



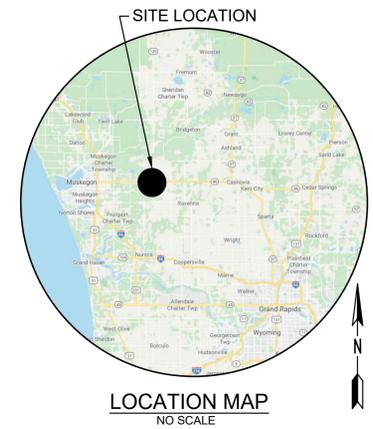
BRENDA M. MOORE  
MUSKEGON COUNTY DRAIN COMMISSIONER  
STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

# BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT

**DIVISION 1**

**JTB&S DRAIN AT M-46**

PART OF EDELSTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS  
MUSKEGON COUNTY, MICHIGAN



LOCATION MAP  
NO SCALE

LIST OF DRAWINGS

- 1 COVER SHEET
- 2 APPLE AVE (M-46) ROADWAY CROSSING DETAIL
- 3 DETAILS
- 4 SOIL EROSION & SEDIMENTATION CONTROL DETAILS

NOTES APPLYING TO STANDARD PLANS

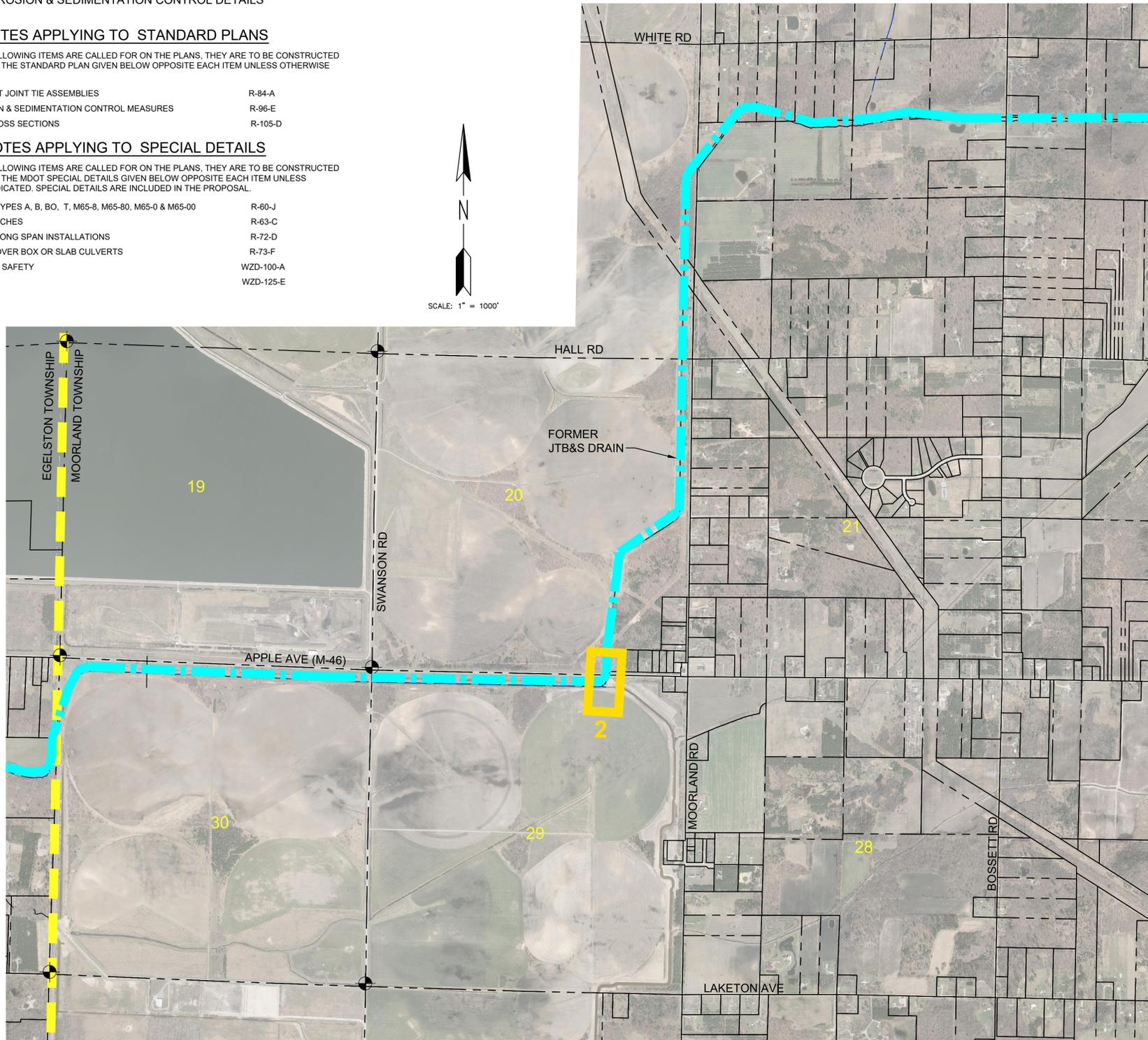
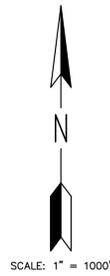
WHERE THE FOLLOWING ITEMS ARE CALLED FOR ON THE PLANS, THEY ARE TO BE CONSTRUCTED ACCORDING TO THE STANDARD PLAN GIVEN BELOW OPPOSITE EACH ITEM UNLESS OTHERWISE INDICATED.

BOX CULVERT JOINT TIE ASSEMBLIES	R-84-A
SOIL EROSION & SEDIMENTATION CONTROL MEASURES	R-96-E
GRADING CROSS SECTIONS	R-105-D

NOTES APPLYING TO SPECIAL DETAILS

WHERE THE FOLLOWING ITEMS ARE CALLED FOR ON THE PLANS, THEY ARE TO BE CONSTRUCTED ACCORDING TO THE MDOT SPECIAL DETAILS GIVEN BELOW OPPOSITE EACH ITEM UNLESS OTHERWISE INDICATED. SPECIAL DETAILS ARE INCLUDED IN THE PROPOSAL.

GUARDRAIL TYPES A, B, BO, T, M65-8, M65-80, M65-0 & M65-00	R-60-J
UTILITY TRENCHES	R-63-C
GUARDRAIL LONG SPAN INSTALLATIONS	R-72-D
GUARDRAIL OVER BOX OR SLAB CULVERTS	R-73-F
TRAFFIC AND SAFETY	WZD-100-A
	WZD-125-E



LIST OF CONTACTS

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CONSUMERS ENERGY  
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COMCAST  
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**ROADS**  
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**GAS TRANSMISSION**  
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**ROADS**  
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P.O. BOX 30050  
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PHONE: 517-335-6781

**WASTEWATER**  
MUSKEGON COUNTY WASTEWATER MANAGEMENT SYSTEM  
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698 N MAPLE ISLAND ROAD  
MUSKEGON, MI 49442  
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LEGEND

- BLACK CREEK CONSOLIDATED DRAIN CENTERLINE
- BRANCH DRAIN CENTERLINE
- MUNICIPAL BOUNDARY
- PARCEL LINE
- ROAD
- SECTION LINE
- SECTION NUMBER
- SECTION CORNER
- SHEET LOCATION



*Ryan C. McEnhill*  
RYAN C MCENHILL, P.E. #58096

6-25-20

DATE

**COVER SHEET**

NO.	REVISIONS	BY	DATE	Drawn	SPM	Use	Approved	Date

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517.287.1100

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engdot.com

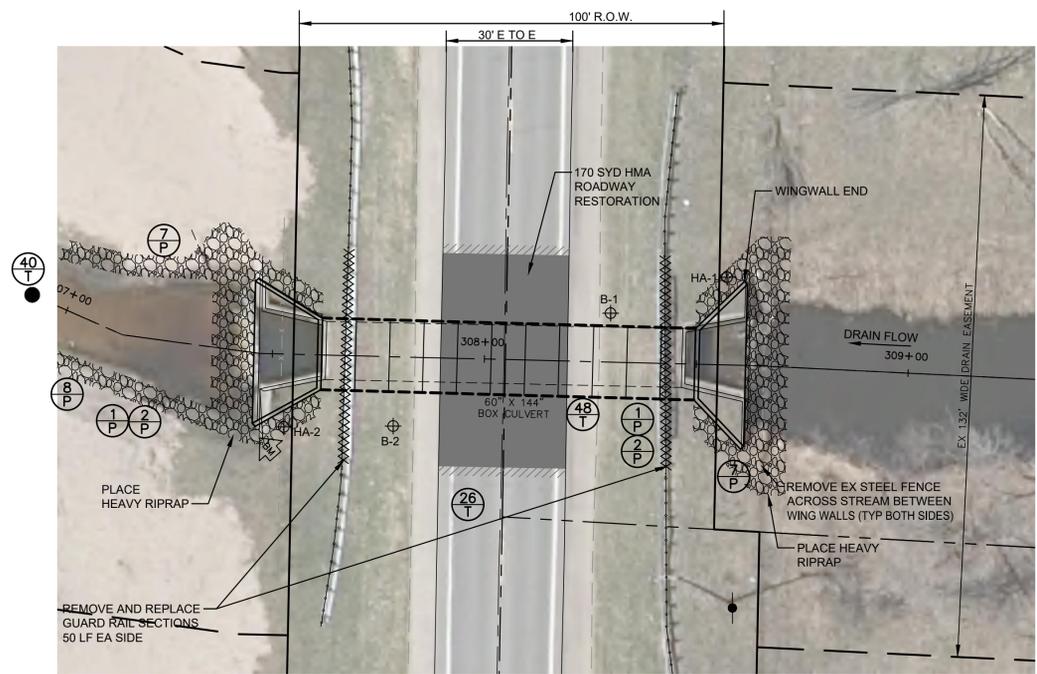


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DIVISION 1  
JTB&S DRAIN AT M-46

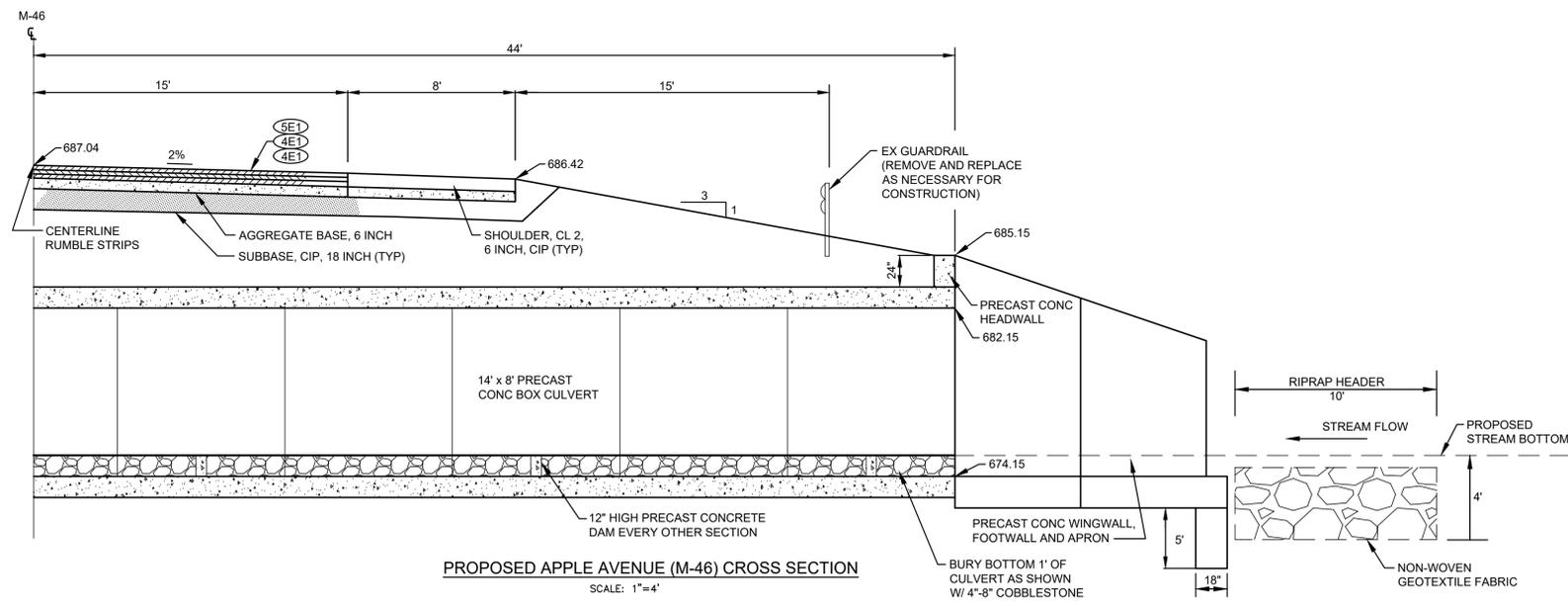
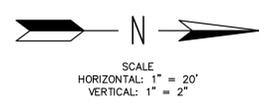
PROJECT NO.  
**16041**

SHEET NO.  
**DIVISION 1**  
**1 OF 4**

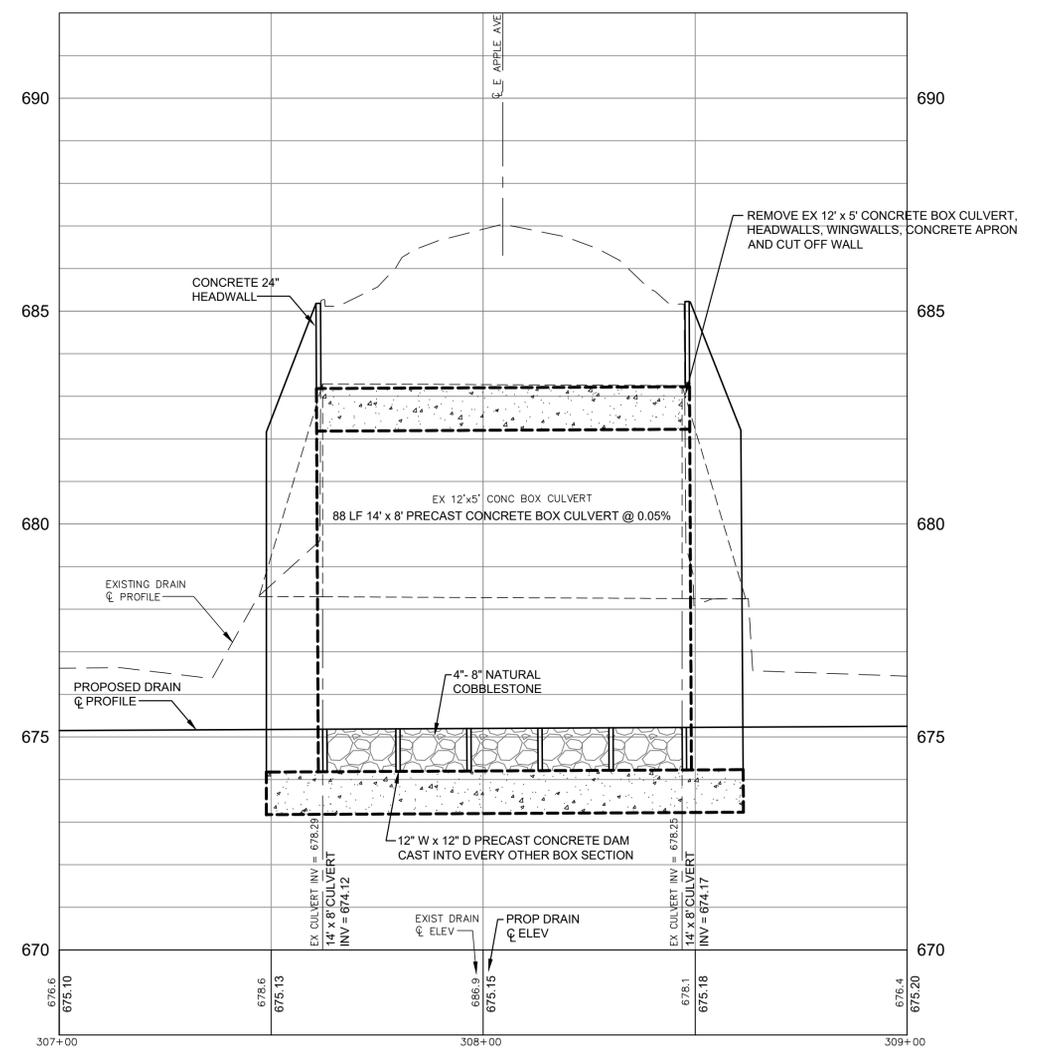
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MUSKEGON-NEWAYGO DRAIN (FMRLY)  
E APPLE AVE (M-46) CROSSING  
(100' R.O.W.)



PROPOSED APPLE AVENUE (M-46) CROSS SECTION  
SCALE: 1"=4'



APPLE AVE (M-46)  
ROADWAY CROSSING DETAIL

HMA APPLICATION ESTIMATE				
IDENT. NO.	ITEM	RATE PER SYD	PERFORMANCE GRADE	REMARKS
5E1T	HMA, 5E1	220 LB	58-28	TOP COURSE, AWI 260
4E1L	HMA, 4E1	220 LB	58-28	LEVELING COURSE
4E1B	HMA, 4E1	220 LB	58-28	BASE COURSE

- \* SUBBASE SHALL BE MDOT CLASS II GRANULAR MATERIAL
- \*\* AGGREGATE BASE SHALL BE MDOT 21AA MATERIAL
- \*\*\* SLOPE RESTORATION EQUALS GRADING LIMITS. THE LIMITS ARE TO THE RIGHT-OF-WAY LINE OR THE LIMITS OF GRADING PERMITS AND DRAIN EASEMENTS, WHERE APPLICABLE

DATE		BY	NO.	REVISIONS
Drawn	SPM			
By	Date			
6/23/17				
Approved	By			
Date				

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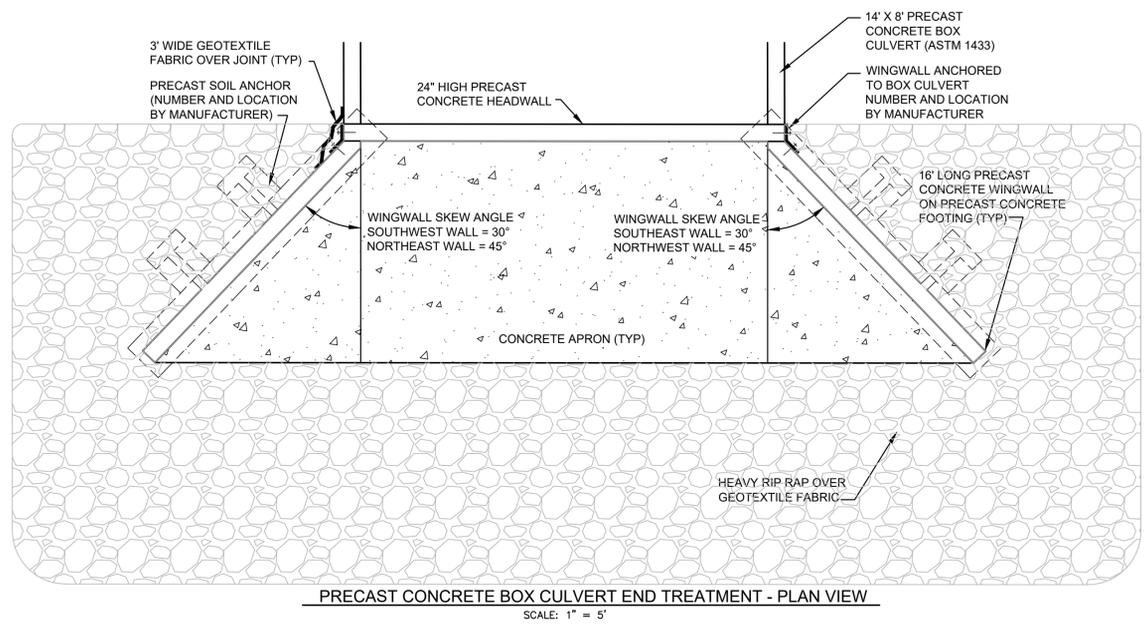
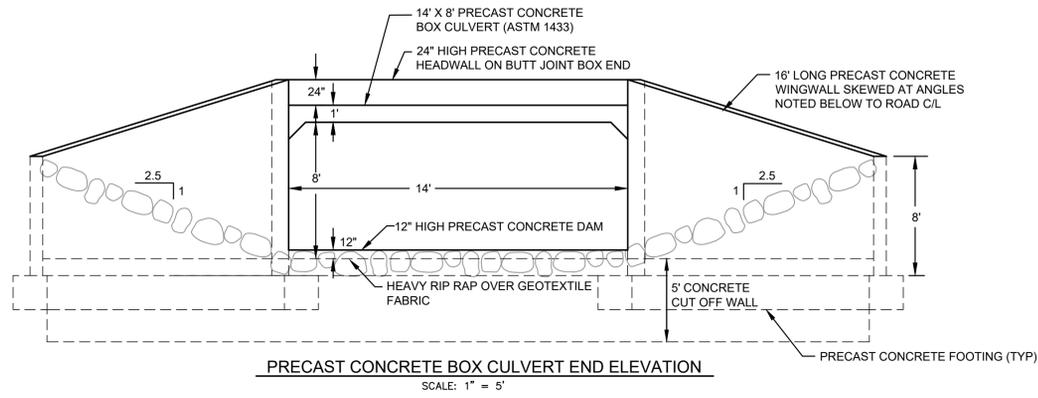
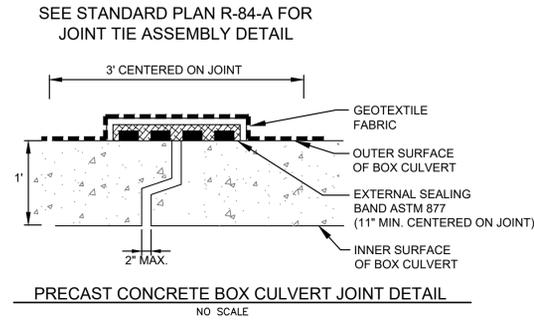
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DIVISION 1  
JTB&S DRAIN AT M-46

PROJECT NO.  
**16041**

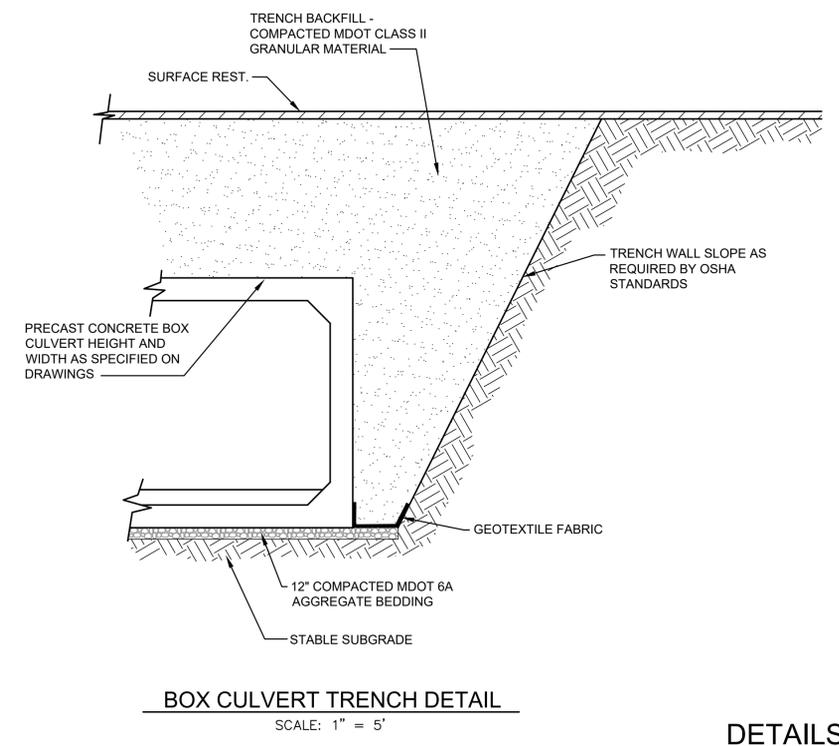
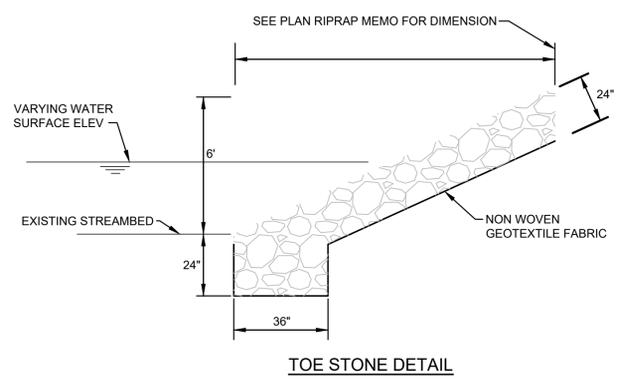
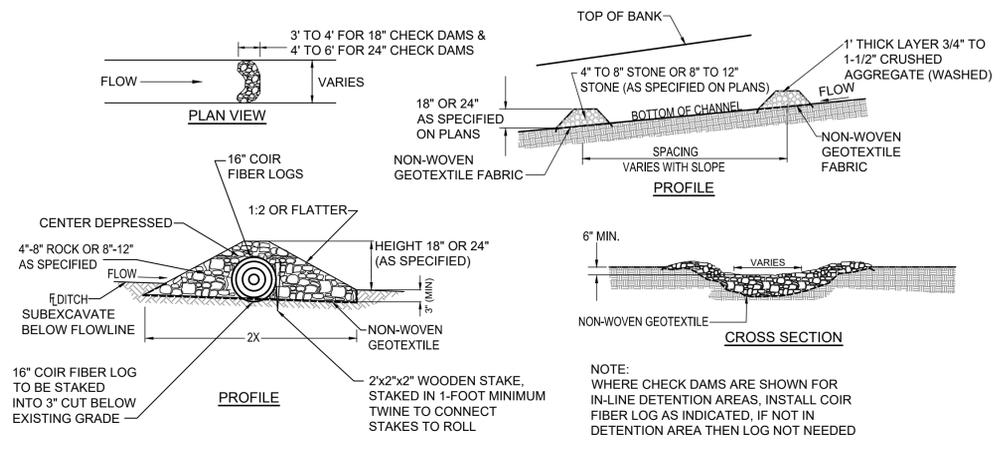
SHEET NO.  
DIVISION 1  
**2 OF 4**

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PLACE RIPRAP UP EMBANKMENT TO A HEIGHT EQUAL TO THE TOP OF THE WING WALLS AND PLACE RIPRAP BEHIND THE WAIN WALLS AS SHOWN

10'



NO.	REVISIONS	DATE	BY	Drawn By	SPM	Date	Approved By	Date

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DIVISION 1  
JTB&S DRAIN AT M-46

PROJECT NO.  
**16041**

SHEET NO.  
DIVISION 1  
**3 OF 4**

**DETAILS**

EROSION CONTROL MEASURES

1	SEEDING		When bare soil is exposed, temporarily or permanently, to erosive forces from wind and or water on flat areas, mid slopes, grassed waterways and spillways, diversion ditches and dikes, borrow and stockpile areas, and spoil piles.
2	MULCH		On flat areas, mid slopes, grassed waterways and spillways, diversion ditches and dikes, borrow and stockpile areas, and spoil piles when areas are subject to raindrop impact, and erosive forces from wind or water. When a temporary or permanent vegetative cover is necessary or desired to prevent soil erosion and filter sediment in residential, commercial or high traffic areas; or on steep slopes, auxiliary spillways, and grassed swales.
3	SODDING		On disturbed slopes and stream or drain banks when site grading or construction activities result in grades that may cause increased erosive velocities or off-site sedimentation.
4	SLOPE ROUGHENING AND SCARIFICATION		As a temporary measure to line a channel, cover stockpile areas or to provide immediate cover on exposed slopes.
5	PLASTIC SHEETING OR GEOTEXTILE COVER		Over all exposed soil surfaces or prepared seed beds that need protection from precipitation impact, sheet flow, fill flow or wind prior to erosive force impact.
6	SOIL BINDING POLYMERS		Erosion Control
7	RIPRAP		Along drain banks, shorelines, or where concentrated flows occur. Slows velocity, reduces erosion and sediment load.
8	RIPRAP TOE OF SLOPE		Riprap and toe of slope protection is used in areas where velocities are causing drain bank erosion and are too high to stabilize using other methods.
9	OUTFALL STABILIZATION		In the stream or drain bank usually above the ordinary high water mark where an enclosed drain or tile discharges to an open drain.
10	SIDE DITCH OUTLET		In a ditch or drain just upgradient from the discharge into a stream or open drain to prevent erosive velocities.
11	GRASSED WATERWAYS		In intermittent streams or drains and constructed ditches and drainage swales where flow velocities and channel grades do not warrant armoring the channel with riprap or cobble.
12.1	TEMP CROSSING - FORD DRAIN		Where access to the opposite side of a drain is temporarily required and crossing the drain by fording will result in less damage than constructing a crossing.
12.2	TEMP CROSSING - NATIVE SOIL FORD		Where access to the opposite side of a drain is temporarily required and the crossing location will be dredged and stabilized the same day.
12.2	TEMP CROSSING - NATIVE SOIL FORD		Where access to the opposite side of a drain is temporarily required and the crossing location will be dredged and stabilized the same day.
12.3	TEMP CROSSING - TIMBER FORD		Where access to the opposite side of a drain is temporarily required and timbers are available for use as a temporary crossing.
12.4	TEMP OR PERMANENT CROSSING - ROCK FORD		Where access to the opposite side of a drain is temporarily or permanently required and installation will require minimum bank excavation.
12.5	TEMP CROSSING - TEMP CULVERT		Where access to the opposite side of a drain is temporarily required and the channel is narrow and can accommodate a culvert with minimum backfill.
12.6	TEMP CROSSING - TEMP BRIDGE		Where access to the opposite side of a drain is temporarily required and the banks are stable and can support a bridge deck.
13	PIPE DROP SPILLWAY		Where surface runoff accumulates at the top of a slope and must be conveyed, either temporarily or permanently, from a higher to lower elevation within a short horizontal distance, down steep slopes, or when soils are highly erodible or excessively wet. Also used when velocities must be reduced to prevent channel scour or drain bank erosion at the outlet.
14	SLOPED PIPE SPILLWAY		Where surface runoff accumulates at the top of a slope and must be conveyed to a lower elevation without causing slope erosion, gully formation, slope failure, or channel scour.
15	ARMORED SPILLWAY		When concentrated flow must be conveyed down a drain bank or slope or discharge into another drain. Where slope failure or channel scour is observed or is likely to occur, or when runoff must be redirected around work in the drain.
16	REINFORCED VEGETATED SPILLWAY		When slope failure at eroded outlets are observed or are likely to occur from concentrated runoff on very shallow slopes (where flow velocities will be low enough not to undermine the reinforced grass root structure).
17	TOE DRAIN		Where piping is causing erosion and unstable drain banks.
18	TEMPORARY BYPASS CHANNEL		In and adjacent to a stream when flow conditions prevent completing work activity without diverting flow around a work area.
19	ENERGY DISSIPATORS		Where the discharge velocity of concentrated flow exceeds the erosive velocity of the receiving area or channel.
20	CONCRETE BAG RIPRAP HEADWALL		At culvert ends as a headwall when culvert backfill is eroding or a longer culvert is impractical.
21	SHEET PILING		As a permanent measure in locations where a vertical bank is required and other erosion control measures have failed. As a weir. As a temporary cofferdam during construction.
22	SAND OR STONE FILLED BAGS		Within or adjacent to a stream to isolate or divert flow during construction. Can also be used to temporarily impound water for very short time periods.

EROSION CONTROL MEASURES (CONTINUED)

22	SAND OR STONE FILLED BAGS		Within or adjacent to a stream to isolate or divert flow during construction. Can also be used to temporarily impound water for very short time periods.
23	TREE REVETMENT		Where stream banks are eroding or undercutting. The placement of trees or tree tops along the edge of the stream provides a place for sediment to settle out behind the trees when water levels recede. The sediment remains in place behind the logs and allows a stream to "naturally" rebuild its banks.
24	LOG REVETMENT		Where stream banks are eroding or undercutting. The placement of logs along the edge of the stream provides a place for sediment to settle out behind the logs when water levels recede. The sediment remains in place behind the logs and allows a stream to "naturally" rebuild its banks.
25	GABION BASKETS		At the toe of steep slopes and drain banks within or adjacent to the stream channel when flow velocities are resulting in major drain bank or slope failure or instability and slope and drain bank reshaping with or without riprap is not practical.
26	DUST CONTROL		As a temporary measure on exposed and unstabilized areas that must be protected from wind or water erosion.
27	LIVE STAKING		Slopes and drain banks, wetland buffer and reservoir drawdown areas. In areas requiring stabilization but with limited access for equipment or when little site disturbance is required.
28	WATTLES		Where a slope or streambank requires stabilization and minimal disturbance is preferred or the site has limited access.
29	CELLULAR CONFINEMENT SYSTEMS		On steep slopes and stream or drain banks and in high velocity vegetated channels.

APPROXIMATE CONSTRUCTION SCHEDULE FOR SESC MEASURES

SESC - CONSTRUCTION SEQUENCE	JUNE 2021	JULY 2021	AUG 2021
INSTALL TEMPORARY SESC MEASURES:			
A. STABILIZED CONSTRUCTION ACCESSES	■		
B. CONSTRUCTION PROTECTION FENCE	■		
C. CHECK DAM	■		
D. SEEDING		■	
MAINTAIN TEMPORARY SESC MEASURES		■	■
SITE GRADING & REMOVALS		■	■
CULVERT CONSTRUCTION		■	■
PAVEMENT CONSTRUCTION			■
FINAL GRADE			■
FINAL SITE STABILIZATION (TO BE COMPLETED WITHIN 24 HOURS OF FINAL GRADING OR ACTIVITY WITHIN THAT AREA)			■
REMOVE TEMPORARY SESC MEASURES			■
PERMANENT SESC MEASURES			■

$\frac{\#}{P}$  = PERMANENT MEASURE       $\frac{\#}{T}$  = TEMPORARY MEASURE

EROSION AND SEDIMENT CONTROL MEASURES

40	CHECK DAM		In constructed and existing flow corridors to reduce flow velocities.
41	CATCH BASIN		Where surface water accumulates and needs an outlet or an open drain discharges to a stream or drain at erosive velocities. Within an enclosed drain system to provide an inlet and a sump.
42	VEGETATED BUFFER STRIPS		Along stream and drain corridors, sensitive areas, and shorelines when earth changes will occur during a drain maintenance or improvement project or when an eroding bank or drain easement area needs to be stabilized.
43	DIVERSION DIKE		Runoff needs to be diverted around sensitive areas, unstable or easily eroded soils, bare soils, away from steep banks, or around earth change activities.
44	DIVERSION DITCH		Runoff needs to be intercepted and diverted around sensitive areas, unstable or easily eroded soils, bare soils, away from steep banks, or around earth change activities.
45	DIVERSION DITCH AND DIKE		Within existing flow corridors to divert runoff, temporarily or permanently, around sensitive areas, unstable or easily eroded soils, steep banks, along narrow drain easements or around maintenance or improvement activities.
46	STONE FILTER BERM		When runoff must be filtered prior to entering a lake, stream, drain or wetland. Never use in place of a check dam in a flowing stream.
47	SAND FENCE		In areas susceptible to wind erosion, particularly where the soil has not yet been stabilized by other means. To re-build a slope.
48	DEWATERING		When construction or maintenance activities are limited by the presence of water and a dry work area is required.
49	STRAW BALES		As a temporary diversion structure. Occasionally as an alternative to silt fence for projects that will be completed within a very short time period (less than one month).

SESC Notes

- General Maintenance**
  - Temporary SESC measures to be maintained by the contractor at all times.
- Silt fence**
  - Silt fence is to be trenched in no less than 6 inches below the ground surface
  - Inspect silt fence immediately following each rainfall
  - Repair when silt fence is sagging or has been removed/torn down
  - When silt collects to half the height of the fence all silt is to be removed and fence repaired
  - Remove silt fence when permanent SESC measures are in place and vegetation is established
- Seeding and Mulching**
  - Seeding practices include topsoil (as required), and mulch or mulch blanket (as directed by Engineer or required on plans).
  - Where necessary, appropriate mulch blanket must be applied based on slope and growing conditions as approved by the engineer.
  - All slopes and highly erosive areas will be temporarily seeded and mulched when construction activity is not taking place
  - Seed and mulch is to be inspected following each rain event to determine if concentrated flows are present
  - In the event that seed and mulch are removed by erosive runoff, repairs are to be made immediately.
  - Site will be permanently stabilized within 5 days of final grade
- Storm drain inlet protection**
  - Storm drain inlets to be inspected weekly and after each rain event.
  - Empty sediment and keep inlet protection clean during inspection and maintenance operations.
- Compliance with Part 91 of PA 451**
  - Respond immediately to stormwater operator and/or soil erosion and sedimentation control inspector concerns. Make corrective measures as required.
- Continued Maintenance Plan**
  - Stormwater operator/APA owner or maintenance supervisor will inspect monthly through the first growing season. Non established vegetation will be repaired/reseeded as necessary.

CONSTRUCTION & SOIL EROSION AND SEDIMENTATION CONTROL NOTES:

- ALL TEMPORARY SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE IN PLACE BEFORE CONSTRUCTION BEGINS. THE CONTRACTOR IS RESPONSIBLE FOR INSPECTING ALL MEASURES AT LEAST ONCE EACH WEEK AND/OR WITHIN 24 HOURS OF A PRECIPITATION EVENT THAT RESULTS IN STORM WATER RUNOFF OR DISCHARGE.
- SURFACE RESTORATION OF ALL SEWER TRENCHES IN LAWN AREAS SHALL BE TOP SOILED, SEEDED, AND MULCHED WITHIN 5 CALENDAR DAYS OF BACKFILLING THE TRENCH.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR DUST CONTROL AND SHALL PROVIDE ALL EQUIPMENT AND MATERIAL NECESSARY TO KEEP DUST IN CHECK AT ALL TIMES. THE CONTRACTOR SHALL RESPOND IMMEDIATELY TO ANY AND ALL COMPLAINTS: STREETS, PARKING LOTS, DRIVEWAYS, PAVED ACCESS ROADS, AND ALL OTHER PAVED SURFACES SHALL BE SWEEPED AT LEAST ONCE A DAY AND/OR AS NEEDED THROUGHOUT THE DAY.
- MULCH AND/OR MULCH BLANKET SHALL BE APPLIED AND ANCHORED APPROPRIATELY ON ALL SLOPES 3:1 OR GREATER ON ALL SLOPES DEEMED NECESSARY TO PREVENT OR CORRECT EROSION PROBLEMS AND ON ALL DISTURBED AREA DUE TO CONSTRUCTION.
- ALL TEMPORARY SOIL EROSION MEASURES SHALL BE REMOVED AFTER PERMANENT MEASURES HAVE BEEN ESTABLISHED.
- ALL CONSTRUCTION SHALL BE CONFINED TO AREAS OF DISTURBANCE WITHIN THE ROAD RIGHT OF WAY AND/OR WITHIN STORM SEWER EASEMENTS. NO WORK, MATERIAL, OR STOCKPILES WILL BE ALLOWED OUTSIDE OF THESE LIMITS.
- ALL TRENCHES SHALL BE BACKFILLED TO GRADE OR PROPERLY PROTECTED IN ACCORDANCE WITH PROJECT PLANS & SPECIFICATIONS AT THE END OF EVERY DAY. AT NO TIME SHALL A TRENCH BE LEFT OPEN FOR A PERIOD LONGER THAN 48 HOURS.
- UNLESS SPECIFICALLY NOTED OTHERWISE, ALL UTILITY TRENCHES SHALL CONFORM TO TYPICAL TRENCH DETAIL, SEE SHEET 3 OF 4.
- PROTECT ALL TREES AND VEGETATION NOT SCHEDULED TO BE REMOVED. ENGINEER APPROVAL IS REQUIRED FOR ANY UNSCHEDULED REMOVAL OF TREES, SHRUBS OR LANDSCAPING.
- EROSION AND SEDIMENTATION FROM WORK ON THIS PROJECT SHALL BE CONTAINED WITHIN THE WORK AREA AND NOT ALLOWED TO COLLECT ON OFF-SITE AREAS OR IN WATERWAYS - WATERWAYS INCLUDE BOTH NATURAL AND MAN-MADE OPEN DITCHES, STREAMS, STORM DRAINS, LAKES AND PONDS.
- SILT FENCE MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY BUILT-UP SEDIMENT. CONTRACTORS SHALL BE RESPONSIBLE TO REMOVE, REPLACE, RETRENCH OR REBACKFILL THE SILT FENCE SHOULD IT FAIL OR BECOME DAMAGED DURING THE CONSTRUCTION.
- INLET FILTER MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY ACCUMULATED SILT OR OTHER DEBRIS. IF INLET FILTERS CANNOT BE CLEANED, OR ARE DAMAGED, THEN THE FILTER AND/OR STONE SHALL BE REPLACED.

SEDIMENT CONTROL MEASURES

60	STORM DRAIN INLET PROTECTION		Around the entrance to a newly constructed catch basin or an inlet that will capture runoff from an earth change activity.
61	SILT FENCE		As a temporary measure used to capture sediment from sheet flow. May also divert small volumes of sheet flow to protected outlets.
62	SEDIMENT BASIN		When working in the drain, or drain easement. In streams or drains where sediment sumps are inadequate.
63	SEDIMENT SUMP (TRAP)		When working in the drain, or drain easement and the soil disturbance and anticipated sediment is limited.
64	POLYMER FLOCCULANTS		Where turbid water can be collected and suspended sediments removed prior to discharging runoff to a lake, stream, drain, or a wetland or runoff leaves the drain easement.
65	TURBIDITY CURTAIN		Within a stream or drain parallel to flow when a slack water area is necessary to isolate earth change activities from a lake or channel.
66	STABILIZED CONSTRUCTION ACCESS		At locations where construction equipment will enter and exit the drain easement and tracking of soil is anticipated.

ROUTINE MAINTENANCE ACTIVITY DETAILS

80	Debris Removal
81	Sediment Removal
82	Stormwater Basin Maintenance
83	Vegetation Removal Without Grubbing
84	Vegetation Removal With Selective Grubbing
85	Slope and Streambank Stabilization
86	Drain Crossing Maintenance
87	Enclosed Drain Maintenance
88	Culvert Repair

CONSTRUCTION & RESTORATION ACTIVITY DETAILS

100	Stormwater Basin Construction
101	Drain Relocation
102	Drain Enclosure
103	Drain Crossing
104	Weir Installation
105	Beaver Dam Removal
106	Low Flow Channel
107	Floodway Shelf
108	Riffle Zones
109	Pools
110	Meanders
111	Cross-Vanes
112	J-Hook Vanes

DETAILED DRAWINGS AND SPECIFICATIONS ARE LOCATED IN THE MICHIGAN ASSOCIATION OF COUNTY DRAIN COMMISSIONERS SOIL EROSION AND SEDIMENTATION CONTROL AUTHORIZED PUBLIC AGENCY PROCEDURES MANUAL

SYMBOLGY FOR INSERTION INTO CONSTRUCTION DRAWINGS:

$\frac{\#}{P}$  = PERMANENT MEASURE  
 $\frac{\#}{T}$  = TEMPORARY MEASURE

SOIL EROSION & SEDIMENTATION CONTROL DETAILS

Drawn By: SPM  
 Date: 6/04/20  
 Approved By: [Signature]  
 Date: [Blank]

REVISIONS

NO.	DATE	BY

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BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT

DIVISION 1  
 JTB&S DRAIN AT M-46

PROJECT NO.  
**16041**

SHEET NO.  
**DIVISION 1**

**4** OF **4**