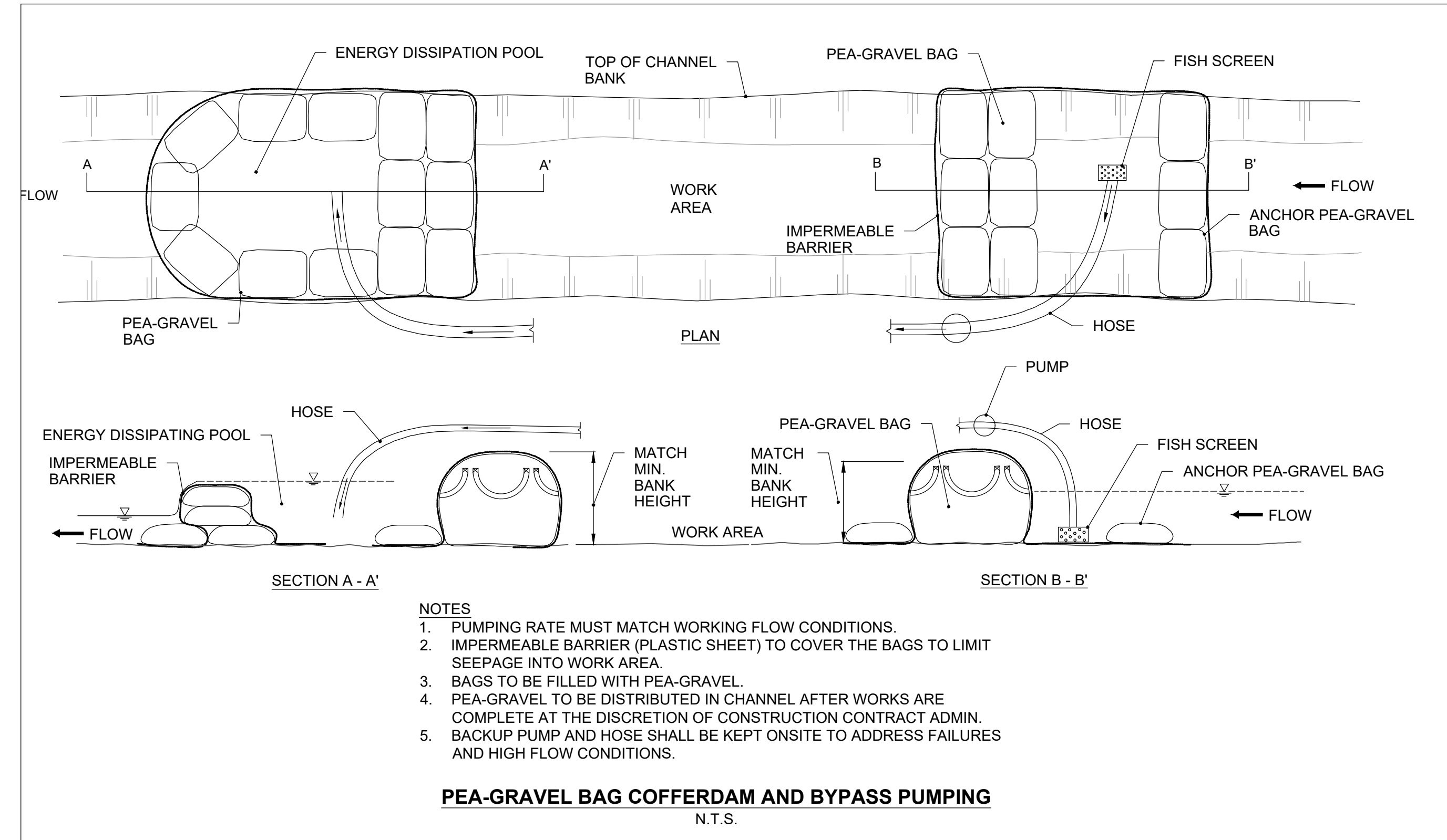
**NOT FOR CONSTRUCTION**

PROJECT No.: 20094	DRAWING No.: DET-1
SCALE: AS NOTED	SHEET 4 OF 6





**PLANFORM**  
1:250



**SUGGESTED SEQUENCE OF CONSTRUCTION**

1. DESIGNER OR REPRESENTATIVE SHALL BE PRESENT DURING CONSTRUCTION TO PROVIDE GUIDANCE ON INSTALLATION OF THE FEATURES GIVEN THE WORKS DIFFER FROM ENGINEERING PROJECTS.
2. CONSTRUCTION CONTRACT ADMINISTRATOR TO REVIEW SITE CONDITIONS PRIOR TO COMMENCEMENT OF WORK.
3. MONITORING WEATHER TO ENSURE IN-WATER WORKS IS COMPLETED UNDER LOW-FLOW CONDITIONS.
4. INSTALL SILT FENCE TO ISOLATE THE WORK AREA.
5. CONSTRUCT AS MUCH AS ENHANCED BIOSWALE AS POSSIBLE WITHOUT INTERFERENCE TO THE EXISTING FEATURE, INCLUDING DOWNSTREAM TIE-IN.
6. STABILIZE ANY DISTURBED AREA WITH SEED AND 100% BIODEGRADABLE EROSION CONTROL BLANKET (BIONET C125BN OR APPROVED EQUIVALENT).
7. INSTALL COFFERDAMS AND PUMP FLOWS AROUND WORK ARE TO COMPLETE TIE-IN WITH EXISTING FEATURE AT THE UPSTREAM EXTENT.
8. INTRODUCE FLOWS TO THE FEATURE ONCE THE SITE HAS BEEN DEEMED STABLE BY THE DESIGNER OR REPRESENTATIVE.
9. REMOVE EROSION AND SEDIMENT CONTROL MEASURES ONCE AREA IS DEEMED STABLE BY THE DESIGNER OR REPRESENTATIVE.

**GENERAL NOTES**

1. ALL CONTRACT DRAWINGS, SPECIFICATIONS AND APPLICABLE PERMITS MUST BE KEPT ON SITE DURING CONSTRUCTION FOR REFERENCE.
2. THE CONTRACTOR MUST NOTIFY THE CONTRACT ADMINISTRATOR AND CONSERVATION AUTHORITY OF THE INTENT TO COMMENCE WORK AT LEAST 48 HOURS IN ADVANCE.
3. THE CONTRACTOR IS RESPONSIBLE FOR ALL UTILITY LOCATIONS.
4. LAYOUT MUST BE REVIEWED AND APPROVED BY THE CONTRACT ADMINISTRATOR.
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1. WORKS SHALL BE COMPLETED BETWEEN JULY 1ST TO MARCH 31ST.
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3. THE WEATHER FORECAST SHOULD BE CONTINUALLY MONITORED TO ENSURE THAT WORKS ARE UNDERTAKEN ONLY DURING FAVOURABLE WEATHER CONDITIONS.
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4. STABILIZE STOCKPILED SOILS THAT ARE STORED FOR PROLONGED PERIODS WITH THE APPLICATION OF A NURSE CROP AT A RATE OF 40 kg/ha.
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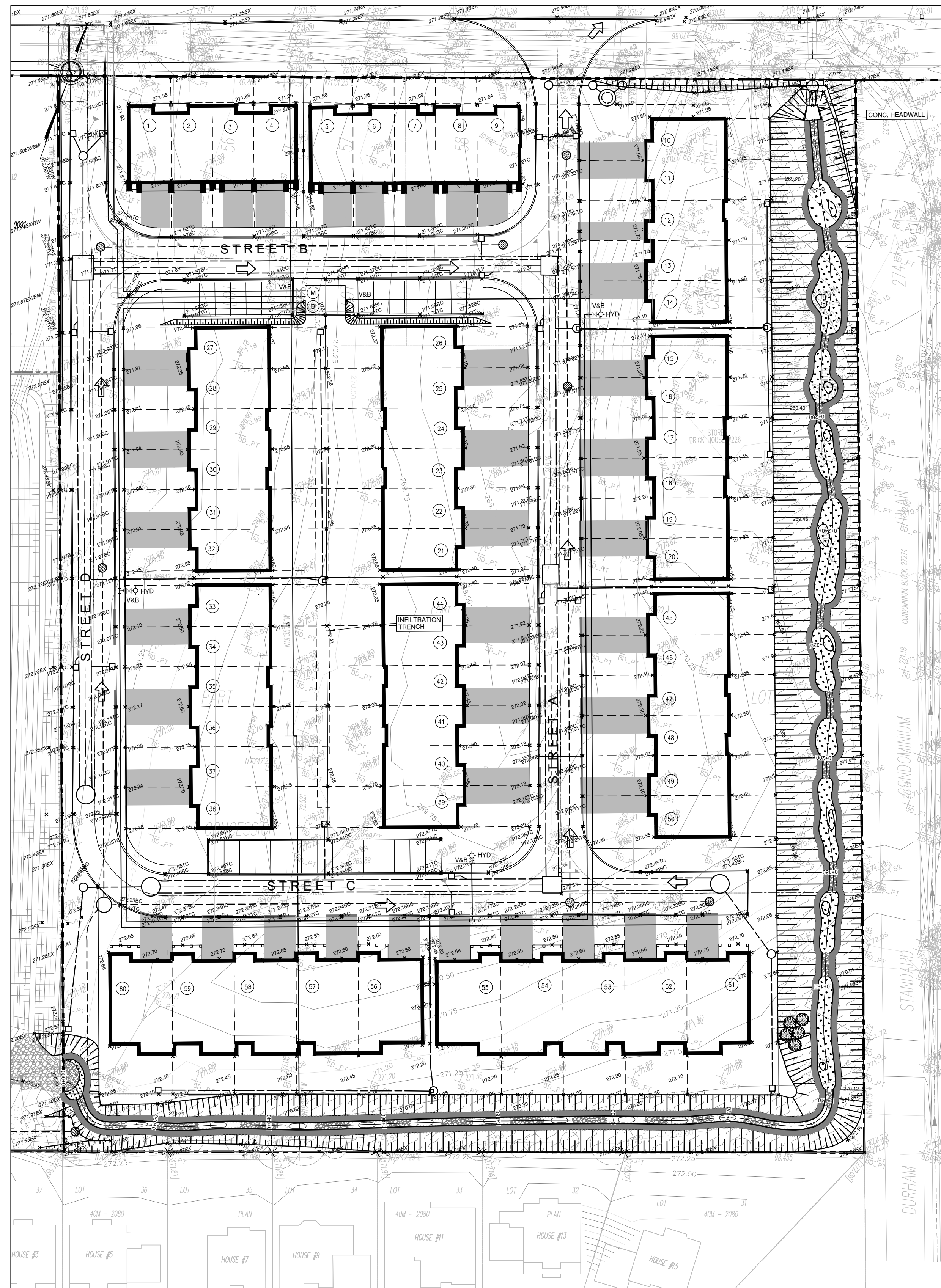
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**BIOSWALE DESIGN**  
**PHASING AND EROSION AND SEDIMENT**  
**CONTROL PLAN**

PROJECT No.: 20094	DRAWING No.: PESC-1
SCALE: AS NOTED	SHEET 5 OF 6

**NOT FOR CONSTRUCTION**





**PLANFORM**  
1:500

**RIPARIAN SEED MIX**

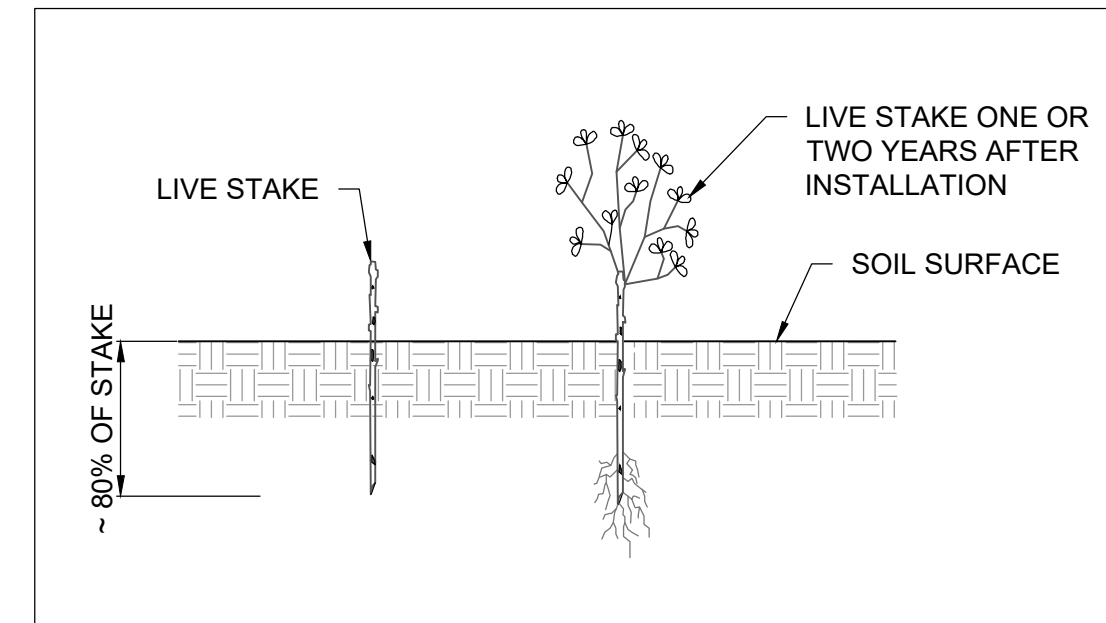
COMMON NAME	SPECIES	QUANTITY	CONDITION
BLUE VERVAIN	<i>Verbena hastata</i>	3	
BLUNT BROOM SEDGE	<i>Carex scoparia</i>	5	
FOX SEDGE	<i>Carex vulpinoidea</i>	30	
GREEN BULRUSH	<i>Scirpus atrovirens</i>	10	
PURPLE STEMMED ASTER	<i>Aster puniceus</i>	5	
SPOTTED JOE PYE WEED	<i>Eupatorium maculatum</i>	2	
SWAMP MILKWEED	<i>Asclepias incarnata</i>	10	
SWEET FLAG	<i>Acorus americana</i>	5	
VIRGINIA WILD RYE	<i>Elymus virginicus</i>	30	

**NOTES**  
 1. APPLY SEED MIX AT A RATE OF 30 kg PER HECTARE.  
 2. SEEDING SHALL OVERLAP ADJACENT GROUND COVER BY 300 mm.  
 3. APPLY OAT OR RYE NURSE CROP AT A RATE OF 25 kg PER HECTARE.  
 4. WATER SOIL AFTER SEED APPLICATION.

**WETLAND MEADOW SEED MIX**

COMMON NAME	SPECIES	% OF MIX
BEBB'S SEDGE	<i>Carex bebbii</i>	1
BLUE LOBELIA	<i>Lobelia siphilitica</i>	1
BLUE VERVAIN	<i>Verbena hastata</i>	10
BONESET	<i>Eupatorium perfoliatum</i>	1
DARK GREEN BULRUSH	<i>Scirpus atrovirens</i>	1
FOWL BLUEGRASS	<i>Poa palustris</i>	20
FOX SEDGE	<i>Carex vulpinoidea</i>	27
NEW ENGLAND ASTER	<i>Aster novae-angliae</i>	2
PURPLE STEMMED ASTER	<i>Aster puniceus</i>	1
SOFT RUSH	<i>Juncus effusus</i>	2
SPOTTED JOE PYE WEED	<i>Eupatorium maculatum</i>	1
SQUARE STEMMED MONKEY FLOWER	<i>Minulus ringens</i>	2
SWAMP MILKWEED	<i>Asclepias incarnata</i>	1
TALL MANNAGRASS	<i>Glyceria grandis</i>	2
VIRGINIA WILD RYE	<i>Elymus virginicus</i>	27
WOOLGRASS	<i>Scirpus cyperinus</i>	1

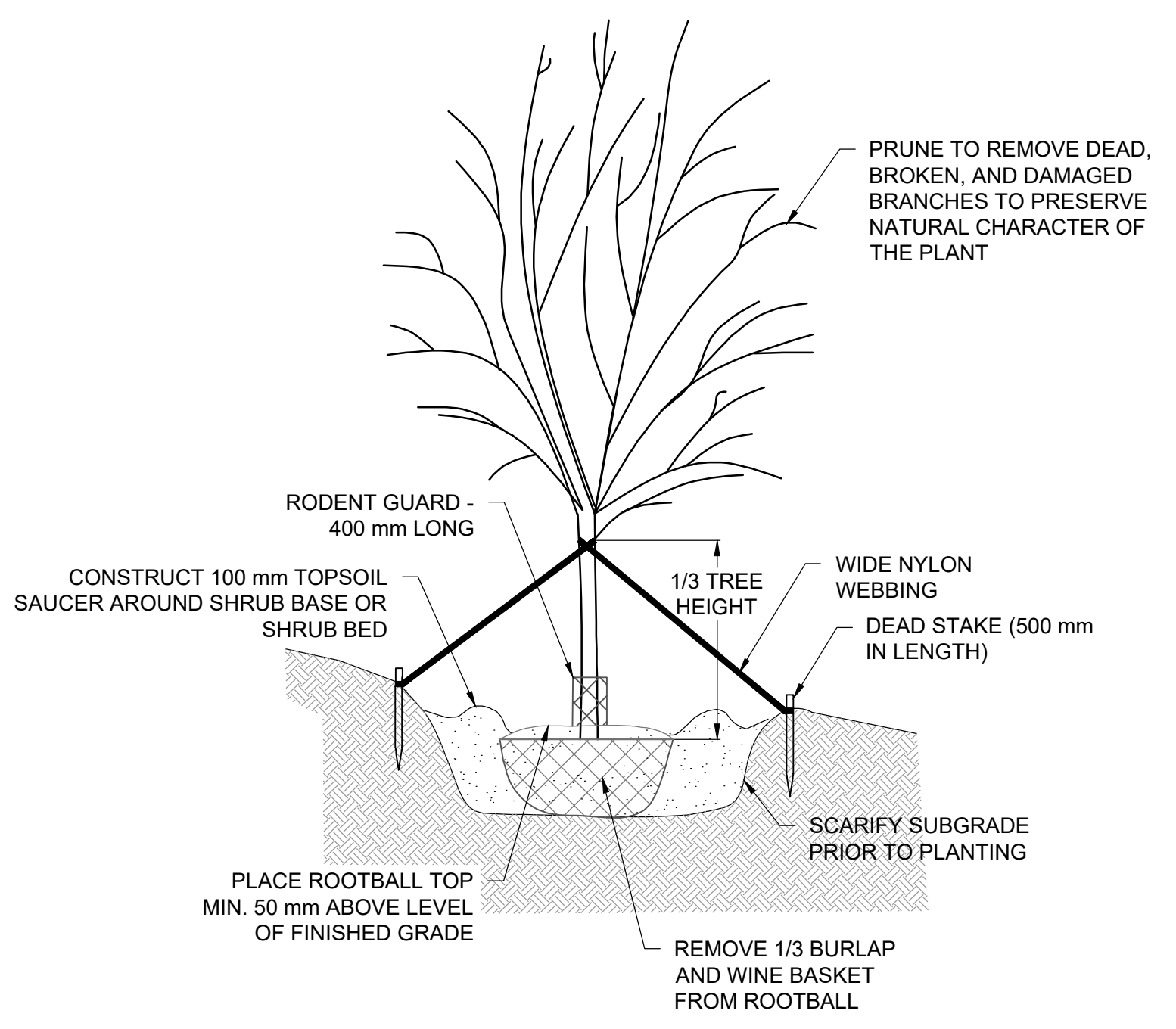
**NOTES**  
 1. APPLY SEED MIX AT A RATE OF 25 kg PER HECTARE WITHIN WETLANDS (SEE WETLAND DETAIL).  
 2. SEEDING SHALL OVERLAP ADJACENT GROUND COVER BY 300 mm.  
 3. APPLY COMMON OAT (*Avena sativa*) NURSE CROP AT A RATE OF 25 kg PER HECTARE.



**SPECIES AND QUANTITIES**

COMMON NAME	SPECIES	QUANTITY	CONDITION
RED OSIER DOGWOOD	<i>Cornus stolonifera</i>	325	1 m ht. BARE ROOT
PUSSY WILLOW	<i>Salix discolor</i>	325	1 m ht. BARE ROOT
SANDBAR WILLOW	<i>Salix exigua</i>	325	1 m ht. BARE ROOT

**LIVE STAKE**  
N.T.S.



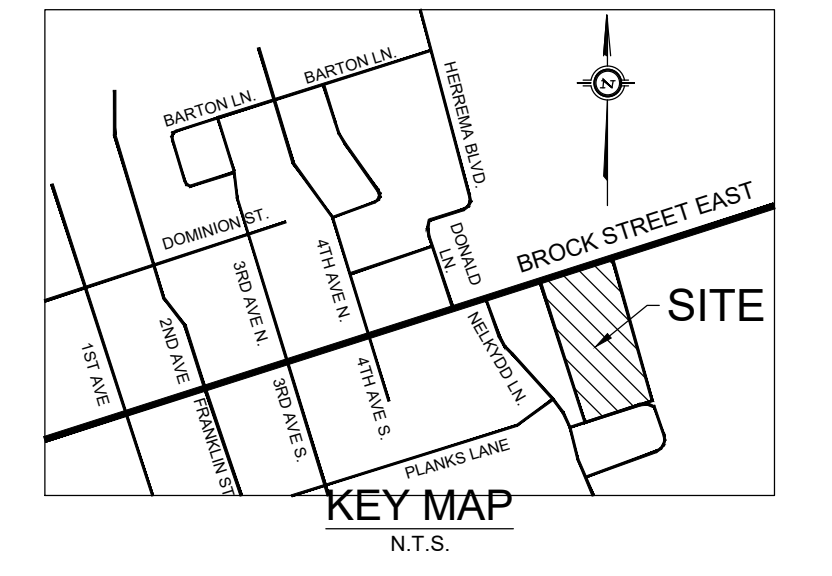
**SPECIES AND QUANTITIES**

I.D.	COMMON NAME	SPECIES	QTY	CONDITION / SIZE
Jc	BUTTERNUT	<i>Juglans cinerea</i>	5	60 mm CAL., B&B

**NOTE:**  
 ANY TREES FOUND TO BE DEAD, DEFECTIVE OR NOT IN A HEALTHY GROWING CONDITION WITHIN 2 YEARS OF PLANTING SHALL BE REPLACED AND RE-GUARANTEED FOR AN ADDITIONAL YEAR FROM THE DATE OF REPLACEMENT.

**TREE PLANTING**  
N.T.S.

- NOTES**
- QUANTITY TO BE DETERMINED BASED ON AREA OF DISTURBANCE TO BE RESTORED
  - LIVE STAKES SHOULD BE FROM AT MINIMUM 2-YEAR OLD STOCK.
  - LIVE STAKES ARE TO BE INSTALLED AT A DENSITY OF 1.5 STAKES PER LINEAR METRE.
  - LIVE STAKES SHOULD BE PRE-SOAKED (SUBMERGED IN WATER) FOR AT LEAST 24 HOURS AFTER HARVESTING AND IMMEDIATELY BEFORE INSTALLATION.
  - LIVE STAKES SHOULD NOT BE STORED FOR A PERIOD LONGER THAN 2 DAYS, UNLESS THEY ARE BEING SOAKED.
  - THE CONTRACTOR SHALL PROTECT PLANT MATERIALS FROM DRYING FROM THE TIME OF HARVEST UNTIL INSTALLED.
  - LIVE STAKES ARE TO BE A MINIMUM OF 25 mm IN DIAMETER AND CUT TO A LENGTH OF 1000 mm.
  - CUT ANGLE AT THE BOTTOM OF THE STAKE AND FLAT ON THE TOP.
  - TRIM ALL SIDE BRANCHES WHILE TAKING CARE NOT TO DAMAGE THE BARK.
  - INSTALL STAKES WITH BUDS POINTING UPWARDS AND THICKER STEM IN THE BED.
  - LIVE STAKES SHOULD BE INSTALLED USING A LARGE RUBBER MALLET.
  - 80% OF THE STAKE IS TO BE BELOW SURFACE.
  - TAMP THE LIVE STAKE INTO THE GROUND AT RIGHT ANGLE TO THE SURFACE.
  - IN COMPACT SOIL A PILOT HOLE SHOULD BE USED TO LIMIT DAMAGE TO THE STAKES.
  - IF USING A PILOT HOLE REPACK SOIL AROUND THE LIVE STAKE.
  - LIVE STAKES SHOULD STAND FIRM FROM THE SOIL FOLLOWING INSTALLATION.
  - ALL STAKES NOT PLANTED TO THE SPECIFICATIONS ABOVE WILL BE REPLACED AT THE CONTRACTOR'S EXPENSE.



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**PROFESSIONAL GEOSCIENTIST**  
 PAUL V. VILLARD  
 PRACTISING MEMBER 0957  
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**BIOSWALE DESIGN**  
**RESTORATION PLAN AND DETAILS**

PROJECT No.: 20094	DRAWING No.: RES-1
SCALE: AS NOTED	SHEET 6 OF 6

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