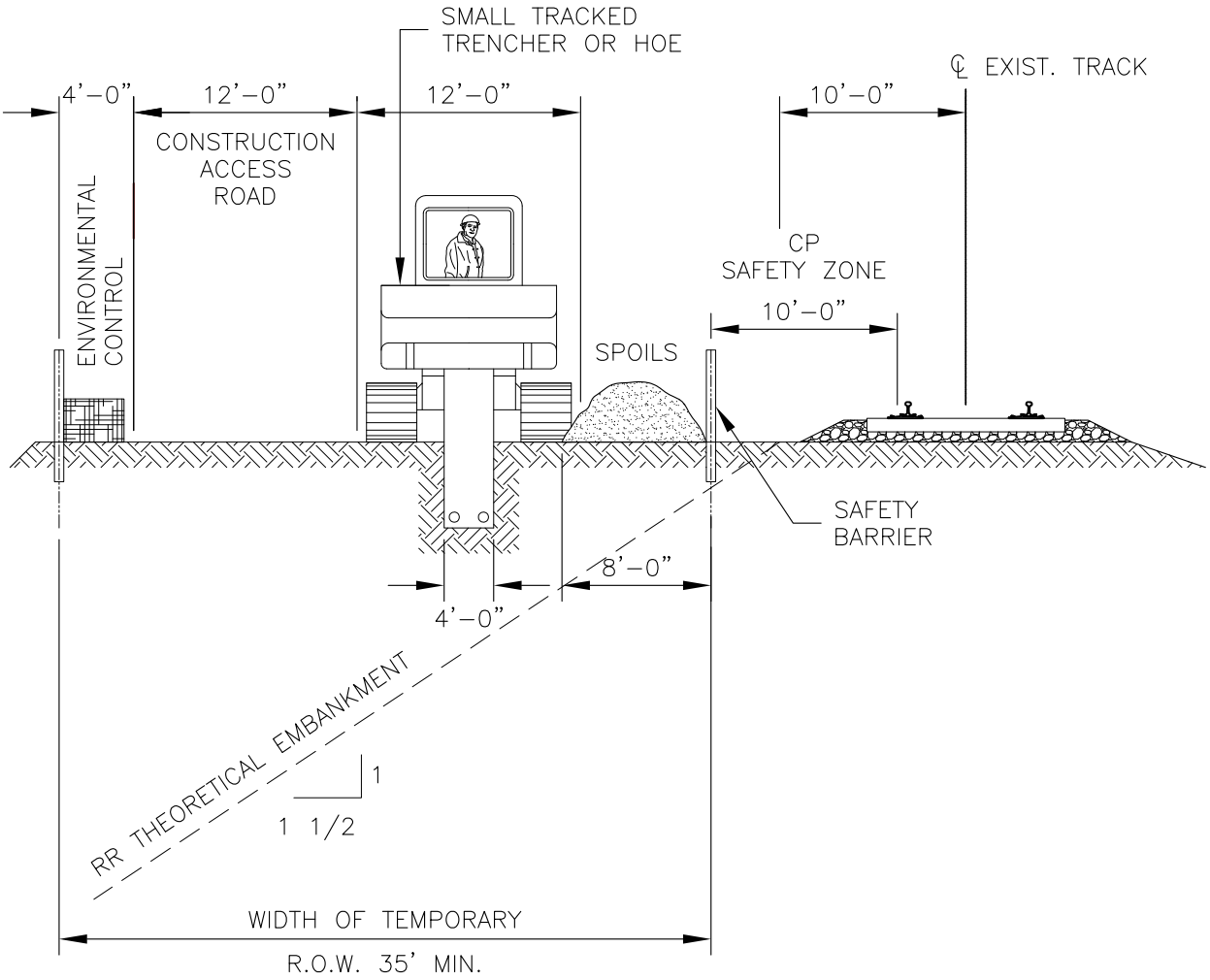
ATTACHMENT H
CROSS-SECTION DIAGRAMS



NOTE:

1. EXCAVATION SHALL BE SHORED OR SLOPED AS REQUIRED FOR OSHA COMPLIANCE. SLOPED EXCAVATION WILL REQUIRE INCREASED ROW.

2. CONTRACT STAGING AREAS WILL BE REQUIRED APPROXIMATELY EVERY 5 MILES. STAGING AREA SIZE IS ESTIMATED TO BE APPROXIMATELY 5 ACRES EACH.

3. WHERE ADEQUATE SPACE IS NOT AVAILABLE ALONG THE RR, THE CONTRACTOR WILL BE REQUIRED TO CAREFULLY PLAN HIS CONSTRUCTION OPERATIONS TO ENSURE ENVIRONMENTAL IMPACTS ARE MINIMIZED AND ALL WORK IS CONTAINED WITHIN THE APPROVED ROW.

4. SHORE ALL EXCAVATIONS WITHIN RR THEORICAL EMBANKMENT.

5. ABOVE SKETCH DEPICTS MINIMUM R.O.W. REQUIRED FOR CONVENTIONAL EXCAVATING AND TRENCHING PROCEDURES.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

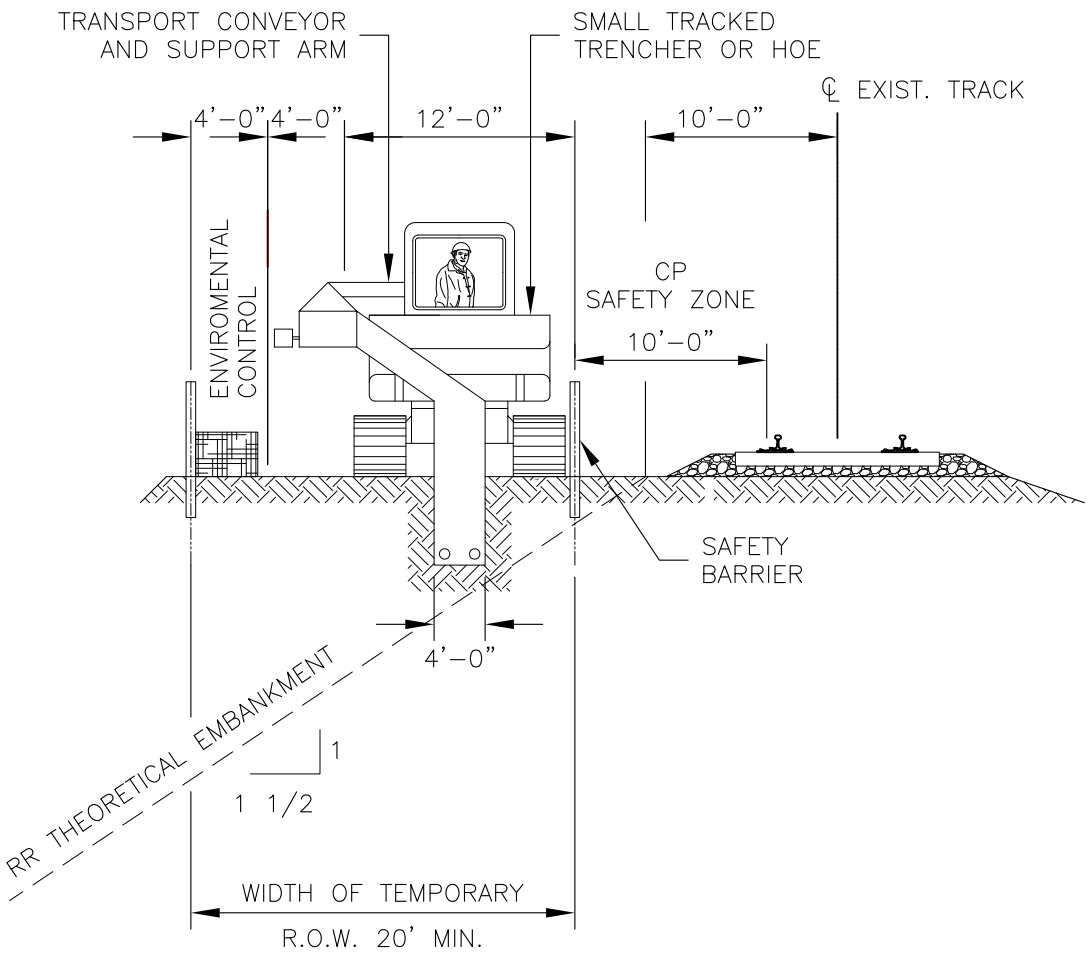
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

CP TEMPORARY CONSTRUCTION ROW

176764-UM-01 SHEET 01 OF 34

Prepared by: HDR | PTA & TRC 12/06/2010



NOTE:

1. EXCAVATION SHALL BE SHORED OR SLOPED AS REQUIRED FOR OSHA COMPLIANCE. SLOPED EXCAVATION WILL REQUIRE INCREASED ROW.

2. CONTRACT STAGING AREAS WILL BE REQUIRED APPROXIMATELY EVERY 5 MILES. STAGING AREA SIZE IS ESTIMATED TO BE APPROXIMATELY 5 ACRES EACH.

3. WHERE ADEQUATE SPACE IS NOT AVAILABLE ALONG THE RR, THE CONTRACTOR WILL BE REQUIRED TO CAREFULLY PLAN HIS CONSTRUCTION OPERATIONS TO ENSURE ENVIRONMENTAL IMPACTS ARE MINIMIZED AND ALL WORK IS CONTAINED WITHIN THE APPROVED ROW.

4. SHORE ALL EXCAVATIONS WITHIN RR THEORETICAL EMBANKMENT.

5. ABOVE SKETCH DEPICTS MINIMUM R.O.W. REQUIRED FOR EMPLOYMENT OF IN–LINE TRENCHING OPERATIONS. THIS METHOD WILL ONLY BE UTILIZED ON A VERY LIMITED BASIS.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

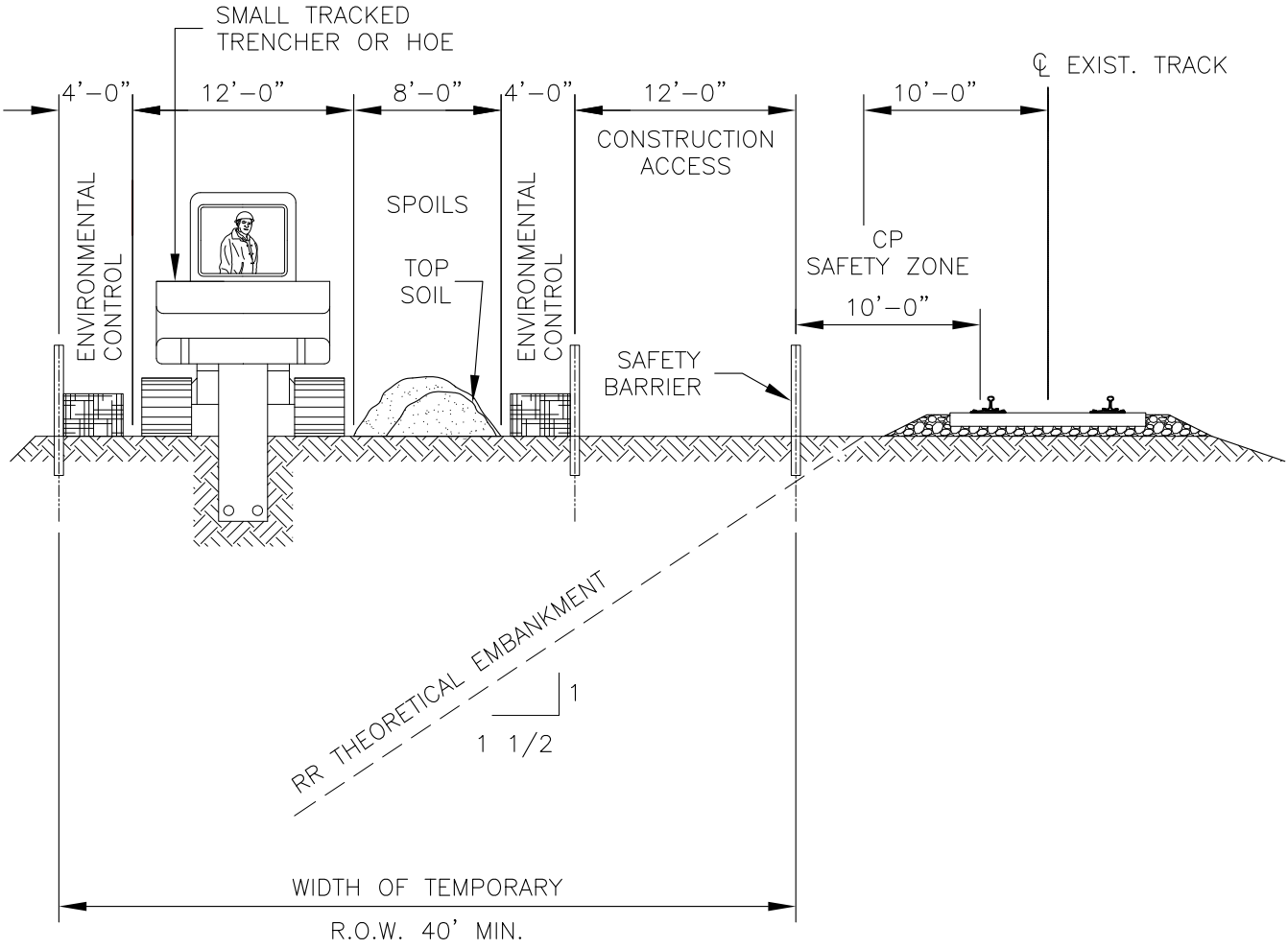
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

CP IN-LINE TRENCHER RIGHT OF WAY

176764-UM-02 SHEET 02 OF 34

Prepared by: HDR | PTA & TRC 12/06/2010



NOTE:

1. EXCAVATION SHALL BE SHORED OR SLOPED AS REQUIRED FOR OSHA COMPLIANCE. SLOPED EXCAVATION WILL REQUIRE INCREASED ROW.

2. CONTRACT STAGING AREAS WILL BE REQUIRED APPROXIMATELY EVERY 5 MILES. STAGING AREA SIZE IS ESTIMATED TO BE APPROXIMATELY 5 ACRES EACH.

3. WHERE ADEQUATE SPACE IS NOT AVAILABLE ALONG THE RR, THE CONTRACTOR WILL BE REQUIRED TO CAREFULLY PLAN HIS CONSTRUCTION OPERATIONS TO ENSURE ENVIRONMENTAL IMPACTS ARE MINIMIZED AND ALL WORK IS CONTAINED WITHIN THE APPROVED ROW.

4. SHORE ALL EXCAVATIONS WITHIN RR THEORICAL EMBANKMENT.

5. ABOVE SKETCH DEPICTS MINIMUM R.O.W. REQUIRED FOR CONVENTIONAL EXCAVATING AND TRENCHING PROCEDURES.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

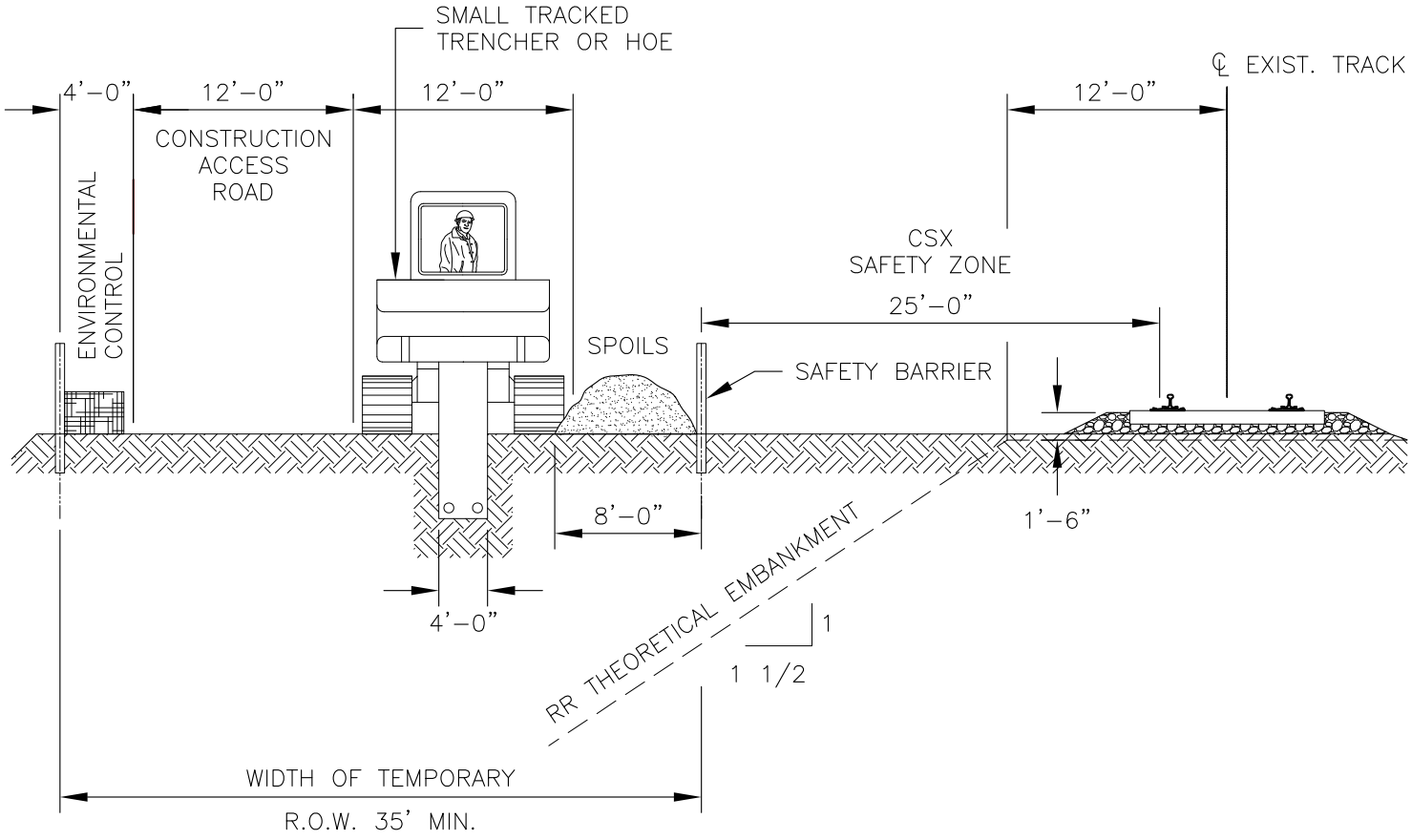
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

CP WIDE RIGHT OF WAY

176764-UM-03 SHEET 03 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010



NOTE:

1. EXCAVATION SHALL BE SHORED OR SLOPED AS REQUIRED FOR OSHA COMPLIANCE. SLOPED EXCAVATION WILL REQUIRE INCREASED ROW.
2. CONTRACT STAGING AREAS WILL BE REQUIRED APPROXIMATELY EVERY 5 MILES. STAGING AREA SIZE IS ESTIMATED TO BE APPROXIMATELY 5 ACRES EACH.
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4. SHORE ALL EXCAVATIONS WITHIN RR THEORICAL EMBANKMENT.
5. ABOVE SKETCH DEPICTS MINIMUM R.O.W. REQUIRED FOR CONVENTIONAL EXCAVATING AND TRENCHING PROCEDURES.

Designed	A WIRONEN
Drawn	DFW/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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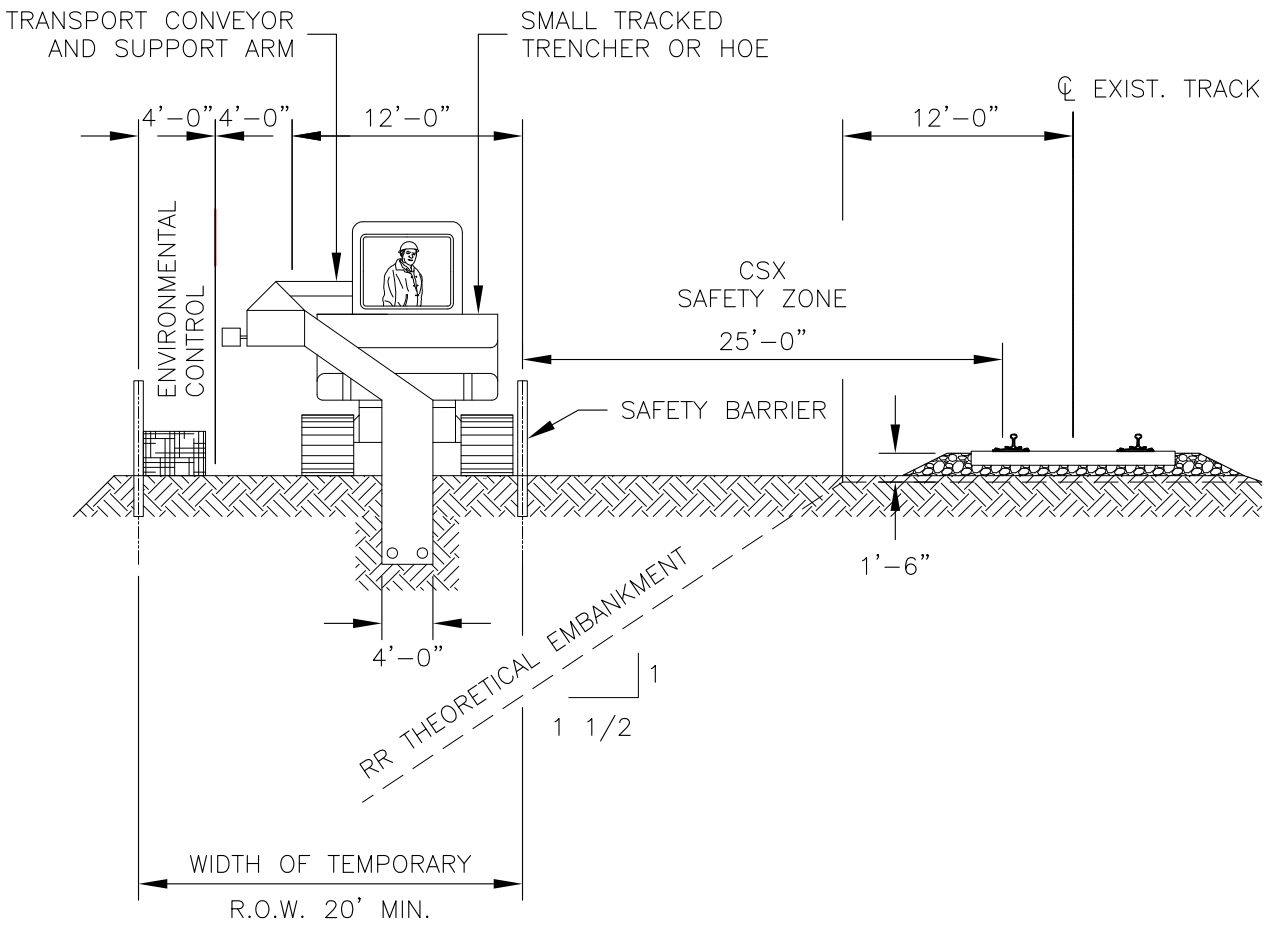
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

CSX TEMPORARY CONSTRUCTION ROW

176764-UM-04 SHEET 04 0F 34

Prepared by: HDR | DTA & TRC 12/06/2010



NOTE:

1. EXCAVATION SHALL BE SHORED OR SLOPED AS REQUIRED FOR OSHA COMPLIANCE. SLOPED EXCAVATION WILL REQUIRE INCREASED ROW.

2. CONTRACT STAGING AREAS WILL BE REQUIRED APPROXIMATELY EVERY 5 MILES. STAGING AREA SIZE IS ESTIMATED TO BE APPROXIMATELY 5 ACRES EACH.

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4. SHORE ALL EXCAVATIONS WITHIN RR THEORICAL EMBANKMENT.

5. ABOVE SKETCH DEPICTS MINIMUM R.O.W. REQUIRED FOR EMPLOYMENT OF IN–LINE TRENCHING OPERATIONS. THIS METHOD WILL ONLY BE UTILIZED ON A VERY LIMITED BASIS.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

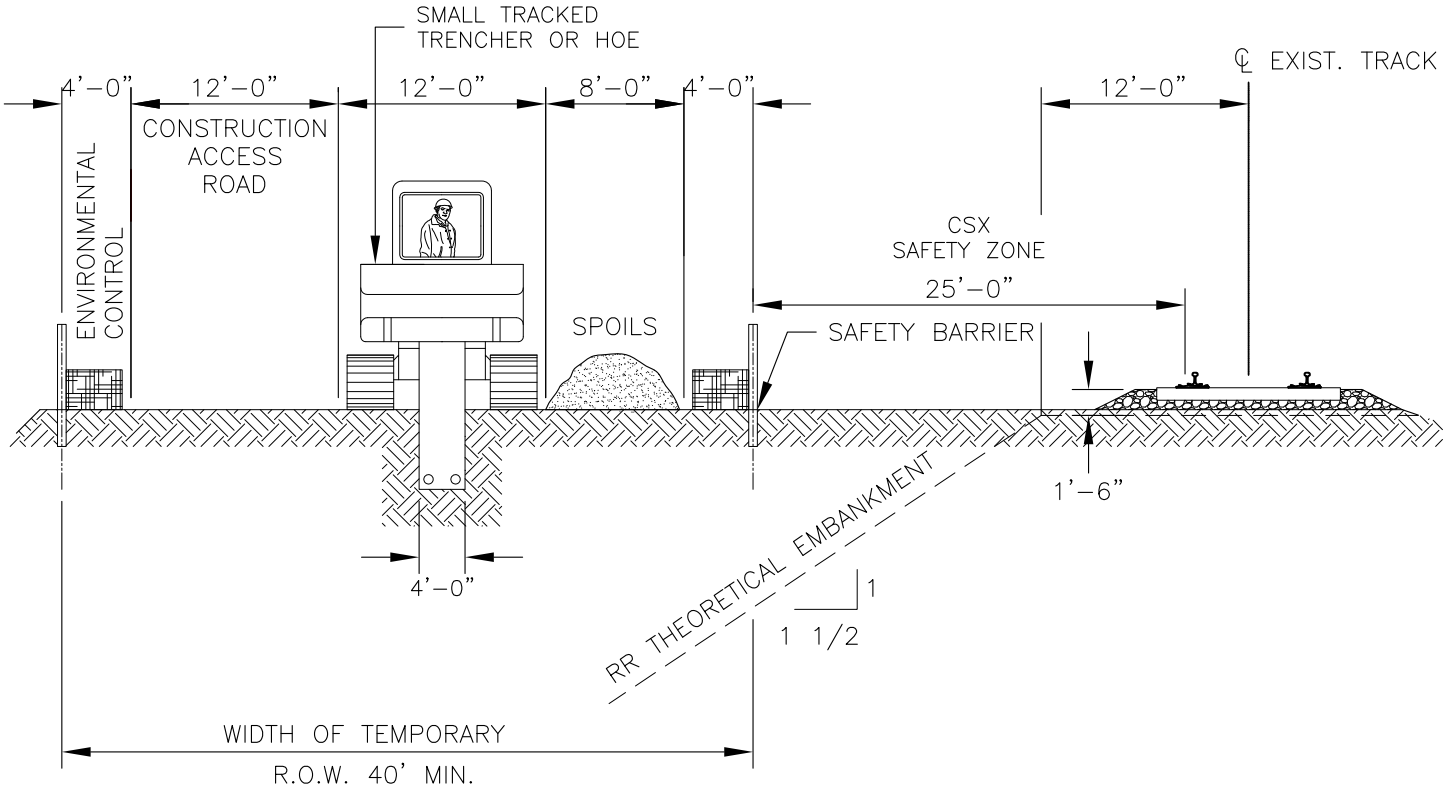
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

CSX IN-LINE TRENCHER RIGHT OF WAY

176764-UM-05 SHEET 05 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010



NOTE:

1. EXCAVATION SHALL BE SHORED OR SLOPED AS REQUIRED FOR OSHA COMPLIANCE. SLOPED EXCAVATION WILL REQUIRE INCREASED ROW.

2. CONTRACT STAGING AREAS WILL BE REQUIRED APPROXIMATELY EVERY 5 MILES. STAGING AREA SIZE IS ESTIMATED TO BE APPROXIMATELY 5 ACRES EACH.

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5. ABOVE SKETCH DEPICTS MINIMUM R.O.W. REQUIRED FOR CONVENTIONAL EXCAVATING AND TRENCHING PROCEDURES.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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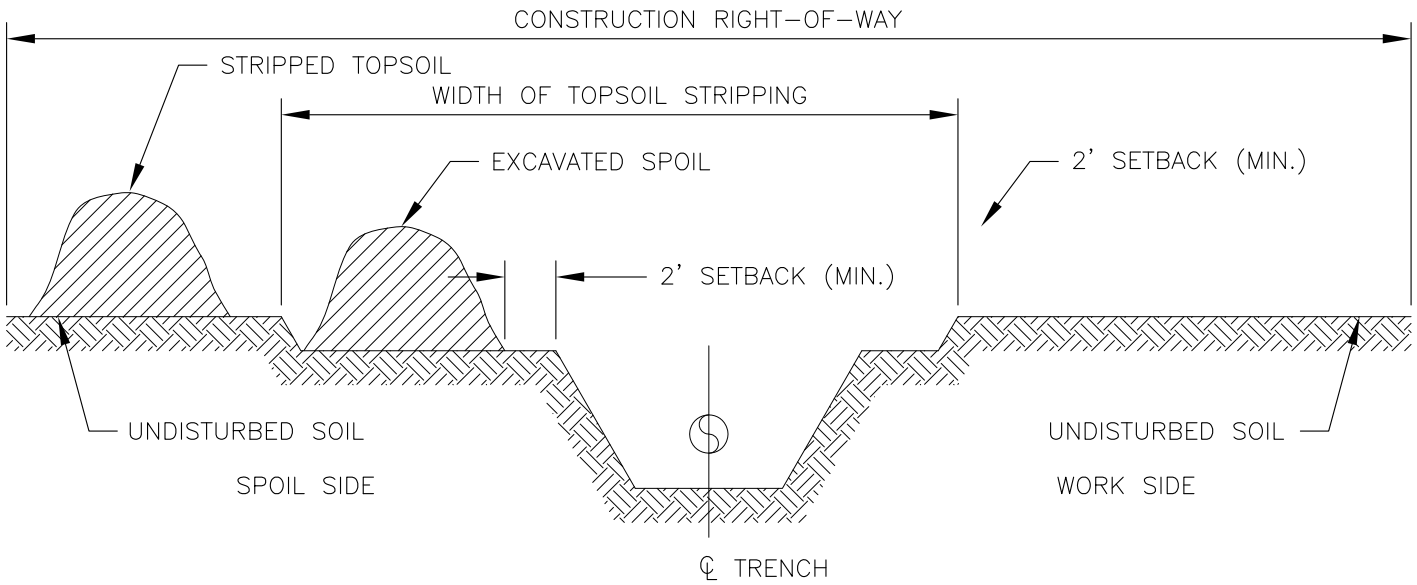
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

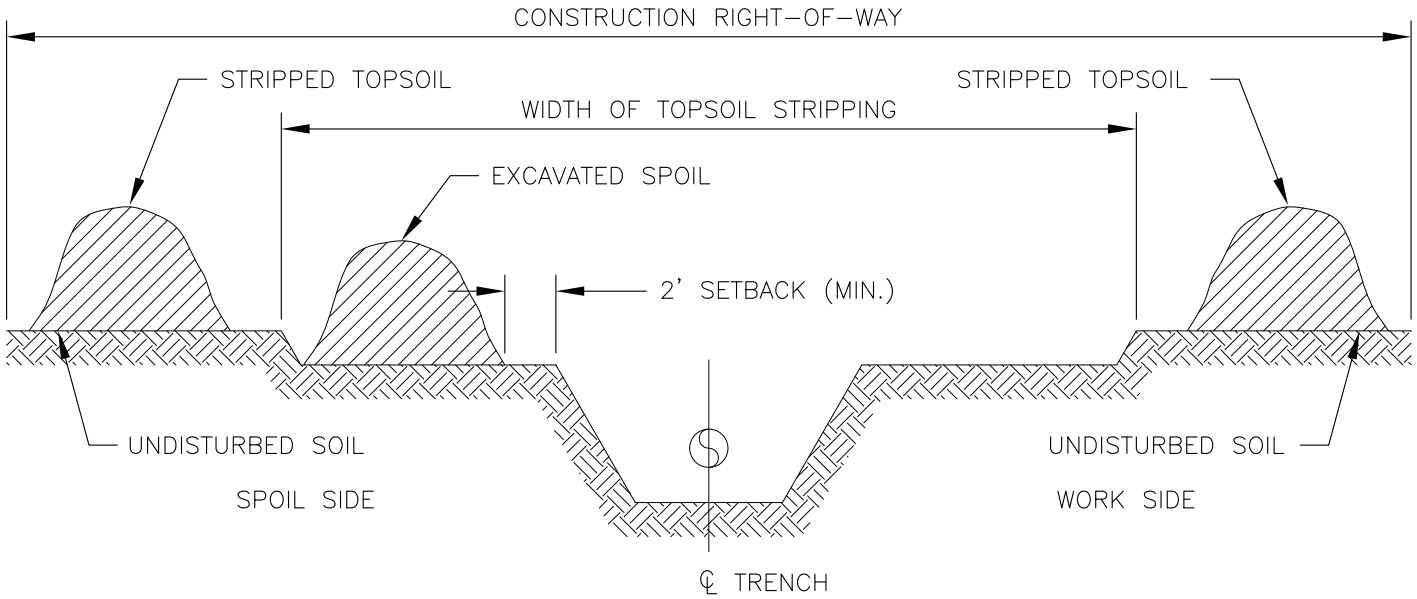
CSX WIDE RIGHT OF WAY

176764-UM-06 SHEET 06 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010



DITCH PLUS SPOILSIDE TOPSOIL SEGREGATION



FULL RIGHT–OF–WAY TOPSOIL STRIPPING

NOTES:
1. TOPSOIL MAY BE STORED IN LOCATIONS AS SHOWN ABOVE, OR AT OTHER COMPANY APPROVED LOCATIONS WITHIN THE CONSTRUCTION R.O.W.

2. LEAVE GAPS IN SPOIL PILES FOR WATER RUN–OFF.

3. CONSTRUCTION R.O.W. MAY BE EXPANDED UP TO FULL R.O.W. WIDTH IN NON WETLAND AREAS, FOR TOPSOIL SALVAGE.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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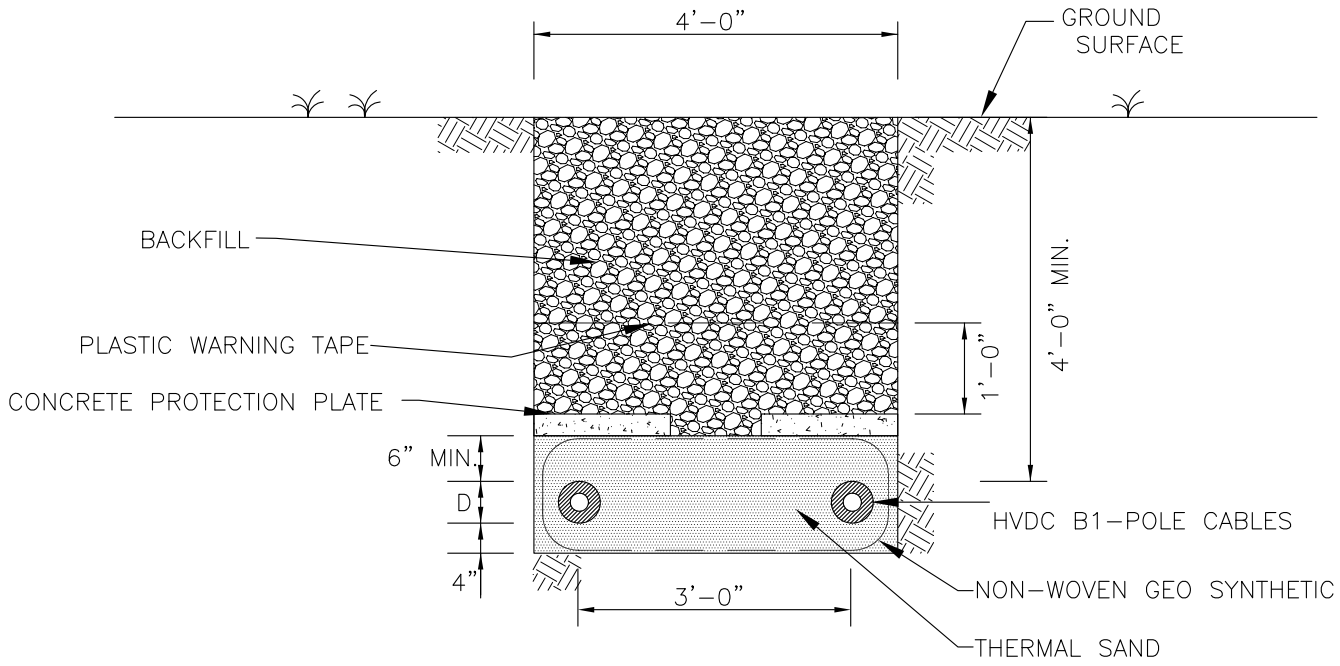
ROW TOPSOIL SEGREGATION TECHNIQUES

176764-UM-07 SHEET 07 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010



D= CABLE DIAMETER = 5 1/2"

NOTES:

1. CABLE SPACING MAY VARY BASED UPON CONTRACTOR INSTALLATION PREFERENCE AND LOCATION.
2. CABLES WILL BE BEDDED IN SCREENED SAND OR NATIVE SOIL. THERMAL SAND WILL BE USED WHERE REQUIRED. DEPTH OF THERMAL SAND OVER CABLE WILL BE FIELD DETERMINED FOLLOWING TESTING OF NATIVE SOILS.
3. GEOSYNTHETIC BLANKET WILL BE PROVIDED AROUND SAND BEDDING OVER THERMAL FILL WHEN INSTALLATION IS WITHIN FINE–GRADED SOILS.
4. CONCRETE PROTECTIVE PLATES WILL BE PROVIDED OVER EACH CABLE.
5. EXCAVATION MAY BE VERTICAL SHORED OR LAYED BACK PER OSHA REQUIREMENTS WHERE NECESSARY.
6. THERMAL SAND OVER SCREENED NATIVE SOIL SHALL BE 6 INCH MINIMUM OVER CABLES. ADDITIONAL THERMAL FILL SHALL BE PROVIDED AS REQUIRED PER DESIGN.
7. PRIOR TO EXCAVATION PROVIDE EROSION AND SEDIMENT CONTROLS AS REQUIRED.
8. ABOVE SKETCH IS TO PRESENT CONCEPTS. MORE RESTRICTIVE REQUIREMENTS OF THE RAILROAD, STATE OR OTHER AUTHORITY WILL BE REFLECTED IN THE DETAILED DESIGN REQUIREMENTS OF THE EM & CP DOCUMENTS.

Designed	WJL
Drawn	WJL
Checked	CRP
Approved	LEP
Scale	NTS

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC		

Transmission Developers Inc.

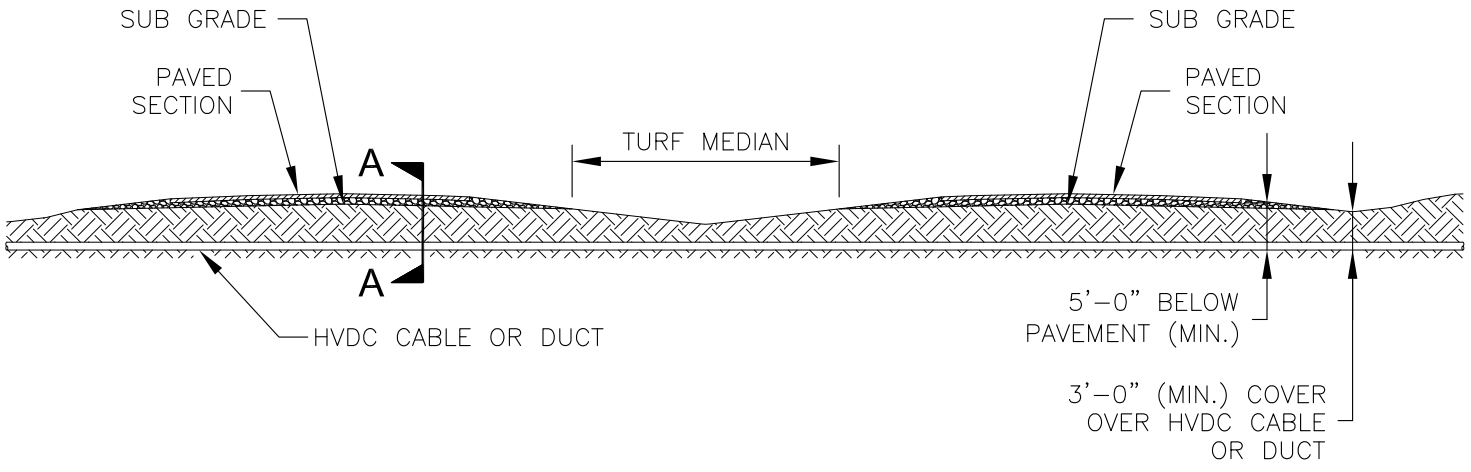
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

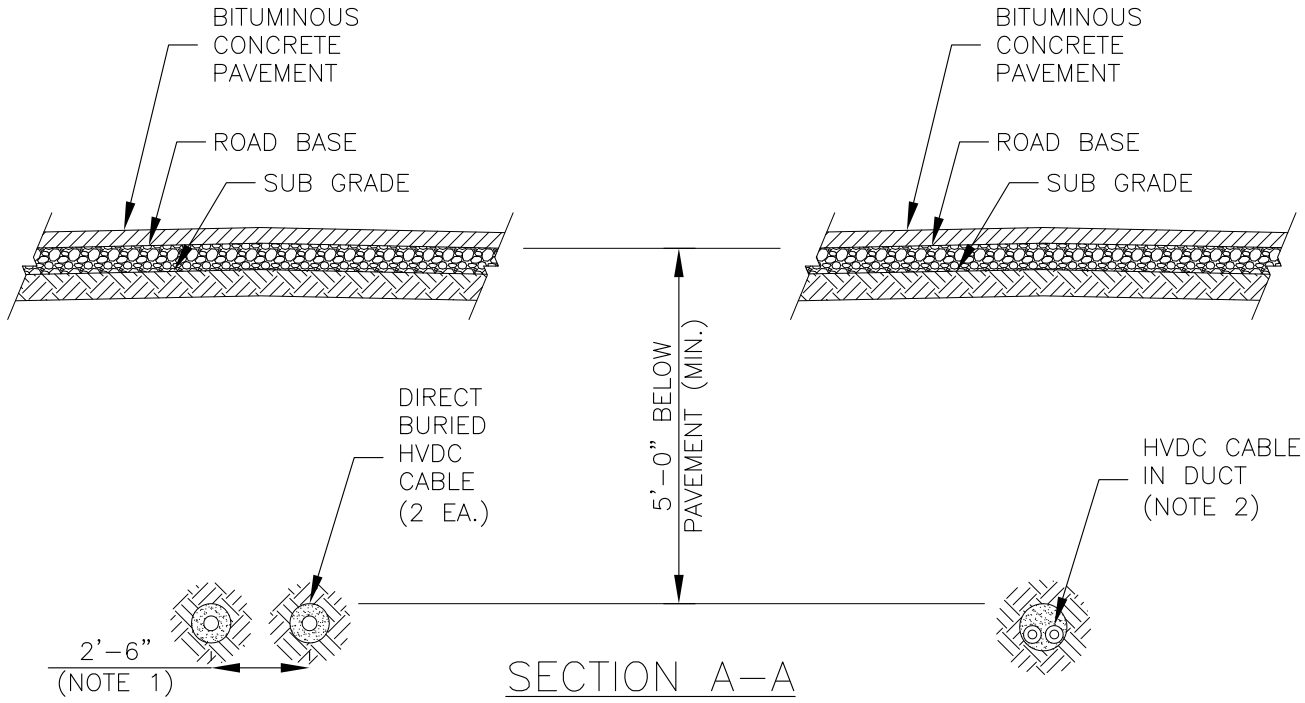
TYPICAL TRENCH CROSS-SECTION

176764-UM-08 SHEET 08 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010



INTERSTATE SECTION VIEW



SECTION A–A

NOTES:
1. SPACING BETWEEN CABLES MAY BE REDUCED OR ELIMINATED IF THERMAL PROPERTIES OF SOIL PERMIT.

2. ONE OR TWO DUCTS MAY BE INSTALLED BASED UPON SOIL PROPERTIES AND INSTALLATION CONDITIONS.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

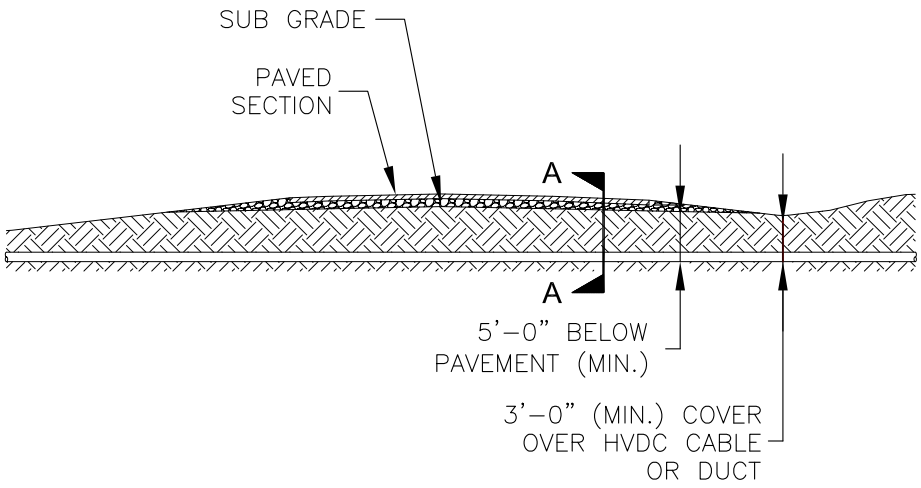
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

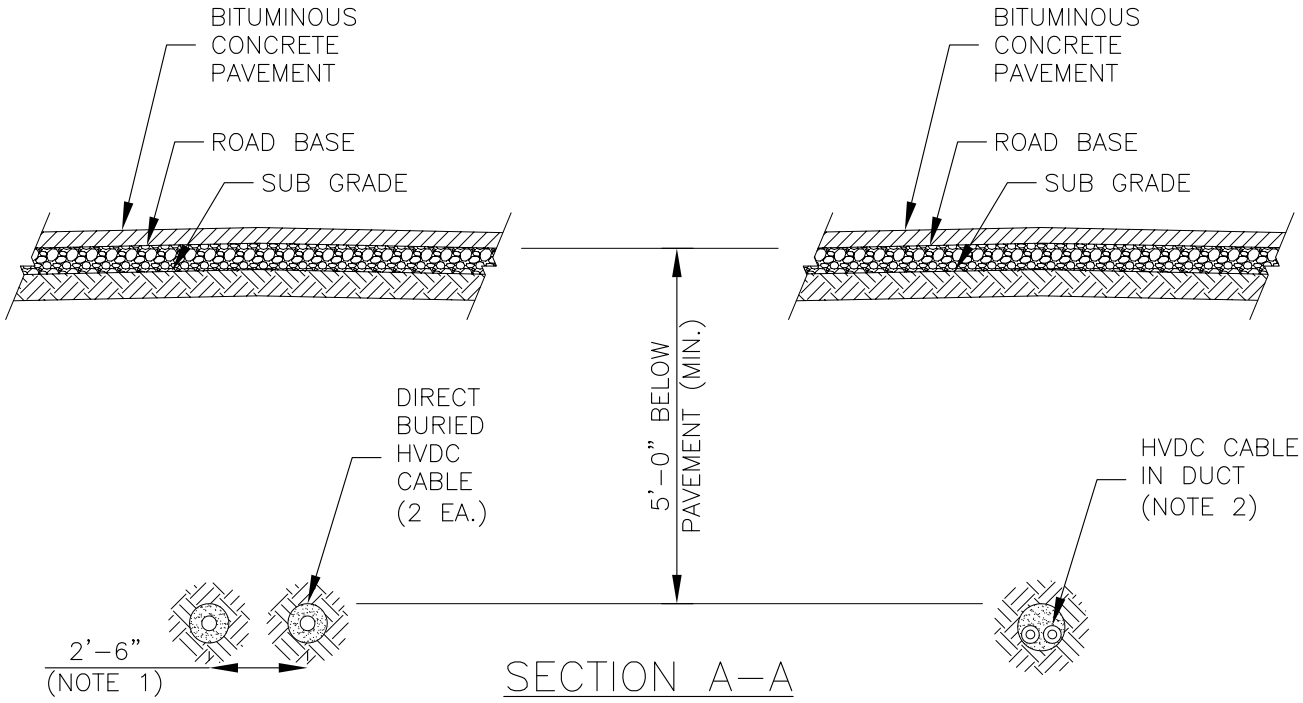
INTERSTATE CROSSING

176764-UM-09 SH 09 OF 34

Prepared by: HDR | PTA & TRC 12/06/2010



RURAL HIGHWAY SECTION VIEW



SECTION A–A

NOTES:
1. SPACING BETWEEN CABLES MAY BE REDUCED OR ELIMINATED IF THERMAL PROPERTIES OF SOIL PERMIT.

2. ONE OR TWO DUCTS MAY BE INSTALLED BASED UPON SOIL PROPERTIES AND INSTALLATION CONDITIONS.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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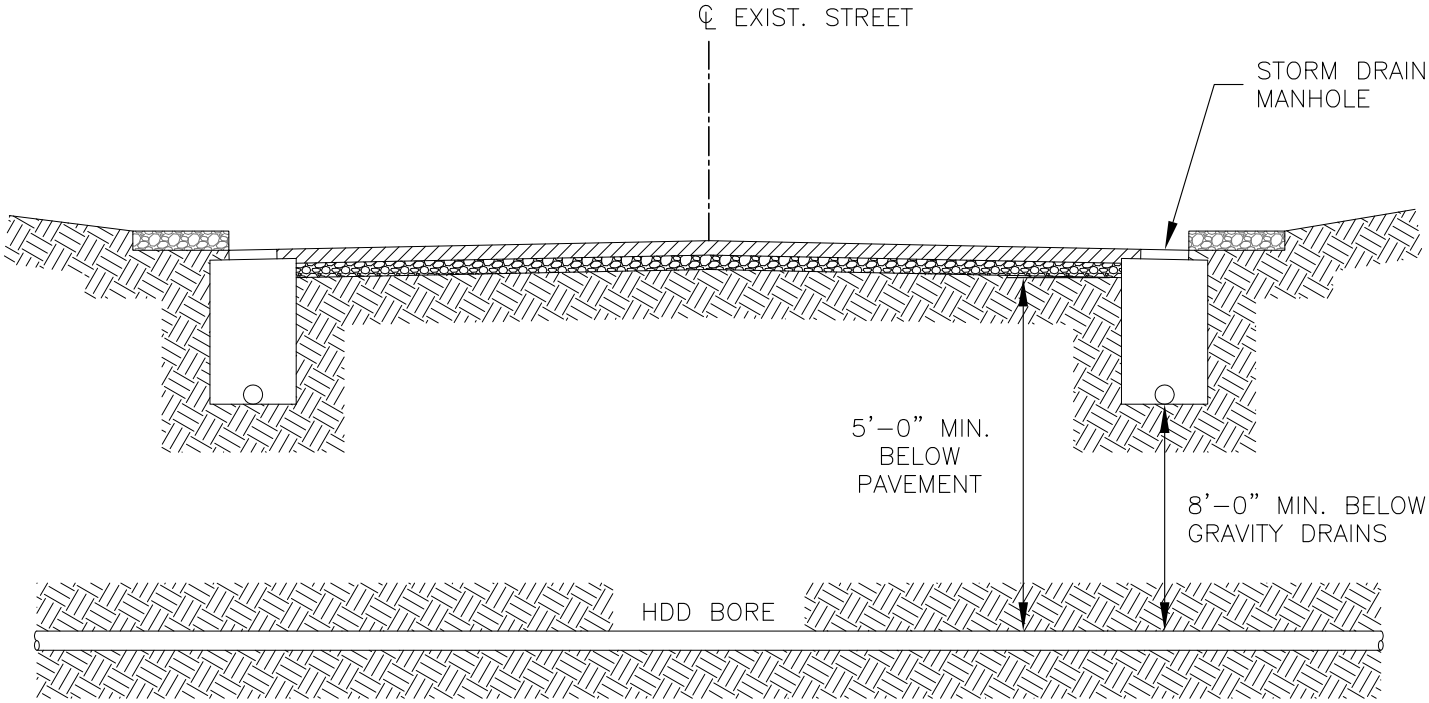
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

TYPICAL RURAL HIGHWAY

176764-UM-10 SHEET 10 OF 34

Prepared by: HDR | PTA & TRC 12/06/2010



NOTES:

1. PLANNED CLEARANCE TO GRAVITY DRAINS AND OTHER UTILITIES SHALL BE INCREASED AS REQUIRED BY THE HDD COMPANY, MUNICIPALITY, OR UTILITY.

2. ABOVE CROSSING IS TO PRESENT CONCEPTS. MORE RESTRICTIVE REQUIREMENTS OF THE UTILITIES, REGULATORS, OR OTHER AUTHORITIES HAVING JURISDICTION (IF ANY) SHALL BE REFLECTED IN THE DETAILED DESIGN REQUIREMENTS OF THE EM & CP DOCUMENTS.

Designed	A WIRONEN
Drawn	WJL
Checked	CRP
Approved	LEP
Scale	NTS

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

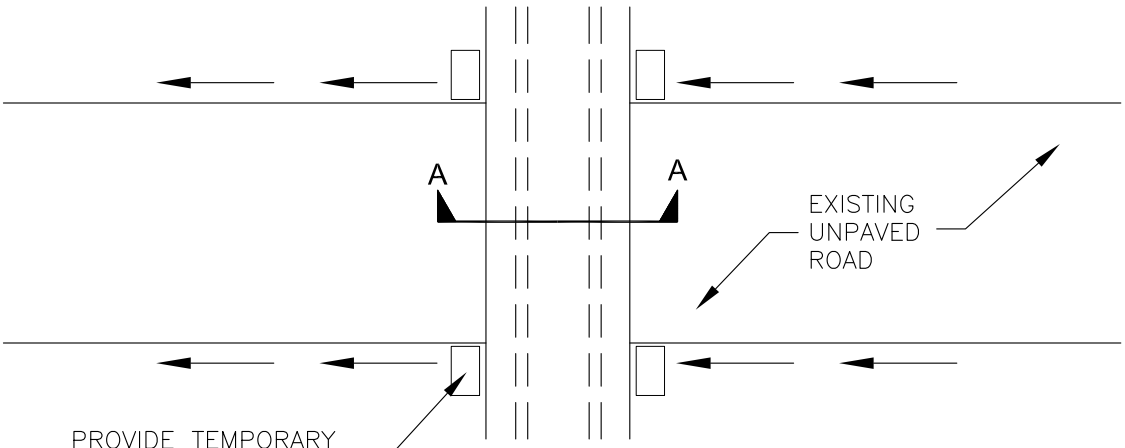
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

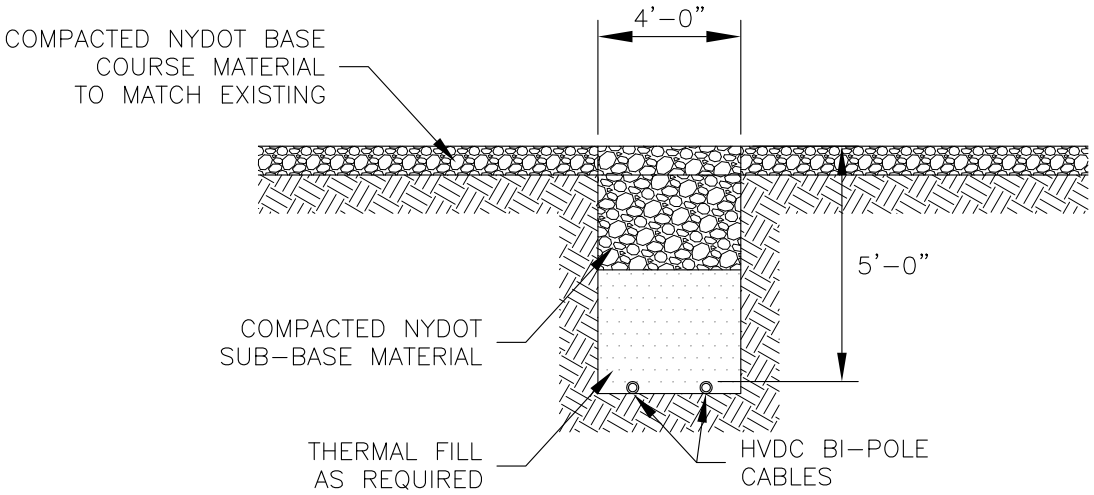
RURAL STREET CROSSING

176764-UM-11 SHEET 11 OF 34

Prepared by: HDR | PTA & TRC 12/06/2010



UNPAVED ROAD PLAN



SECTION A

NOTES:
1. PRIOR TO EXCAVATING ROADWAY, PROVIDE EROSION AND SEDIMENT CONTROLS AS REQUIRED IN DITCH LINES.
2. ABOVE CROSSING IS TO PRESENT CONCEPTS. MORE RESTRICTIVE REQUIREMENTS OF THE MUNICIPALITY, STATE OR OTHER AUTHORITY HAVING JURISDICTION (IF ANY) SHALL BE REFLECTED IN THE DETAILED DESIGN REQUIREMENTS OF THE EM & CP DOCUMENTS.

Designed	WJL
Drawn	WJL
Checked	CRP
Approved	LEP
Scale	NTS

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC		

Transmission Developers Inc.

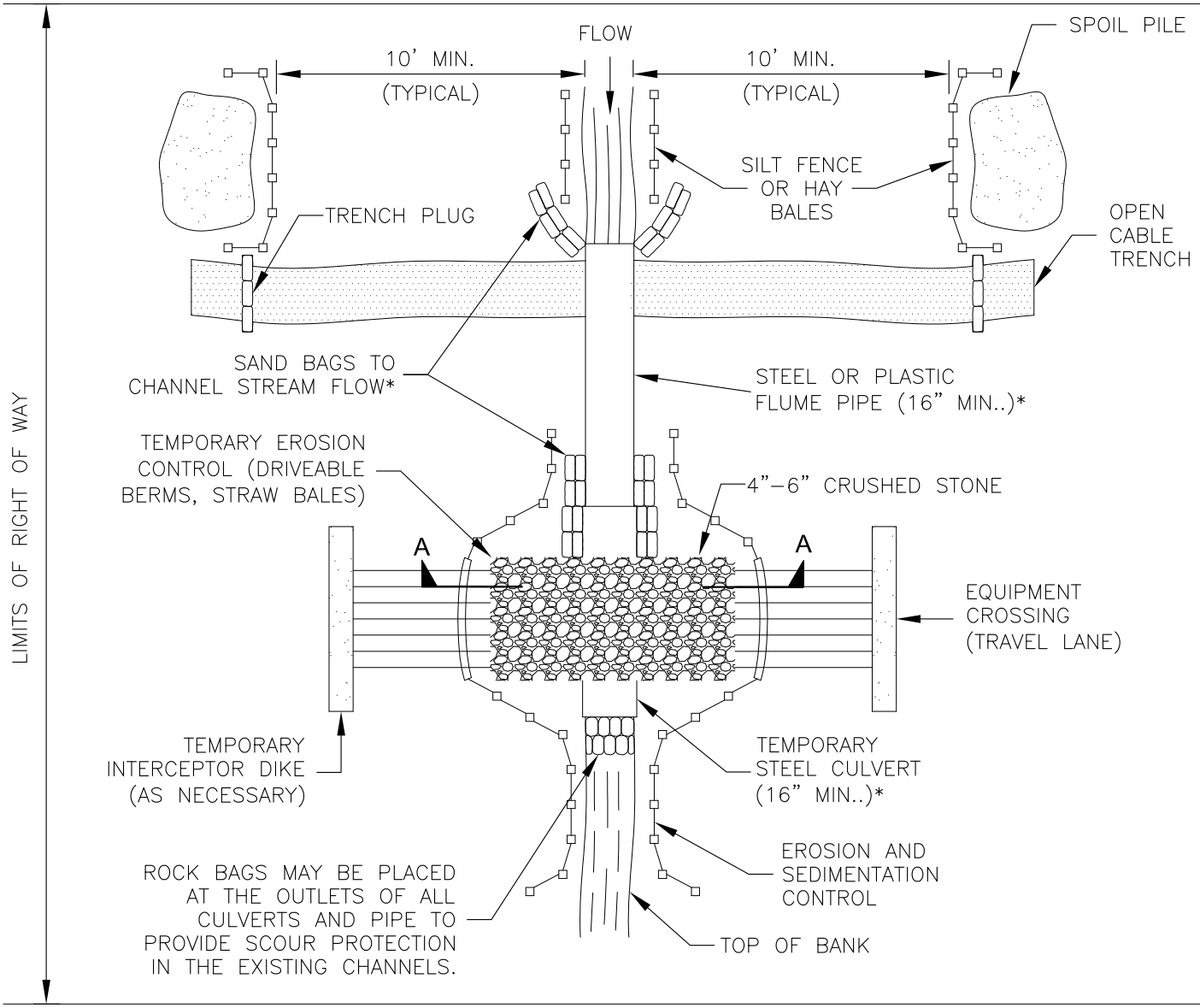
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

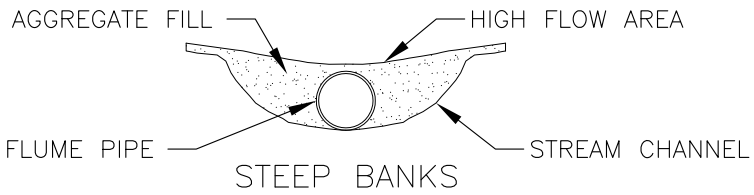
UNPAVED ROAD CROSSING

176764-UM-12 SHEET 12 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010



PLAN VIEW



SECTION A–A

* IF WELDED PIPE IS USED SAND BAGS AT JOINTS NOT REQUIRED. ACTUAL NUMBERS OF FLUMES AND CULVERT PIPE REQUIRED TO BE DETERMINED BY STREAM WIDTH.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

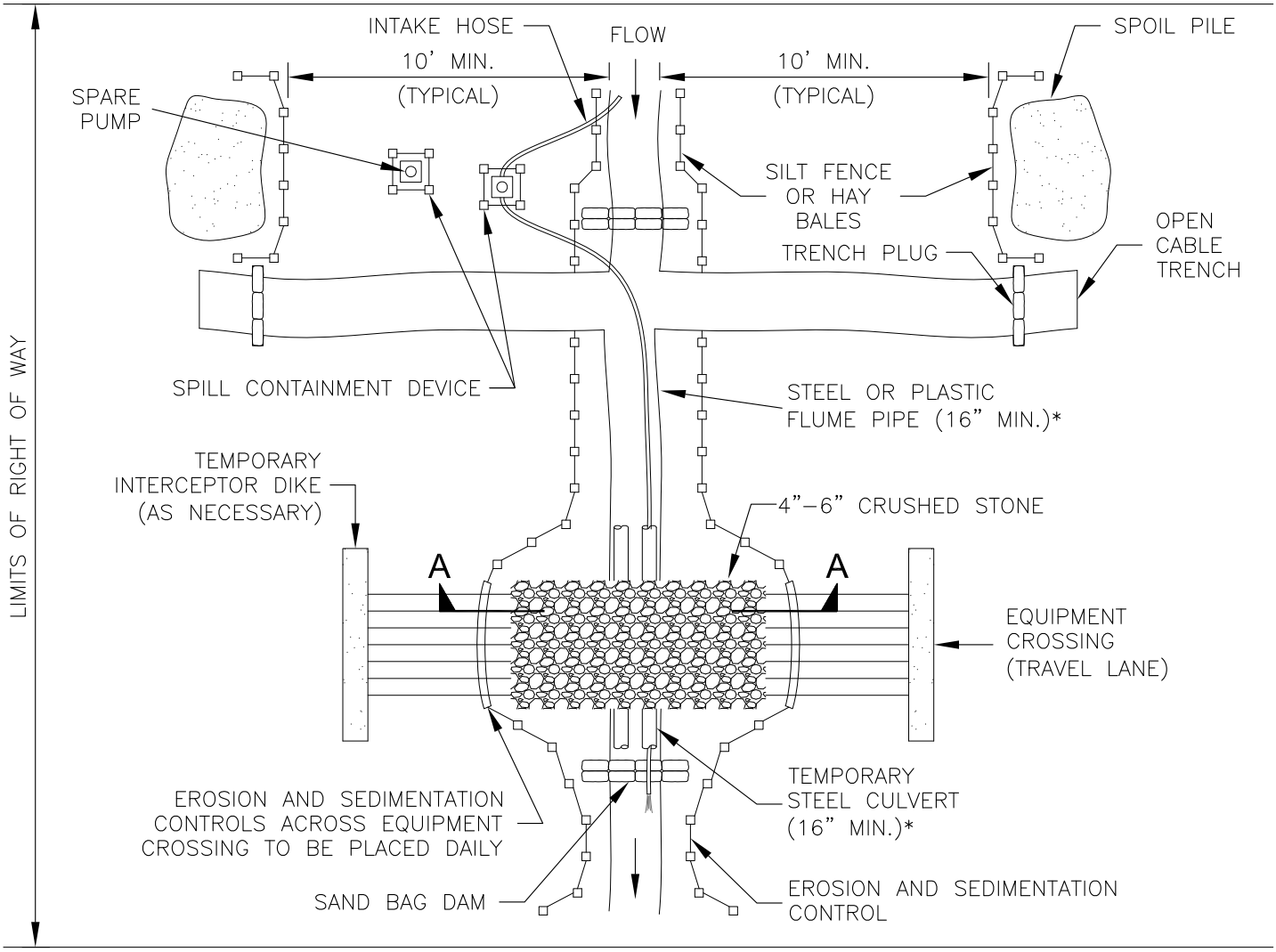
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

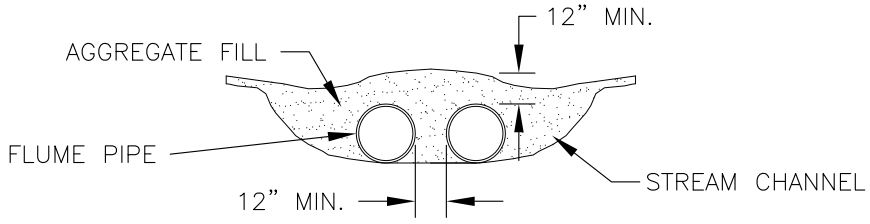
TYPICAL FLUMED CROSSING

176764-UM-13 SH 13 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010



PLAN VIEW



SECTION A–A

NOTES:
1. EXCAVATE ACROSS STREAM CHANNEL FOLLOWING WATER RE–ROUTING.
2. LOWER PIPE UNDER HOSE AND BACKFILL.
3. MONITOR PUMPS AT ALL TIMES DURING STREAM CROSSING PROCEDURE.
4. REMOVE SILT FENCE/HAY BALES ACROSS EQUIPMENT CROSSING AS NEEDED FOR ACCESS, AND REPLACE AT THE END OF EACH DAY.
5. NUMBER OF FLUME PIPES WILL VARY DEPENDING ON SITE CONDITIONS.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

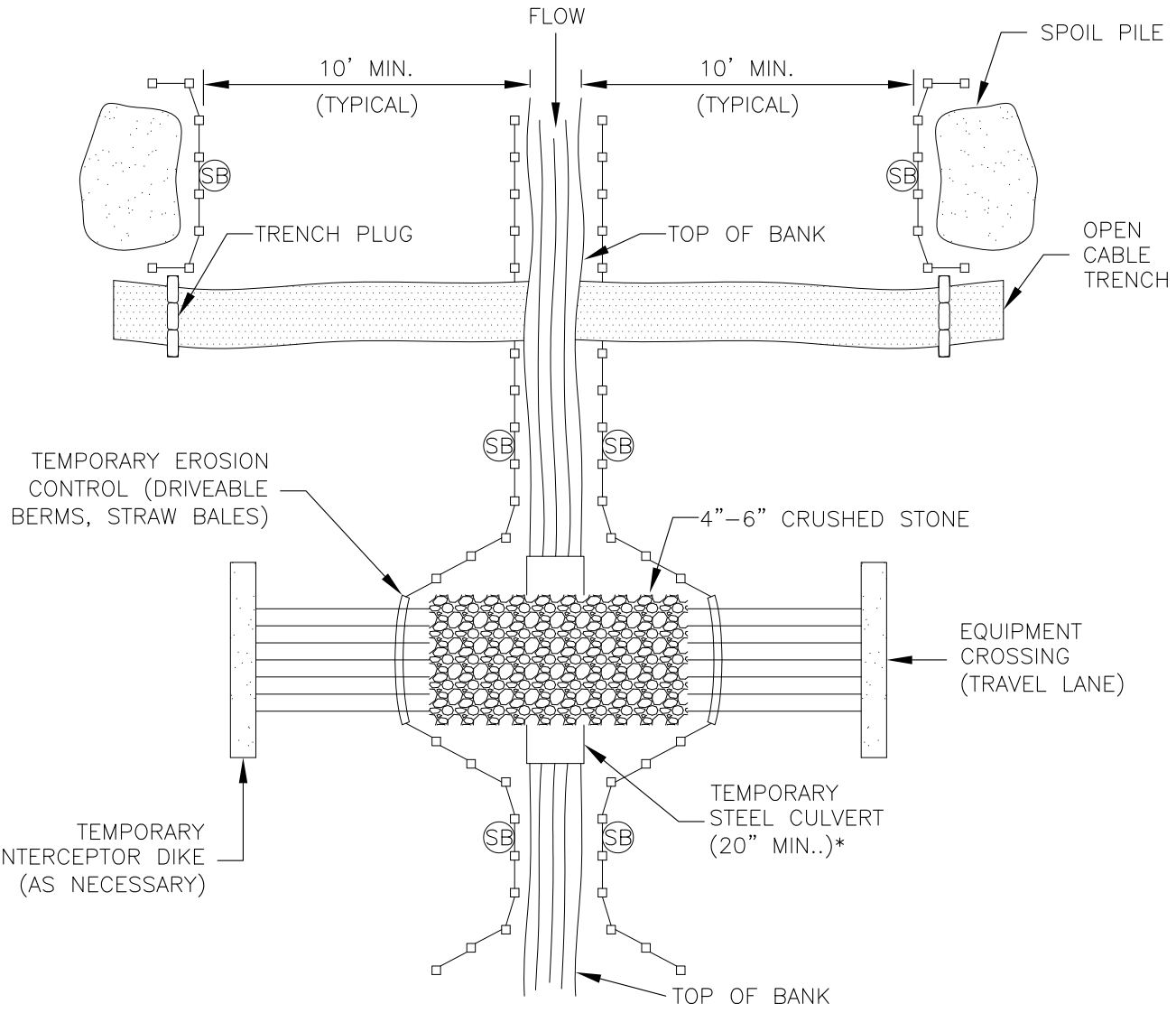
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

TYPICAL DAM AND PUMP STREAM CROSSING

176764-UM-14 SHEET 14 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010



NOTES:

1. (SB) TEMPORARY SEDIMENT BARRIER OF SILT FENCE AND/OR STRAW BALES, OR APPROPRIATE MATERIALS.
2. FOR MINOR WATERBODIES, COMPLETE TRENCHING AND BACKFILL IN THE WATERBODY (NOT INCLUDING BLASTING OR OTHER ROCK BREAKING MEASURES) WITHIN 24 CONTINUOUS HOURS. IF A FLUME IS INSTALLED WITHIN THE WATERBODY DURING MAINLINE ACTIVITIES, IT CAN BE REMOVED JUST PRIOR TO LOWERING IN THE CABLE OR CONDUIT. THE 24–HOUR TIMEFRAME STARTS AS SOON AS THE FLUME IS REMOVED.
3. FOR INTERMEDIATE WATERBODIES, COMPLETE TRENCHING AND BACKFILLING IN THE WATERBODY (NOT INCLUDING BLASTING OR OTHER ROCK BREAKING MEASURES) WITHIN 48 CONTINUOUS HOURS, IF FEASIBLE.

* ACTUAL NUMBERS OF FLUMES AND CULVERT PIPE REQUIRED TO BE DETERMINED BY STREAM WIDTH.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

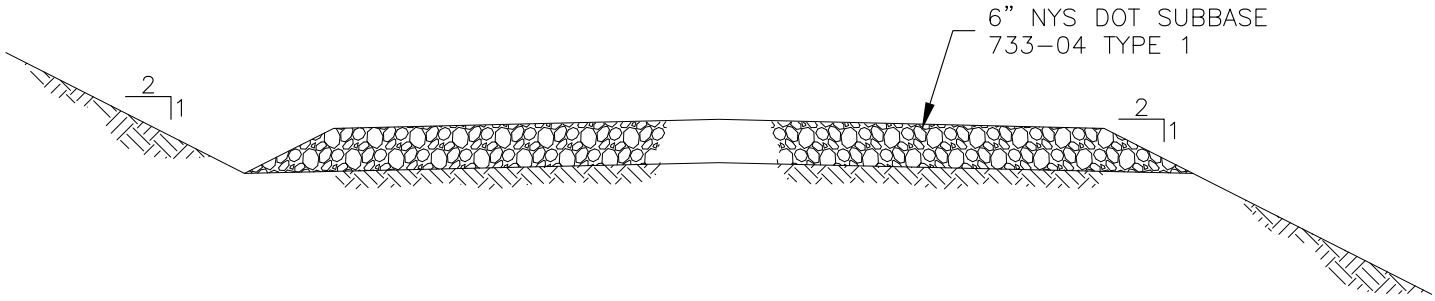
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

TYP. OPEN CUT STREAM CROSSING

176764-UM-15 SHEET 15 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010



PROJECT ROW TEMPORARY ACCESS ROAD

NOTE:

1. REMOVE TOPSOIL, ROOTS AND OTHER ORGANIC MATERIAL.
2. GRADE SLOPES AT NOT GREATER THAN 2H:1V.
3. PROVIDE SLOPE AND DRAINAGE DITCH STABILIZATION AS REQUIRED PER NYS STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.
4. PLACE NON-WOVEN GEOTEXTILE REINFORCEMENT BLANKET OVER PREPARED ROAD BED.
5. SPREAD NOT LESS THAN 6 INCHES SUBBASE MATERIAL FOR FULL WIDTH OF ACCESS ROAD.
6. AT COMPLETION OF PROJECT REMOVE ROADWAY MATERIALS, RE-GRADE, AND RE-VEGETATE TO MATCH EXISTING CONDITIONS.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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Champlain Hudson Power Express Project

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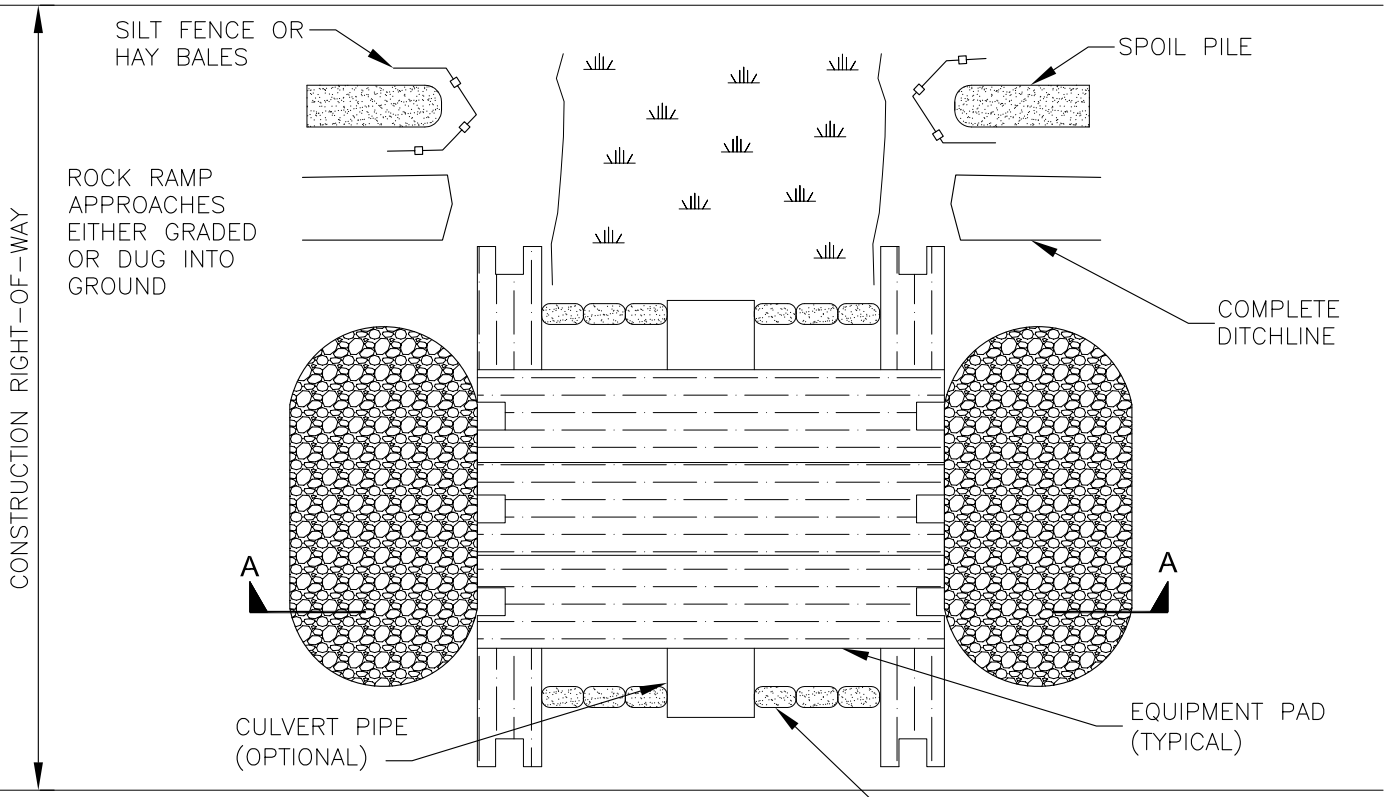
TEMPORARY ACCESS ROAD

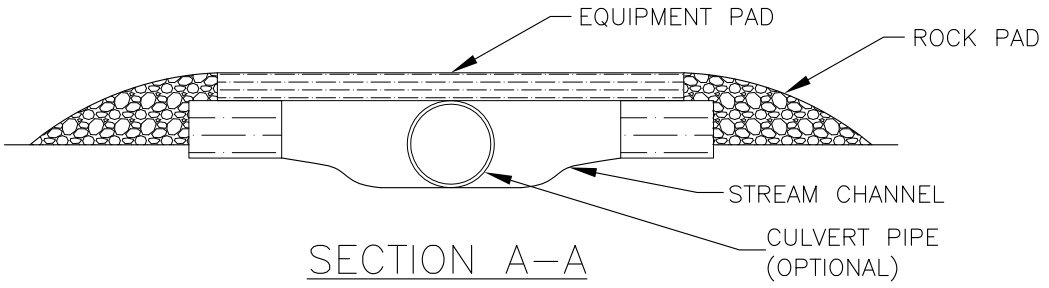
176764-UM-16 SHEET 16 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010



PLAN VIEW

TYPICAL PAD SECTION DIMENSIONS
3' WIDE, 1' THICK, 20' LONG



SECTION A-A

NOTES:
1. CULVERT PIPE UTILIZED IF ADDITIONAL SUPPORT IS REQUIRED.
2. ADDITIONAL PADS CAN BE PUT SIDE BY SIDE IF EXTRA WIDTH IS REQUIRED
3. EQUIPMENT PAD TYPICALLY CONSTRUCTED OF HARDWOOD; MUST ACCOMMODATE THE LARGEST EQUIPMENT USED.
4. ROCK PADS OR CRUSHED STONE SHALL BE USED AT ENTRANCE TO THE EQUIPMENT PADS (IF NECESSARY).

Designed	A WIRONEN
Drawn	DFW/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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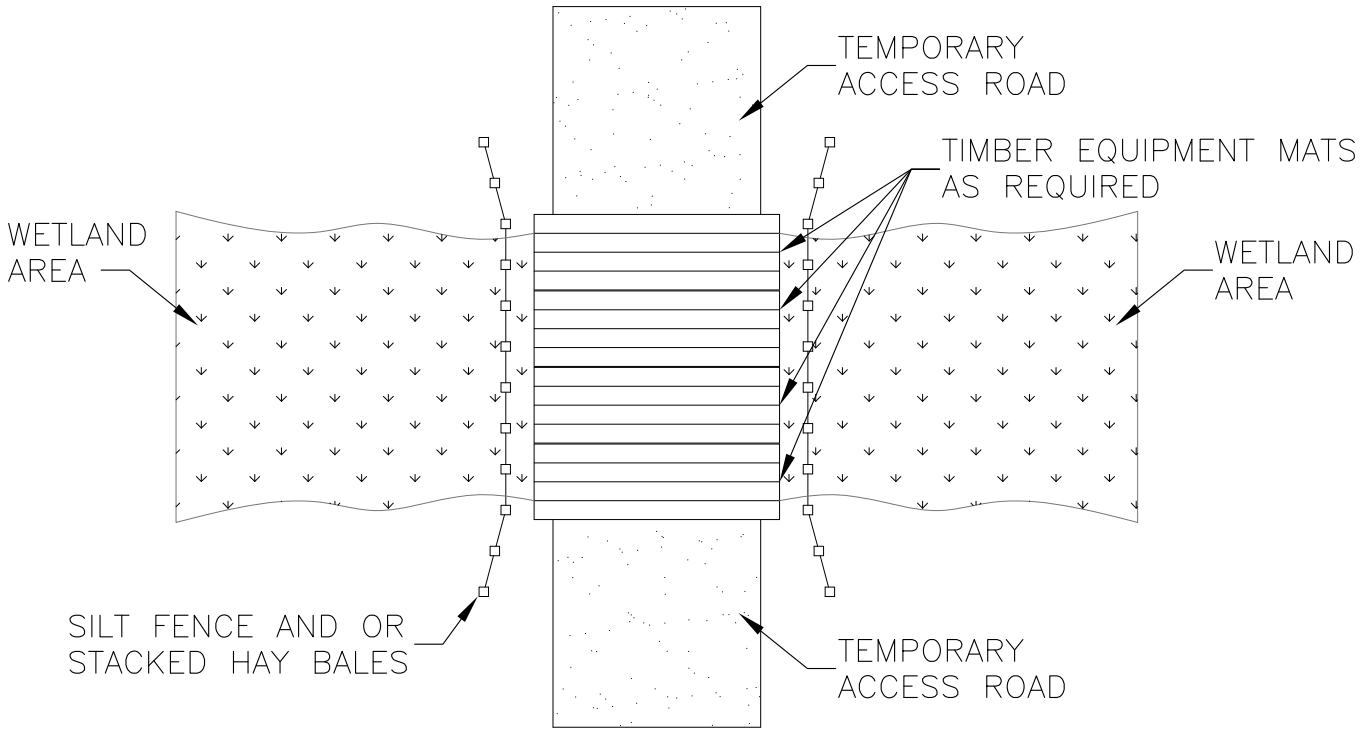
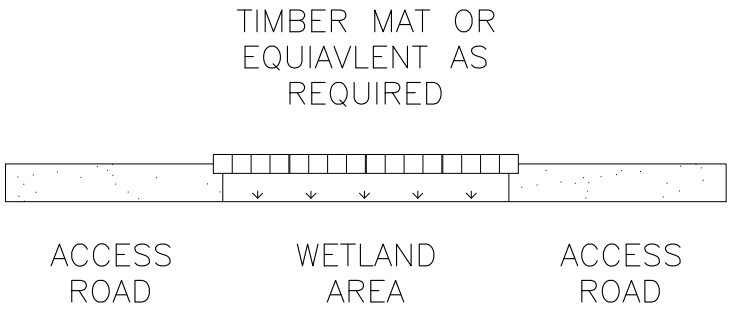
TEMP. EQUIPMENT BRIDGE (WOODEN MAT)

176764-UM-17 SHEET 17 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010





Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
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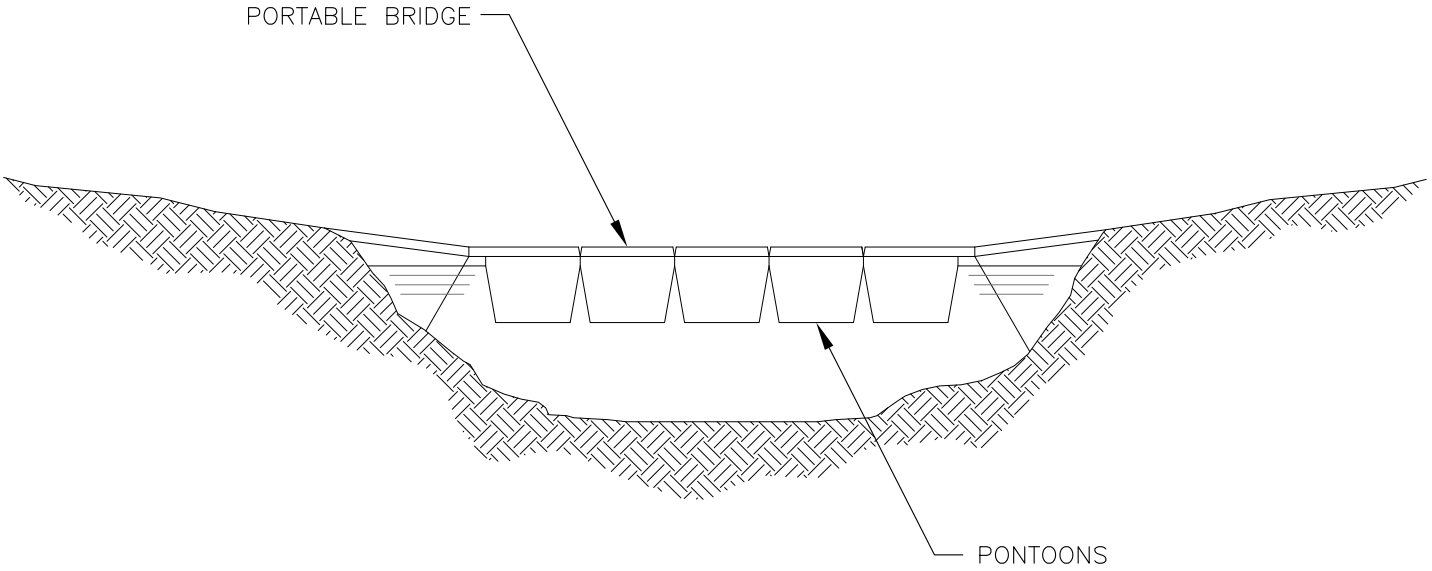
TYP. TEMP. ACCESS ROAD EQUIP. MAT CROSS-SECTION

176764-UM-18 SHEET 18 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010



NOTES:
1. STABILIZE EDGES WITH SANDBAGS OR STONE.

2. REMOVE BRIDGE DURING CLEANUP.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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TEMP. EQUIPMENT BRIDGE (FLEXI-FLOAT OR PORTABLE)

176764-UM-19 SHEET 19 OF 34

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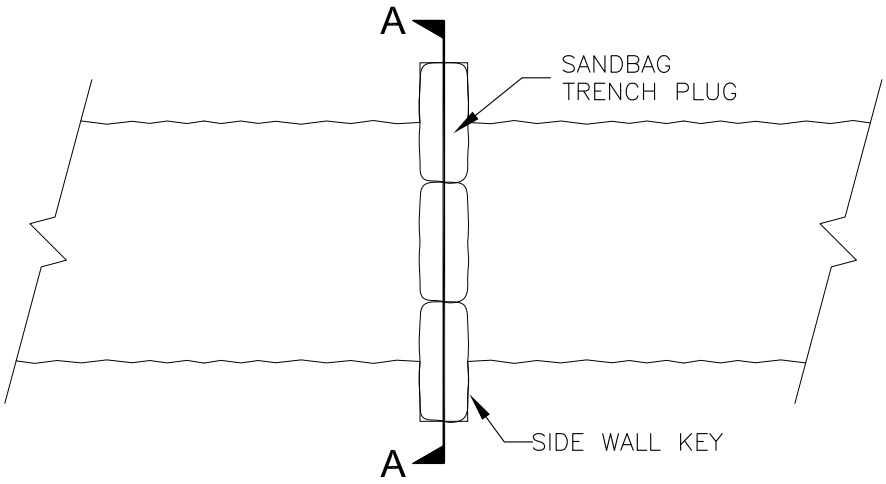
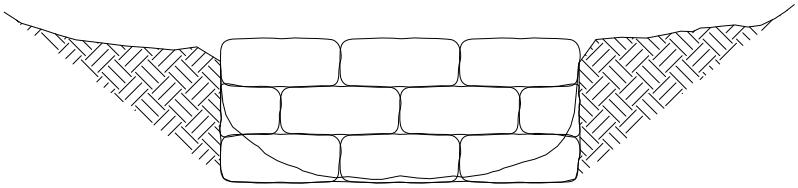


TRENCH PLUG
PLAN VIEW



SECTION A

NOTES:
1. AFTER TRENCH EXCAVATION TO EDGE OF STREAM, HAND DRESS BOTTOM OF TRENCH IN VICINITY OF PLANNED PLUG CONSTRUCTION.
2. EXCAVATE KEY INTO TRENCH SIDE WALL. EXCAVATE TO PROVIDE VERTICAL SURFACE NOT LESS THAN 6" INTO BANK.
3. CONSTRUCT SANDBAG TRENCH PLUG USING SANDBAGS FILLED WITH CLEAN, FINE SAND.
4. BACK FILL KEY WAY TO PROVIDE COMPACTED NATIVE SOIL AGAINST SANDBAGS.
5. BACK FILL TRENCH CONCURRENT WITH CABLE PLACEMENT. REMOVE SANDBAG TRENCH PLUG AS CABLE IS PLACED.
6. PROVIDE STREAM BED AND EMBANKMENT PROTECTION PER NY STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
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TRENCH PLUG

176764-UM-20 SHEET 20 OF 34

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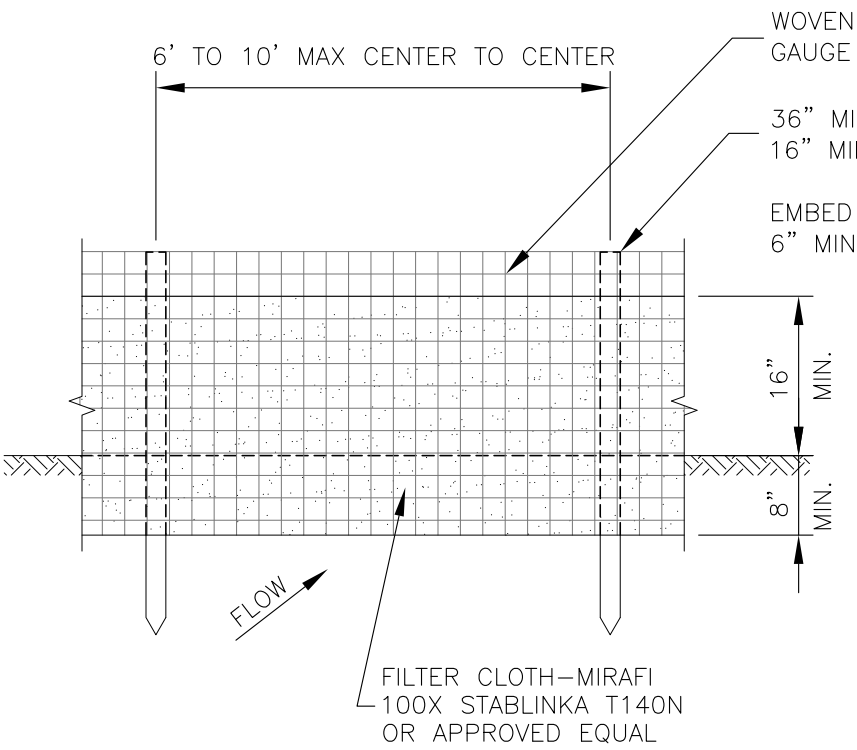
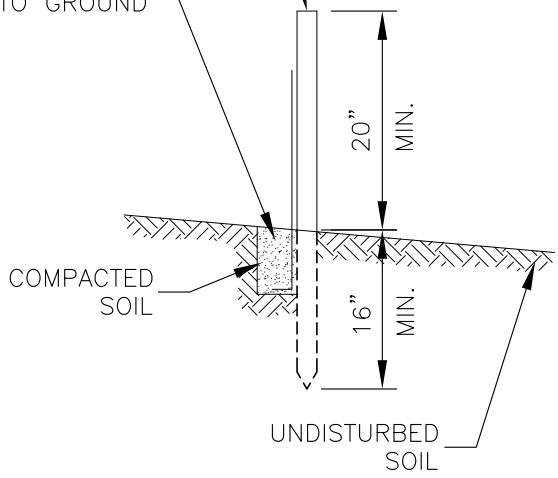


ELEVATION



SECTION

NOTES:

1. WOVEN WIRE FENCE TO BE FASTENED TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY 6" AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

POSTS:
STEEL "T" OR "U" TYPE OR 2" HARDWOOD.

FENCE:
WOVEN WIRE. 14 1.2 GA. 6" MAX MESH OPENING.

FILTER CLOTH:
FILTER X, MIRAFI 100X. STABLINKA T140N OR APPROVED EQUAL.

PREFABRICATED UNIT:
ENVIROFENCE OR APPROVED EQUAL.

SILT FENCE DETAIL

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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SILT FENCE

176764-UM-21 SHEET 21 OF 34

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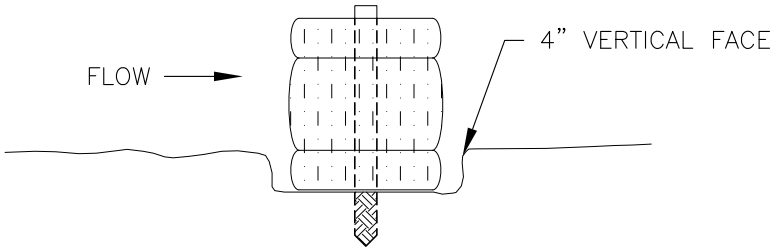
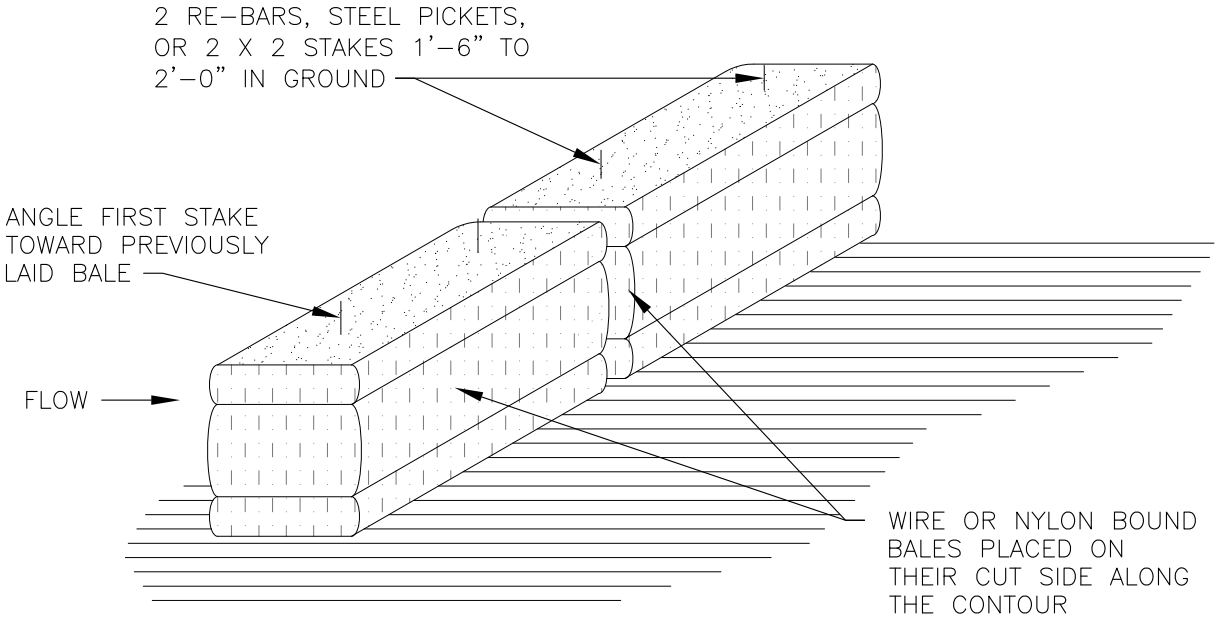


EMBEDDING DETAIL



ANCHORING DETAIL

STRAW BALE DIKE DETAIL

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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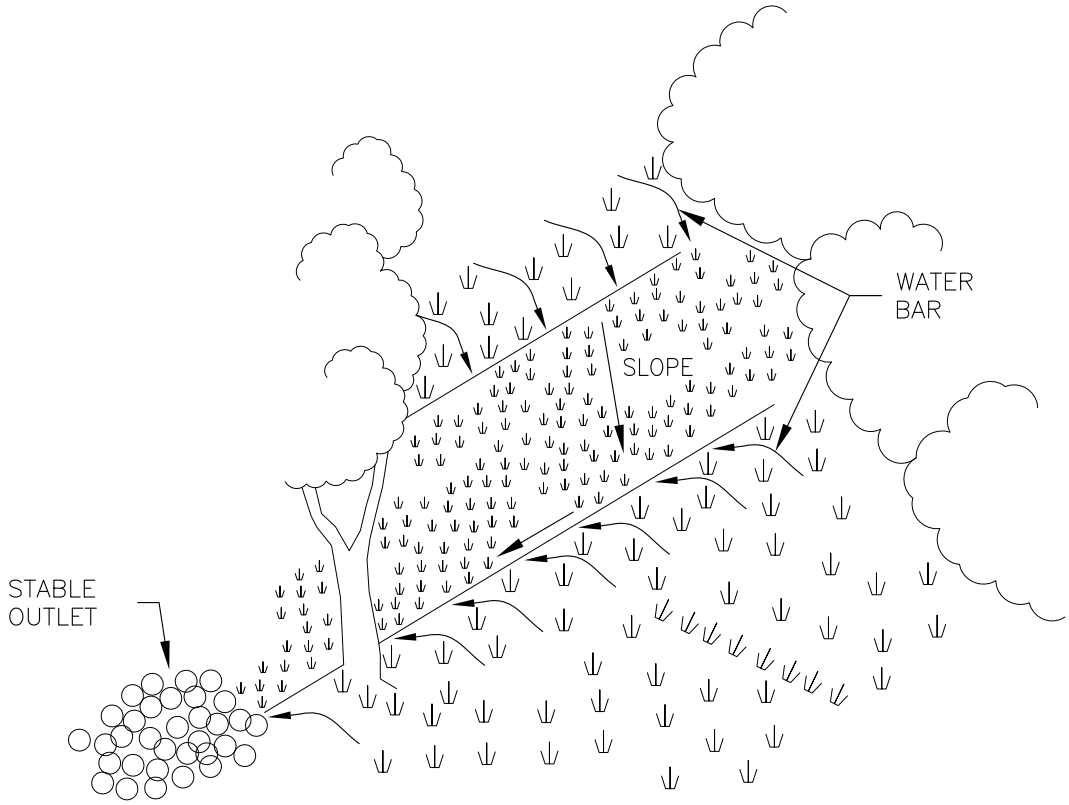
STRAW BALE DIKE

176764-UM-22 SHEET 22 OF 34

Prepared by: HDR | PTA & TRC 12/06/2010



WATER BAR

CONSTRUCTION SPECIFICATIONS NOTES:

1. INSTALL THE WATER BAR BEFORE VEHICULAR TRAFFIC BEGINS TRAVELING ALONG THE RIGHT OF WAY.
2. DISK OR STRIP THE SOD FROM THE BASE FOR THE CONSTRUCTED RIDGE BEFORE PLACING FILL.
3. TRACK THE RIDGE TO COMPACT IT TO THE DESIGN CROSS SECTION.
4. THE OUTLET SHALL BE LOCATED ON AN UNDISTURBED AREA. FIELD SPACING WILL BE ADJUSTED TO USE THE MOST STABLE OUTLET AREAS. OUTLET PROTECTION WILL BE PROVIDED WHEN NATURAL AREAS ARE NOT ADEQUATE.
5. VEHICLE CROSSING SHALL BE STABILIZED WITH GRAVEL. EXPOSED AREAS SHALL BE IMMEDIATELY SEEDED AND MULCHED.
6. PERIODICALLY INSPECT WATER BARS FOR EROSION DAMAGE AND SEDIMENT. CHECK OUTLET AREAS AND MAKE REPAIRS AS NEEDED TO RESTORE OPERATION.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
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Champlain Hudson Power Express Project

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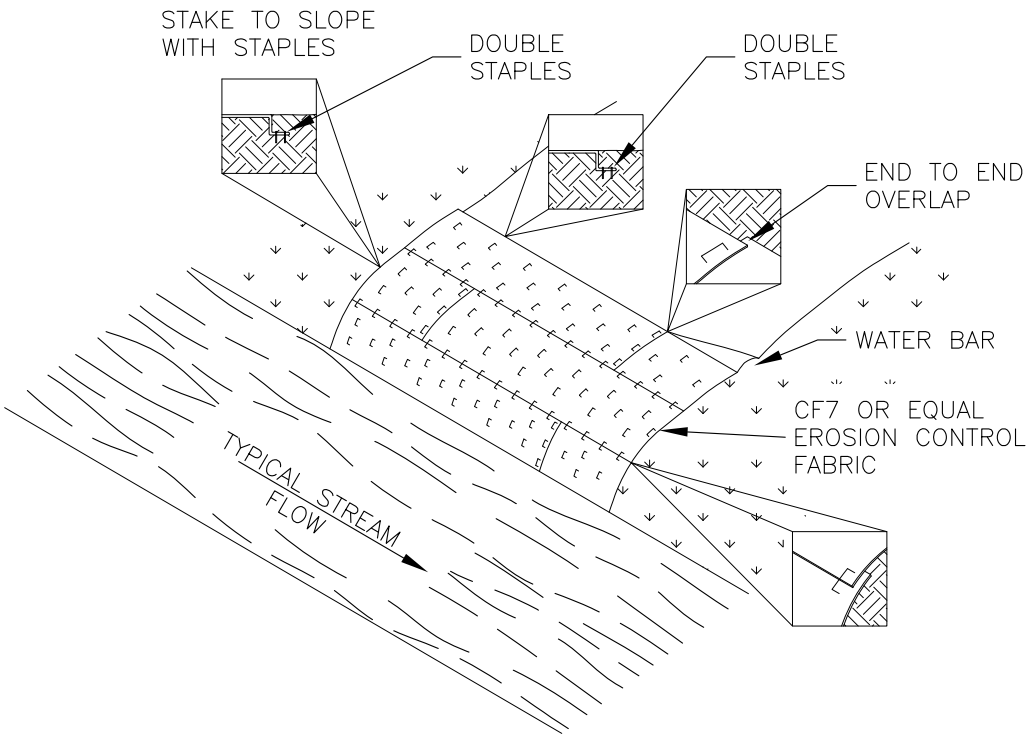
WATER BAR

176764-UM-23 SHEET 23 OF 34

Prepared by: HDR | PTA & TRC 12/06/2010



NOTES:

1. EROSION CONTROL MATTING SHALL BE PLACED ON THE BANKS OF FLOWING STREAMS WHERE VEGETATION HAS BEEN REMOVED OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
2. THE EROSION CONTROL MATTING SHALL MEET THE REQUIREMENTS SPECIFIED IN THE SOIL EROSION AND SEDIMENTATION CONTROL GUIDELINES AND/OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
3. STAPLES SHALL BE MADE OF 11 GAUGE WIRE, U-SHAPED WITH 6" LEGS AND A 1" CROWN. STAPLES SHALL BE DRIVEN INTO THE GROUND FOR THE FULL LENGTH OF THE STAPLE LEGS. ALTERNATELY 1" WOODEN PEGS 6" LONG AND BEVELED TO SECURE MATTING.
4. MATTING SHALL BE INSTALLED ACCORDING TO MANUFACTURER SPECIFICATIONS OR AS STATED BELOW:
   *THE TOP OF THE BLANKET SHALL EXTEND 2' PAST THE UPPER EDGE OF THE HIGH WATER MARK. IF A WATERBED IS PRESENT ON THE APPROACH SLOPE, THE BLANKET SHALL BEGIN ON THE UPHILL SIDE OF THE WATERBED.
   *INSTALL BLANKET(S) ACROSS THE SLOPE IN THE DIRECTION OF WATER FLOW.
   *ANCHOR ("KEY") THE UPSTREAM EDGE OF THE BLANKET(S) INTO THE SLOPE USING A 6" WIDE BY 6" DEEP TRENCH. DOUBLE STAPLE EVERY 12" BEFORE BACK FILLING AND COMPACTING TRENCH.
   *ANCHOR ("KEY") THE UPPER EDGE OF THE BLANKET INTO THE SLOPE USING A 6" WIDE BY 6" DEEP TRENCH. DOUBLE STAPLE EVERY 12" BEFORE BACK FILLING AND COMPACTING TRENCH.
   *THE EDGES OF PARALLEL BLANKETS SHALL BE OVERLAPPED A MINIMUM OF 6". THE UPPER BLANKET SHALL BE PLACED OVER THE LOWER BLANKET (SHINGLE STYLE) AND STAPLED EVERY 12" ALONG THE LENGTH OF THE EDGE.
   *WHEN BLANKET ENDS ARE TO ADJOINING BLANKETS, THE UPSTREAM BLANKET SHALL BE PLACED OVER THE DOWNSTREAM BLANKET (SHINGLE STYLE) WITH APPROXIMATELY 6" OF OVERLAP, STAPLE THROUGH THE OVERLAP AREA EVERY 12".
   *STAPLE DOWN THE CENTER OF THE BLANKET(S), THREE STAPLES IN EVERY SQUARE YARD.
5. IN LIVESTOCK AREAS WHERE EROSION CONTROL MATTING IS APPLIED TO STREAM BANKS, FENCING WILL BE USED IF NECESSARY TO EXCLUDE LIVESTOCK, WITH PERMISSION OF THE LANDOWNER.
6. MONITOR FOR WASHOUTS, STAPLE INTEGRITY OR MAT MOVEMENT. REPLACE OR REPAIR AS NECESSARY.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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Champlain Hudson Power Express Project

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TYPICAL MATTING STREAMBANKS

176764-UM-24 SHEET 24 OF 34

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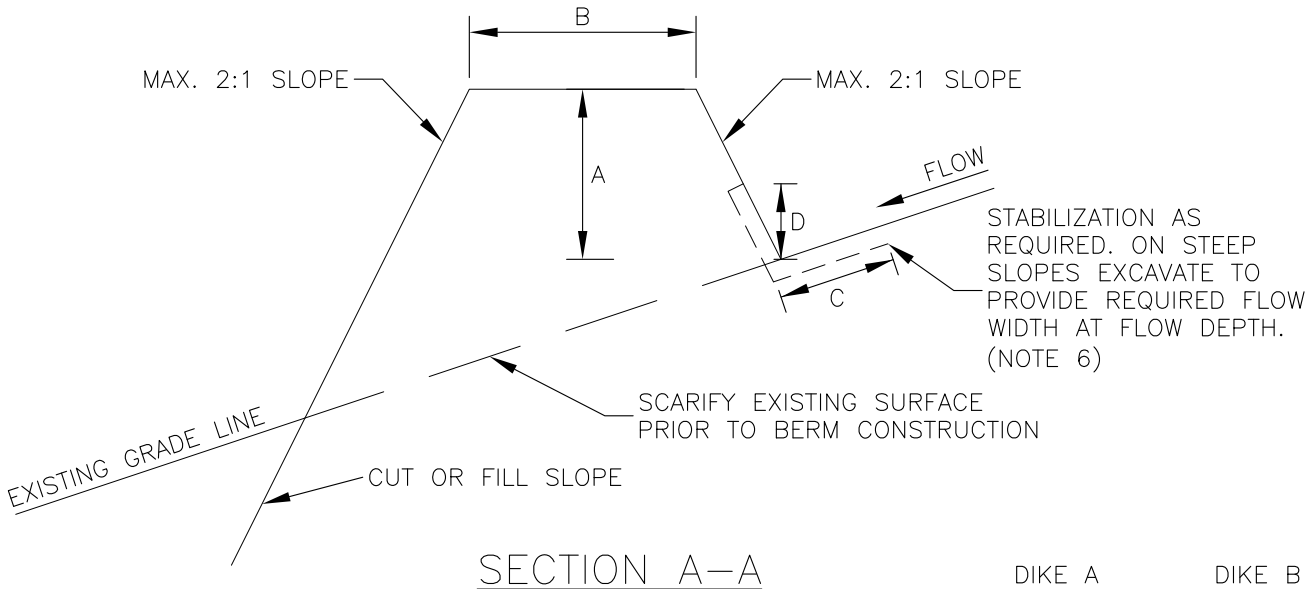
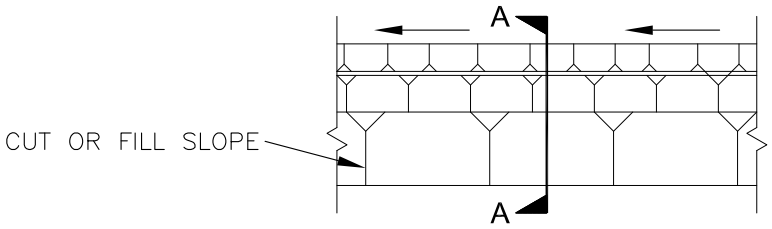


SECTION A–A

NOT TO SCALE

	DIKE A (5AC. OR LESS)	DIKE B (5–10AC.)
A – DIKE HEIGHT	18"	36"
B – DIKE WIDTH	24"	36"
C – FLOW WIDTH	48"	72"
D – FLOW DEPTH	8"	15"

POSITIVE DRAINAGE–GRADE SUFFICIENT TO DRAIN



CONSTRUCTION SPECIFICATIONS

NOTES:

1. DIKES SHALL BE COMPACTED TO NOT LESS THAN THE IN–SITE SOIL DENSITY.
2. PROVIDE POSITIVE DRAINAGE TO AN APPROVED, STABILIZED OUTLET.
3. TOP WIDTH MAY BE WIDER AND SIDE SLOPES FLATTER AS REQUIRED TO FACILITATE CROSSING BY CONSTRUCTION TRAFFIC.
4. FIELD LOCATION SHOULD BE ADJUSTED AS NEEDED TO UTILIZE A STABILIZED OUTLET.
5. EARTH DIKES SHALL HAVE AN OUTLET THAT FUNCTIONS WITH A MINIMUM OF EROSION. RUNOFF SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE SUCH AS A SEDIMENT TRAP OR SEDIMENT BASIN.
6. PROVIDE FLOW CHANNEL STABILIZATION IN ACCORDANCE WITH THE REQUIREMENTS OF THE NY STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	10/29/10	TRC	TRC	.	.

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Champlain Hudson Power Express Project

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EARTHEN BERM

176764-UM-25 SHEET 25 OF 34

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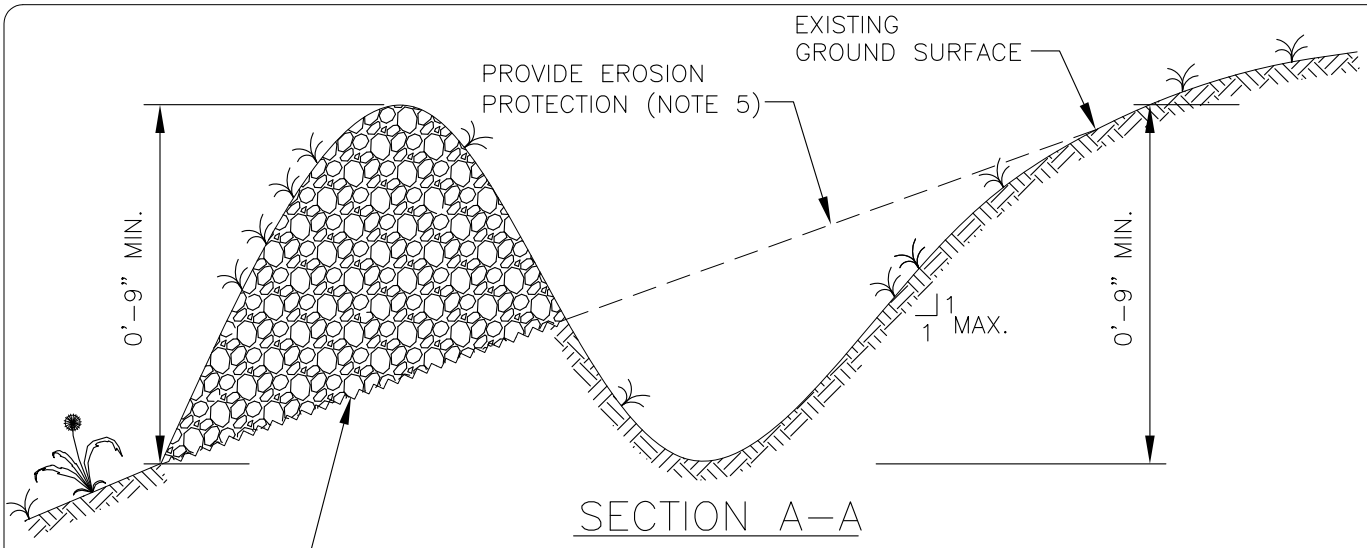
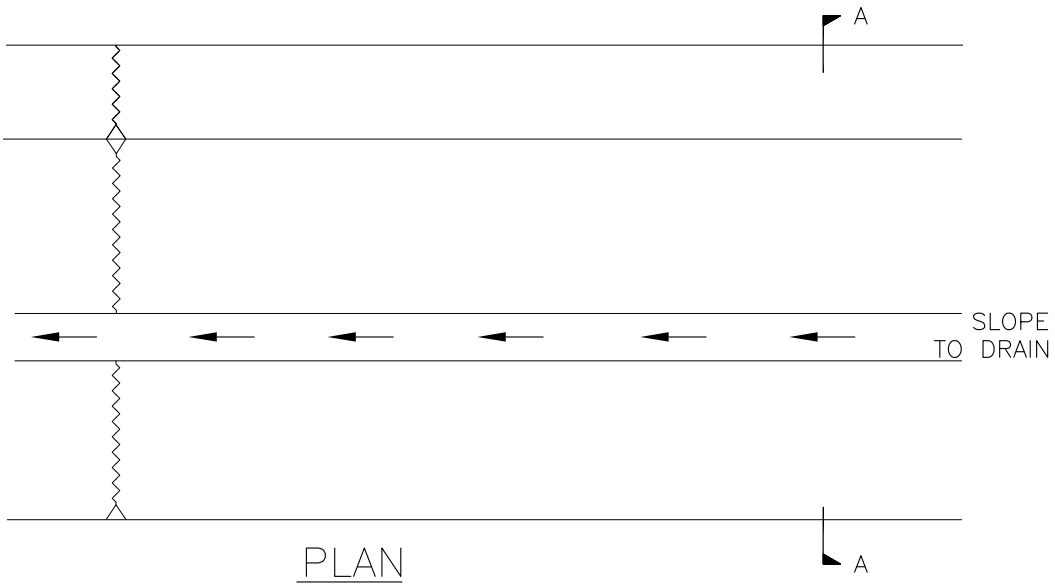


SECTION A–A



PLAN

NOTE:

1. ALL PERIMETER DIKE/SWALE SHALL HAVE UNINTERUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON–EROSION VELOCITY.
4. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED IN THE NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.
5. STABILIZATION OF THE AREA DISTURBED BY THE DIKE AND SWALE SHALL BE DONE IN ACCORDANCE WITH THE STANDARD AND SPECIFICATIONS FOR THE TEMPORARY SEEDING AND MULCHING, AND SHALL BE DONE WITHIN 10 DAYS.
6. PERIODIC INSPECTION AND REQUIRED MAINTENANCE AFTER EACH RAIN EVENT.

   MAX. DRAINAGE AREA LIMIT= 2 ACRES

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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PERIMETER DIKE/SWALE

176764-UM-26 SHEET 26 OF 34

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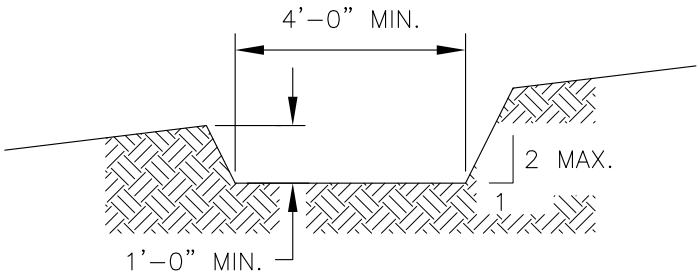
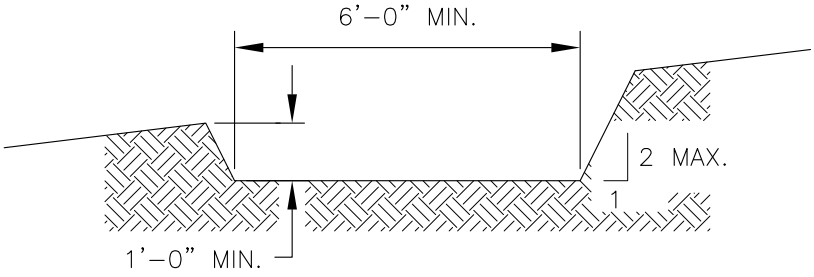


SWALE TYPE A
(5AC OR LESS)



SWALE TYPE B
(GREATER THAN 5AC)

NOTE:

1. SLOPE DITCH AT 0.5% MIN., 20% MAX..
2. DISCHARGE DITCH TO LEVEL SPREADER AT NON–EROSIVE VELOCITY FOR DRAINAGE FROM UNDISTURBED AREAS, TO SEDIMENT BASIN OR OTHER EROSION CONTROL DEVICE.
3. STABILIZE DITCH WITHIN 7 DAYS OF CONSTRUCTION AS INDICATED.

CHANNEL GRADE	TYPE A DITCH (5AC OR LESS DRAINED)	TYPE B DITCH (GREATER THAN 5AC DRAINED)
0.5–3%	SEED & STRAW MULCH	SEED & STRAW MULCH
3.1–5%	SEED & STRAW MULCH	SEED AND COVER W/ RECP
5.1–5%	SEED AND COVER W/ RECP	LINED 4–8" RIP RAP OR GEOTEXTILE
8.1–20%	LINED 4–8" RIP RAP OR GEOTEXTILE	ENGINEERED DESIGN

4. INSPECT AND PROVIDE MAINTENANCE AFTER EACH RAIN EVENT.
5. FIGURE IS BASED ON NYS STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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Champlain Hudson Power Express Project

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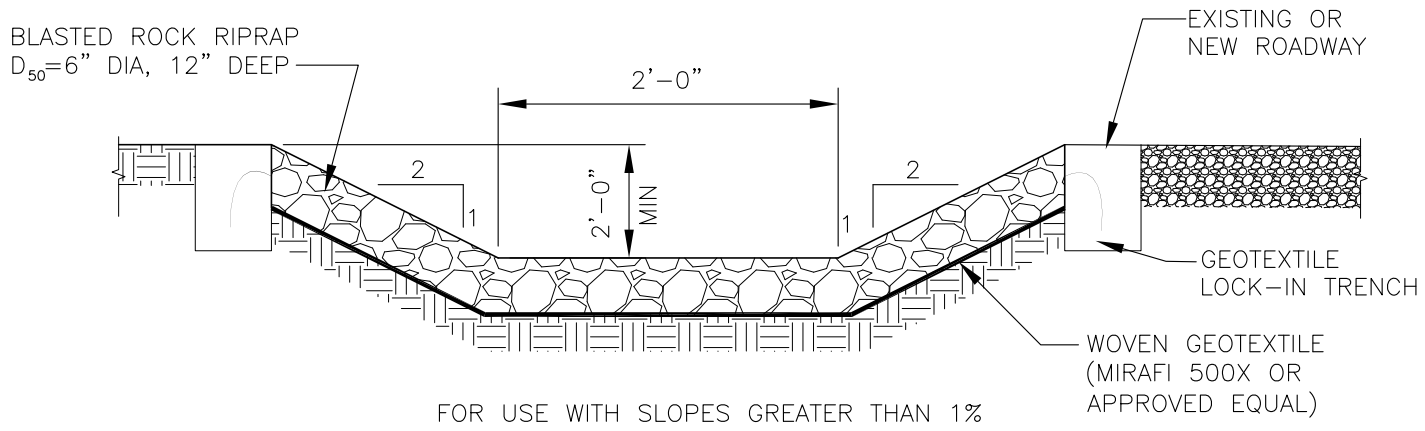
TEMPORARY SWALE

176764-UM-27 SHEET 27 OF 34

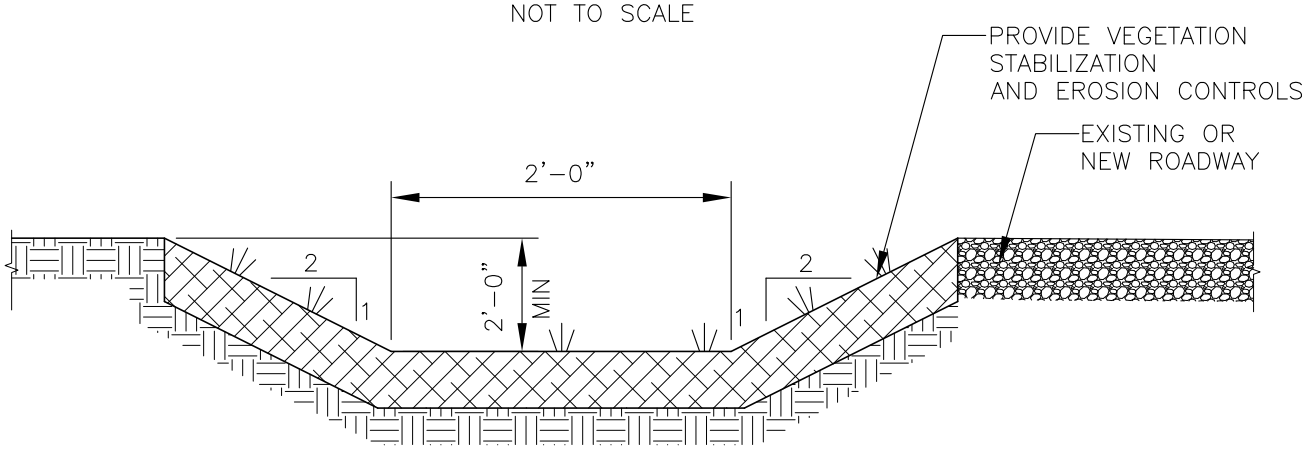
Prepared by: HDR | PTA & TRC 12/06/2010



FOR USE WITH SLOPES GREATER THAN 1%

TYPICAL RIPRAP DRAINAGE SWALE

NOT TO SCALE



FOR USE WITH SLOPES LESS THAN 1%

TYPICAL VEGETATED DRAINAGE SWALE

NOT TO SCALE

NOTES:

1. DRAINAGE SWALE PROFILE SHALL BE MODIFIED TO TRANSITION WHERE IT TIES INTO EXISTING SWALES. TRANSITION LENGTH SHALL BE COORDINATED WITH ON-SITE ENVIRONMENTAL INSPECTOR.

2. SWALE SHALL DISCHARGE TO STABILIZED LEVEL SPREADERS, CONTAINMENT OR OTHER STRUCTURES PROVIDED TO CONTROL EROSION RUN-OFF.

3. PROVIDE STABILIZATION AND EROSION CONTROLS AS REQUIRED BY THE ON-SITE ENVIRONMENTAL INSPECTOR IN ACCORDANCE WITH THE NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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Champlain Hudson Power Express Project

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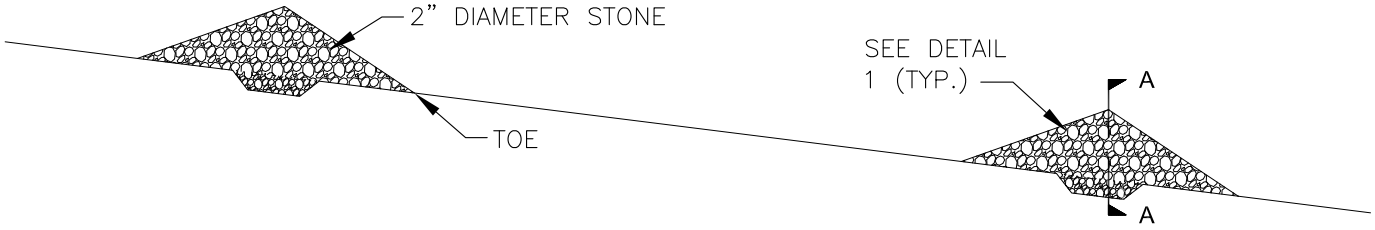
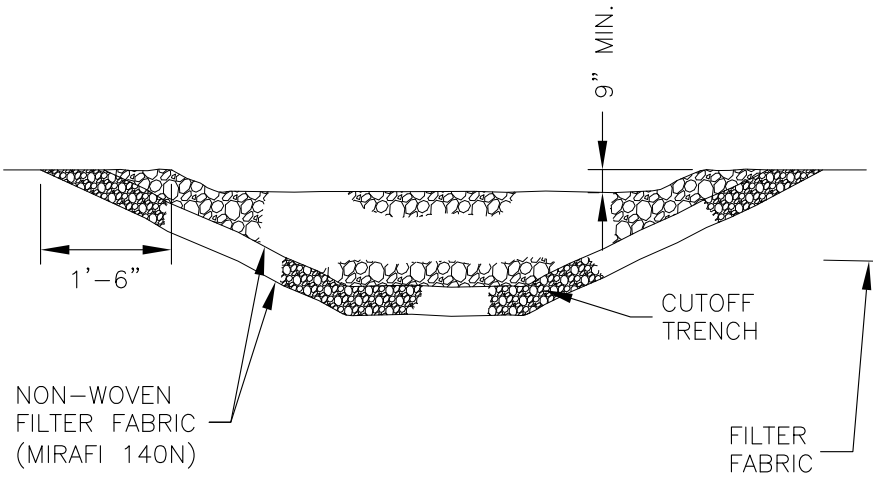
SIDE DITCHES

176764-UM-28 SHEET 28 OF 34

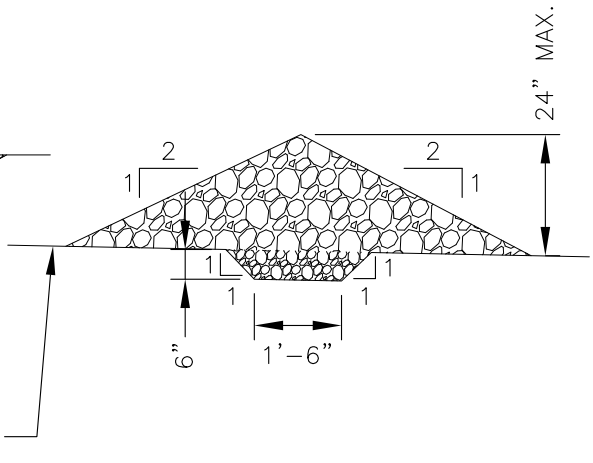
Prepared by: HDR | DTA & TRC 12/06/2010



PROFILE



SECTION A-A



DETAIL 1

CHECK DAM

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

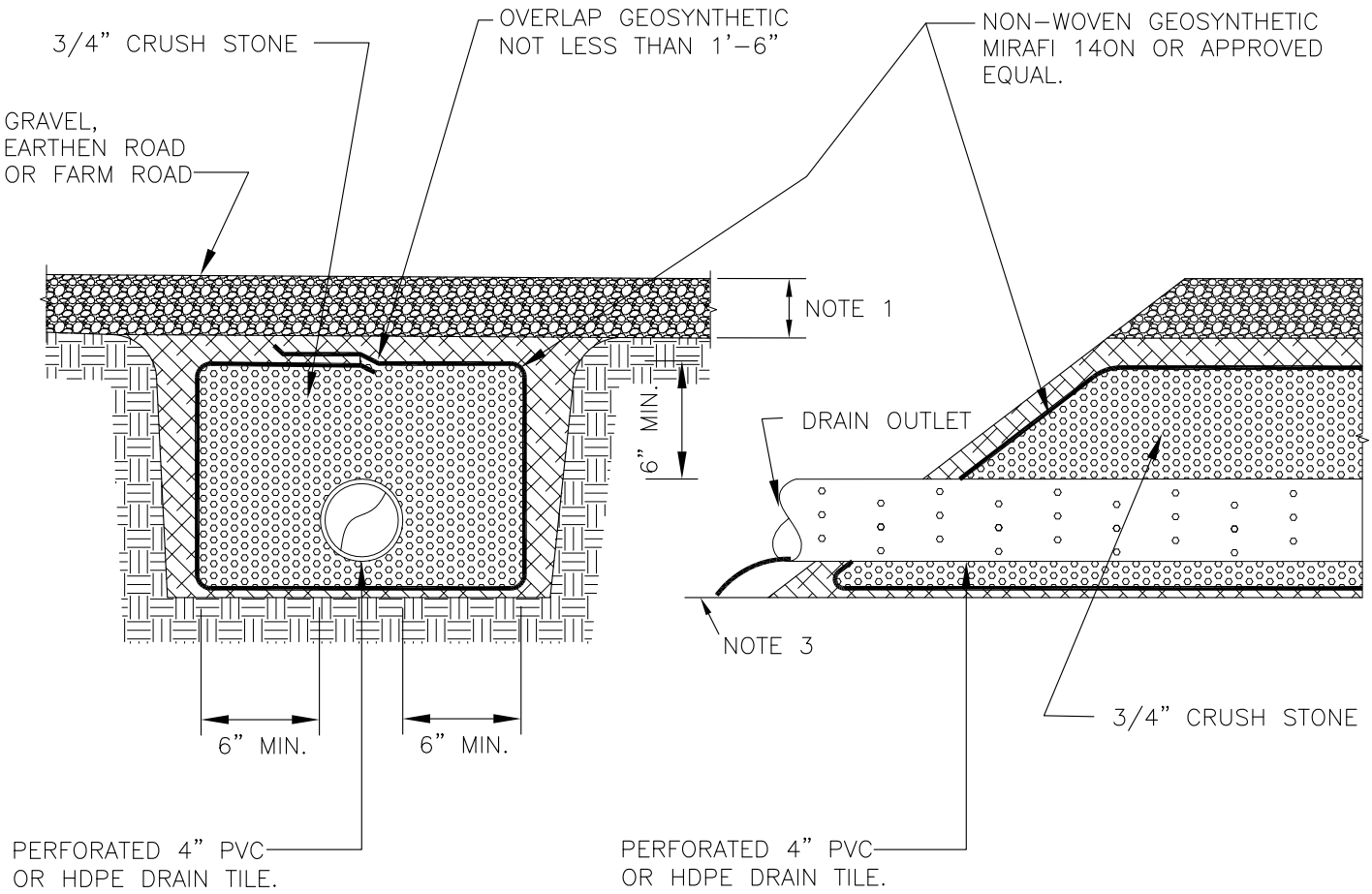
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

CHECK DAM

176764-UM-29 SH 29 OF 34

Prepared by: HDR | PTA & TRC 12/06/2010



NOTES:

1. WITHIN EXISTING FARM FIELDS, PROVIDE TOP SOIL TO MATCH EXISTING SOIL DEPTH, BUT NOT LESS THAN 4".
2. PROVIDE DRAIN OUTLET TO ROAD DITCH, DRAIN STRUCTURE OR OTHER APPROVED DEVICE.
3. PROVIDE EROSION PROTECTION AND SOIL STABILIZATION IN ACCORDANCE WITH NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND TEMPORARY SEDIMENT CONTROL.
4. GRAVEL AND EARTHEN ROADS CONSTRUCTED ON AGRICULTURAL LAND SHALL PROVIDE A BARRIER BETWEEN ROADWAY AND LOAM. BARRIER SHALL BE MIRAFI 500X OR APPROVED EQUAL. AS AN ALTERNATIVE, LOAM MAY BE STRIPPED AND STOCKPILED FOR RE-USE.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

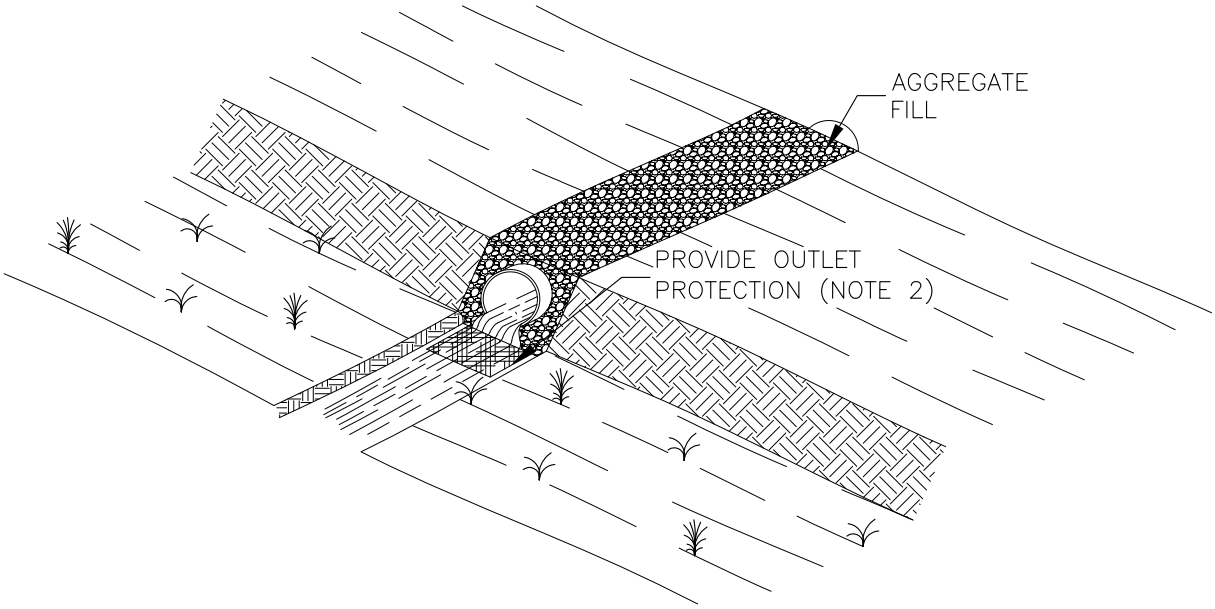
Champlain Hudson Power Express Project

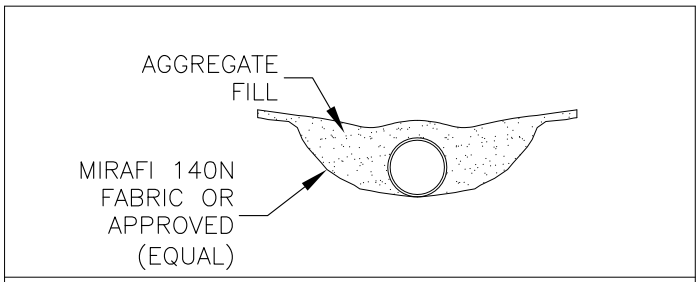
Champlain Hudson Power Express Inc.

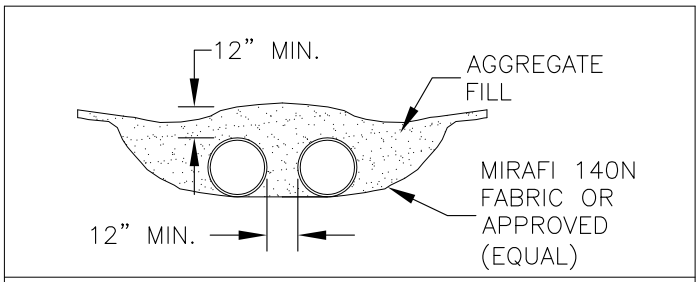
FRENCH DRAIN

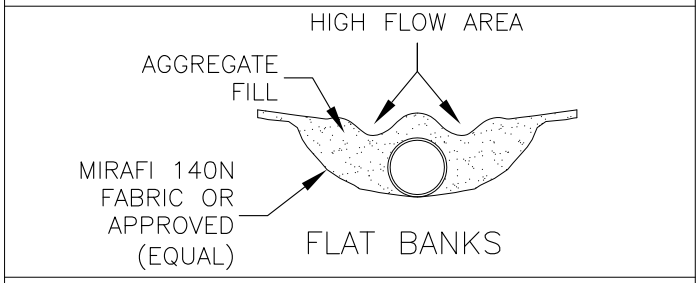
176764-UM-30 SHEET 30 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010









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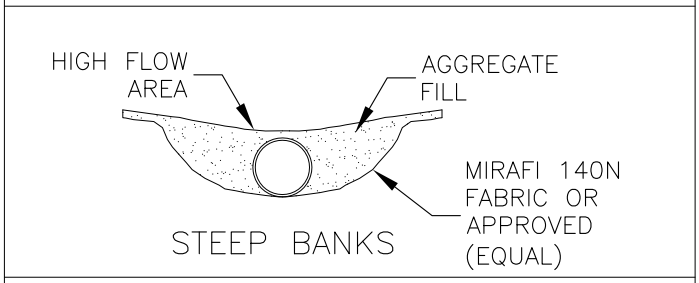

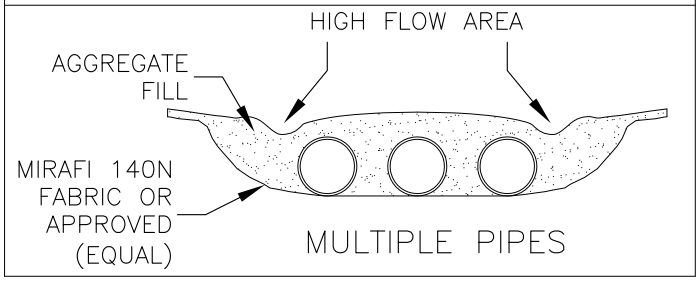

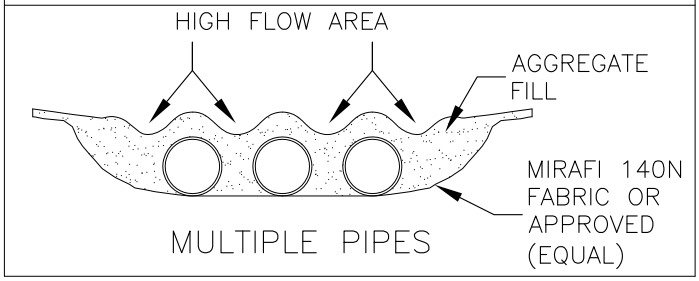

NOTES:
1. AGGREGATE FILL SHALL BE NYDOT BASE COURSE MATERIAL, 3/4" CRUSHED STONE, OR APPROVED EQUAL.

2. PROVIDE OUTLET PROTECTION IN ACCORDANCE WITH REQUIREMENTS OF NY STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
A	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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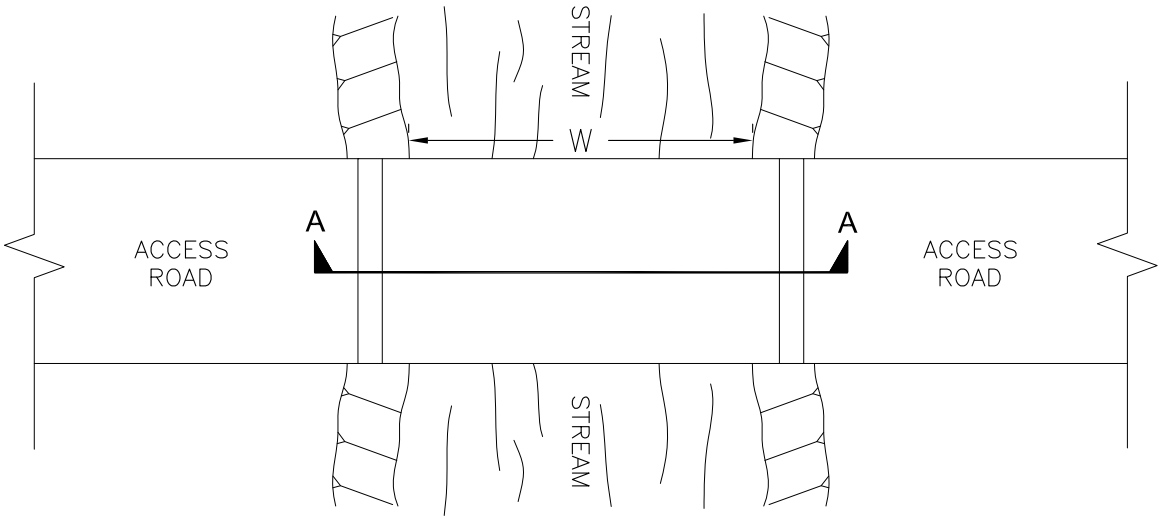
Champlain Hudson Power Express Project

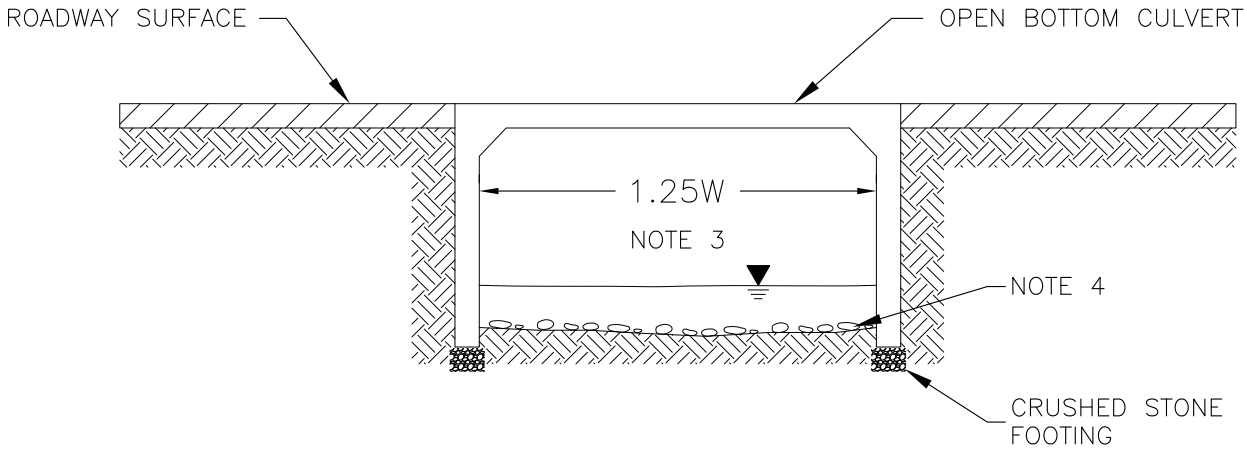
Champlain Hudson Power Express Inc.

TEMPORARY CULVERT

176764-UM-31 SHEET 31 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010





DETAIL A–A

NOTES:

1. PROVIDE ENVIRONMENTAL CONTROLS AND STABILIZATION TECHNIQUES AS REQUIRED PRIOR TO THE START OF CONSTRUCTION. ENVIRONMENTAL CONTROLS SHALL BE IN ACCORDANCE WITH NY STATE STANDARD SPECIFICATION FOR EROSION AND SEDIMENT CONTROL.
2. OPEN BOTTOM CULVERT SHALL BE SUPERIOR CONCRETE 3 – SIDED BRIDGE OR EQUAL.
3. BRIDGE SPAN SHALL BE MIN. 1.25 X NATURAL CHANNEL WIDTH.
4. CHANNEL BOTTOM SHALL BE RESTORED TO MATCH EXISTING CHANNEL CONDITIONS USING NATURAL MATERIALS SALVAGED FROM BRIDGE EXCAVATION AREA.
5. WING WALLS, RIP–RAP AND OTHER PERMANENT FLOW DIVERTERS SHALL NOT BE INSTALLED WITHOUT PRIOR NYDEC APPROVAL.
6. ABOVE SKETCH IS INTENDED TO CONVEY CONCEPT. MORE RESTRICTIVE REQUIREMENTS OF THE MUNICIPALITY, STATE OR OTHER AUTHORITY HAVING JURISDICTION SHALL BE REFLECTED IN THE DETAIL DESIGN REQUIREMENTS AT THE EM & CP DOCUMENTS.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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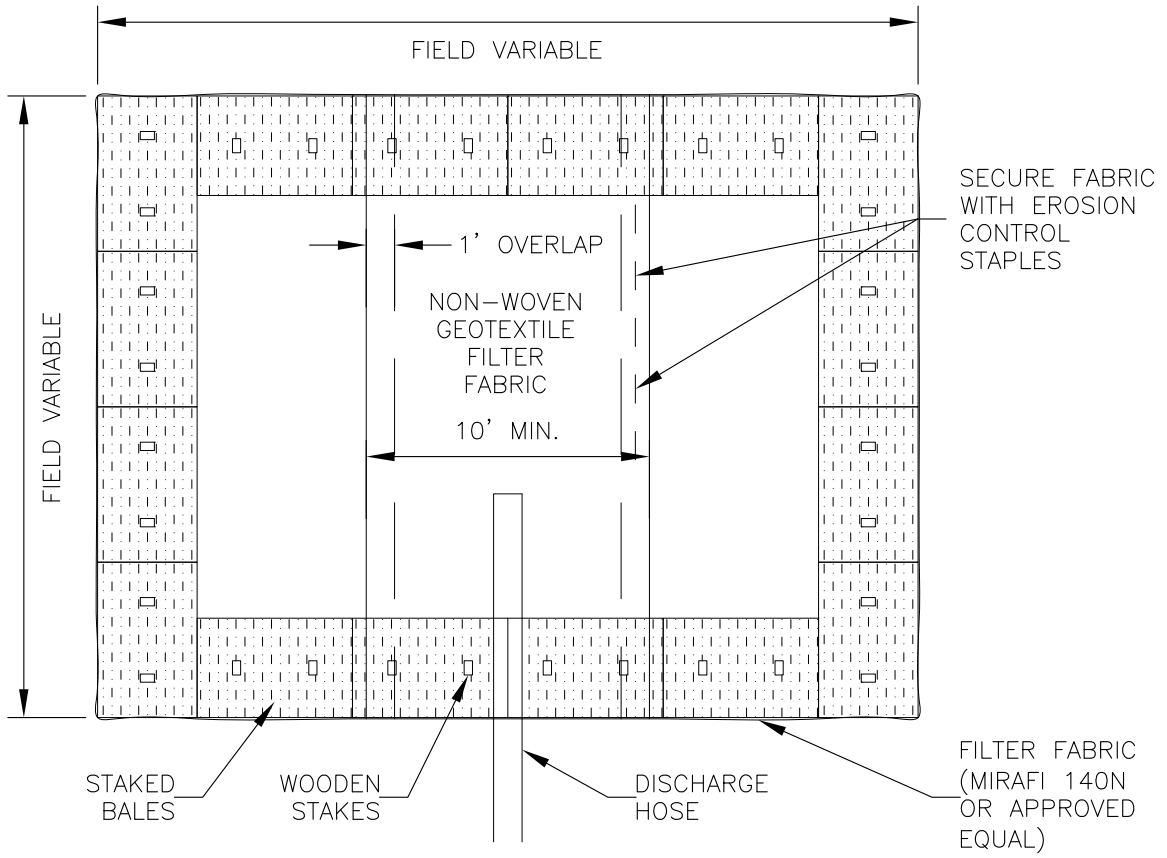
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

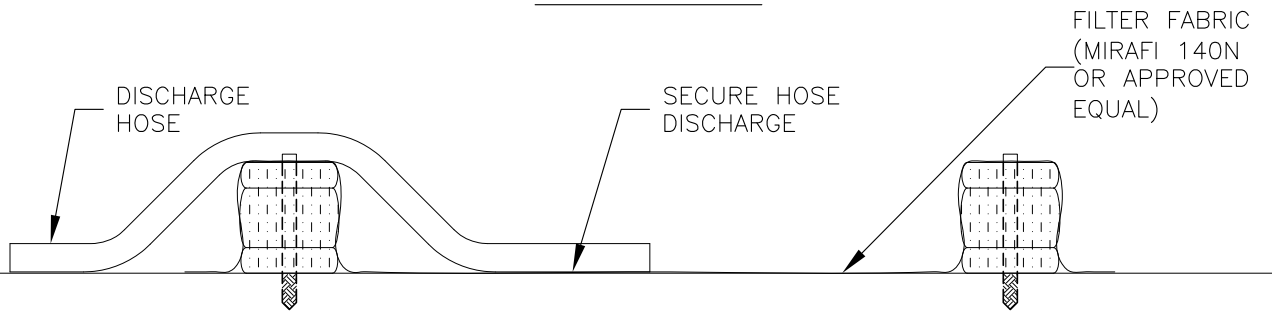
PERMANENT CULVERT

176764-UM-32 SHEET 32 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010



PLAN VIEW



CROSS-SECTION

NOTES:
1. NUMBER OF BALES MAY VARY DEPENDING ON SITE CONDITIONS.
2. THE BASIN TO BE SIZED TO PREVENT DISCHARGE WATER FROM OVERTOPPING BASIN.
3. KEEP AS FAR FROM WETLANDS AS PRACTICAL.
4. CLEAN AND REMOVE AS SOON AS DEWATERING IS COMPLETE.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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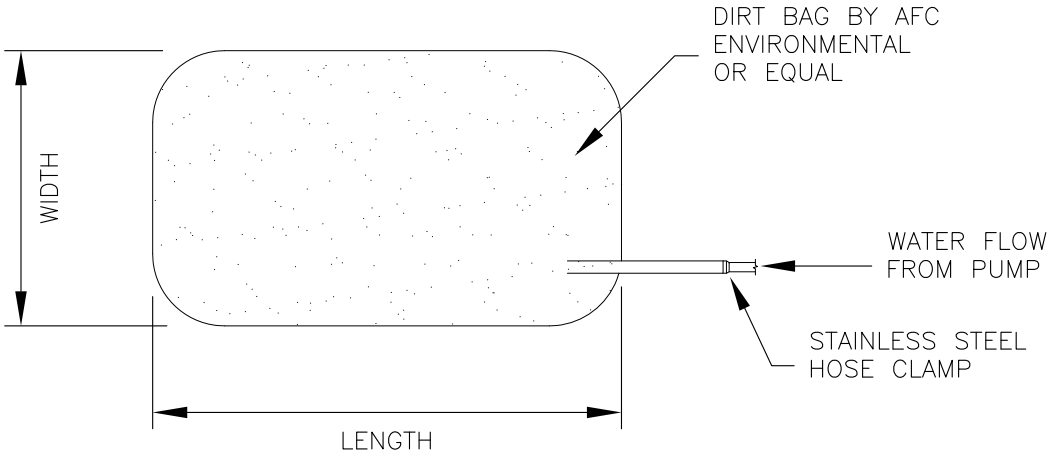
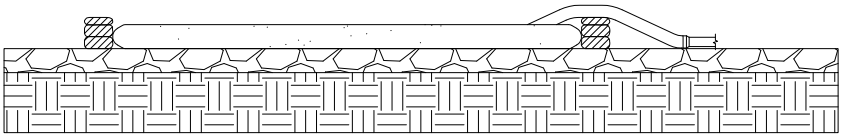
TYPICAL DEWATERING CATCHMENT BASIN

176764-UM-33 SHEET 33 OF 34

Prepared by: HDR | DTA & TRC 12/06/2010





ELEVATION VIEW

NOTE:
1. PROVIDE SMOOTH SURFACE OF CRUSHED STONE OR HAT PADDED BASE UNDER FILTER BAG.
2. SATURATE BAG MEMBRANE WITH CLEAN WATER PRIOR TO INTRODUCTION OF TURBID WATER.
3. SIZE OF BAG TO BE DETERMINED AT THE SITE. ADJUST SIZE PER JOB REQUIREMENTS.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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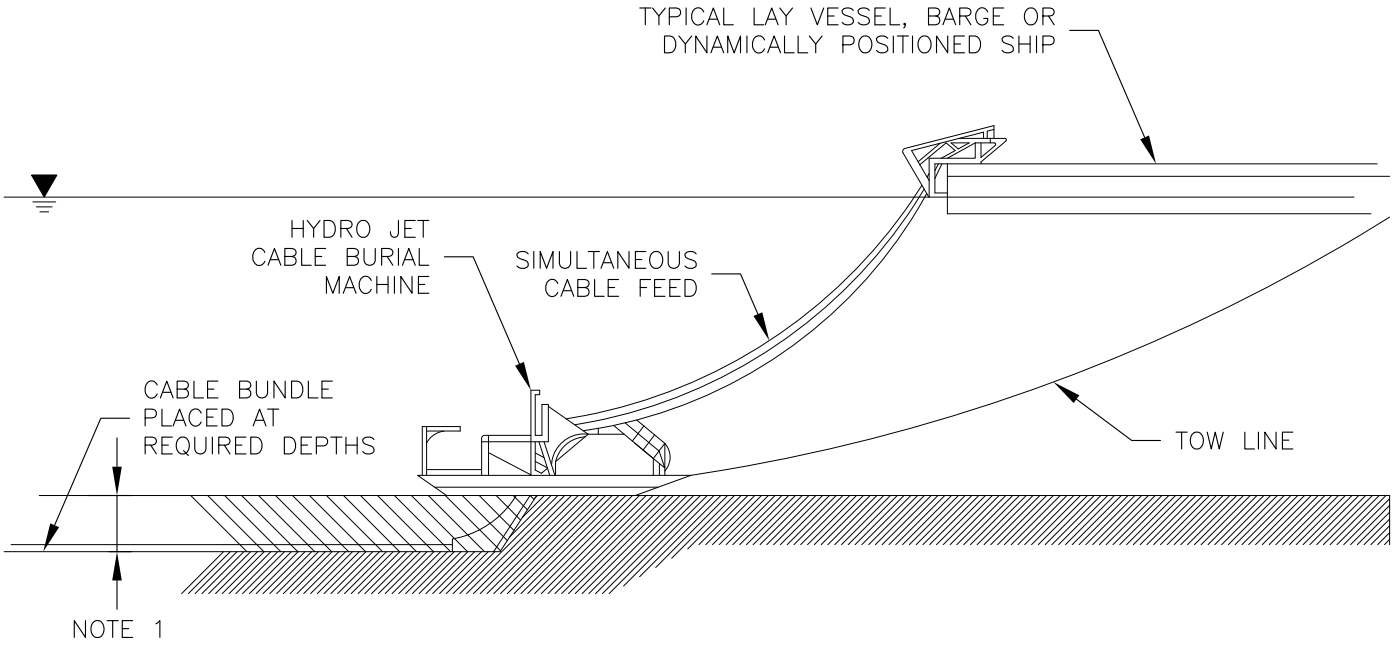
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

SEDIMENT FILTER BAG

176764-UM-34 SHEET 34 OF 34

Prepared by: HDR | PTA & TRC 12/06/2010



NOTES:

1. BURIAL DEPTH SHALL BE 15 FT. MIN. WITHIN MAINTAINED NAVIGATION CHANNELS AND NOT LESS THAN 4 FT. ELSEWHERE.

2. HYDROPLOW IS TYPICAL OF EQUIPMENT THAT MAY BE EMPLOYED. ACTUAL EQUIPMENT WILL BE DETERMINED BY THE EPC CONTRACTOR.

3. HYDROPLOW MAY BE OPERATED WITH OR WITHOUT HYDROJET OPERATION DEPENDING ON BOTTOM SEDIMENT CONDITIONS.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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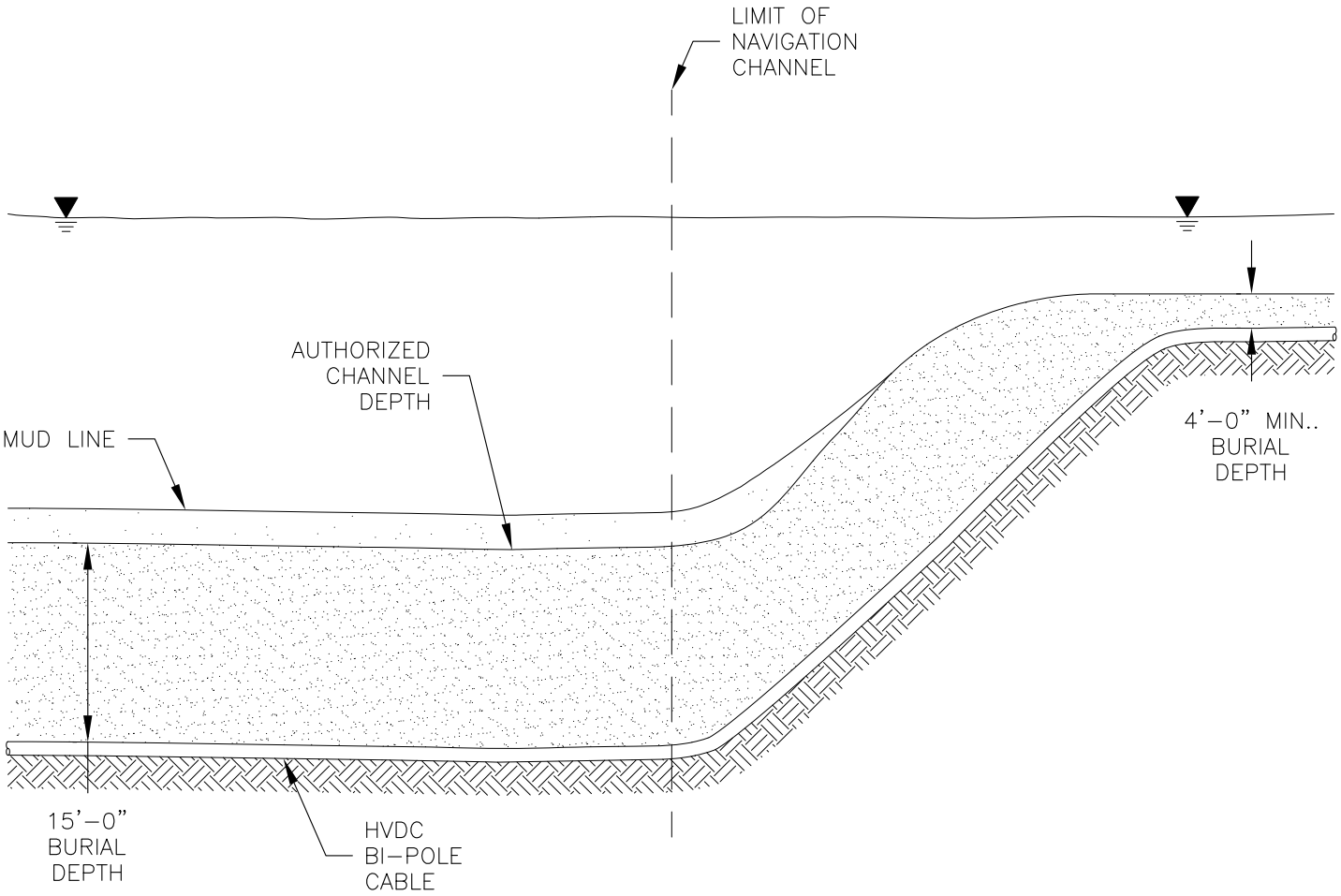
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

HYDRO PLOW OR JET PLOW

176764-SM-01 SHEET 01 OF 16

Prepared by: HDR | PTA & TRC 12/06/2010



NOTE:
BURIAL DEPTH SHALL BE 15'–0" MIN. IN NAVIGATION CHANNELS NOT LESS THAN 4'–0" ELSEWHERE.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

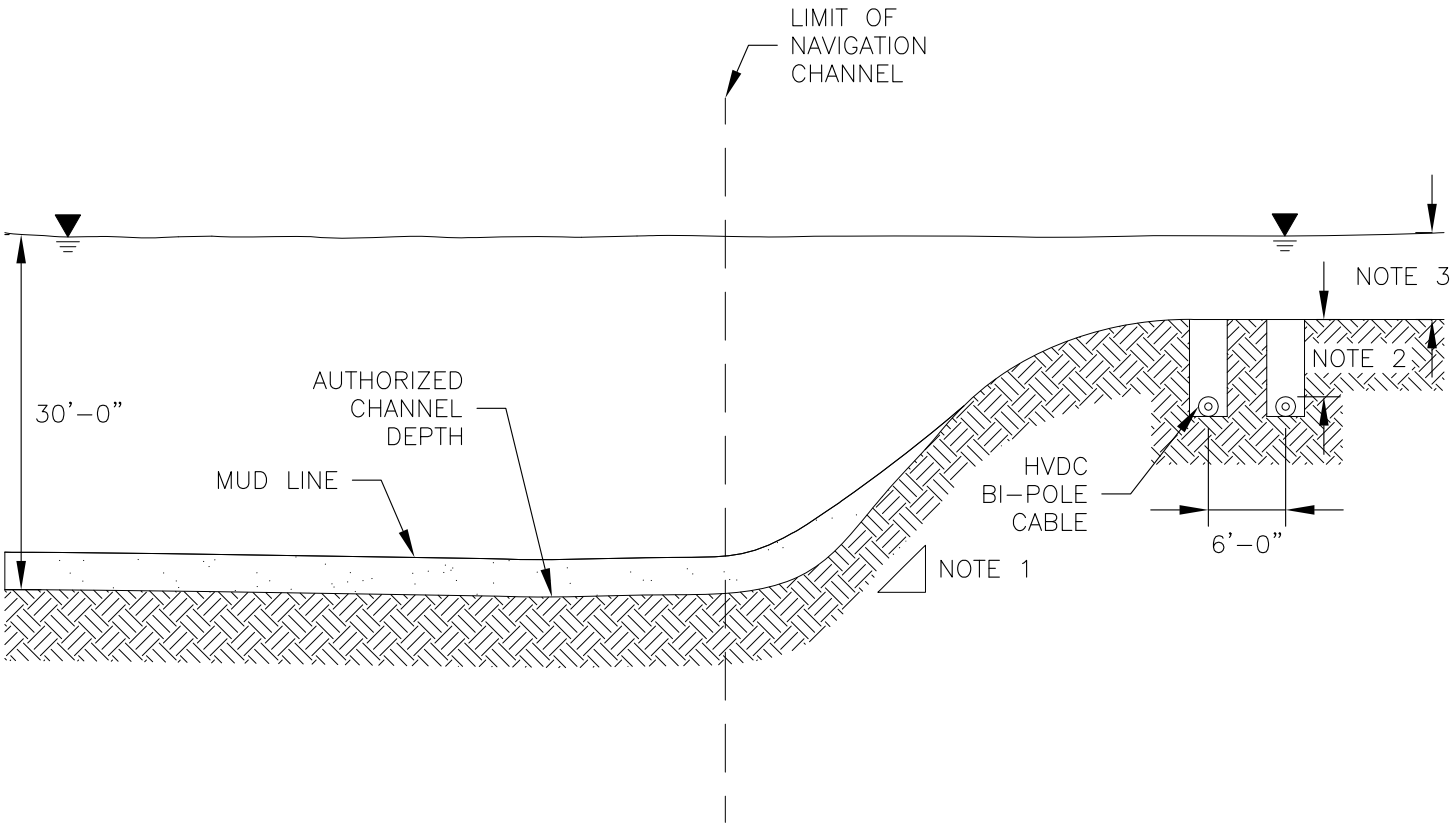
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

TYPICAL NAVIGATION CHANNEL SECTION

176764-SM-02 SHEET 02 OF 16

Prepared by: HDR | DTA & TRC 12/06/2010



NOTE:
1. SIDE SLOPE VARIES.

2. DEPTH OF BURIAL IS 4'–0" MINIMUM OUTSIDE MAINTAINED CHANNEL.

3. DEPTH OF SHALLOW AREA OUTSIDE CHANNEL VARIES.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

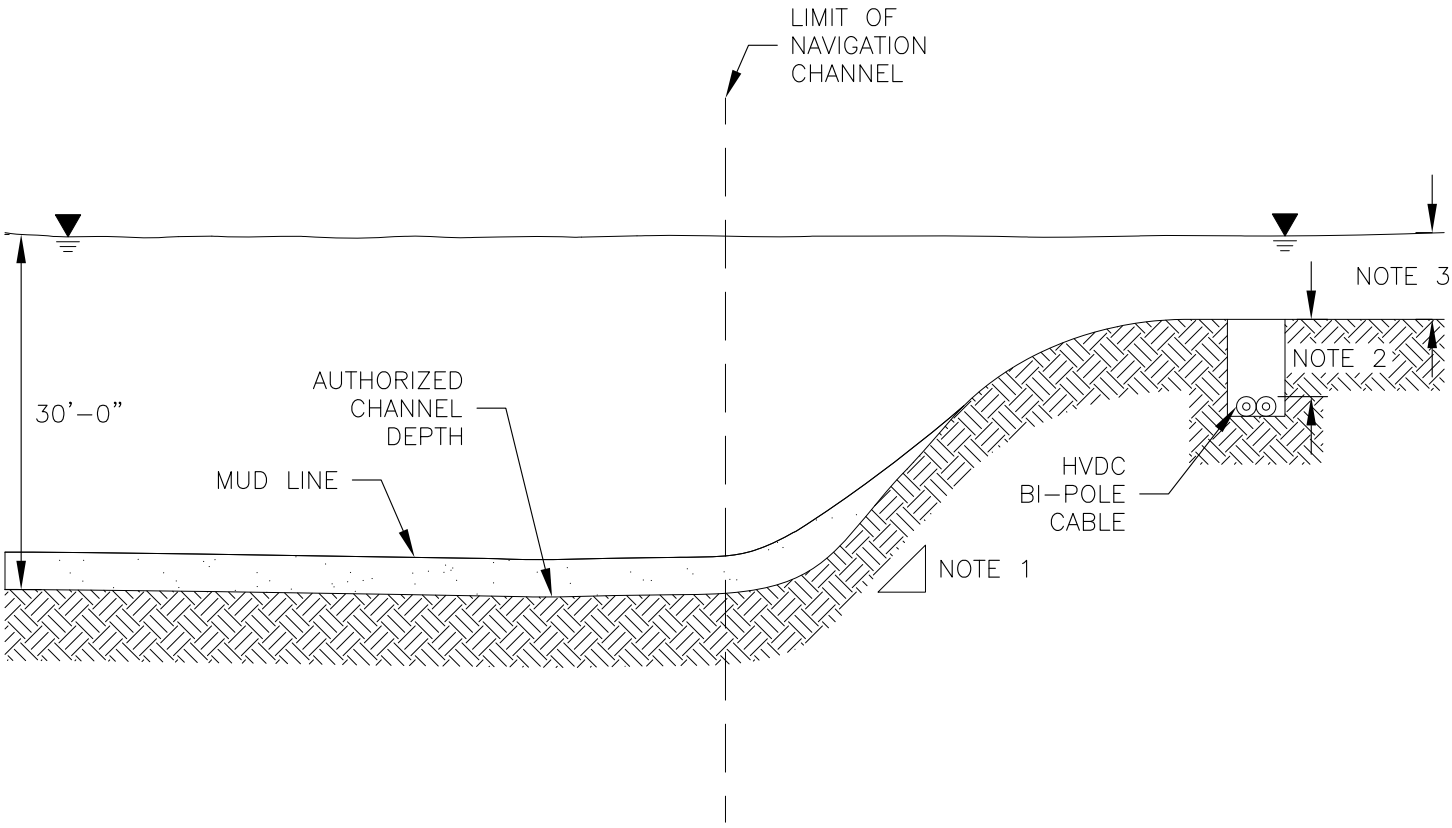
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

TYPICAL HVDC CABLE INSTALLATION (SUBMARINE)

176764-SM-03 SHEET 03 OF 16

Prepared by: HDR | PTA & TRC 12/06/2010



NOTE:
1. SIDE SLOPE VARIES.

2. DEPTH OF BURIAL IS 4'–0" MINIMUM OUTSIDE MAINTAINED CHANNEL.

3. DEPTH OF SHALLOW AREA OUTSIDE CHANNEL VARIES.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

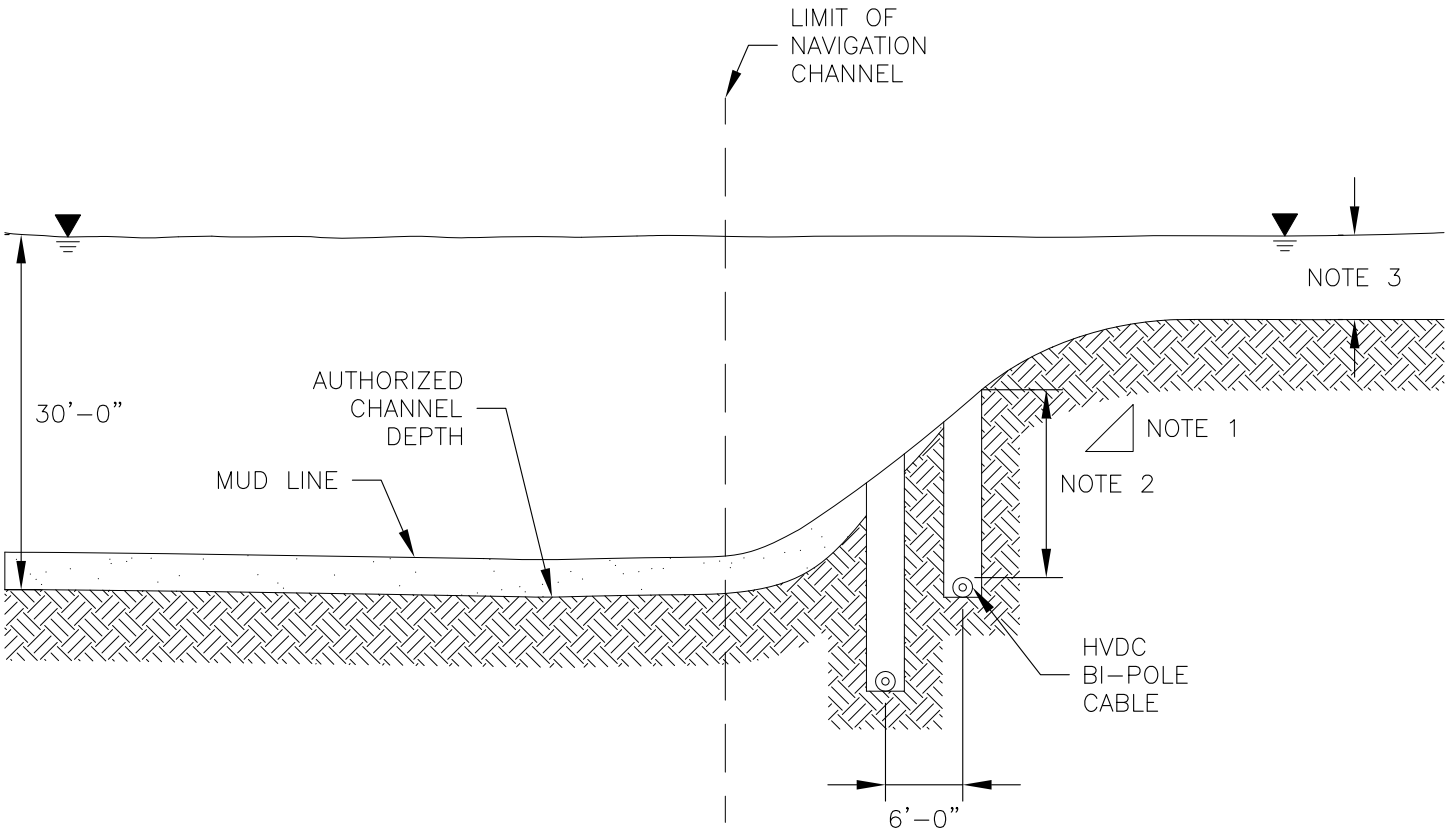
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

TYPICAL HVDC CABLE INSTALLATION (SUBMARINE)

176764-SM-04 SHEET 04 OF 16

Prepared by: HDR | PTA & TRC 12/06/2010



NOTE:
1. SIDE SLOPE VARIES.
2. DEPTH OF BURIAL IN SIDE SLOPE VARIES FROM 15'–0" TO NOT LESS THAN 4'–0".
3. DEPTH OF SHALLOW AREA OUTSIDE CHANNEL VARIES.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

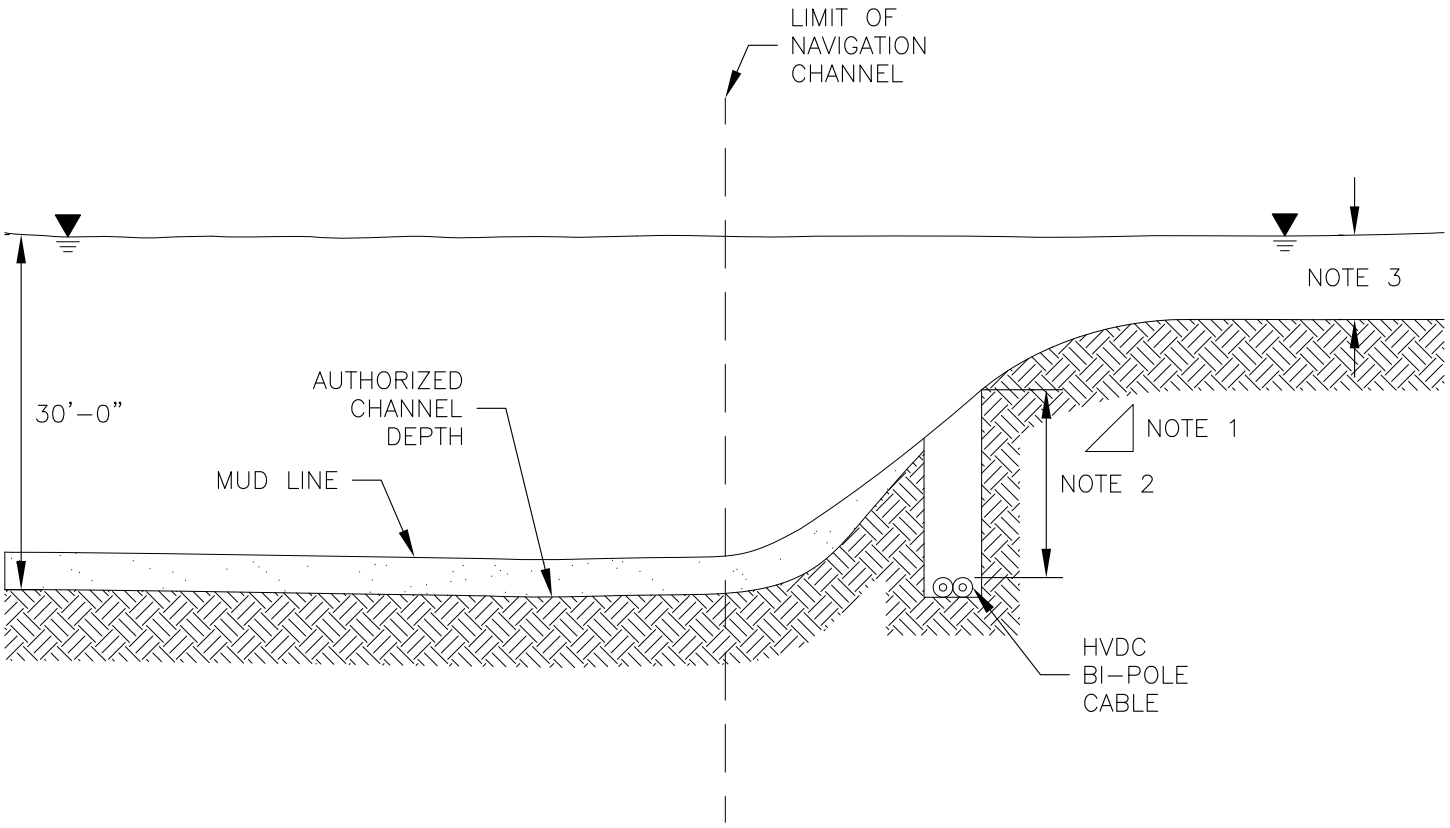
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

HVDC CABLE INSTALLATION (CHANNEL SIDE SLOPE)

176764-SM-05 SHEET 05 OF 16

Prepared by: HDR | PTA & TRC 12/06/2010



NOTE:
1. SIDE SLOPE VARIES, DEPTH OF BURIAL IN SIDE SLOPE VARIES FROM 15'–0" TO NOT LESS THAN 4'–0".

2. DEPTH OF SHALLOW AREA OUTSIDE CHANNEL VARIES.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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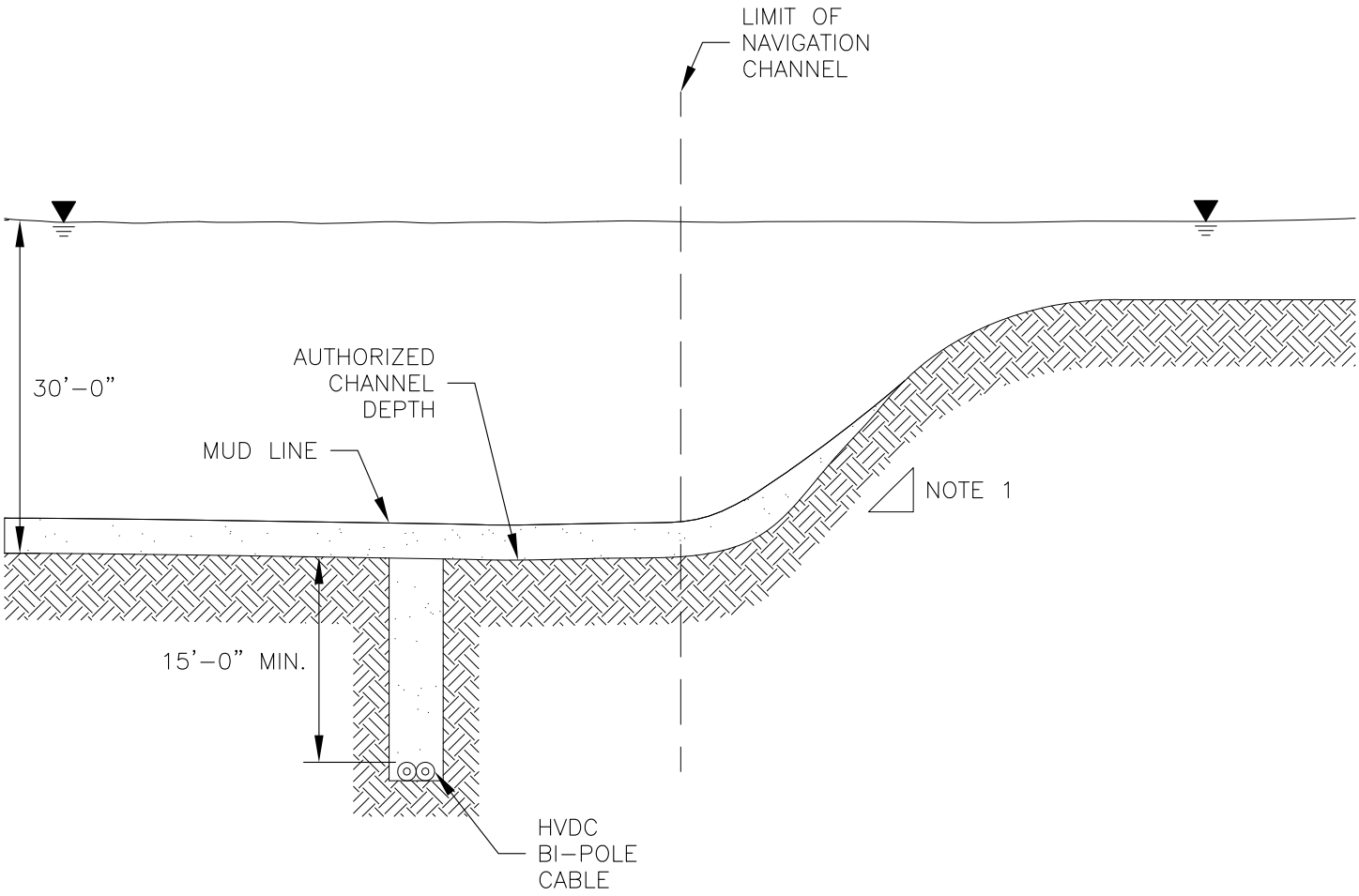
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

HVDC CABLE INSTALLATION (CHANNEL SIDE SLOPE)

176764-SM-06 SHEET 06 OF 16

Prepared by: HDR | PTA & TRC 12/06/2010



NOTE:
1. CHANNEL SIDE SLOPE VARIES.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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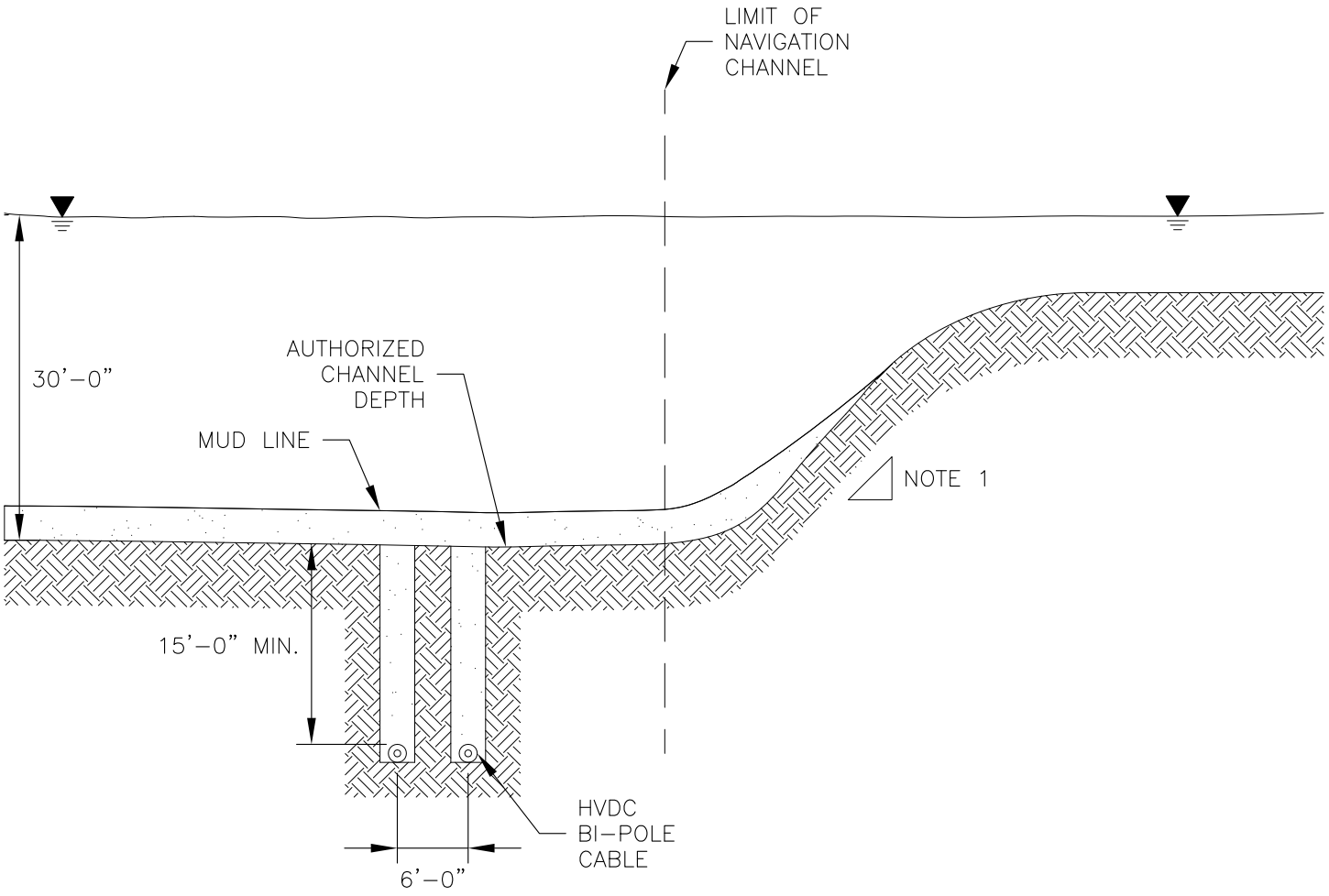
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

HVDC CABLE INSTALLATION (NAVIGATION CHANNEL)

176764-SM-07 SHEET 07 OF 16

Prepared by: HDR | PTA & TRC 12/06/2010



NOTE:
1. CHANNEL SIDE SLOPE VARIES.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

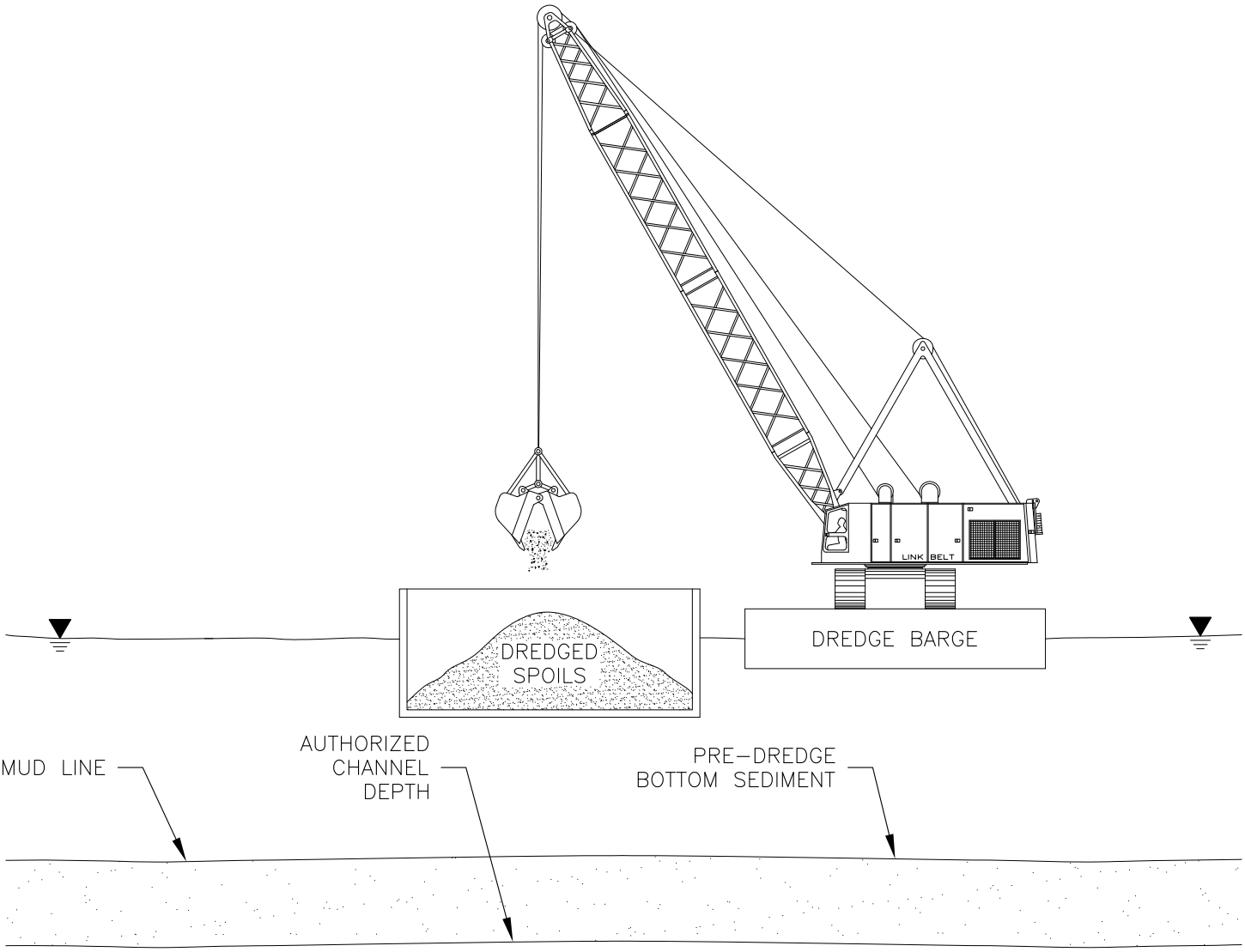
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

HVDC CABLE INSTALLATION (NAVIGATION CHANNEL)

176764-SM-08 SHEET 08 OF 16

Prepared by: HDR | PTA & TRC 12/06/2010



NOTES:

1. GASKETED ENVIRONMENTAL CLAM SHELL DREDGE SHOWN, OTHER EQUIPMENT MAY BE UTILIZED AS REQUIRED BY PERMIT, BOTTOM CONDITIONS, AND EPC CONTRACTOR.
2. CONTRACTOR TO COMPLY WITH BEST MANAGEMENT PRACTICE AND OTHER ENVIRONMENTAL CONTROLS AS APPROPRIATE.
3. CONVENTIONAL DREDGE EQUIPMENT MAY BE EMPLOYED FOR PRE–DREDGING TO REMOVE SEDIMENT AS REQUIRED FOR HYDRO–JET OR OTHER EQUIPMENT TO PLACE CABLE AT DESIRED DEPTH.
4. DREDGE EQUIPMENT MAY BE USED IN AREAS INACCESSIBLE TO HYDRO–JET, CABLE LAY EQUIPMENT, OR WHERE BOTTOM CONDITIONS PREVENT USE OF OTHER EXCAVATING TECHNIQUES. (I.E. HEAVY CABLES, BROKEN ROCK, CEMENTED STONE)
5. DREDGE WILL BE POSITIONED USING SPUD PILES OR ANCHORS, DEPENDING ON WATER DEPTH AND CURRENT.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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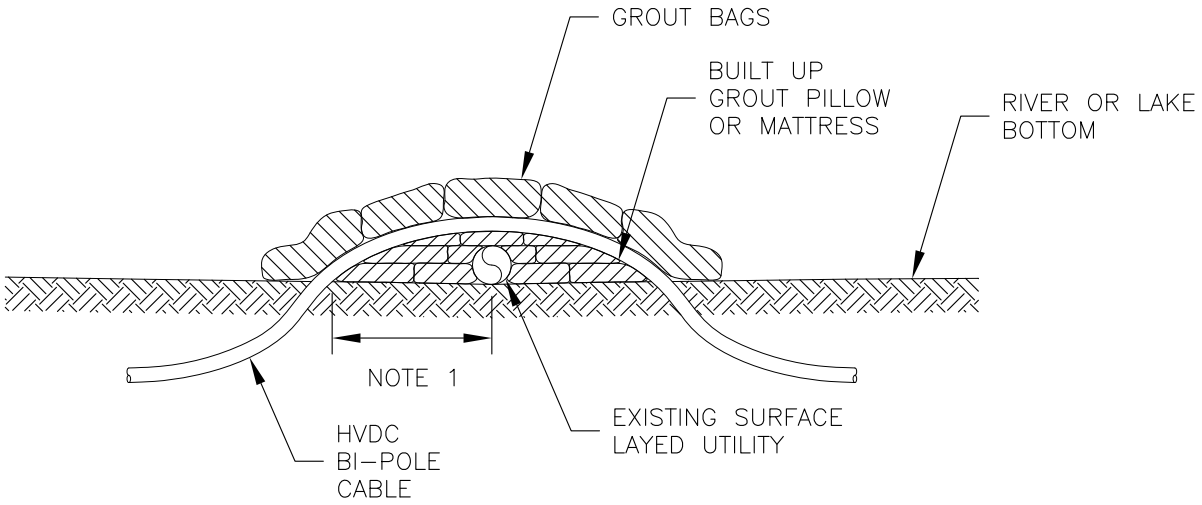
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

CONVENTIONAL DREDGE BARGE

176764-SM-09 SHEET 09 FO 16

Prepared by: HDR | PTA & TRC 12/06/2010



NOTES:

1. VARIES BASED ON EXISTING UTILITY DIAMETER/EXPOSURE AND MINIMUM BEND RADIUS OF CABLE.

2. ADDITIONAL SUPPORTS MAY BE PROVIDED, WHERE EXISTING UTILITY IS ON UNSTABLE SEDIMENT. SUPPORT MAY INCLUDE, GROUT BAG STABILIZATION, RIP–RAP, PILES OR OTHER.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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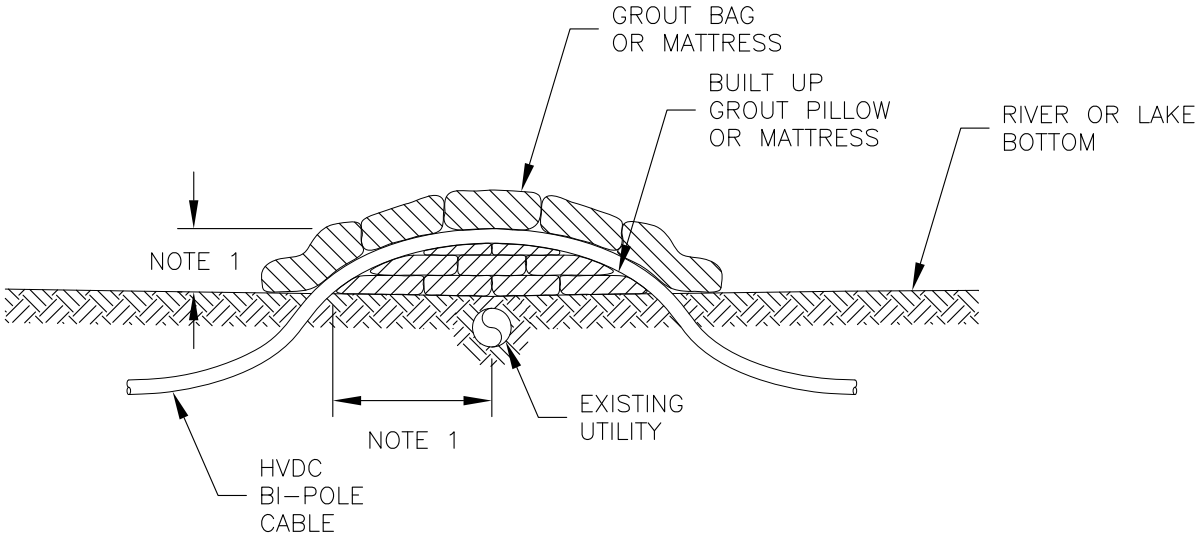
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

GROUT FILLED MATTRESS UTILITY CROSSING SURFACE LAID

176764-SM-10 SHEET 10 OF 16

Prepared by: HDR | DTA & TRC 12/06/2010



NOTE:
1. VARIES BASED ON STABILITY OF EXISTING BOTTOM SEDIMENT, UTILITY DIAMETER AND BEND RADIUS OF CABLE.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

Transmission Developers Inc.

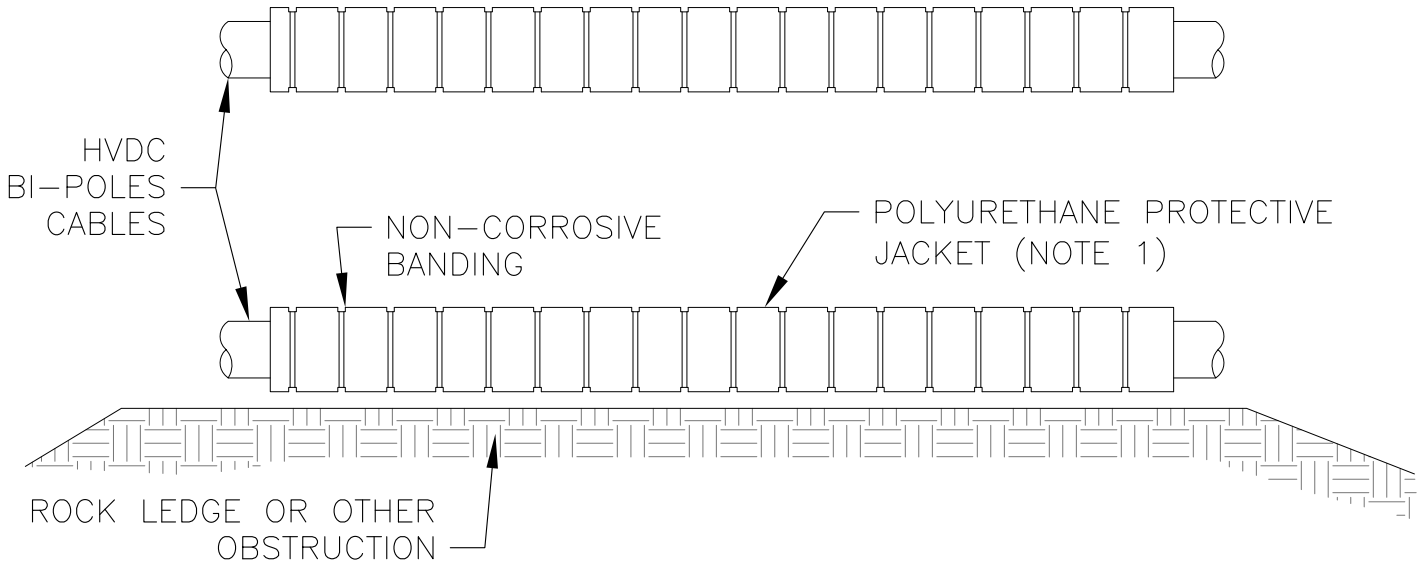
Champlain Hudson Power Express Project

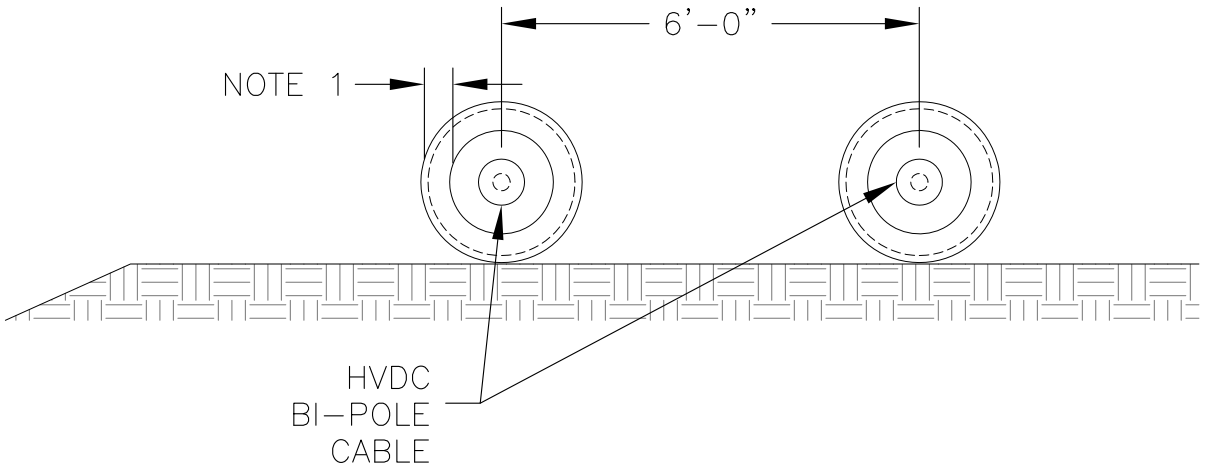
Champlain Hudson Power Express Inc.

GROUT FILLED MATTRESS UTILITY CROSSING NEAR SURFACE LAID

176764-SM-11 SHEET 11 OF 16

Prepared by: HDR | DTA & TRC 12/06/2010





NOTE:

1. POLYURETHANE PROTECTIVE JACKET SHALL BE URADUCT AS MANUFACTURED BY TRELLEBORG, OR EQUAL. THICKNESS AND DENSITY SHALL BE MANUFACTURER'S STANDARD UNLESS GREATER PROTECTIONS DETERMINED TO BE NECESSARY.

2. INSTALLATION OF POLYURETHANE PROTECTIVE JACKET MAY BE SUPPLEMENTED BY GROUT PILLOWS, MATTRESSES, RIP–RAP AND OTHER MEASURES AS DETERMINED NECESSARY BY THE EM & CP ENGINEER.

3. ABOVE SKETCH IS INTENDED TO CONVEY CONCEPTS, SPECIFIC INSTALLATION REQUIREMENTS AND RESTRICTIONS SHALL BE DETAILED IN THE EM & CP DOCUMENTS.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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Champlain Hudson Power Express Project

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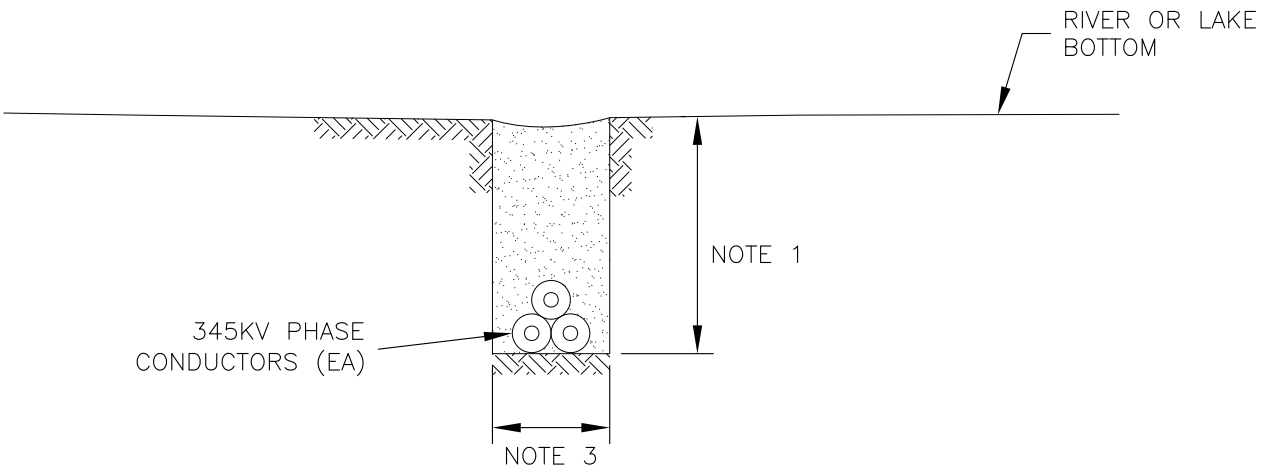
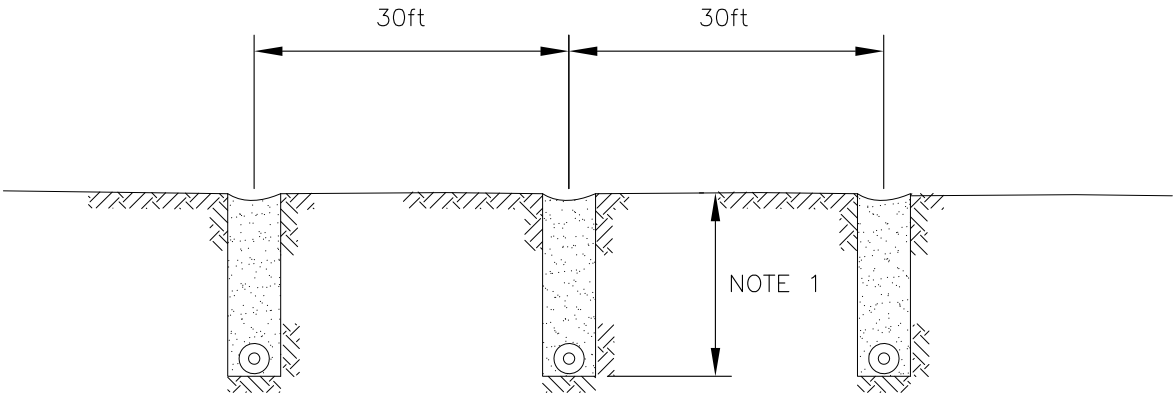
URADUCT

176764-SM-12 SHEET 12 OF 16

Prepared by: HDR | PTA & TRC 12/06/2010





345KV 3–PHASE CIRCUIT

NOTE:

1. 4'–0" MINIMUM DEPTH OF BURIAL SHOWN. FOR PROPER THERMAL DISSIPATION, WHERE DEEP BURIAL IS REQUIRED (15ft OR GREATER), PHASE CONDUCTORS WILL NOT BE BUNDLED.
2. ALTHOUGH CONSIDERED "BUNDLED" NO CONDUCTOR LASHING, STRAPS OR ENCASEMENT IS NORMALLY PROVIDED.
3. TRENCH WIDTH IS NORMALLY AT 3X CABLE DIAMETER OR GREATER.
4. ABOVE SKETCH REPRESENTS CABLE PLACEMENT CONCEPTS ONLY. ACTUAL CONFIGURATION WILL BE DETERMINED BY THE EPC CONTRACTOR AND THE DETAILS PRESENTED IN THE EM & CP DOCUMENTS.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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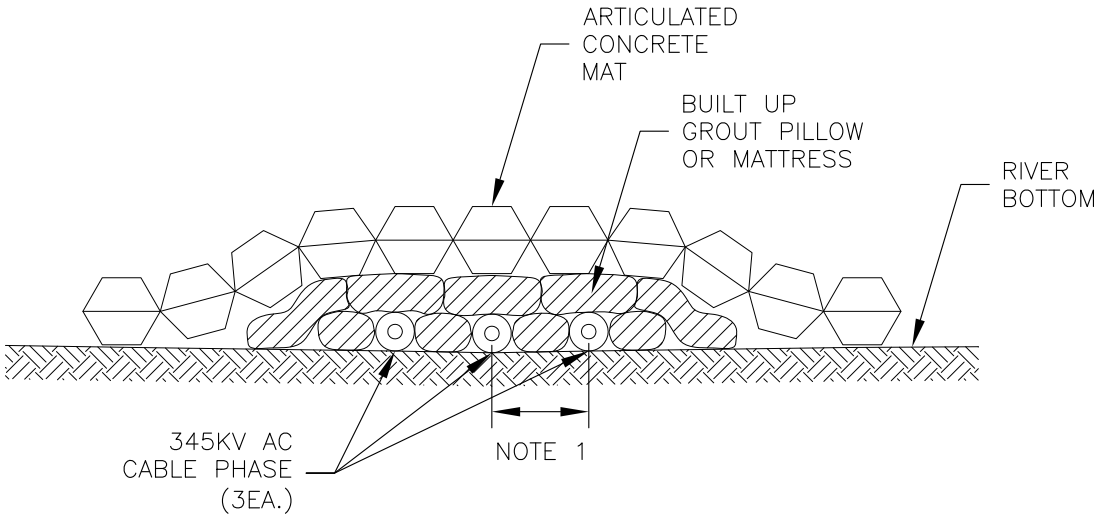
TYPICAL HVAC CABLE INSTALLATION

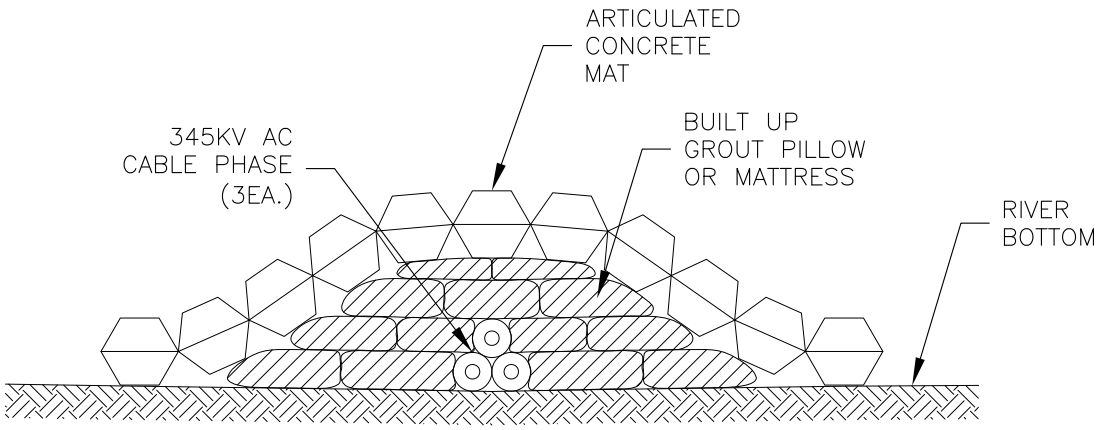
176764-SM-13 SHEET 13 OF 16

Prepared by: HDR | DTA & TRC 12/06/2010

345KV AC CABLE NON-BURIAL CABLE INSTALLATION USING ARTICULATED CONCRETE MAT PROTECTIVE COVERING



SEPARATED PHASE CONDUCTORS



BUNDLED PHASE CONDUCTORS

NOTES:

1. SPACE CABLE PHASE AS REQUIRED TO ENSURE PROPER SUPPORT OF GROUT PILLOWS WITHOUT UNDUE STRESS ON CABLE CASING. CABLE PHASES MAY BE IN DIRECT CONTACT.

2. BUILD UP PILLOWS AND MATTRESS WITH OVERLAPPING JOINTS (RUNNING BOND) AS NESSARY TO BRIDGE OVER BUNDLED CONDUCTORS WITHOUT APPLYING UNDUE STRESS ON CONDUCTORS.

3. ARTICULATED CONCRETE MATS SHALL BE SUBMAT AS MANUFACTURED BY SLP PRE CAST, OR EQUAL.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
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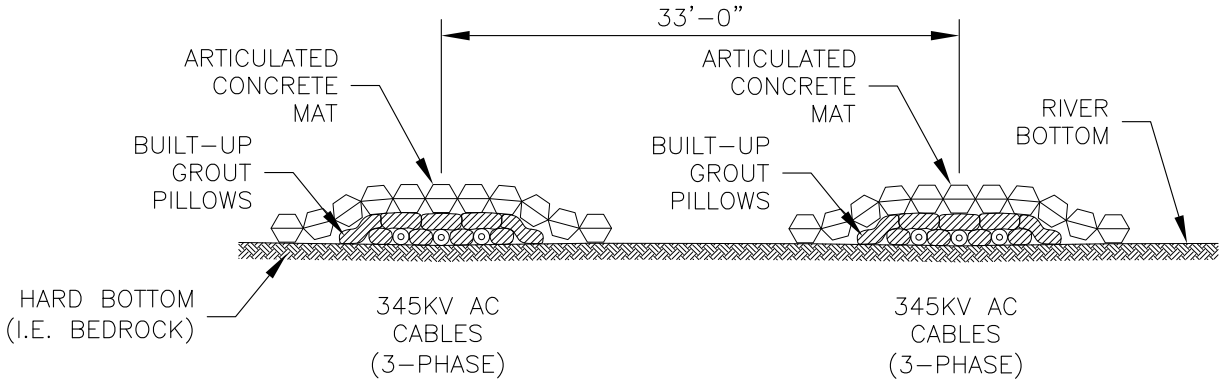
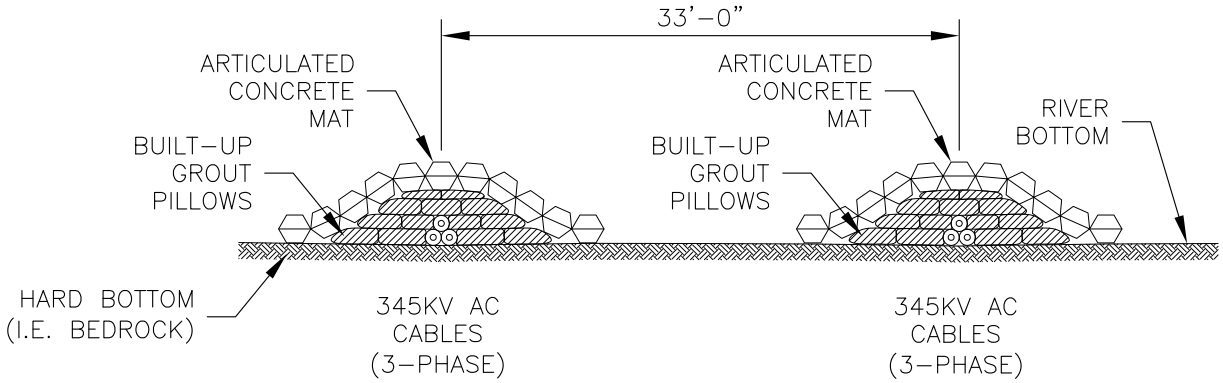
ARTICULATED CONCRETE MAT PROTECTIVE COVERING

176764-SM-14 SHEET 14 OF 16

Prepared by: HDR | DTA & TRC 12/06/2010



345KV AC CONDUCTORS



345KV AC BUNDLED CONDUCTORS

NOTES:
1. INSTALLATION SHOWN AS SURFACE LAYED TO ILLUSTRATE INSTALLATION WHERE THERE IS A PREDOMINANCE OF BEDROCK. OTHER INSTALLATION TECHNIQUES MAY BE EMPLOYED AS APPROPRIATE.

2. CABLE SHALL BE BUNDLED WITH PHASE IN DIRECT CONTACT AT ALL RIVER INSTALLATION LOCATIONS EXCEPT WHERE TRANSITIONING TO HDD BORES.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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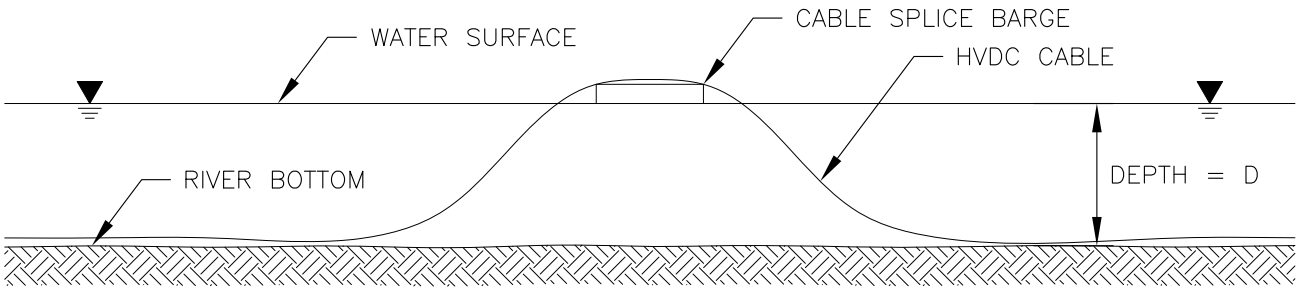
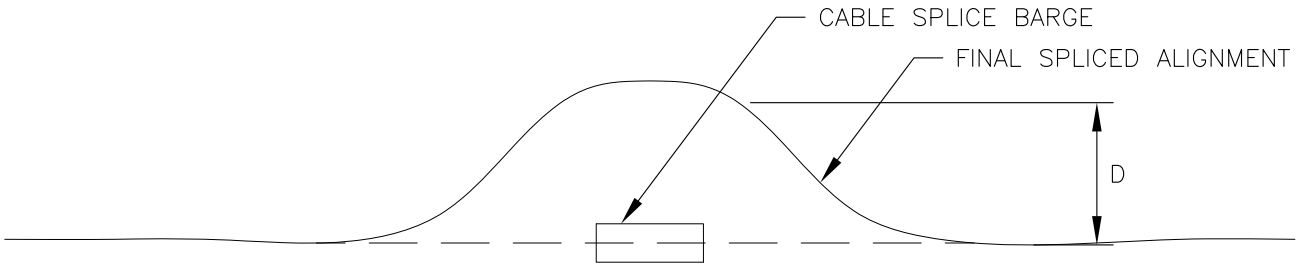
ARTICULATED CONCRETE MAT PROTECTIVE COVERING

176764-SM-15 SHEET 15 OF 16

Prepared by: HDR | DTA & TRC 12/06/2010



PROFILE VIEW



PLAN VIEW

NOTE:
CABLE SHOWN SURFACE LAID FOR ILLUSTRATIVE PURPOSES ONLY. CONSTRUCTION WILL BE DETERMINED BASED UPON BOTTOM CONDITIONS, AND OTHER FACTORS.

Designed	A WIRONEN
Drawn	JRP/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
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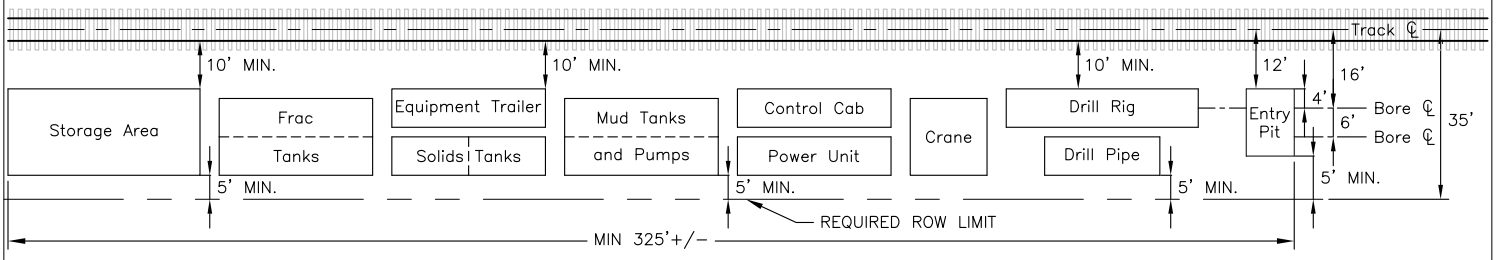
CABLE SPLICE

176764-SM-16 SHEET 16 OF 16

Prepared by: HDR | PTA & TRC 12/06/2010



TYPICAL HDD LAYOUT ON CP ROW
BI-POLE (2 CABLES) ONE SIDE OF TRACK

Designed	WJL
Drawn	WJL
Checked	CRP
Approved	LEP
Scale	NTS

No.	Revision	Date	By	Ck	PE	PE #
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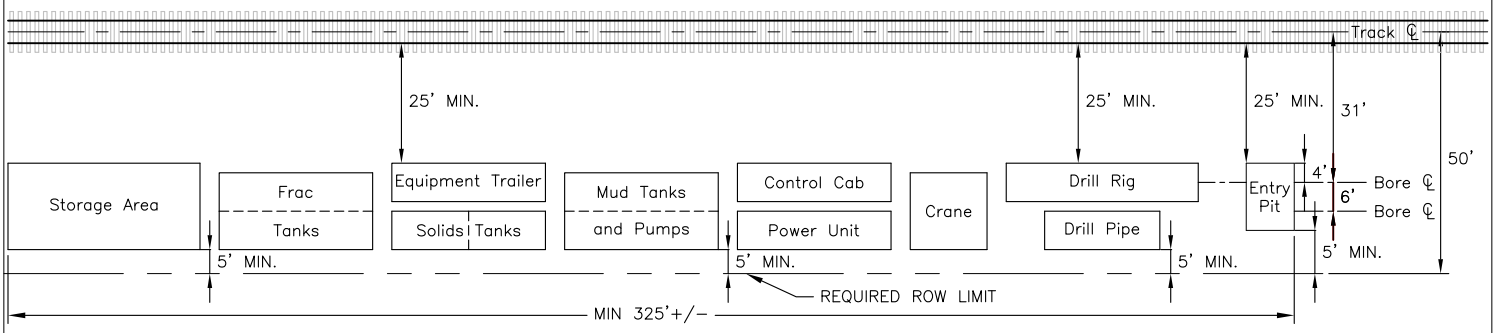
HDD LAYOUT CP
RIGHT OF WAY

176764-HDDM-01 SHEET 01 OF 08

Prepared by: HDR | PTA & TRC 12/06/2010



TYPICAL HDD LAYOUT ON CSX ROW
BI-POLE (2 CABLES) ONE SIDE OF TRACK

Designed	WJL
Drawn	WJL
Checked	CRP
Approved	LEP
Scale	NTS

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC		

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Champlain Hudson Power Express Project

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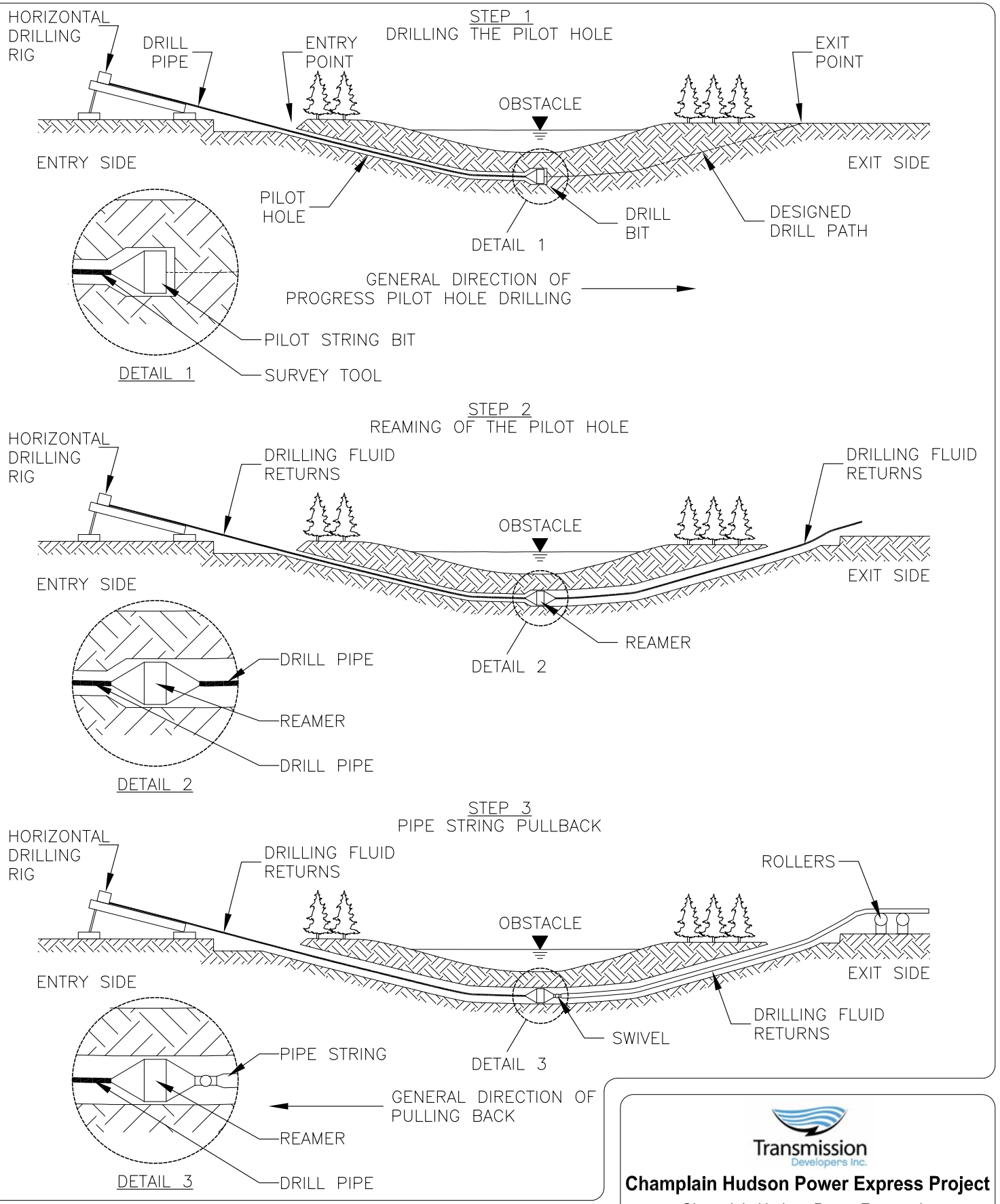
HDD LAYOUT CSX RIGHT OF WAY

176764-HDDM-02 SHEET 02 OF 08

Prepared by: HDR | PTA & TRC 12/06/2010



Designed	A WIRONEN
Drawn	JJD/TRC
Checked	.
Approved	.
Scale	NONE

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC	.	.

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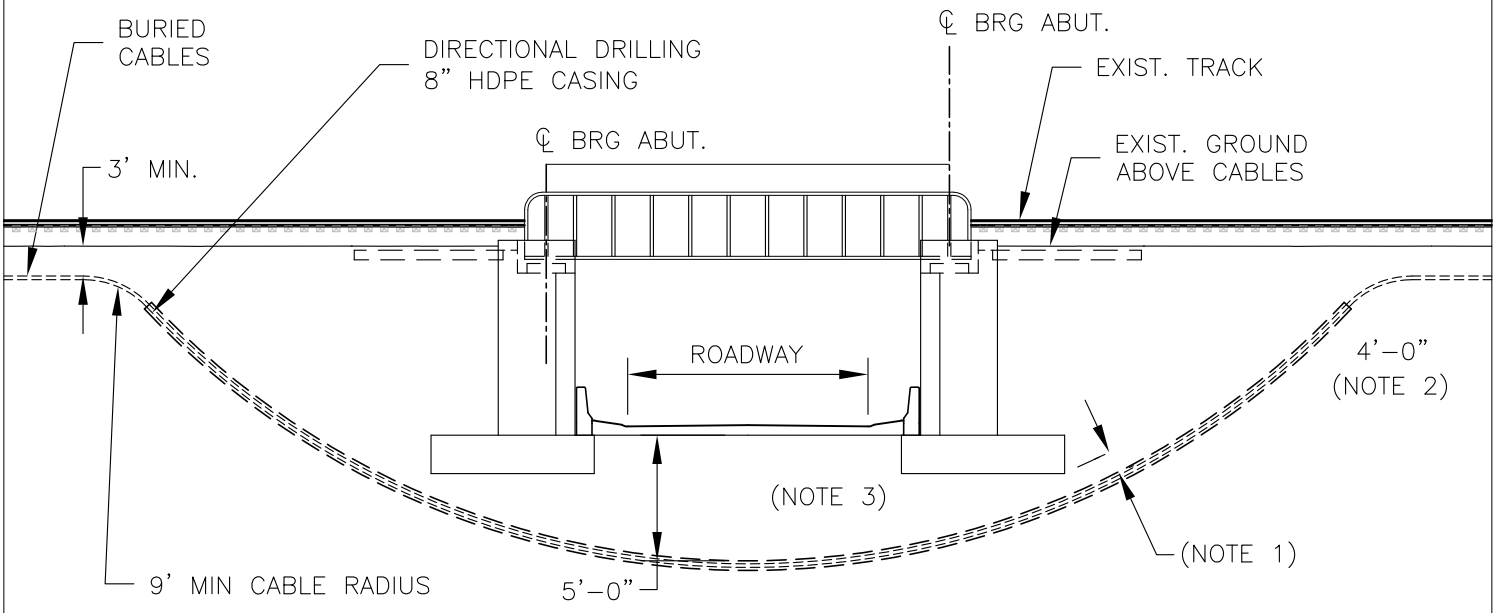
HDD
MULTI-STAGE PROCESS

176764-HDDM-03 SHEET 03 OF 08

Prepared by: HDR | DTA & TRC 12/06/2010



DIRECTIONAL DRILLING LONGITUDINAL SECTION
ROADWAY UNDER GRADE BRIDGE

NOTE:

1. ACTUAL CLEARANCE MAY VARY BASED UPON LENGTH OF HDD BORE, LOCAL SOIL/GEOTECHNICAL CONDITIONS AND OTHER FACTORS. HDD BORE HOLE SHALL BE NO CLOSER THAN 45 FEET HORIZONTALLY TO ANY CSX STRUCTURE FOUNDATION.
2. BASED UPON CSX DESIGN CRITERIA. DEPTH OF BURIAL MAY DIFFER ALONG C.P. ROW.
3. PER NYDOT BLUE BOOK CRITERIA.
4. DIMENSIONS AND DETAILS ARE CONCEPT ONLY. ACTUAL DETAILS AND DESIGN PARAMETERS WILL BE DEVELOPED BY THE EPC CONTRACTOR AND SUBMITTED WITH THE EM & CP DOCUMENT.

Designed	WJL
Drawn	WJL
Checked	CRP
Approved	LEP
Scale	NTS

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC		

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Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

HDD LONGITUDINAL SECTION

176764-HDDM-04 SHEET 04 OF 08

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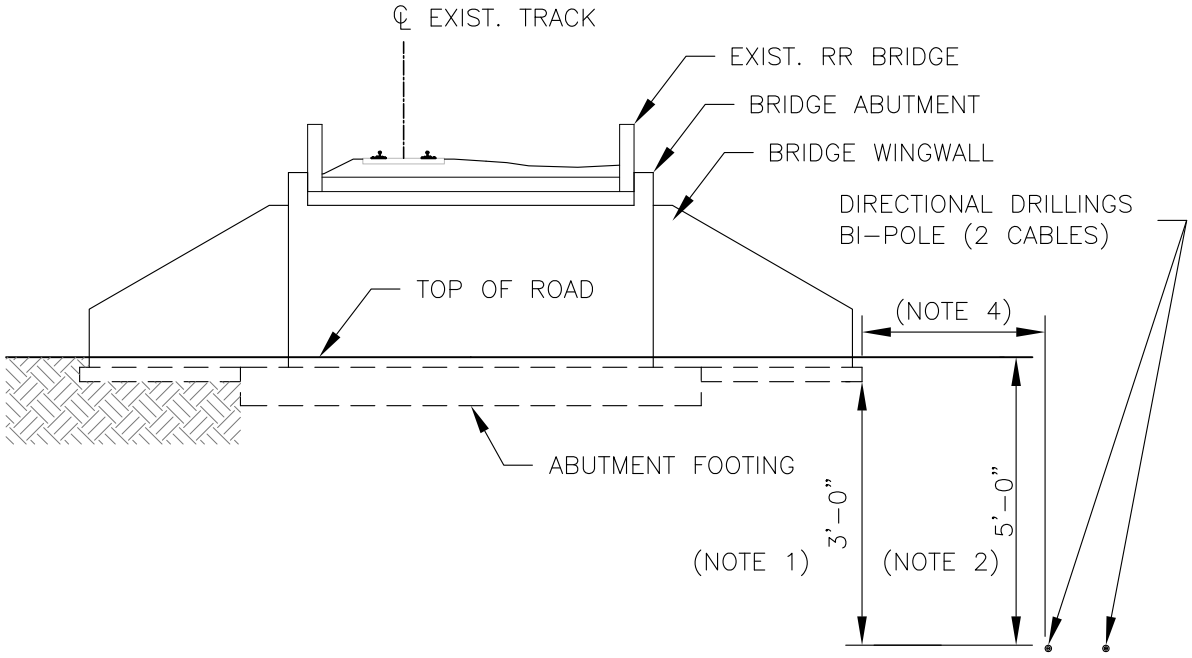

DIRECTIONAL DRILLING CROSS SECTION
ROADWAY UNDERGRADE BRIDGE

NOTES:

1. ACTUAL CLEARANCE MAY VARY BASED UPON LENGTH OF HDD BORE, LOCAL SOIL/GEOTECHNICAL CONDITIONS AND OTHER FACTORS.
2. BASED UPON CSX DESIGN CRITERIA. DEPTH OF BURIAL MAY DIFFER ALONG C.P. ROW.
3. DIMENSIONS AND DETAILS ARE CONCEPT ONLY. ACTUAL DETAILS AND DESIGN PARAMETERS WILL BE DEVELOPED BY THE EPC CONTRACTOR AND SUBMITTED WITH THE EM & CP DOCUMENT.
4. HDD BORE HOLE SHALL BE NO CLOSER THAN 45 FEET HORIZONTALLY TO ANY CSX STRUCTURE FOUNDATION. OTHER CRITERIA APPLIES TO CP AND DOT ASSETS.

Designed	WJL
Drawn	WJL
Checked	CRP
Approved	LEP
Scale	NTS

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC		

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Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

HDD UG BRIDGE SECTION

176764-HDDM-05 SHEET 05 OF 08

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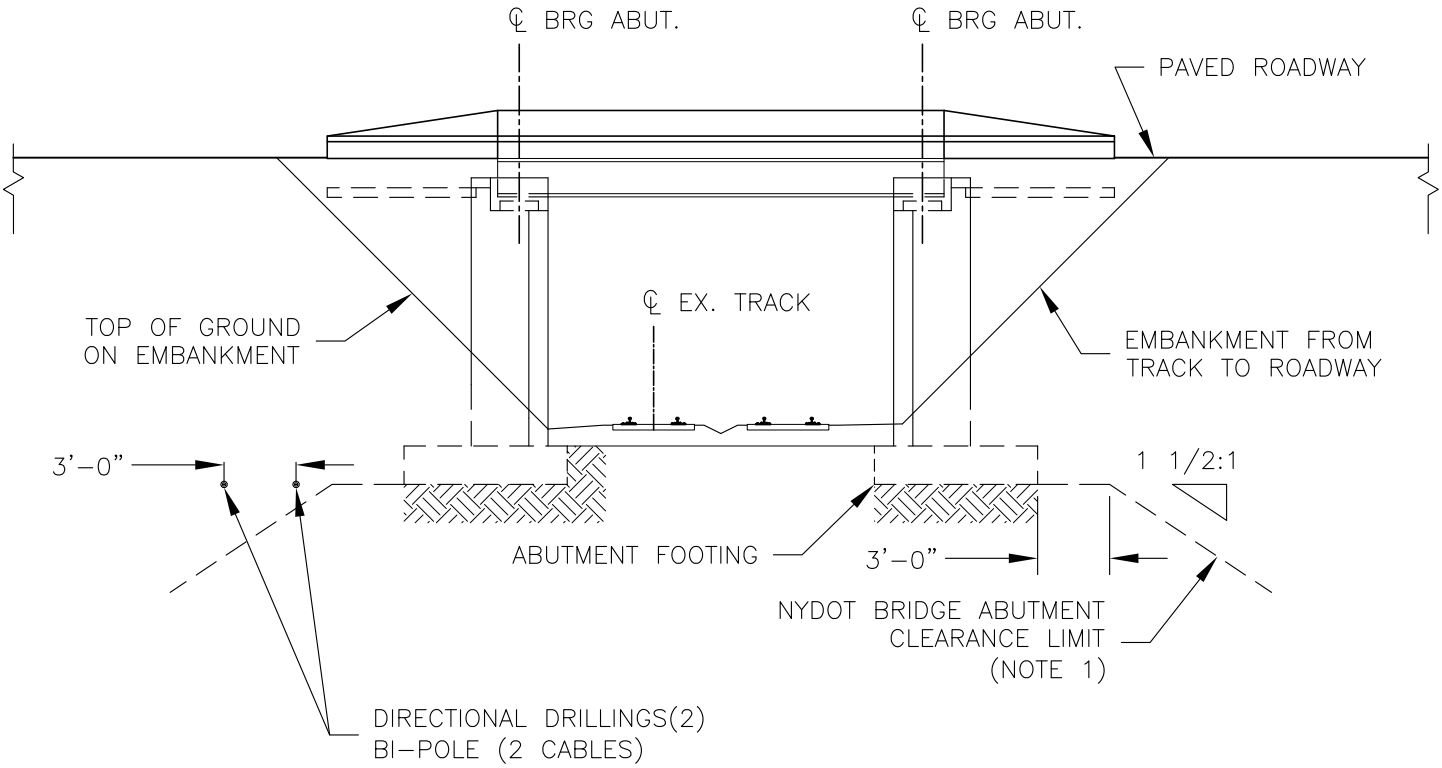

DIRECTIONAL DRILLING CROSS SECTION
ROADWAY OVERHEAD BRIDGE

NOTE:
1. NYDOT CLEARANCE LIMIT RECOMMENDATIONS PROVIDED BY NYDOT REGION 1 DESIGN & CONSULTANT MANAGEMENT GROUP.

2. DIMENSIONS AND DETAILS ARE CONCEPT ONLY. ACTUAL DETAILS AND DESIGN PARAMETERS WILL BE DEVELOPED BY THE EPC CONTRACTOR AND SUBMITTED WITH THE EM & CP DOCUMENT.

Designed	WJL
Drawn	WJL
Checked	CRP
Approved	LEP
Scale	NTS

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC		

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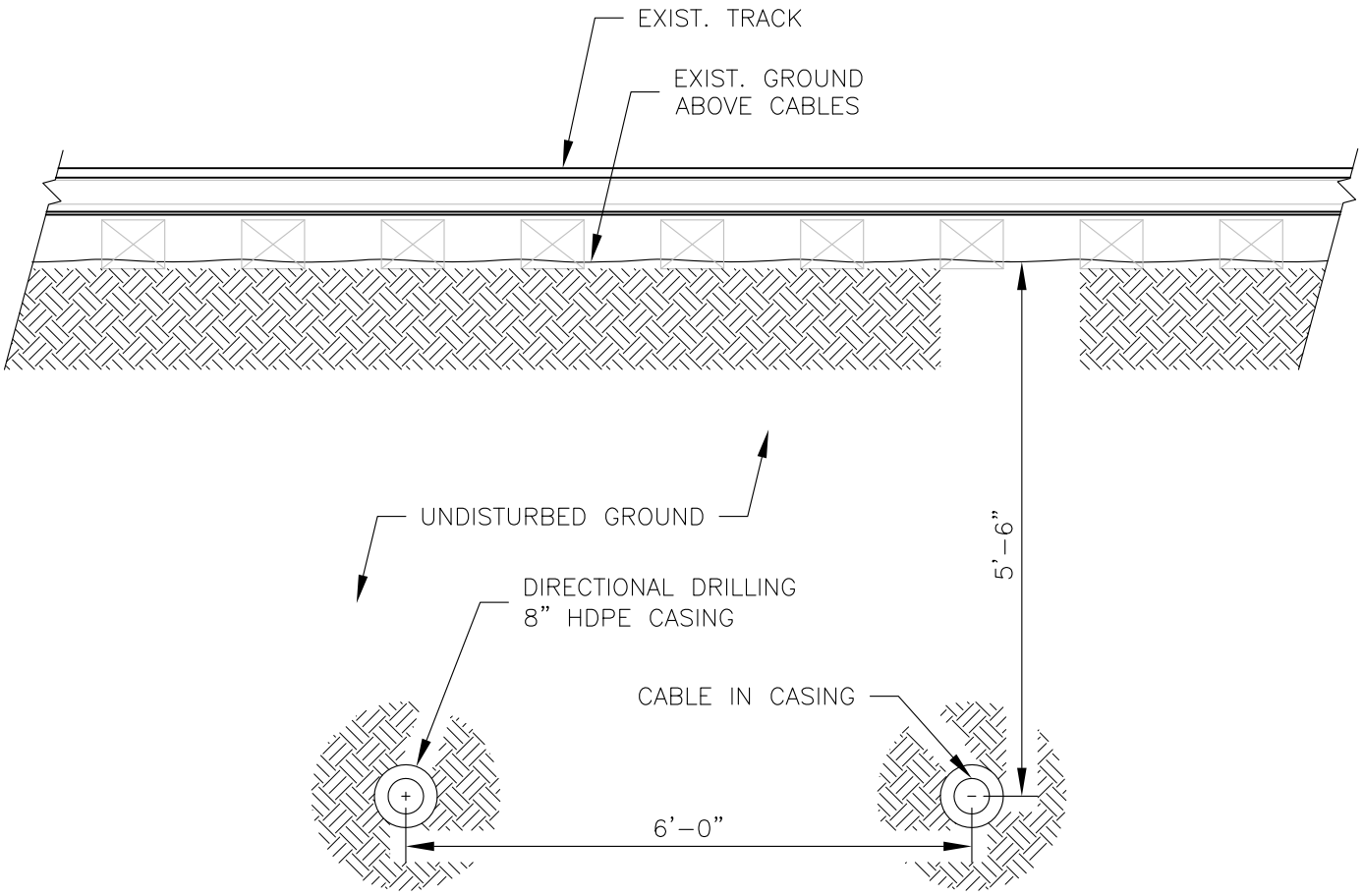
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

HDD OH BRIDGE SECTION

176764-HDDM-06 SHEET 06 OF 08

Prepared by: HDR | PTA & TRC 12/06/2010



DIRECTIONAL DRILLING
BI-POLE SECTION

NOTE:
1. DEPTH OF BURIAL BASED ON CSX DESIGN AND CONSTRUCTION STANDARD SPECIFICATION.

2. DIMENSIONS AND DETAILS ARE CONCEPT ONLY. ACTUAL DETAILS AND DESIGN PARAMETERS WILL BE DEVELOPED BY THE EPC CONTRACTOR AND SUBMITTED WITH THE EM & CP DOCUMENT.

Designed	WJL
Drawn	WJL
Checked	CRP
Approved	LEP
Scale	NTS

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC		

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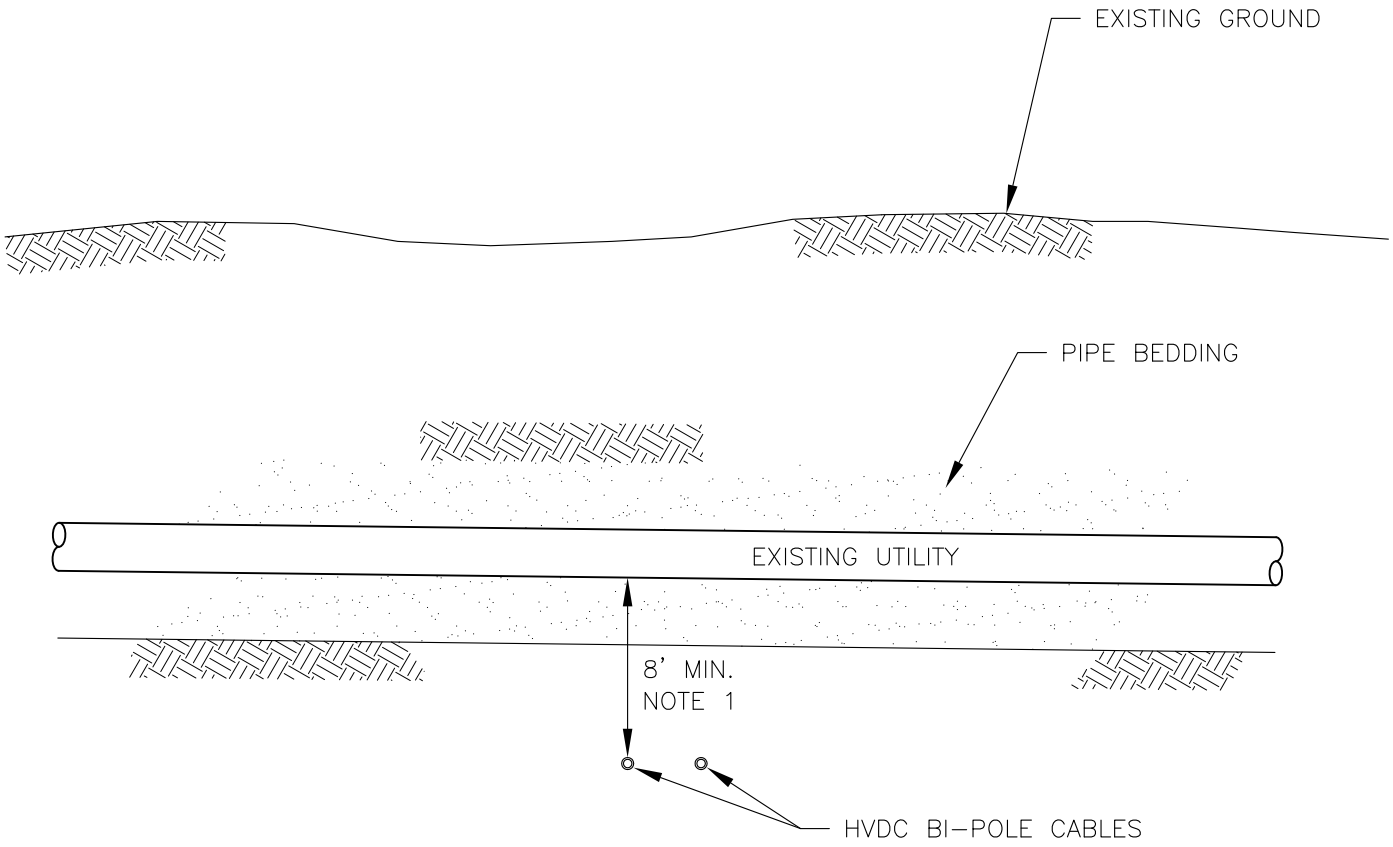
Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

HDD BI-POLE SECTION

176764-HDDM-07 SHEET 07 OF 08

Prepared by: HDR | PTA & TRC 12/06/2010



NOTES:

1. HDD BORE HOLE WILL CROSS NO CLOSER THAN 8 FEET FROM KNOWN GRAVITY DRAIN LINES (SANITARY SEWER, STORM DRAIN) NOR CLOSER THAN 4 FEET TO OTHER UTILITIES. CLEAR DISTANCE MAY BE INCREASED TO MEET REQUIREMENTS OF UTILITY OR MUNICIPALITY. ADDITIONAL CLEARANCE MAY BE PROVIDED AS DEEMED PRUDENT BY THE HDD CONTRACTOR AND AGREED UPON IN THE CROSSING AGREEMENT.

2. CROSSING SKETCH IS TO PRESENT CONCEPTS. MORE RESTRICTIVE REQUIREMENTS OF THE UTILITY, MUNICIPALITY, OR OTHER AUTHORITY HAVING JURISDICTION (IF ANY) SHALL BE REFLECTED IN THE DETAILED DESIGN REQUIREMENTS OF THE EM & CP DOCUMENTS.

Designed	WJL
Drawn	WJL
Checked	CRP
Approved	LEP
Scale	NTS

No.	Revision	Date	By	Ck	PE	PE #
0	ISSUED FOR PERMIT	12/06/10	TRC	TRC		

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Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

HDD UTILITY CROSSING

76764-HDDM-08 SHEET 08 OF 08

Prepared by: HDR | PTA & TRC 12/06/2010