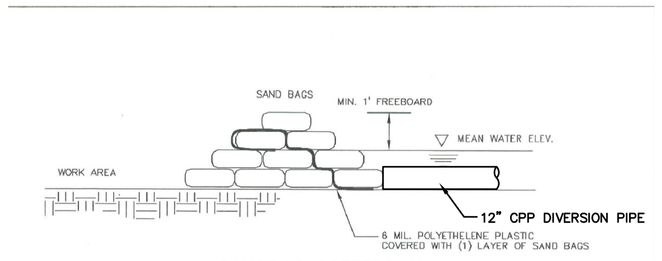
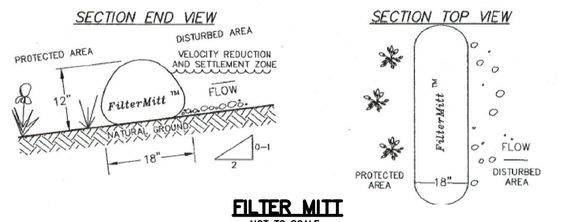


SANDBAG COFFERDAM
NOT TO SCALE



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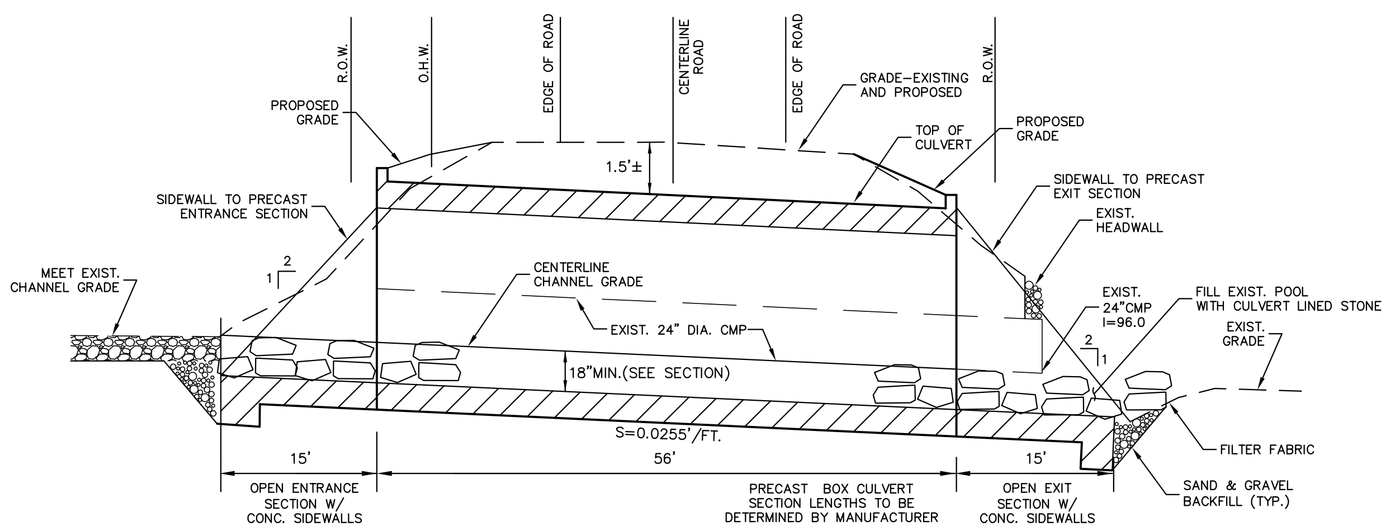


PROFILE
SCALE: HORIZONTAL 1"=10'
VERTICAL: 1"=4'

MASS. STREAM CROSSING STANDARDS

WIDTH: 1.2 FULL BANK WIDTH
1.2 X 5 = 6'
12' PROVIDED

OPENNESS: (HEIGHT X WIDTH)LENGTH
(4-1/2 AVG. X 12)56 = 0.96>0.82

VEGETATED AREAS/SLOPES:

4" LOAM AND SEED WITH EROSION CONTROL BLANKET (ON 3:1 SLOPE OR LESS USE NORTH AMERICAN GREEN S75BN SINGLE NET EROSION BLANKET; ON SLOPES GREATER THAN 3:1 US NORTH AMERICAN GREEN SC150BN DOUBLE NET EROSION CONTROL BLANKET, OR ENGINEER APPROVED EQUAL.)

WORK IN VEGETATED WETLAND AREAS

1. WETLAND SOIL SHALL BE EXCAVATED TO A DEPTH OF 12 INCHES, AND STOCKPILED AND COVERED WITH BURLAP OR STRAW MULCH. PERIODIC LIGHT APPLICATION OF WATER MAY BE REQUIRED TO MAINTAIN MOISTURE.
2. WETLAND SOIL SHALL BE RESPREAD 12 INCHES DEEP AND LIGHTLY COMPACTED BY HAND.
3. WETLAND SEED MIX SHALL BE APPLIED AT A RATE OF 1/2 LB./1000 SQUARE FEET AND LIGHTLY RAKED TO ENSURE SOIL/SEED CONTACT.
4. WETLAND SEED MIX SHALL BE PURE LIVE SEED AND CONTAIN NATIVE NON-HYBRIDIZED SPECIES. SEED MIX SPECIES LIST SHALL BE SUBMITTED TO THE ENGINEER FOR APROVAL PRIOR TO APPLICATION.

RESOURCE IMPACTS

BORDERING VEGETATED WETLANDS (BVW)

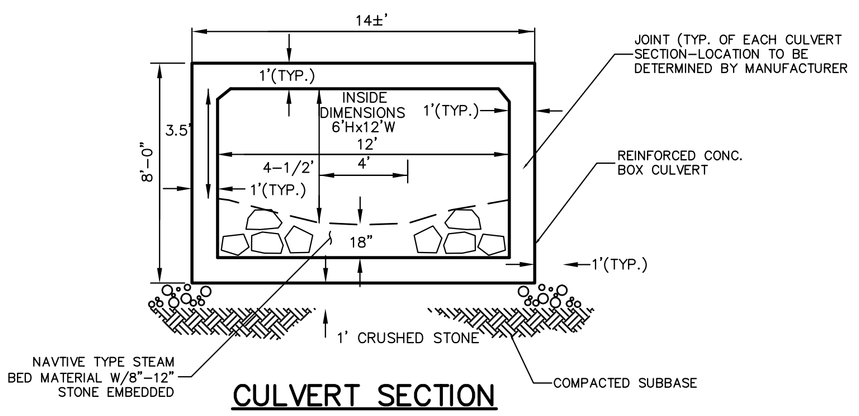
	PRE-DEVELOPMENT	POST DEVELOPMENT
LOST UPSTREAM	64 SF	
LOST DOWNSTREAM	13 SF	
NET LOSS	77 SF	77 SF REPLICATION

BANK

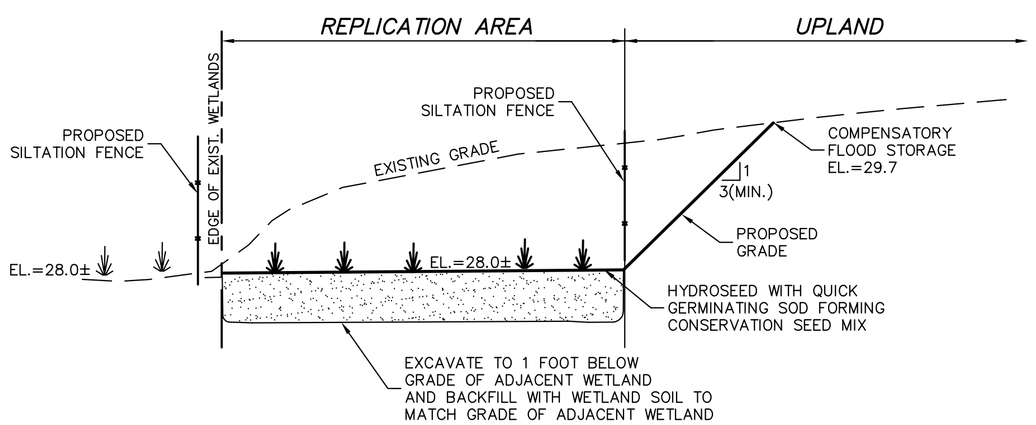
UPSTREAM	53 LF	NEW UPSTREAM OUTSIDE CULVERT LIMIT	37 LF
DOWNSTREAM	16 LF	DOWNSTREAM OUTSIDE CULVERT LIMIT	10 LF
TOTAL	69 LF	NEW BANK WITHIN CULVERT, ENTRANCE & EXIT	154 LF
			201 LF
NET GAIN	132 LF		

LAND UNDER WATER (LUW)

UPSTREAM	178 SF		140 SF
DOWNSTREAM	1,142 SF		1,157 SF
TOTAL	1,320 SF	WITHIN CULVERT	308 SF
			1,605 SF
NET GAIN	285 SF		



CULVERT SECTION
NOT TO SCALE



WETLAND REPLICATION SECTION
NOT TO SCALE

PAVEMENT NOTES:

ROADWAY PAVEMENT: (FULL DEPTH RECONSTRUCTION)

SUBSURFACE COURSE:
3-1/2" HOT MIX ASPHALT PAVEMENT PLACED IN TWO LAYERS, 1-1/2" TOP COURSE MATERIAL OVER 2" BINDER COURSE MATERIAL.

BASE COURSE:
3" HOT MIX ASPHALT BASE COURSE MATERIAL, PLACED IN ONE LAYER.

SUBBASE: 12" GRAVEL BURROW

ROADWAY PAVEMENT: (COLD PLANING/RESURFACING)

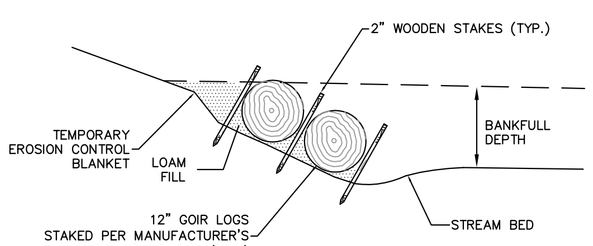
SURFACE COURSE:
1-1/2" MIN. HOT MIX ASPHALT PAVEMENT PLACED IN ONE LAYER, TOP COURSE MATERIAL.

MILLED PAVEMENT SURFACE TREATED WITH BITUMEN FOR TACK COAT, 0.07 GAL. PER SY.

TEMPORARY PATCH:

SURFACE COURSE:
3" HOT MIX ASPHALT BASE COURSE MATERIAL PLACED IN ON LAYER.

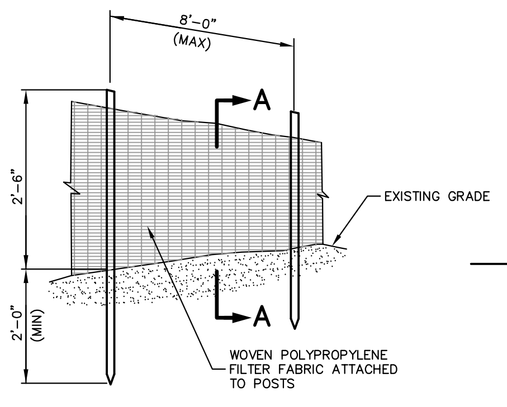
SUBBASE:
GRAVEL BORROW



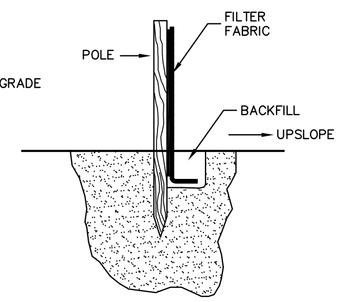
BANK RESTORATION
NOT TO SCALE

CONSTRUCTION NOTES (SEE CONSTRUCTION SEQUENCE)

1. INSTALL SEDIMENTATION AND EROSION CONTROLS PRIOR TO BEGINNING WORK.
2. ALL WORK SHALL BE CLOSELY COORDINATED WITH THE BOXFORD CONSERVATION COMMISSION OR THEIR DESIGNEE.
3. ALL IN-STREAM WORK SHALL BE COORDINATED SO THAT THE CULVERT REMOVAL AND NEW CULVERT INSTALLATION BEGINS AND IS COMPLETED DURING A PERIOD OF "LOW FLOW" CONDITIONS AND IS PERFORMED IN ACCORDANCE WITH THE ORDER OF CONDITIONS. CONTRACTOR'S PROPOSED WORK SCHEDULE AND VERIFICATION OF WEATHER CONDITIONS SHALL BE SUBMITTED TO THE BOXFORD DEPARMENT OF PUBLIC WORKS FOR REVIEW AND APPROVAL PRIOR TO COMMENCING WORK.
4. EXISTING STREAMBED MATERIAL SHALL BE STOCKPILED SEPARATELY FOR REUSE. ADDITIONAL STREAMBED MATERIAL SHALL CONSIST OF CLEAN GRANULAR MATERIAL WITH THE SAME GRADATION AS THE EXISTING STREAM CHANNEL. STREAMBED MATERIAL SHALL BE DURABLE WASHED ROUNDED AGGREGATE FREE OF FINES, ORGANIC AND DELETERIOUS MATERIAL. CONCRETE, BRICK AND OTHER CONSTRUCTION DEBRIS IS PROHIBITED. THE ENGINEER SHALL APPROVE MATERIAL PRIOR TO PLACEMENT.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTROL OF WATER AND STORM WATER AT ALL TIMES INCLUDING BUT NOT LIMITED TO MAINTAINING, REPLACING AND RE-FASTENING EROSION AND SEDIMENTATION CONTROL DEVICES AS NEEDED TO PREVENT SEDIMENT FROM LEAVING THE SITE AND ENTERING WETLAND RESOURCE AREAS.
6. THE REFUELING OF VEHICLES AND/OR THE STOCKPILING OF NEW OR EXCAVATED FILL MATERIALS WITHIN 100 FEET OF THE STREAM NOT BE PERMITTED.
7. THE CONTRACTOR SHALL COORDINATE ROAD CLOSURE CLOSELY WITH THE TOWN OF BOXFORD DEPARTMENT OF PUBLIC WORKS, TOWN MANAGER, POLICE, FIRE AND NEIGHBORING TOWN PUBLIC SAFETY DEPARTMENTS IN ACCORDANCE WITH ANY MUTUAL AID AGREEMENTS WITH THE MANUFACTURER'S REQUIREMENTS.
8. WORK IN WETLAND RESOURCE AREAS SHALL BE CONDUCTED MANUALLY WITH EXCEPTION OF HAND HELD TOOLS, NO MECHANICAL EQUIPMENT SHALL BE OPERATED WITH THE RESOURCE AREAS AND STREAM.
9. DISTURBED AREAS AND SLOPES SHALL BE STABILIZED WITH APPROVED SEED MIX, PLANTINGS AND/OR EROSION CONTROL BLANKET, AS NECESSARY, AS SHOWN ON THE PLANS. SEED MIX AND EROSION CONTROL BLANKET SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.
10. DEBRIS FROM CONSTRUCTION THAT FALLS INTO THE RESOURCE AREA WILL BE REMOVED PRIOR TO THE COMPLETION OF EACH WORKDAY.
11. ALL DISTURBED LAND UNDER WATER AREAS SHALL BE STABILIZED AS INDICATED ON THE PLANS. DETAILS AND SECTIONS, OR AS DIRECTED BY THE ENGINEER OR THE TOWN PRIOR TO REMOVING WATER CONTROL MEASURES.
12. EROSION AND SEDIMENTATION CONTROLS SHALL BE REMOVED AFTER COMPLETION AND ACCEPTANCE OF ALL WORK WHEN AUTHORIZED BY THE BOXFORD CONSERVATION COMMISSION OR DESIGNEE.
13. CONSTRUCTION DISTURBANCE TO VEGETATED WETLAND BUFFER AREA MUST BE RESTORED TO EXISTING CONDITIONS. RESTORATION SHALL INCLUDE ALL EXISTING PLANTINGS.

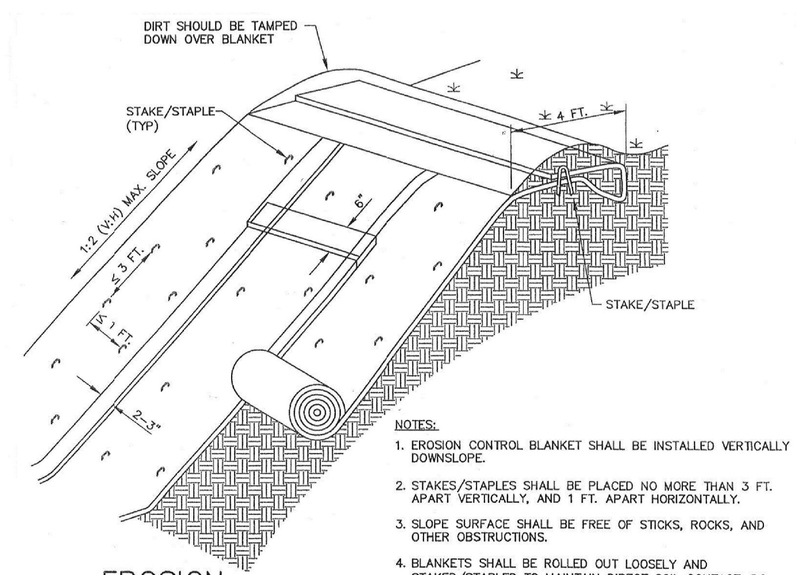


ELEVATION



SECTION A-A

SILTATION FENCE DETAIL



NOTES:
1. EROSION CONTROL BLANKET SHALL BE INSTALLED VERTICALLY DOWNSLOPE.
2. STAKES/STAPLES SHALL BE PLACED NO MORE THAN 3 FT. APART VERTICALLY, AND 1 FT. APART HORIZONTALLY.
3. SLOPE SURFACE SHALL BE FREE OF STICKS, ROCKS, AND OTHER OBSTRUCTIONS.
4. BLANKETS SHALL BE ROLLED OUT LOOSELY AND STAKED/STAPLED TO MAINTAIN DIRECT SOIL CONTACT. DO NOT STRETCH THE BLANKETS.
5. EROSION CONTROL BLANKET SHALL BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS IF MORE STRINGENT.

EROSION CONTROL BLANKET
NOT TO SCALE

CONSTRUCTION SEQUENCE

1. WORK TO BE CONDUCTED DURING MID TO LATE SUMMER BEFORE THE START OF THE SCHOOL YEAR. PART OR ALL OF THE ROAD WILL BE BLOCKED OFF DURING THIS TIME. TRAFFIC WILL BE DETOURED EACH DAY (IF NEEDED) UNTIL CONSTRUCTION IS COMPLETE. CONSTRUCTION TO TAKE AT LEAST 7 TO 10 DAYS. START OF CONSTRUCTION WILL BE BASED ON A 10 DAY WEATHER FORECAST OF LITTLE OR NO RAIN. CERTAIN ITEMS MAY BE INITIATED PRIOR TO THE START OF CONSTRUCTION INCLUDING:
   A-REMOVE EXISTING GUARD RAIL WITHIN WORK AREA.
   B-INSTALL EROSION CONTROL (SILT SOCK OR STRAW WATTLES) ALONG THE OUTER EDGE OF THE WORK AREA.
   C-CUT ASPHALT ACROSS SECTION OF ROAD WHERE CULVERT IS TO BE REPLACED.
2. AT THE START OF CONSTRUCTION, INSTALL SANDBAG DAM AND SUMP IN STREAM CHANNEL ON INLET SIDE OF CULVERT AS SHOWN ON PLAN. PLACE WATER PUMP OUTSIDE STREAM CHANNEL AND EXTEND WATER PUMP HOSE 50 FT OR MORE INTO BORDERING UPLANDS.
3. REMOVE CUT ASPHALT AND EXCAVATE ROAD BASE MATERIAL TO EXPOSE AND REMOVE EXISTING CULVERT. ALL EXCAVATED MATERIAL ESPECIALLY ASPHALT, TO BE REMOVED FROM SITE. CONTRACTOR TO BE RESPONSIBLE FOR THE PROPER DISPOSAL OF MATERIAL. EXCAVATED MATERIAL MAY BE TEMPORARILY STOCKPILED ALONG EDGE OF TRENCH AND/OR ROAD.
4. WDEN AND DEEPEN EXCAVATED TRENCH TO ACCOMMODATE NEW BOX CULVERT. PROVIDE SUPPORT TO EXISTING GAS LINE PER TECHNICIAN SPECIFICATIONS IN CONTRACT DOCUMENTS. INSTALL TEMPORARY STREAM DIVERSION PIPE THAT CONSIST OF APPROXIMATELY 70 FT OF 12" CORRUGATED PLASTIC PIPE. PIPE TO BE INSTALLED FROM SANDBAG BERM TO PLUNGE POOL AT OUTLET OF EXISTING CULVERT.
5. INSTALL ADDITIONAL SUMPS IN EXCAVATED TRENCH (AS NEEDED) AND SET UP DE-WATERING BAG(S) NORTH OF CONSTRUCTION AREA. DE-WATERING BAGS TO BE PLACED ON EDGE OF ROAD. EXCAVATED TRENCH WILL REQUIRE A NEW ALIGNMENT OF OLD STREAMBED (SEE PLAN).
6. BOX CULVERT WILL BE INSTALLED IN SEVEN 8' SECTIONS BEGINNING WITH THE INLET ENTRANCE SECTION UPSTREAM AND ENDING WITH THE OUTLET SECTION.
7. PREPARE AND COMPACT BASE MATERIAL PRIOR TO INSTALLATION OF NEW BOX CULVERT. BASE MATERIAL TO MEET ENGINEERING STANDARDS. INSTALL 2 OR 3 SECTIONS OF NEW CULVERT AT A TIME.
8. PLACE STREAMBED MATERIAL INTO INSTALLED CULVERT SECTIONS. STREAMBED MATERIAL TO CONSIST OF A BASE OF WASHED AND COMPACTED COARSE SAND AND GRAVEL SPREAD AND GRADED TO FORM THE OUTLINE OF A BANK AND STREAMBED. ONCE INSTALLED, THE BASE MATERIAL WILL BE LINED WITH 8" TO 12" STONES TO FORM THE STREAMBED AND BANK.
9. AFTER THE STREAM BANK AND BED HAVE BEEN CREATED, PLACE CONCRETE TOP ON CULVERT AND BACKFILL WITH APPROPRIATE ROAD BASE MATERIAL.
10. REPEAT STEPS 7 AND 9 WITH REMAINING CULVERT SECTIONS.
11. REMOVE TEMPORARY STREAM DIVERSION PIPE.
12. WHEN ENTIRE CULVERT HAS BEEN REPLACED, BACKFILLED AND COMPACTED, REPAVE ROADWAY PER PLAN.
13. FILL PLUNGE POOL AT THE OUTLET OF CULVERT WITH SAME SIZE STONE AS IN CULVERT. SCRAP ACCUMULATED STREAMBED MATERIAL ON OUTLET SIDE OF ROAD TO MATCH THE GRADE OF THE CONSTRUCTED STREAMBED IN THE NEW CULVERT.
14. EXCAVATE WETLAND REPLICATION AREA ON UPSTREAM SIDE OF CULVERT. WORK TO BE DONE MOSTLY BY HAND. RETAIN TOP 6" OF LOAM TO BE USED AS BASE FOR CREATED WETLAND. PLACE 8" STRAW WATTLE AT BASE OF EXCAVATION TO CREATE A TEMPORARY STREAM BANK. ONCE GRADED, PLANT CONSTRUCTED WETLAND WITH 3 WINTERBERRY AND 3 BLUEBERRY SHRUBS.
15. ONCE WORK HAS BEEN COMPLETED AROUND THE NEW BOX CULVERT AND THE STREAMBED BELOW THE CULVERT HAS BEEN RE-GRADED, REMOVE SANDBAG DAM AND SUMP.
16. BACKFILL SCOURED ROAD BANK AREAS WITH COMPACTED SAND AND GRAVEL TOPPED WITH 4" TO 6" OF LOAM (SEE PLAN) AND COVER WITH EROSION CONTROL BLANKET.
17. INSTALL NEW GUARD RAIL.
18. SEED ALL DISTURBED SLOPES WITH AN SCS SOIL STABILIZATION MIX.
19. WHEN ROAD SLOPES ARE STABLE, REMOVE EROSION CONTROL.

DEWATERING NOTES

1. INSTALL SEDIMENTATION AND EROSION CONTROLS PRIOR TO BEGINNING WORK.
2. ALL WORK SHALL BE CLOSELY COORDINATED WITH THE BOXFORD CONSERVATION COMMISSION OR THEIR DESIGNEE.
3. ALL IN-STREAM WORK SHALL BE COORDINATED SO THAT CULVERT REMOVAL AND NEW CULVERT INSTALLATION BEGINS AND IS COMPLETED DURING A PERIOD OF "LOW FLOW" CONDITIONS AND IS PERFORMED IN ACCORDANCE WITH THE ORDERS OF CONDITIONS. CONTRACTOR'S WORK SCHEDULE AND VERIFICATION OF WEATHER CONDITIONS SHALL BE SUBMITTED TO THE BOXFORD DEPARTMENT OF PUBLIC WORKS FOR REVIEW AND APPROVAL PRIOR TO COMMENCING WORK.
4. DEWATERING SHALL BE USED IF NECESSARY TO ENSURE SOIL COMPACTION AND CULVERT INSTALLATION IS PERFORMED "IN THE DRY"
5. DIRECT DEWATERING DISCHARGE TO CROOKED POND STREAM IS PROHIBITED.
6. DEWATERING EFFLUENT SHALL BE DISCHARGED INTO A WATER FILTRATION BAG SUITABLE FOR THE REQUIRED FLOW AND LOCATED WITHIN A SETTLING BASIN SURROUNDED BY SILT FENCE, AT LOCATIONS APPROVED BY THE ENGINEER.
7. THE DEWATERING BASIN SHOULD BE PLACED ON A REASONABLY LEVEL, STABLE SOIL.
8. PUMPS AND HOSES SHALL BE IN GOOD WORKING CONDITION AND OF ADEQUATE CAPACITY FOR THE REQUIRED FLOW.
9. ALL EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO COMMENCING DEWATERING OPERATIONS.

STREAMBED NOTES

1. EXISTING STREAMBED MATERIAL SHALL BE EXCAVATED AND STOCKPILED FOR REUSE.
2. STREAMBED AGGREGATE MATERIAL, SHAPE AND GRADATION SHALL BE AS SPECIFIED IN THE CONTRACT SPECIFICATIONS. IT IS THE INTENT TO GRADE THE STREAMBED WITHIN THE CULVERT TO APPROXIMATE UPSTREAM CHANNEL BOTTOM WIDTHS AND BANKS.

PREPARED FOR:
TOWN OF BOXFORD DEPARMENT
OF PUBLIC WORKS

REVISED: 1/27/16 DEP COMMENTS ADDRESSED

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NOTICE OF INTENT
CROOKED POND STREAM CROSSING
MIDDLETON ROAD
BOXFORD, MASSACHUSETTS

DECEMBER 2, 2015