

DOWAGIAC RIVER RESTORATION PHASE 1

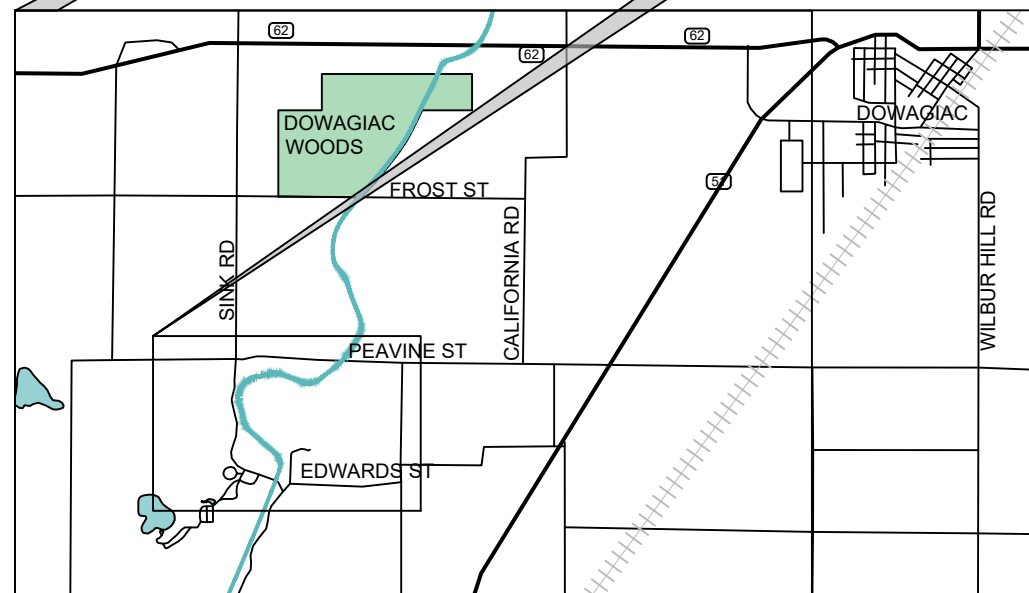
Cass County, MI

Pokagon Band of Potawatomi

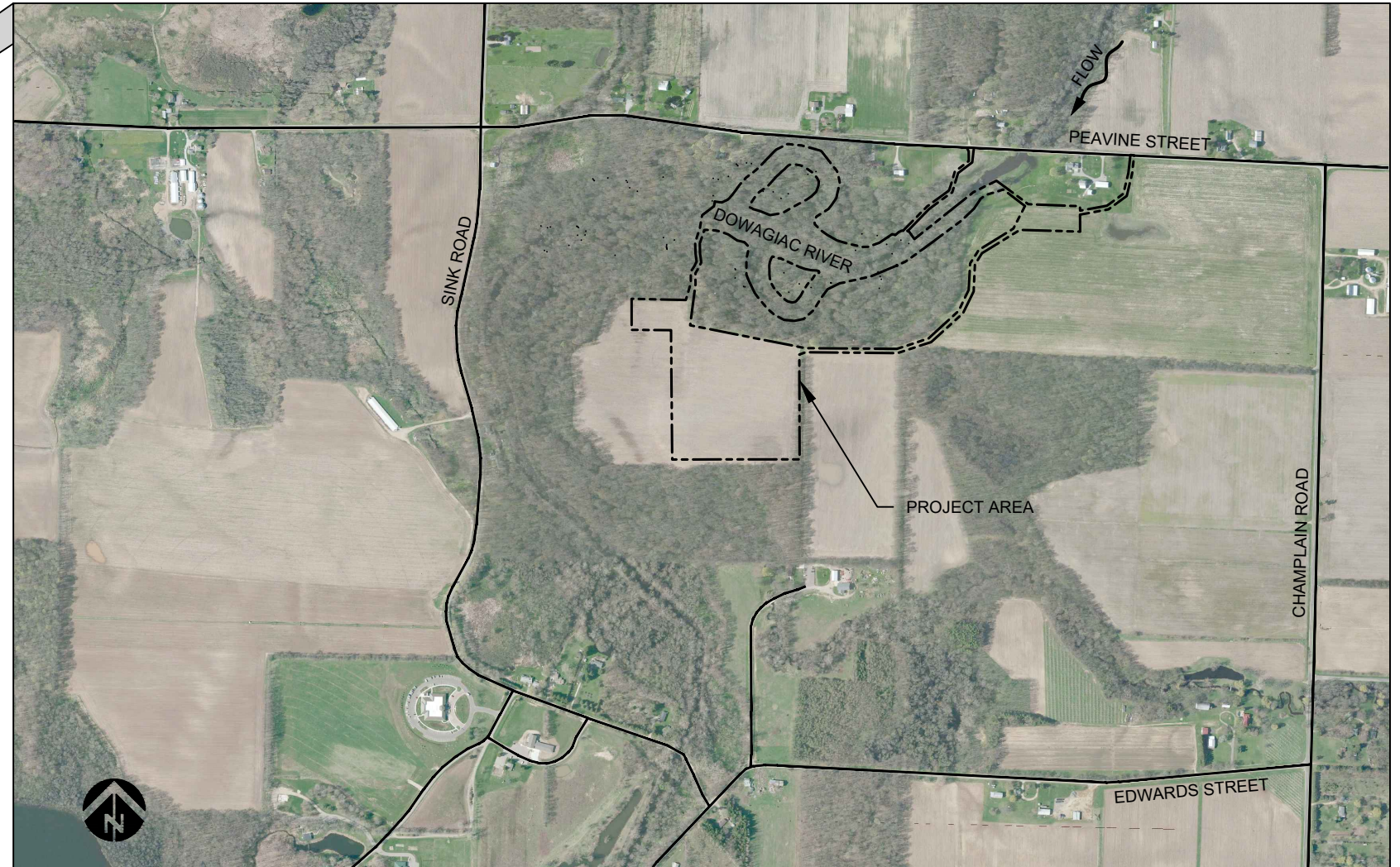
100% Design, August 5, 2021



STATE MAP - MICHIGAN
NOT TO SALE



VICINITY MAP
NOT TO SCALE



LOCATION MAP
SCALE 1" = 1000'



DIG SAFE: STATE LAW REQUIRES ANY PERSON PERFORMING EXCAVATION ON PRIVATE OR PUBLIC PROPERTY TO CALL MISS DIG AT 8-1-1 FOR UTILITY LOCATION. ALL EXCAVATIONS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH MICHIGAN STATE LAW.

NO.	BY	DATE	REVISION DESCRIPTION

GS, ZS DRAWN	NJ, ZS DESIGNED	MM, MB CHECKED
MB APPROVED	8/5/21 DATE	15-04-01 PROJECT

DOWAGIAC RIVER RESTORATION
PHASE 1
POKAGON BAND OF POTAWATOMI
CASS COUNTY, MI



113 South Main Street #107
Lodi, WI 53555
608.441.0342
www.interfluve.com

PROJECT LOCATION & SHEET INDEX

SHEET
1 OF 16

SHEET INDEX

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SOIL EROSION, SEDIMENT, AND POLLUTION CONTROL GENERAL NOTES

- PRIOR TO ANY SITE DISTURBANCE, AND AS REQUIRED AS CONSTRUCTION PROGRESSES, ANY PERMIT REQUIRED EROSION PREVENTION MEASURES AND THE SEDIMENT CONTROL DEVICES (GRAVEL ACCESS APPROACH, SILT FENCE, ETC.) SHOWN ON THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) WILL BE INSTALLED AT THE SITE.
- ALL EXPOSED SOIL AREAS WITHIN THE CONSTRUCTION LIMITS WILL BE STABILIZED WITHIN 5 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY (WILL NOT RESUME FOR A PERIOD EXCEEDING 7 CALENDAR DAYS) OR PERMANENTLY CEASED. EXPOSED SOIL AREAS MUST HAVE TEMPORARY EROSION PROTECTION (SLASH MULCH, EROSION CONTROL BLANKET, SEED) OR PERMANENT COVER YEAR ROUND.
- CONTRACTOR SHALL IMPLEMENT APPROPRIATE CONSTRUCTION PHASING, HORIZONTAL SLOPE GRADING, AND OTHER CONSTRUCTION PRACTICES THAT MINIMIZE EROSION WHEN PRACTICAL. THE NORMAL WETTED PERIMETER OF ANY TEMPORARY OR PERMANENT DRAINAGE DITCH THAT DRAINS WATER FROM A CONSTRUCTION SITE, OR DIVERTS WATER AROUND A SITE, MUST BE STABILIZED OR FROM THE POINT OF DISCHARGE TO ANY SURFACE WATER. STABILIZATION MUST BE COMPLETED WITHIN 24 HOURS OF CONNECTING TO A SURFACE WATER. PIPE OUTLETS MUST BE PROVIDED WITH TEMPORARY OR PERMANENT ENERGY DISSIPATION WITHIN 24 HOURS OF CONNECTION TO A SURFACE WATER.
- THIS SESC PLAN SHALL BE AMENDED BY THE CONTRACTOR IN ACCORDANCE WITH THE APPLICABLE PERMITS AS NECESSARY TO INCLUDE ADDITIONAL REQUIREMENTS TO CORRECT PROBLEMS IDENTIFIED OR ADDRESS SITUATIONS PER APPLICABLE PERMITS.
- THE PROJECT SITE DISCHARGES VIA OVERLAND FLOW DIRECTLY TO DOWAGIAC RIVER
- SITE SOILS - SITE SOILS ARE SHOWN ON THIS SHEET. THIS PROJECT IS NOT LOCATED IN A KARST AREA.

SESC IMPLEMENTATION, PHASING, AND SEQUENCE OF CONSTRUCTION

- BMP AND EROSION CONTROL INSTALLATION SEQUENCE SHALL BE AS FOLLOWS:
 - CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE AND INSTALL SILT FENCE.
 - PREPARE TEMPORARY STORAGE, PARKING, AND PHASING AREAS.
 - PERFORM SITE CLEARING.
 - ESTABLISH CONTROL OF WATER AS REQUIRED FOR GRADING AND PROJECT CONSTRUCTION.
 - PERFORM ROUGH AND FINE GRADING, CONSTRUCT PROJECT ELEMENTS.
 - TEMPORARILY SEED THROUGHOUT CONSTRUCTION DISTURBED AREAS THAT WILL BE INACTIVE FOR SEVEN (7 DAYS) OR MORE AS REQUIRED BY NPDES PERMIT.
 - INSTALL PERMANENT VEGETATION PER THE CONTRACT DOCUMENTS.
- SEDIMENT CONTROL PRACTICES MUST MINIMIZE SEDIMENT FROM ENTERING SURFACE WATERS. THE FOLLOWING MEASURES WILL BE TAKEN AS SEDIMENT CONTROL PRACTICES IN ORDER TO MINIMIZE SEDIMENTS FROM ENTERING SURFACE WATERS:
 - INSTALLATION OF SEDIMENT CONTROL PRACTICES ON ALL DOWN

- GRADIENT PERIMETERS PRIOR TO LAND DISTURBING ACTIVITIES.
- SILT FENCING OR OTHER SEDIMENT CONTROL SURROUNDING TEMPORARY SOIL STOCKPILES.
- VEHICLE TRACKING BMP AT CONSTRUCTION SITE ENTRANCE/EXIT. STREET SWEEPING SHALL BE PERFORMED IF VEHICLE TRACKING BMPS ARE NOT ADEQUATE TO PREVENT SEDIMENT TRACKING. TRACKED SEDIMENT MUST BE REMOVED FROM ALL PAVED SURFACES BOTH ON AND OFFSITE WITHIN 24 HOURS OF DISCOVERY.
- THE FOLLOWING GUIDELINES WILL BE USED TO DETERMINE IF POLLUTION CONTROL DEVICES REQUIRE MAINTENANCE, REPAIR, OR REPLACEMENT:
 - IF SEDIMENT CONTROL DEVICES SUCH AS SILT FENCE ARE FILLED TO 1/3 THE HEIGHT OF THE FENCE, REMOVE ALL SEDIMENT WITHIN 24 HOURS OF DETECTION OR NOTIFICATION.
 - IF INLET PROTECTION DEVICES APPEAR PLUGGED WITH SEDIMENT, ARE FILLED TO 1/3 CAPACITY, OR HAVE STANDING WATER AROUND THEM, REMOVE THE SEDIMENT AND CLEAN OR REPLACE THE FILTER WITHIN 24 HOURS OF DETECTION OR NOTIFICATION.
 - IF THE GRAVEL CONSTRUCTION ENTRANCE(S) ARE FILLED WITH SEDIMENT EITHER REPLACE THE ENTRANCE OR ADD ADDITIONAL GRAVEL WITH 24 HOURS OF DETECTION OR NOTIFICATION.
 - IF SEDIMENT FROM THE SITE IS OBSERVED ON ADJACENT STREETS OR OTHER PROPERTIES, THE INSPECTOR SHALL IDENTIFY THE SOURCE AND DISCHARGE LOCATION OF THE SEDIMENT AND INSTRUCT TO IMPLEMENT ADDITIONAL EROSION AND SEDIMENT CONTROLS AT THOSE LOCATIONS TO PREVENT FUTURE DISCHARGES.
 - IF BUILDING MATERIALS, CHEMICALS, OR GENERAL REFUSE IS BEING USED, STORED, DISPOSED OF, OR OTHERWISE MANAGED INAPPROPRIATELY, CORRECT SUCH DEFECTS WITHIN 24 HOURS OF DETECTION OR NOTIFICATION.

POLLUTION PREVENTION MEASURES

- SOLID WASTE
 - SOLID WASTE, INCLUDING BUT NOT LIMITED TO, COLLECTED ASPHALT AND CONCRETE MILLINGS, FLOATING DEBRIS, PAPER, PLASTIC, FABRIC, CONSTRUCTION AND DEMOLITION DEBRIS AND OTHER WASTE MUST BE DISPOSED OF PROPERLY AND MUST COMPLY WITH DISPOSAL REQUIREMENTS.
- HAZARDOUS MATERIALS
 - HAZARDOUS MATERIALS, INCLUDING BUT NOT LIMITED TO OIL, GASOLINE, PAINT AND ANY HAZARDOUS SUBSTANCE MUST BE PROPERLY STORED INCLUDING SECONDARY CONTAINMENTS, TO PREVENT SPILLS, LEAKS OR OTHER DISCHARGE. RESTRICTED ACCESS TO STORAGE AREAS MUST BE PROVIDED TO PREVENT VANDALISM. STORAGE AND DISPOSAL OF HAZARDOUS WASTE MUST BE IN COMPLIANCE WITH STATE AND LOCAL REGULATIONS.
- CONSTRUCTION EQUIPMENT/VEHICLES
 - EXTERNAL WASHING OF TRUCKS AND OTHER CONSTRUCTION VEHICLES MUST BE LIMITED TO A DEFINED AREA OF THE SITE. RUNOFF MUST BE CONTAINED AND WASTE PROPERLY DISPOSED OF. NO ENGINE DEGREASING IS ALLOWED ON SITE. REASONABLE STEPS TO PREVENT THE DISCHARGE OF SPILLED OR LEAKED CHEMICALS SHALL BE TAKEN. ADEQUATE SUPPLIES MUST BE AVAILABLE AT ALL TIMES TO CLEAN UP DISCHARGED MATERIALS; CONDUCT FUELING IN A CONTAINED AREA UNLESS INFEASIBLE.
 - FERTILIZERS AND LANDSCAPE MATERIALS MUST BE UNDER COVER TO PREVENT THE DISCHARGE OF POLLUTANTS OR PROTECTED BY SIMILARLY EFFECTIVE MEANS DESIGNED TO MINIMIZE CONTACT WITH STORMWATER.
 - PORTABLE TOILETS MUST BE POSITIONED SO THAT THEY ARE SECURE AND WILL NOT BE TIPPED OR KNOCKED OVER - SANITARY WASTE MUST BE DISPOSED OF PROPERLY.

SESC PLAN DOCUMENTS

- THE SESC PLAN IS COMPOSED OF, BUT NOT LIMITED TO, THE BELOW PROJECT DOCUMENTS. THESE DOCUMENTS SHALL BE KEPT ON THE

PROJECT SITE AT ALL TIMES THROUGHOUT CONSTRUCTION. THE SESC PLAN SHALL BE AMENDED BY THE PERSON RESPONSIBLE TO INCLUDE ANY DOCUMENTS NECESSARY TO ENSURE ADHERENCE TO THE GENERAL PERMIT.

- DOWAGIAC RIVER RESTORATION CIVIL CONSTRUCTION DRAWINGS BY INTER-FLUVE.
- THE CONTRACTOR'S APPROVED SWPPP.
- THE CONTRACTOR'S APPROVED CONSTRUCTION SEQUENCING PLAN.
- THE CONTRACTOR'S APPROVED FLOW MANAGEMENT PLAN.
- ALL APPLICABLE PROJECT PERMITS.
- RECORD RETENTION - THE SESC PLAN, ALL CHANGES TO IT, AND INSPECTION AND MAINTENANCE RECORDS MUST BE KEPT ON-SITE DURING CONSTRUCTION; THE CONSTRUCTION DRAWINGS ARE INCORPORATED HEREIN BY REFERENCE, AND A COPY OF THE PLAN SET SHOULD BE KEPT ON-SITE WITH THE SWPPP RECORDS. THE OWNER MUST RETAIN A COPY OF THE SWPPP ALONG WITH THE FOLLOWING RECORDS FOR THREE (3) YEARS AFTER SUBMITTAL OF THE NOTICE OF TERMINATION:
 - ANY OTHER PERMITS REQUIRED FOR THE PROJECT;
 - RECORDS OF ALL INSPECTION AND MAINTENANCE CONDUCTED DURING CONSTRUCTION;
 - ALL PERMANENT OPERATIONS AND MAINTENANCE AGREEMENTS THAT HAVE BEEN IMPLEMENTED, INCLUDING ALL RIGHT OF WAY, CONTRACT, COVENANTS AND OTHER BINDING REQUIREMENTS REGARDING PERPETUAL MAINTENANCE; AND
 - ALL REQUIRED CALCULATIONS FOR DESIGN OF THE TEMPORARY AND PERMANENT STORMWATER MANAGEMENT SYSTEMS.

INSPECTIONS

- THE INSPECTION LOG WILL BE COMPLETED BY THE CONTRACTOR FOR THE CONSTRUCTION SITE.
- INSPECTIONS AT THE SITE WILL BE COMPLETED AS FOLLOWS:
 - ONCE EVERY SEVEN (7) DAYS DURING ACTIVE CONSTRUCTION AND,
 - WITHIN 24 HOURS AFTER A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 24 HOURS.
- INSPECTIONS MUST INCLUDE STABILIZED AREAS, EROSION PREVENTION AND SEDIMENT CONTROL BMPS, AND INFILTRATION AREAS. CORRECTIVE ACTIONS MUST BE IDENTIFIED AND DATE OF CORRECTION MUST BE NOTED. ANY OFFSITE DISCHARGE MUST BE DOCUMENTED. ANY AMENDMENTS TO THE SESC PLAN PROPOSED AS A RESULT OF THE INSPECTION MUST BE DOCUMENTED WITHIN SEVEN (7) CALENDAR DAYS. THE INSPECTION LOG AND SESC PLAN MUST BE KEPT ON-SITE FOR THE DURATION OF THE CONSTRUCTION PROJECT.
- THE CONTRACTOR WILL MAKE CORRECTIONS OR REPAIRS REQUIRED TO COMPLY WITH PROJECT PERMITS.
- AT A MINIMUM, THE FOLLOWING SHALL BE COMPLETED DURING EACH INSPECTION:
 - RECORD DATE AND TIME OF INSPECTION.
 - RECORD RAINFALL RECORDS SINCE THE MOST RECENT INSPECTION.
 - INSPECT THE SITE FOR EXCESS EROSION AND SEDIMENTATION.
 - INSPECT THE SITE FOR DEBRIS, TRASH, AND SPILLS.
 - INSPECT TEMPORARY EROSION AND SEDIMENTATION CONTROL DEVICES.
 - INSPECT CONSTRUCTION ENTRANCES FOR SEDIMENT TRACKING ONTO PUBLIC STREETS.
 - RECORD RECOMMENDED REPAIRS AND MODIFICATIONS TO EROSION AND SEDIMENT CONTROLS.
 - RECOMMEND ANY NECESSARY CHANGES TO THIS SESC PLAN
 - RECORD REPAIRS AND MODIFICATIONS IMPLEMENTED SINCE PREVIOUS INSPECTIONS.
 - INSPECT THE ADJACENT STREETS AND CURB AND GUTTER FOR SEDIMENT, LITTER, AND CONSTRUCTION DEBRIS.
- THE CONTRACTOR MUST UPDATE THE SESC PLAN, INCLUDING THE

JOB SITE BINDER AND SITE MAPS, TO REFLECT THE PROGRESS OF CONSTRUCTION ACTIVITIES AND GENERAL CHANGES TO THE PROJECT SITE. UPDATES SHALL BE MADE DAILY TO TRACK PROGRESS WHEN ANY OF THE FOLLOWING ACTIVITIES OCCUR: BMP INSTALLATION, MODIFICATION OR REMOVAL, CONSTRUCTION ACTIVITIES, CLEARING, GRUBBING, GRADING, OR TEMPORARY AND PERMANENT STABILIZATION.

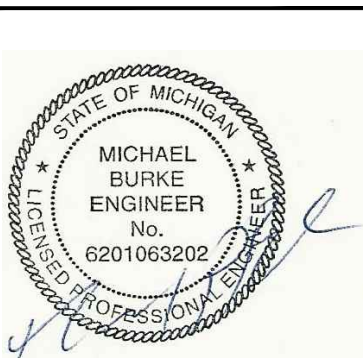
- THE CONTRACTOR MAY UPDATE OR MODIFY THE SESC PLAN WITHOUT ENGINEER APPROVAL IN AN EMERGENCY SITUATION TO PREVENT SEDIMENT DISCHARGE OR PROTECT WATER QUALITY. THE CONTRACTOR IS ULTIMATELY RESPONSIBLE TO ENSURE COMPLIANCE WITH THE PERMIT AND PROTECTION OF DOWNSTREAM WATER QUALITY.

FINAL STABILIZATION

- ALL PERVIOUS AREAS DISTURBED BY CONSTRUCTION AS DESIGNATED WILL RECEIVE VEGETATIVE COVER ACCORDING TO THE PLANS AND SPECIFICATIONS AND WITHIN THE SPECIFIED VEGETATIVE TIME SCHEDULE.
- FINAL STABILIZATION WILL OCCUR WHEN THE SITE HAS A UNIFORM VEGETATIVE COVER WITH A DENSITY OF 70% OVER THE RESTORED PERVIOUS AREAS.
- ALL TEMPORARY SYNTHETIC EROSION PREVENTION AND SEDIMENT CONTROL BMPS (SUCH AS SILT FENCE) MUST BE REMOVED AS PART OF THE SITE FINAL STABILIZATION. ALL SEDIMENT MUST BE CLEANED OUT OF CONVEYANCES AND TEMPORARY SEDIMENTATION BASINS IF APPLICABLE. NOTICE OF TERMINATION (NOT) MUST BE SUBMITTED WITHIN 30 DAYS OF FINAL STABILIZATION.



MAP UNIT SYMBOL	MAP UNIT NAME
4B	OSHTEMO SANDY LOAM, 2 TO 6% SLOPES
4C	OSHTEMO SANDY LOAM, 6 TO 12% SLOPES
5B	SPINKS LOAMY SAND, 0 TO 6% SLOPES
9A	KALAMAZOO LOAM, 0 TO 2% SLOPES
9B	KALAMAZOO LOAM, 2 TO 6% SLOPES
9C	KALAMAZOO LOAM, 6 TO 12% SLOPES
15	GLENDORA MUCK
18	BARRY LOAM, 0 TO 2% SLOPES
19	HOUGHTON MUCK, 0 TO 1% SLOPES
28A	TEASDALE FINE SANDY LOAM, 0 TO 3% SLOPES
39	COHOCTAH LOAM



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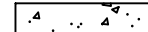

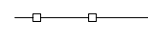
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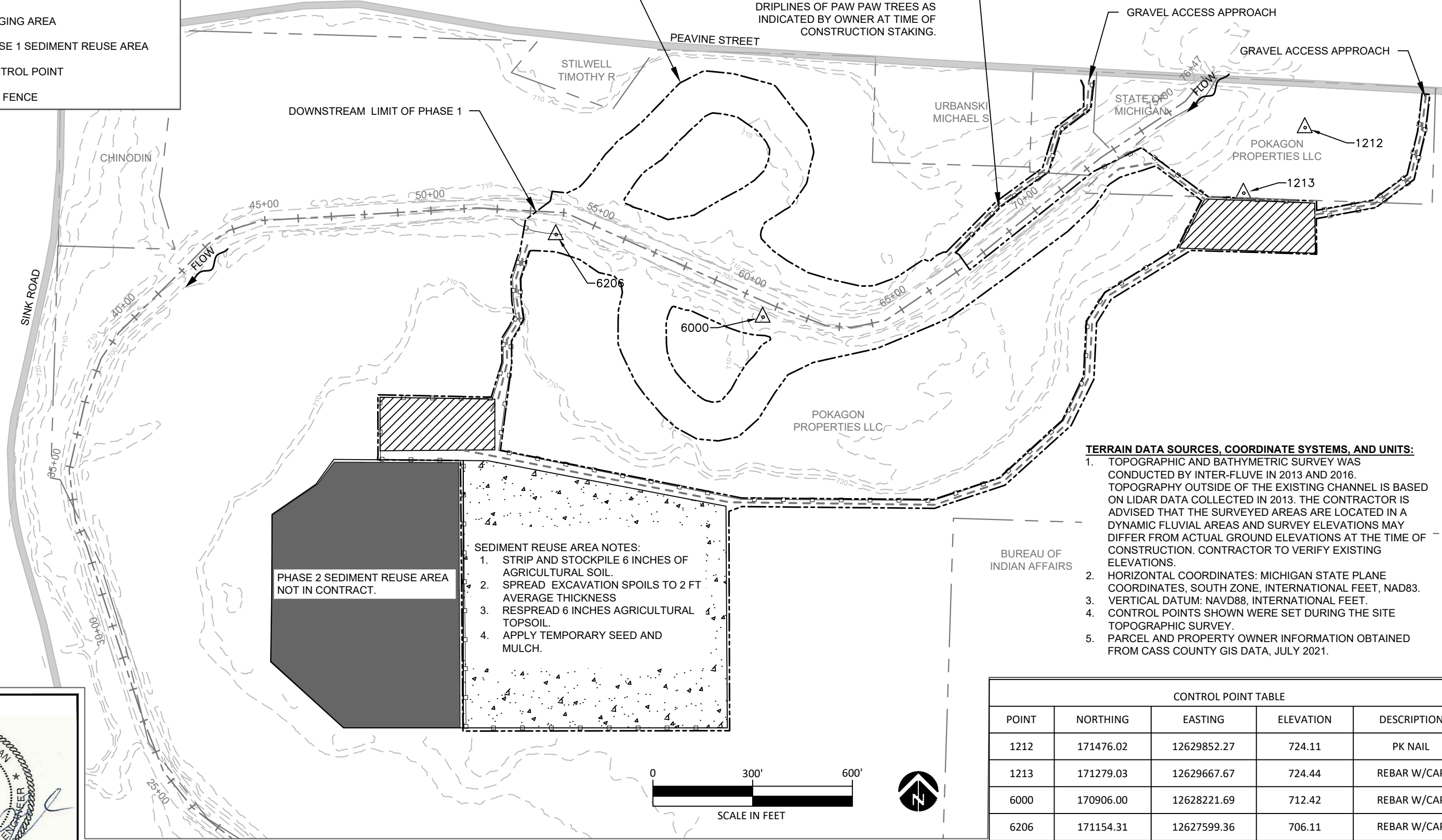
**EROSION AND SEDIMENT CONTROL
NOTES**

LEGEND

-  EXISTING 5' CONTOUR
-  EXISTING CHANNEL ALIGNMENT
-  PROPERTY BOUNDARY
-  LIMITS OF DISTURBANCE
-  TEMPORARY ACCESS ROUTE
-  STAGING AREA
-  PHASE 1 SEDIMENT REUSE AREA
-  CONTROL POINT
-  SILT FENCE

LIMITS OF DISTURBANCE SHALL BE STAKED IN FIELD BY CONTRACTOR. ENGINEER AND OWNER TO REVIEW STAKED LIMITS AT THE TIME OF CONSTRUCTION AND ADJUST AS DEEMED NECESSARY AND ACCEPTABLE TO FACILITATE CONSTRUCTION

ADJUST CONSTRUCTION LIMITS AS NECESSARY TO AVOID IMPACTS TO DRIPLINES OF PAW PAW TREES AS INDICATED BY OWNER AT TIME OF CONSTRUCTION STAKING.



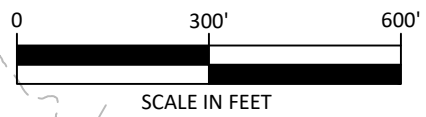
PHASE 2 SEDIMENT REUSE AREA NOT IN CONTRACT.

- SEDIMENT REUSE AREA NOTES:**
1. STRIP AND STOCKPILE 6 INCHES OF AGRICULTURAL SOIL.
 2. SPREAD EXCAVATION SPOILS TO 2 FT AVERAGE THICKNESS
 3. RESPREAD 6 INCHES AGRICULTURAL TOPSOIL.
 4. APPLY TEMPORARY SEED AND MULCH.

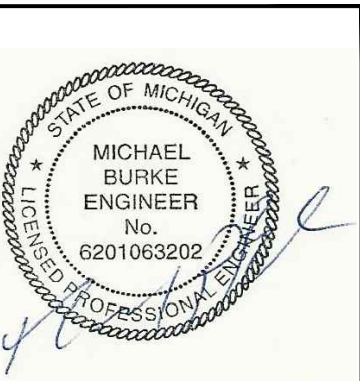
TERRAIN DATA SOURCES, COORDINATE SYSTEMS, AND UNITS:

1. TOPOGRAPHIC AND BATHYMETRIC SURVEY WAS CONDUCTED BY INTER-FLUVE IN 2013 AND 2016. TOPOGRAPHY OUTSIDE OF THE EXISTING CHANNEL IS BASED ON LIDAR DATA COLLECTED IN 2013. THE CONTRACTOR IS ADVISED THAT THE SURVEYED AREAS ARE LOCATED IN A DYNAMIC FLUVIAL AREAS AND SURVEY ELEVATIONS MAY DIFFER FROM ACTUAL GROUND ELEVATIONS AT THE TIME OF CONSTRUCTION. CONTRACTOR TO VERIFY EXISTING ELEVATIONS.
2. HORIZONTAL COORDINATES: MICHIGAN STATE PLANE COORDINATES, SOUTH ZONE, INTERNATIONAL FEET, NAD83.
3. VERTICAL DATUM: NAVD88, INTERNATIONAL FEET.
4. CONTROL POINTS SHOWN WERE SET DURING THE SITE TOPOGRAPHIC SURVEY.
5. PARCEL AND PROPERTY OWNER INFORMATION OBTAINED FROM CASS COUNTY GIS DATA, JULY 2021.

BUREAU OF INDIAN AFFAIRS



CONTROL POINT TABLE				
POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
1212	171476.02	12629852.27	724.11	PK NAIL
1213	171279.03	12629667.67	724.44	REBAR W/CAP
6000	170906.00	12628221.69	712.42	REBAR W/CAP
6206	171154.31	12627599.36	706.11	REBAR W/CAP



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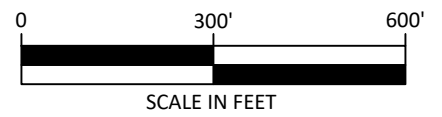
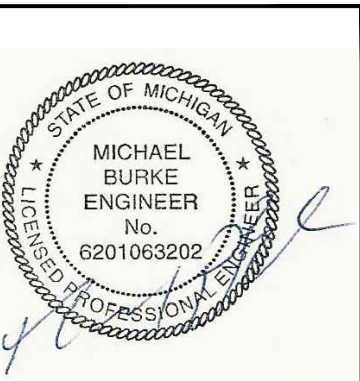
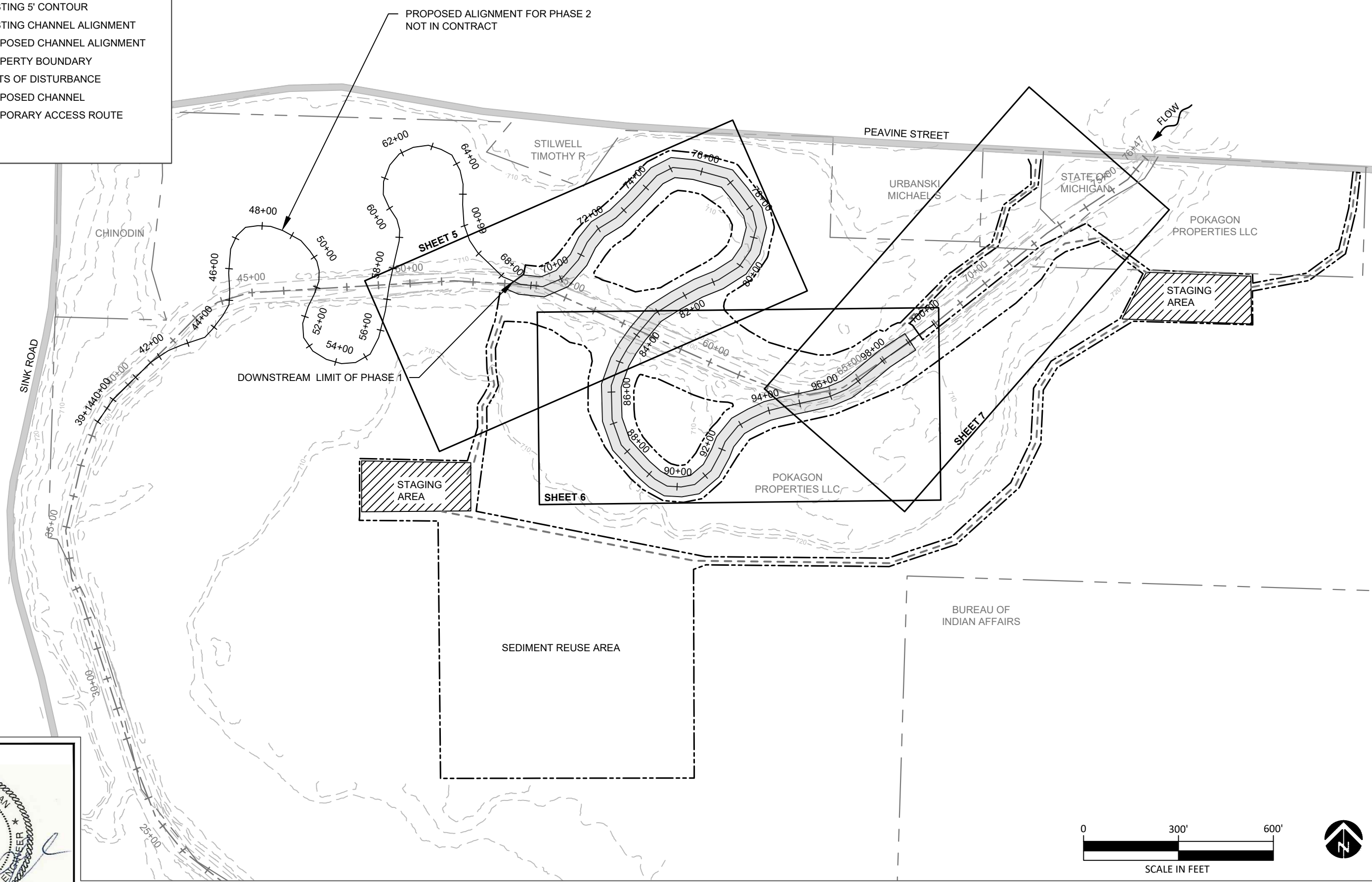


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EXISTING CONDITIONS

LEGEND

- EXISTING 5' CONTOUR
- EXISTING CHANNEL ALIGNMENT
- PROPOSED CHANNEL ALIGNMENT
- PROPERTY BOUNDARY
- LIMITS OF DISTURBANCE
- PROPOSED CHANNEL
- TEMPORARY ACCESS ROUTE



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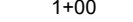










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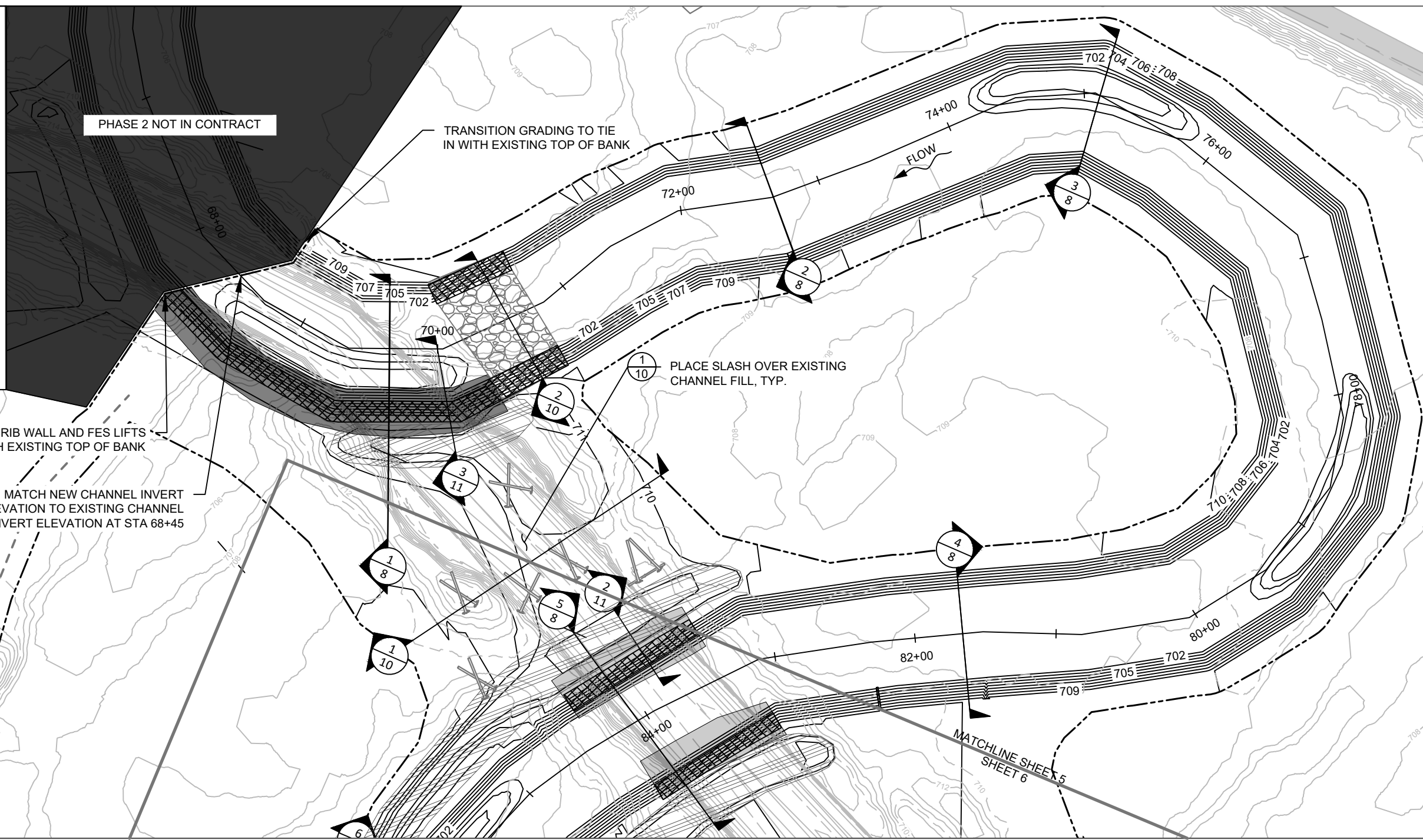
SITE PLAN

SHEET
4 OF 16

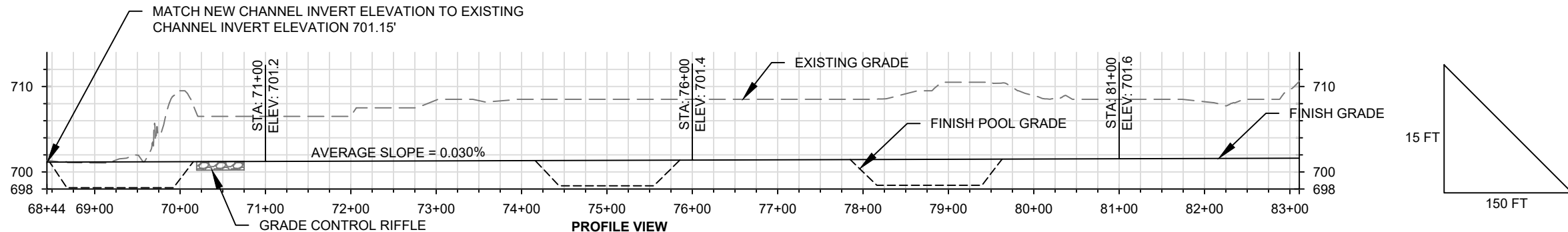
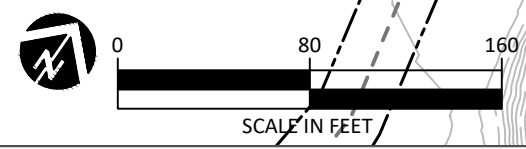
LEGEND

-  EXISTING 1' MINOR CONTOUR
-  EXISTING 5' MAJOR CONTOUR
-  PROPOSED 1' MINOR CONTOUR
-  PROPOSED CHANNEL ALIGNMENT
-  PROPERTY BOUNDARY
-  LIMITS OF DISTURBANCE
-  GRADE CONTROL RIFFLE 2/10
-  FLOODPLAIN LARGE WOOD 2/15 3/15
-  FES LIFTS
-  3 LAYER CRIB WALL 2/11
-  4 LAYER CRIB WALL 3/11
-  FLOODPLAIN LEVEE 2/11
-  TEMPORARY ACCESS

- NOTE:**
1. NUMBER OF LARGE WOOD PIECES REQUIRED FOR CRIB WALLS PROVIDED IN THE CRIB WALL SCHEDULE SHEET 11.
 2. LARGE WOOD IS A FIELD SET ITEM.
 3. FINAL LOCATIONS AND ORIENTATIONS OF LARGE WOOD TO BE INDICATED BY ONSITE ENGINEER.



PLAN VIEW



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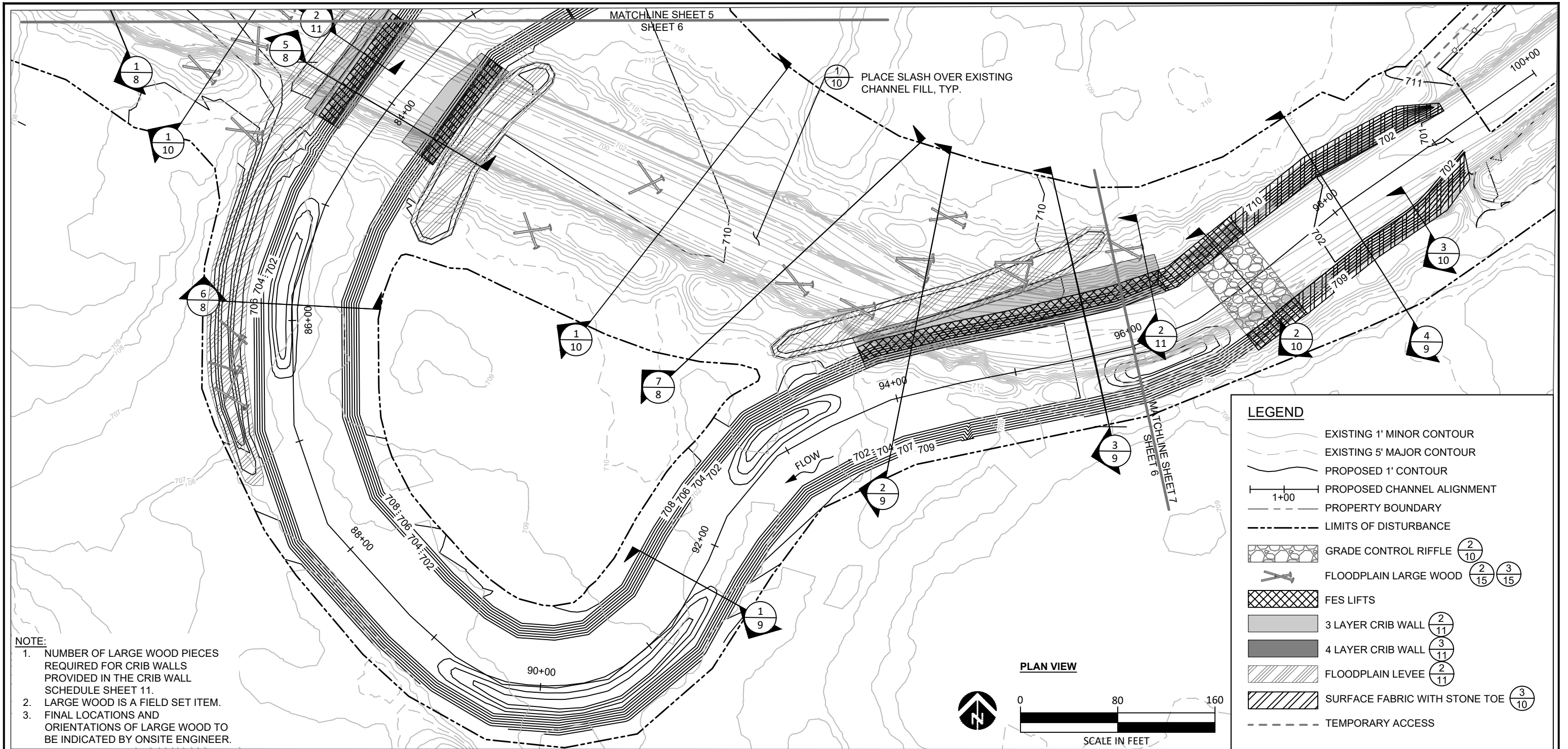
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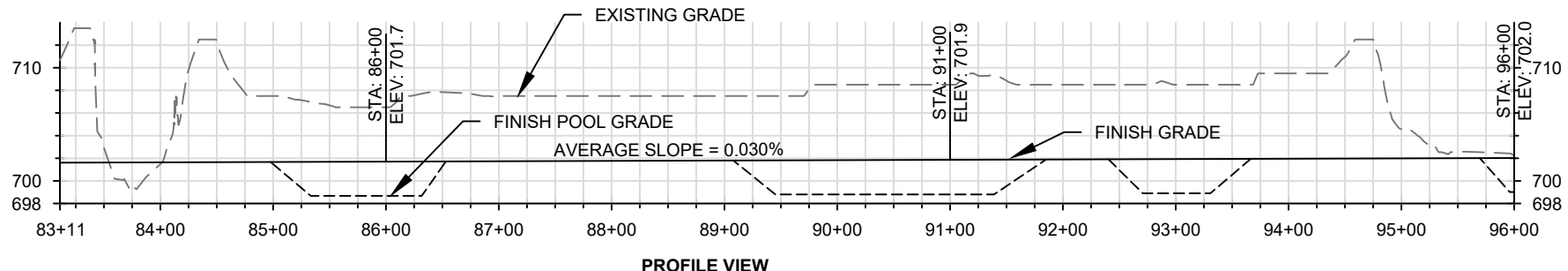
**PLAN & PROFILE 1
STA 68+44 TO 83+11**



NOTE:
 1. NUMBER OF LARGE WOOD PIECES REQUIRED FOR CRIB WALLS PROVIDED IN THE CRIB WALL SCHEDULE SHEET 11.
 2. LARGE WOOD IS A FIELD SET ITEM.
 3. FINAL LOCATIONS AND ORIENTATIONS OF LARGE WOOD TO BE INDICATED BY ONSITE ENGINEER.

LEGEND

- EXISTING 1' MINOR CONTOUR
- EXISTING 5' MAJOR CONTOUR
- PROPOSED 1' CONTOUR
- PROPOSED CHANNEL ALIGNMENT
- PROPERTY BOUNDARY
- LIMITS OF DISTURBANCE
- GRADE CONTROL RIFFLE (2/10)
- FLOODPLAIN LARGE WOOD (2/15, 3/15)
- FES LIFTS
- 3 LAYER CRIB WALL (2/11)
- 4 LAYER CRIB WALL (3/11)
- FLOODPLAIN LEVEE (2/11)
- SURFACE FABRIC WITH STONE TOE (3/10)
- TEMPORARY ACCESS

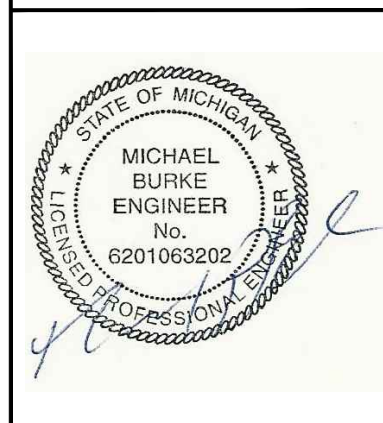
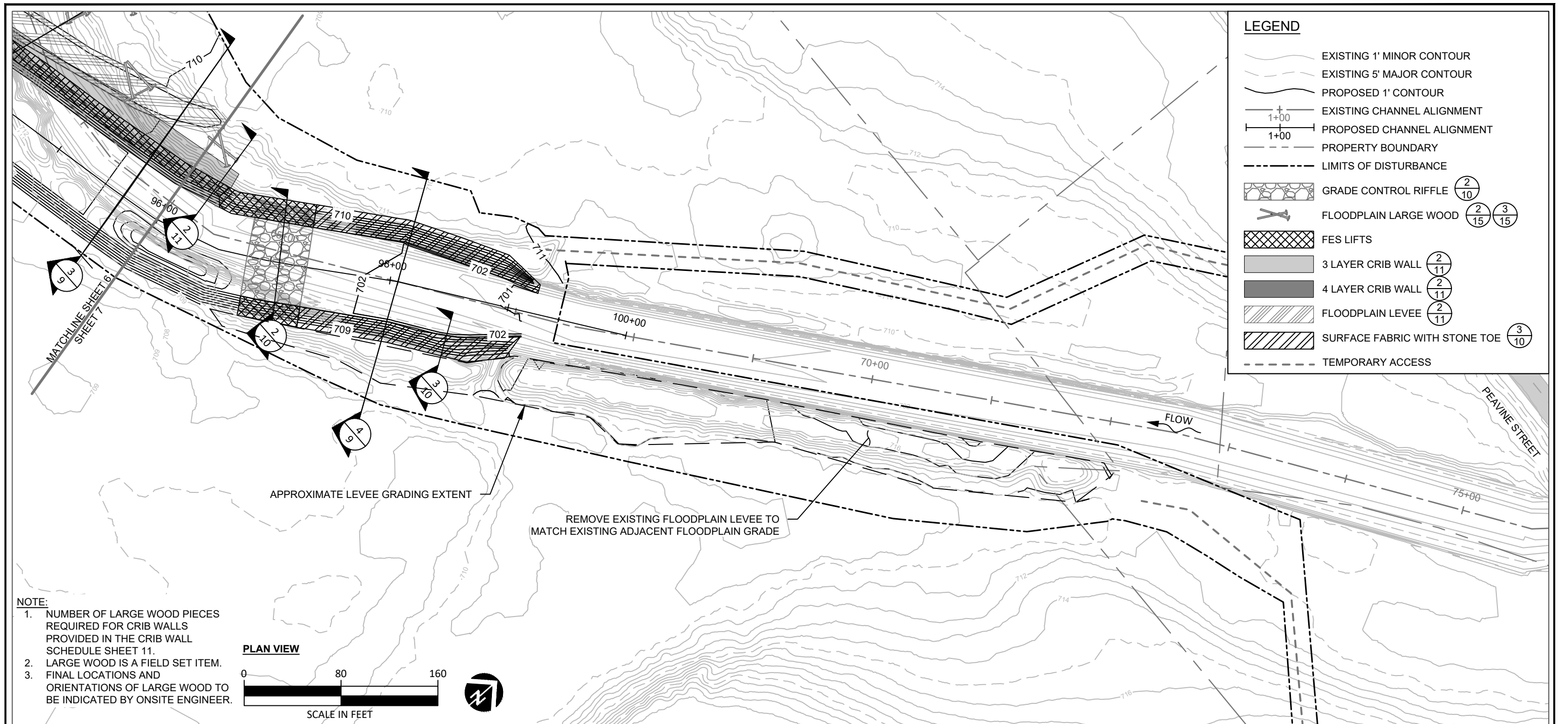


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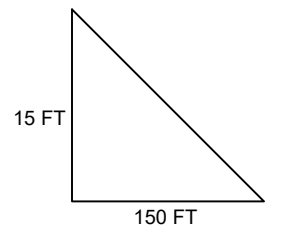
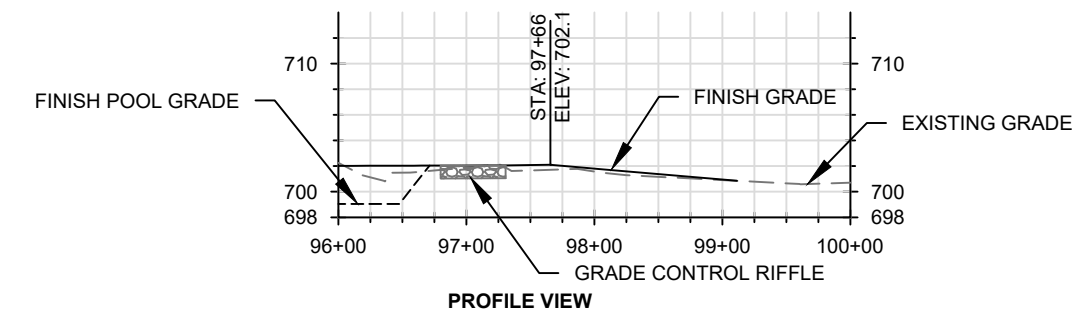
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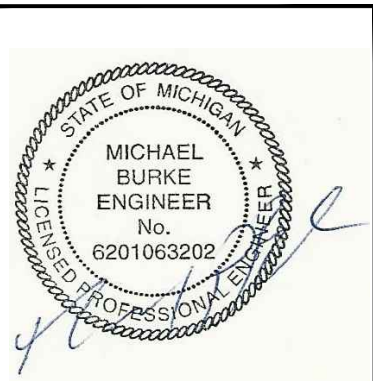
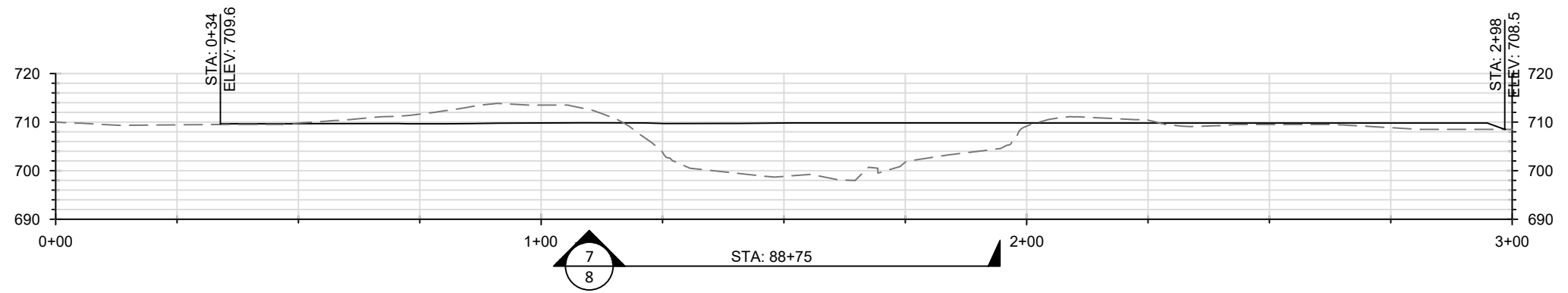
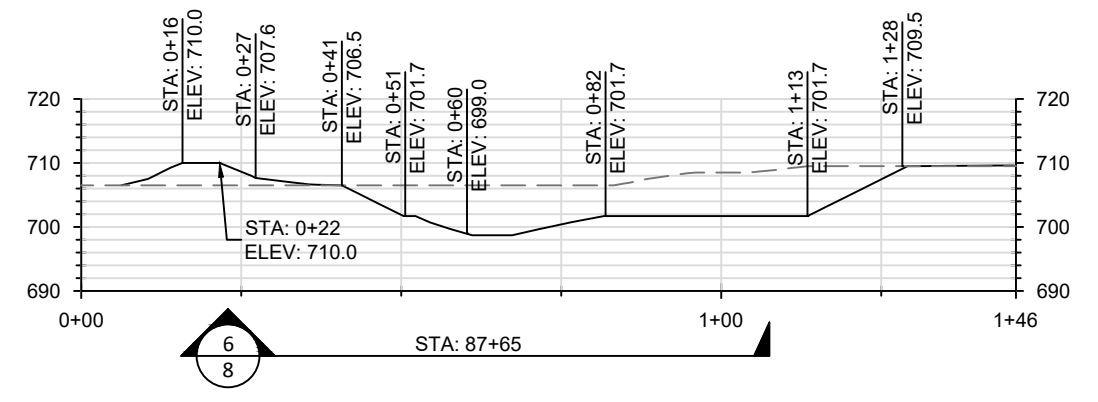
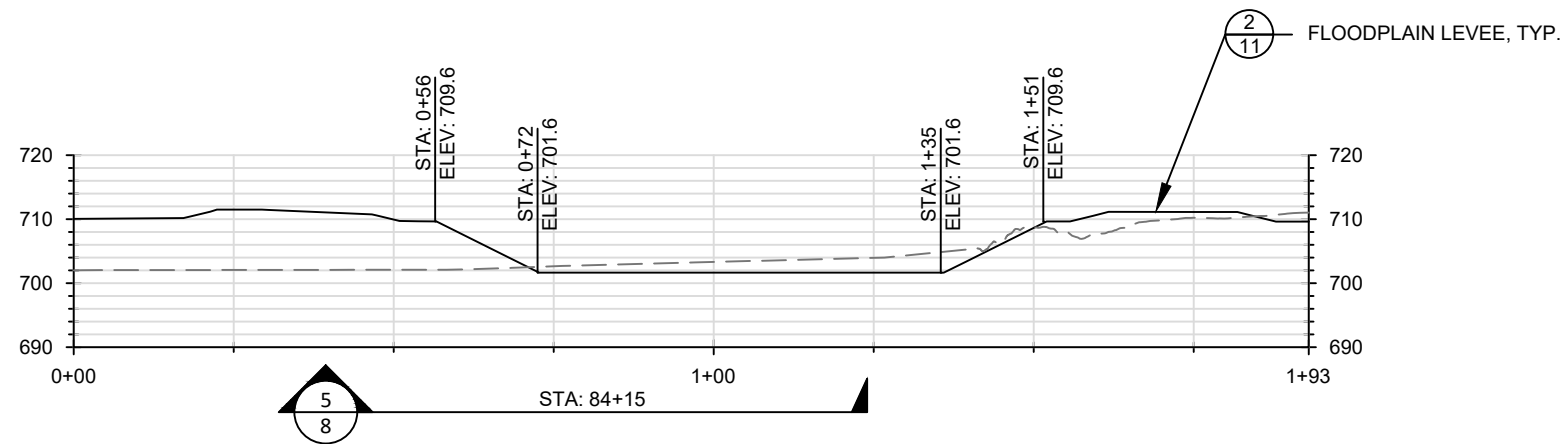
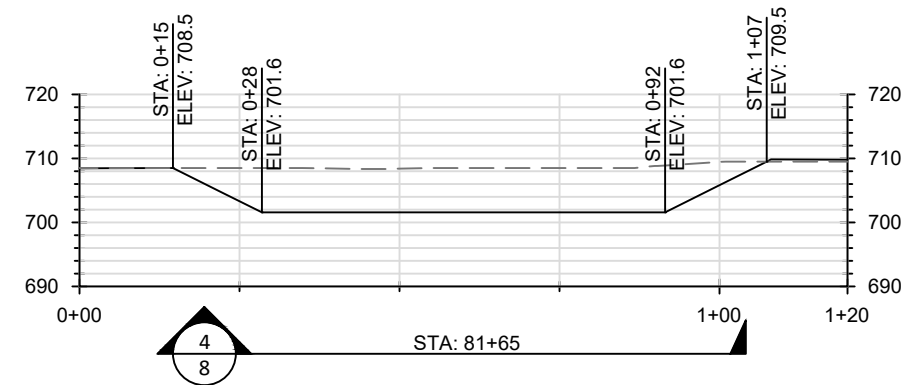
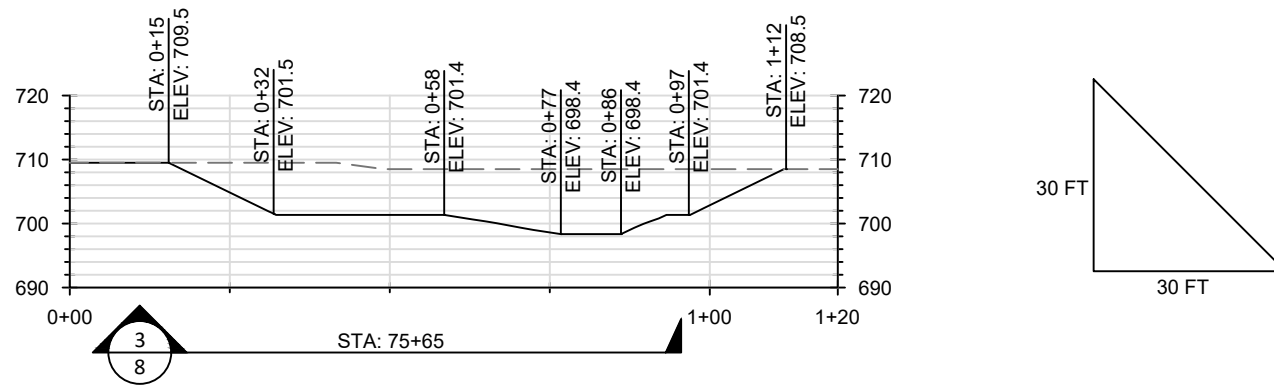
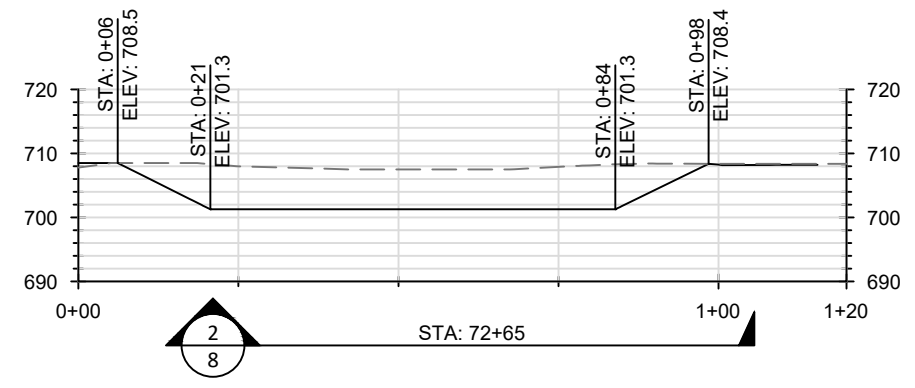
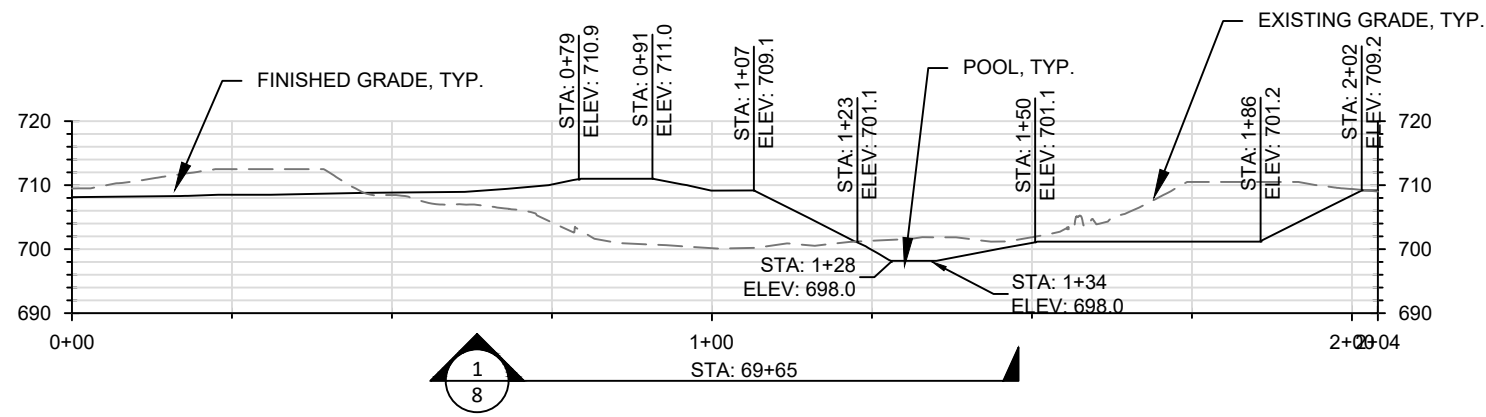


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**PLAN & PROFILE 3
STA 96+00 TO 99+11**

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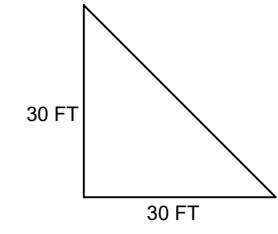
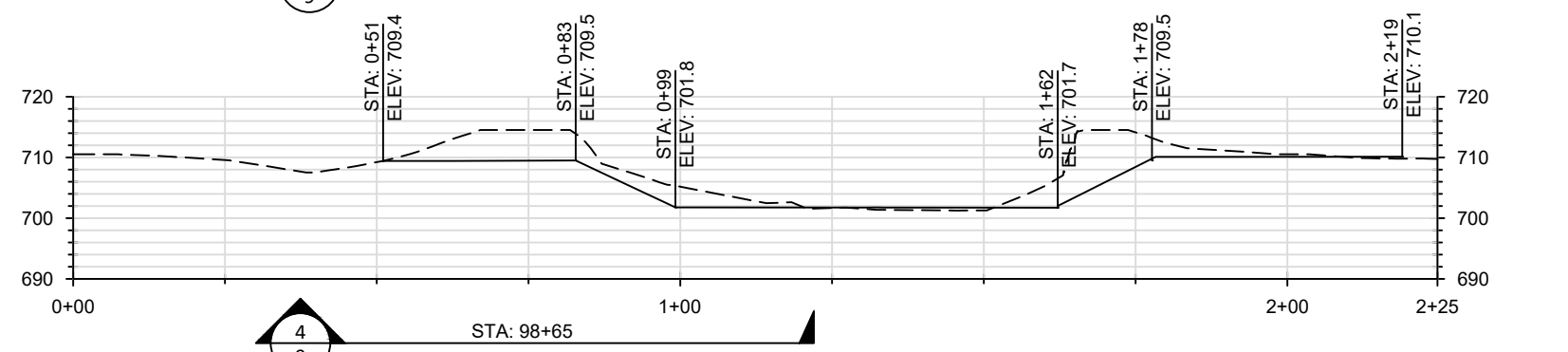
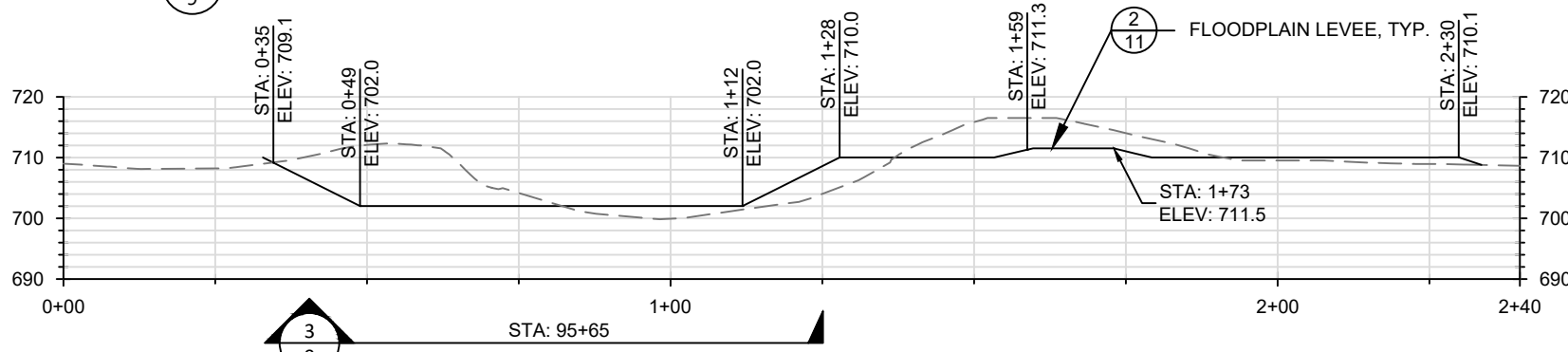
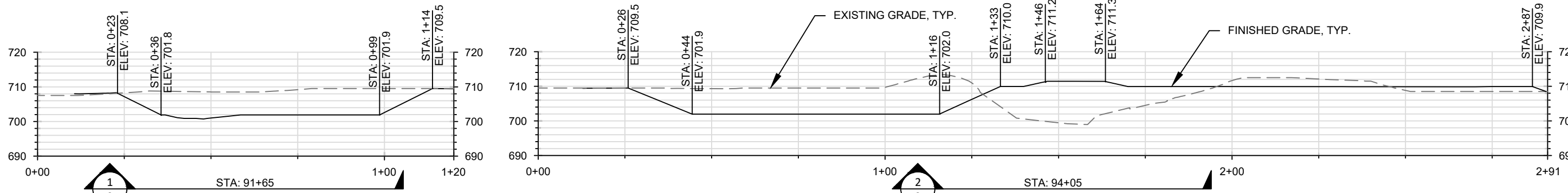
NO.	BY	DATE	REVISION DESCRIPTION

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MB APPROVED	8/5/21 DATE	15-04-01 PROJECT

**DOWAGIAC RIVER RESTORATION
PHASE 1
POKAGON BAND OF POTAWATOMI
CASS COUNTY, MI**



GRADING CROSS SECTIONS 1 OF 2



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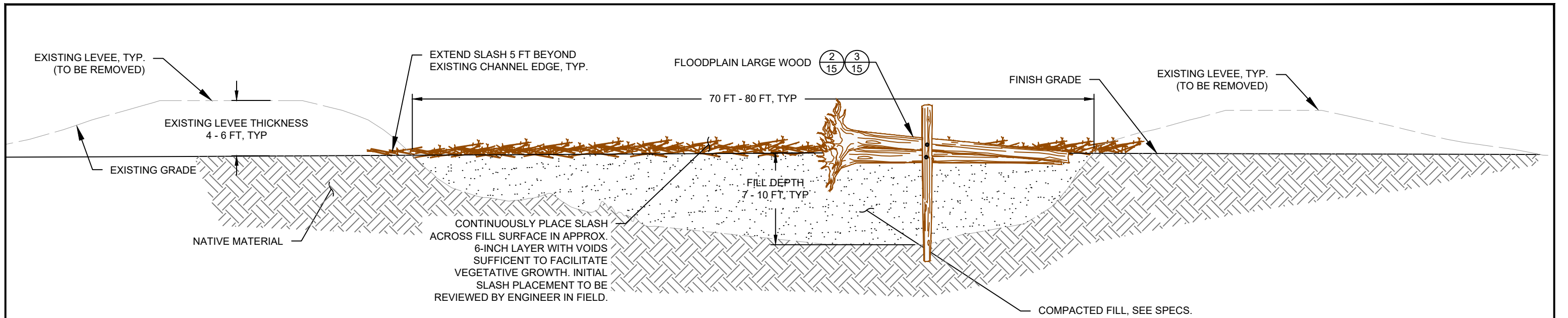
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DOWAGIAC RIVER RESTORATION
 PHASE 1
 POKAGON BAND OF POTAWATOMI
 CASS COUNTY, MI

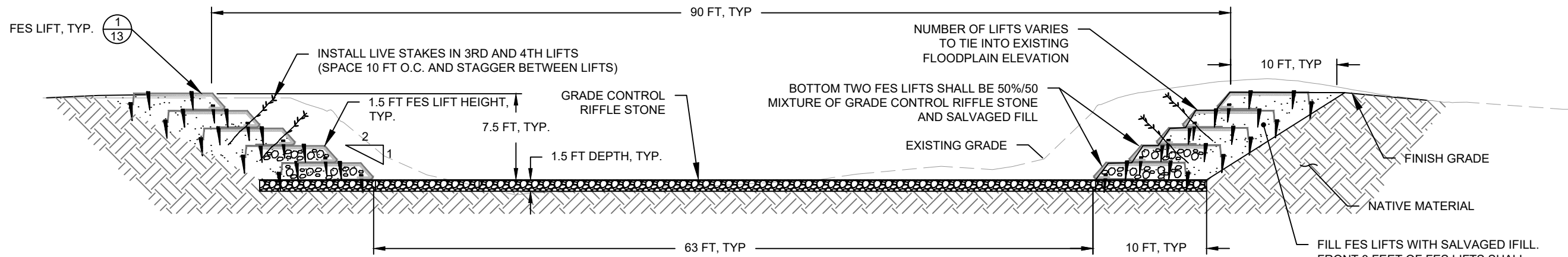


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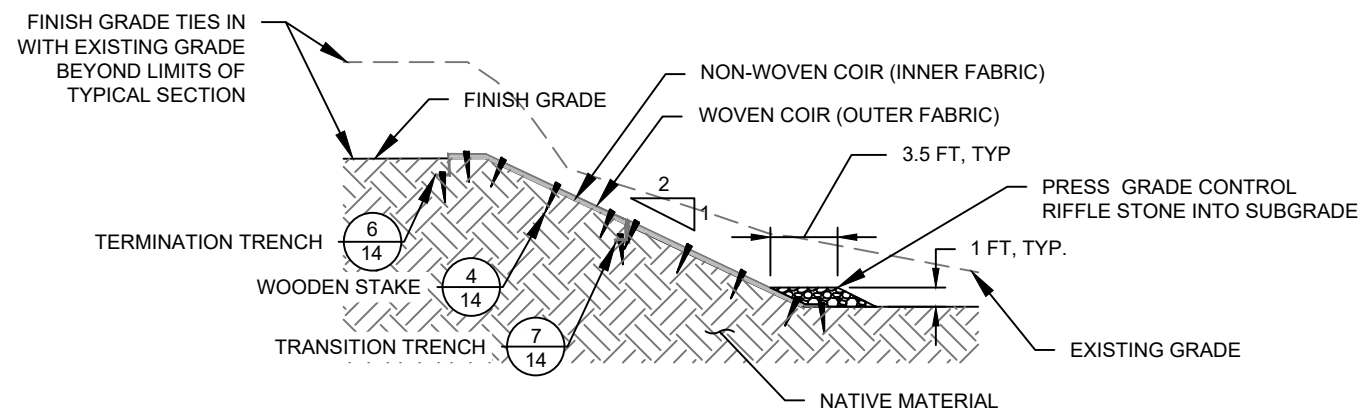
GRADING CROSS SECTIONS 1 OF 2



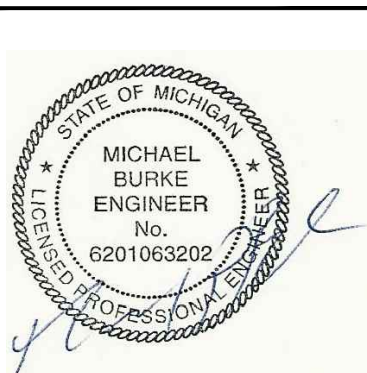
1
10 TYPICAL SECTION
CHANNEL CONSTRUCTION - EXISTING CHANNEL FILL
SCALE 1" = 10'



2
10 TYPICAL SECTION
GRADE CONTROL RIFFLE
SCALE 1" = 10'



3
10 TYPICAL SECTION
SURFACE FABRIC WITH STONE TOE
SCALE 1" = 10'



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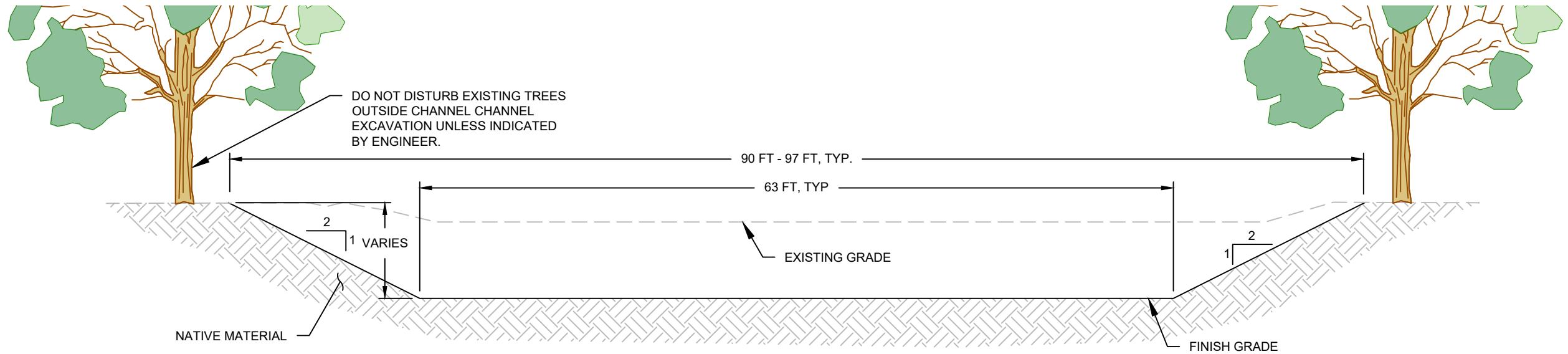
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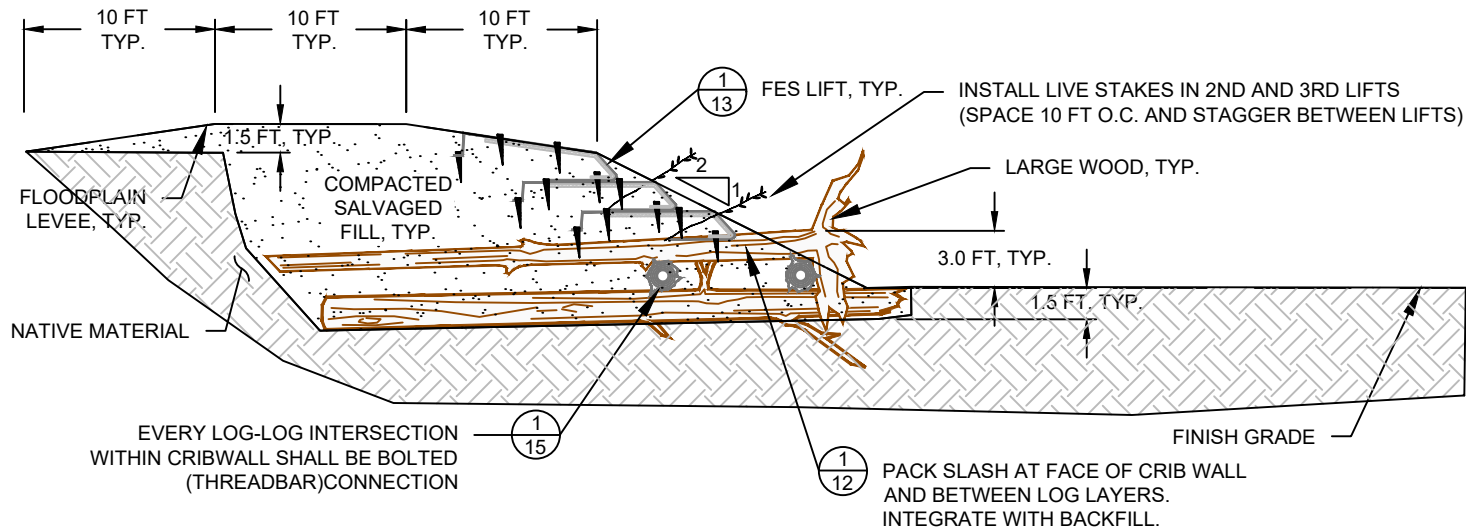


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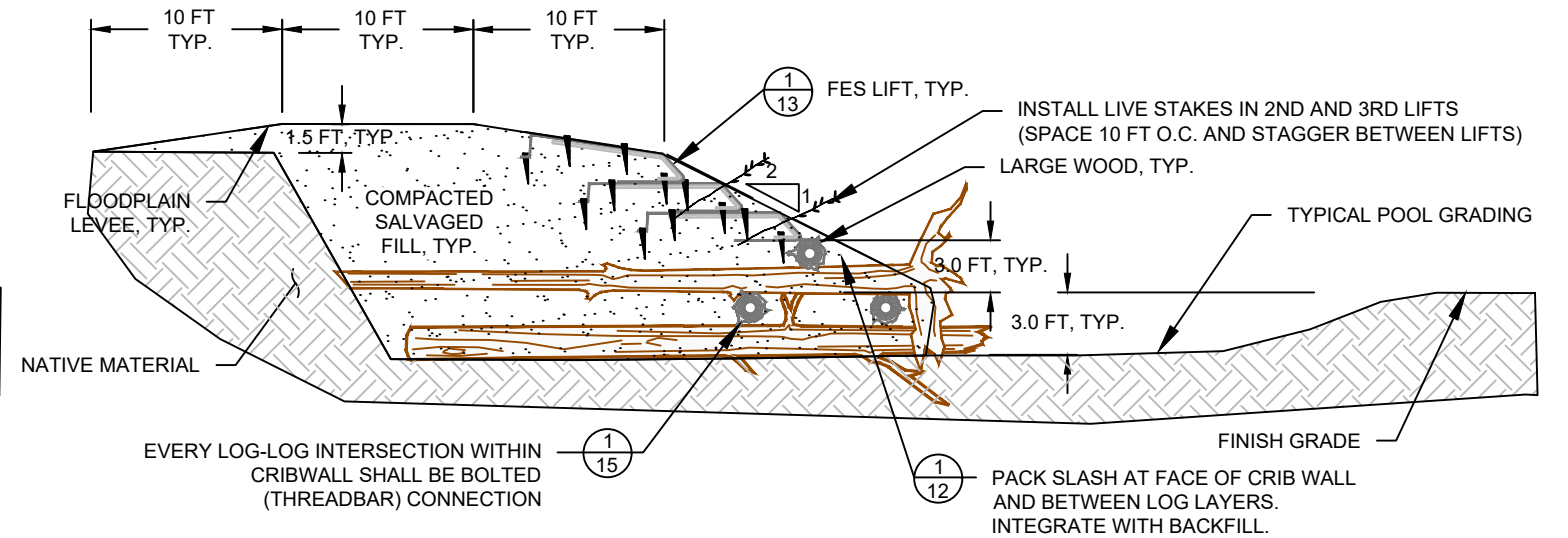
TYPICAL CROSS SECTIONS 1 OF 2



1
11 TYPICAL SECTION
CHANNEL EXCAVATION
1" = 10'



2
11 TYPICAL SECTION
3 LAYER CRIB WALL
1" = 10'



3
11 TYPICAL SECTION
4 LAYER CRIB WALL
1" = 10'

CRIB WALL SCHEDULE								
BANK (LOOKING DOWNSTREAM)	UPSTREAM STA.	DOWNSTREAM STA.	NUMBER OF LARGE WOOD LAYERS	LOGS	ROOT WADS	CRIB BOTTOM ELEV.	CRIB TOP ELEV.	TOP OF BANK ELEV.
RIGHT	96+50	93+75	3	64	64	701	705.5	710
RIGHT	84+32	83+30	3	26	26	700.1	704.6	709.6
LEFT	84+40	83+25	3	25	25	700.1	704.6	709.6
LEFT	70+20	68+30	4	88	88	698.2	704.2	709.2

- NOTES:
- LARGE WOOD IS A FIELD SET ITEM.
 - FINAL LOCATIONS AND ORIENTATIONS OF LARGE WOOD TO BE INDICATED BY ONSITE ENGINEER.



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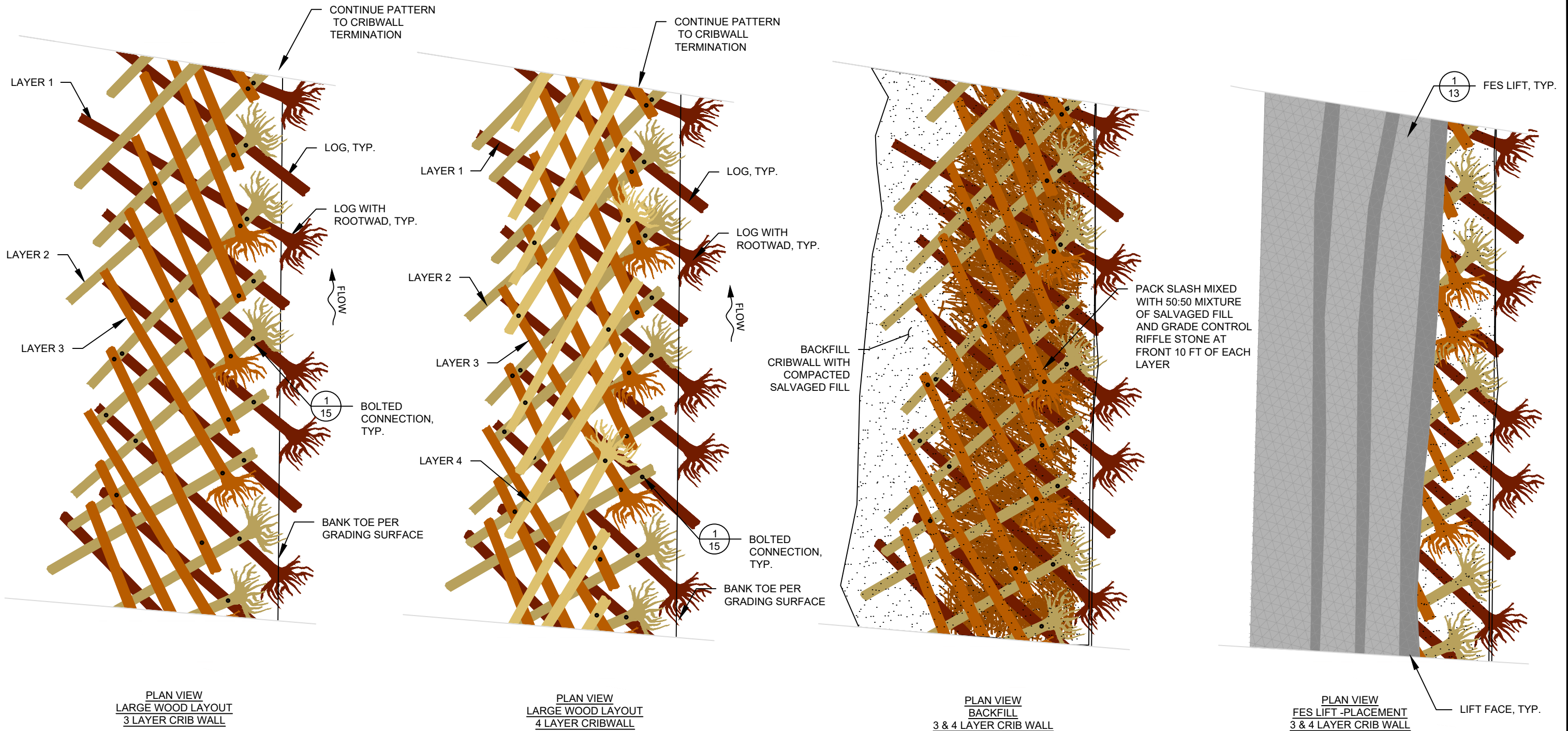
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TYPICAL CROSS SECTIONS 2 OF 2



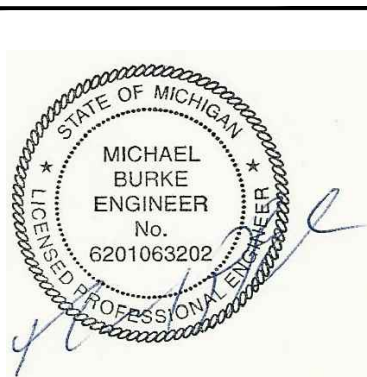
PLAN VIEW
LARGE WOOD LAYOUT
3 LAYER CRIB WALL

PLAN VIEW
LARGE WOOD LAYOUT
4 LAYER CRIB WALL

PLAN VIEW
BACKFILL
3 & 4 LAYER CRIB WALL

PLAN VIEW
FES LIFT - PLACEMENT
3 & 4 LAYER CRIB WALL

1
12 TYPICAL DETAIL
3 & 4 LAYER CRIB WALL
1" = 10'



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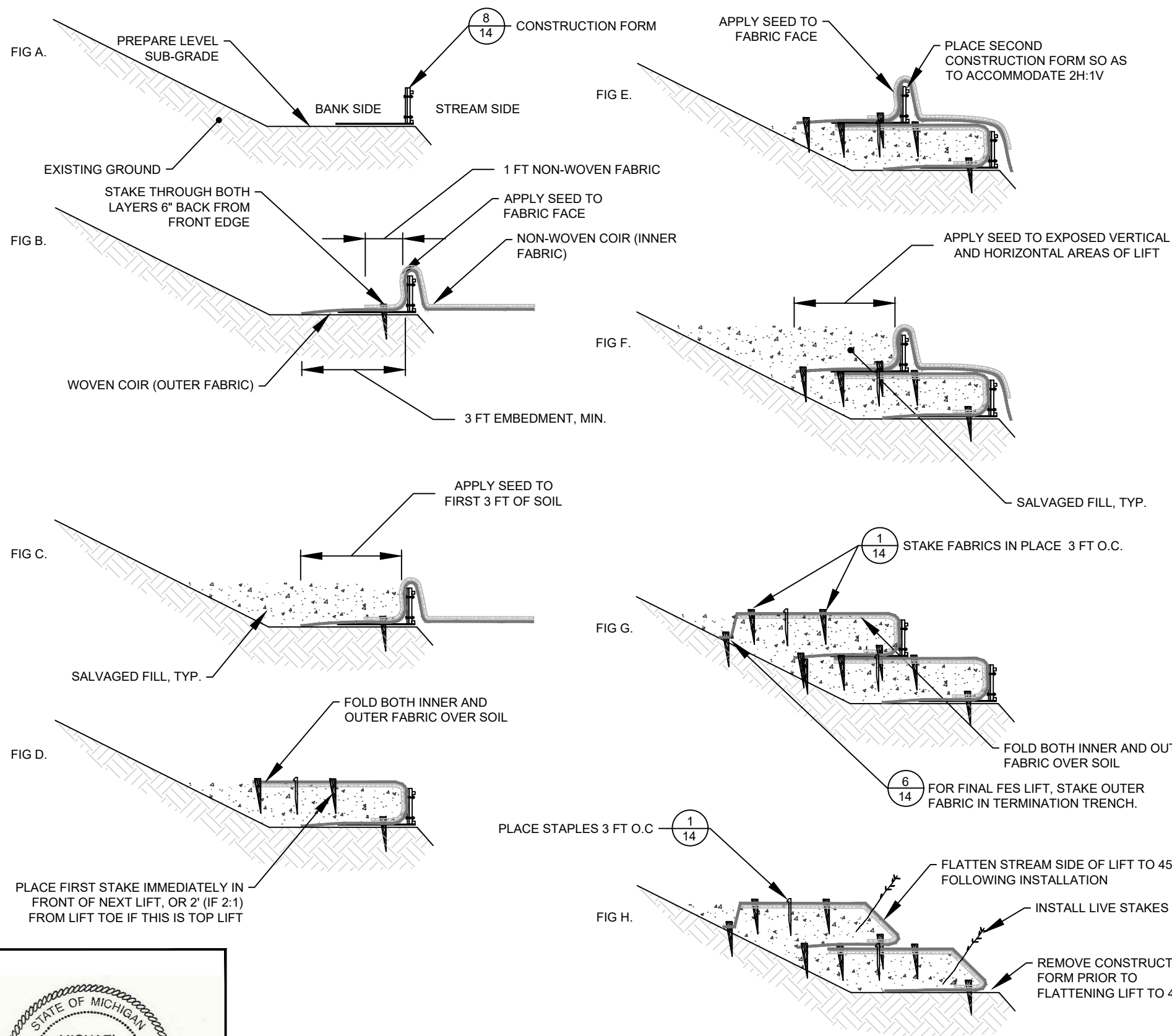
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2 SUGGESTED SEQUENCING FOR PLACING FORMS
13 PROFILE VIEW LOOKING INTO BANK



FIG 1. PLACE A ROW OF CONSTRUCTION FORMS ALONG DESIRED CHANNEL ALIGNMENT FOR FIRST FES LIFT.

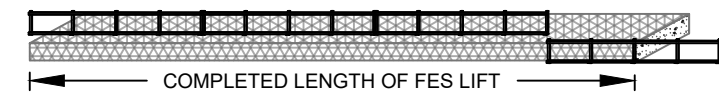


FIG 2. CONSTRUCT FES LIFTS ALONG LENGTH OF FIRST SET OF FORMS AND THEN BEGIN PLACEMENT OF FORMS AND CONSTRUCTION OF SECOND LIFT.

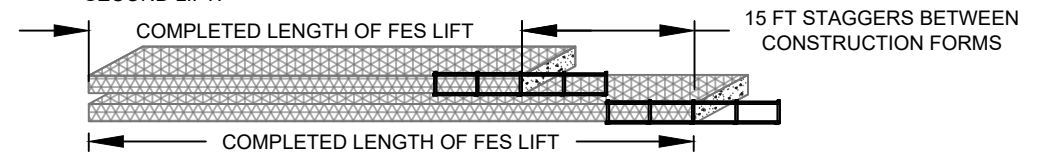


FIG 3. STAGGER FABRIC OVERLAPS A MINIMUM OF 15 FT BETWEEN LIFTS.

3 GENERAL INSTRUCTIONS FOR FABRIC ENCAPSULATED LIFTS
13

- BANKS MAY BE CONSTRUCTED IN EITHER AN UPSTREAM OR DOWNSTREAM DIRECTION, AS LONG AS THE FABRIC IS OVERLAPPED IN THE PROPER DIRECTION.
- PLACE A SERIES OF THREE OR MORE FORMS ON THE GROUND SO THAT THE FORMS FOLLOW THE PROPOSED STREAM BANK ALIGNMENT. BUTT THE ENDS OF THE FORMS TIGHTLY TOGETHER.
- UNROLL THE OUTER FABRIC PARALLEL TO THE LONG AXIS OF THE CHANNEL AND POSITION IT SO THAT 3 FEET EXTENDS FOR EMBEDMENT ON THE BANK SIDE OF THE FORMS (FIG B), AND A MINIMUM 3 FEET EXTENDS LENGTHWISE BEYOND THE LAST FORM FOR OVERLAP. DRAPE THE REMAINDER OF THE FABRIC OVER THE TOP OF THE FORMS ON THE STREAM SIDE (FIG B).
- UNROLL THE INNER FABRIC OVER THE TOP OF THE WOVEN COIR FABRIC (FIG B) AND POSITION IT SO THAT AT LEAST 1 FOOT OF THE INNER FABRIC EXTENDS AS AN EMBEDMENT LENGTH ON THE BANK SIDE OF THE FORMS (FIG B). DRAPE THE REMAINDER OF THE FABRIC OVER THE TOP OF THE FORMS ON THE STREAM SIDE AND ALIGN THE LONG EDGES OF THE FABRICS. STRETCH AND PULL THE FABRIC LAYERS TO REMOVE WRINKLES.
- APPLY NATIVE SEED MIX TO INNER FABRIC ALONG VERTICAL EDGE OF LIFT (FIG B). PLACE SPECIFIED FILL OVER THE FABRIC ON THE BANK SIDE OF THE FORMS. FILL SHALL BE SUFFICIENTLY DRAINED AND MAY NOT BE COMPOSED OF WET OR MUCKY SOILS. LEVEL THE FILL AND COMPACT TO 85-90 PERCENT RELATIVE COMPACTION (FIG C).
- APPLY NATIVE SEED MIX TO TOP OF FILL FROM THE FRONT OF THE LIFT TO 3 FT BACK FROM FRONT OF THE LIFT (FIG C).
- FOLD THE LOOSE ENDS OF THE TWO COIR FABRIC LAYERS BACK OVER THE COMPACTED FILL MATERIAL AND MECHANICALLY STRETCH TIGHT TO REMOVE WRINKLES (FIG D). SECURE WITH WOODEN STAKES 1 PER 3 L.F. ALONG THE BACK EDGE AND INTO UNDISTURBED SOIL.
- REMOVE THE FORMS FROM THE FRONT OF THE COMPLETED LIFTS (FIG. 2). LEAVE THE LAST FORM IN PLACE AT THE END OF THE NEWLY CONSTRUCTED LIFT (FIG. 2).
- WHERE THE TOP OF THE LIFT MEETS THE GROUND SURFACE, EXCAVATE A KEY TRENCH 1.5 FEET WIDE AND 1 FOOT DEEP ALONG THE EDGE OF THE OUTER FABRIC LAYER, PARALLEL TO THE FORMS. SEED ENTIRE AREA OF TOP LIFT. SECURE FABRIC IN THE KEY TRENCH WITH WOODEN STAKES, 3 FT O.C.
- BACKFILL THE KEY TRENCH WITH SALVAGED FILL AND CONTINUE TO APPLY SALVAGED FILL TO SMOOTHLY MERGE WITH EXISTING CONTOURS. APPLY NATIVE SEED MIX TO KEY TRENCH AREA.
- SUPPLEMENT LIFT STAKING WITH ADDITIONAL WOODEN STAPLES ON 3 FT CENTERS EXCEPT WHERE WOODEN STAKES HAVE ALREADY BEEN PLACED.
- INSTALL LIVE STAKES IN FINISHED LIFTS AS SHOWN IN TYPICAL SECTIONS. SEE SPECIFICATIONS FOR TYPE, SPACING AND INSTALLATION REQUIREMENTS.

1 FABRIC ENCAPSULATED SOIL (FES) LIFT
13 NOT TO SCALE



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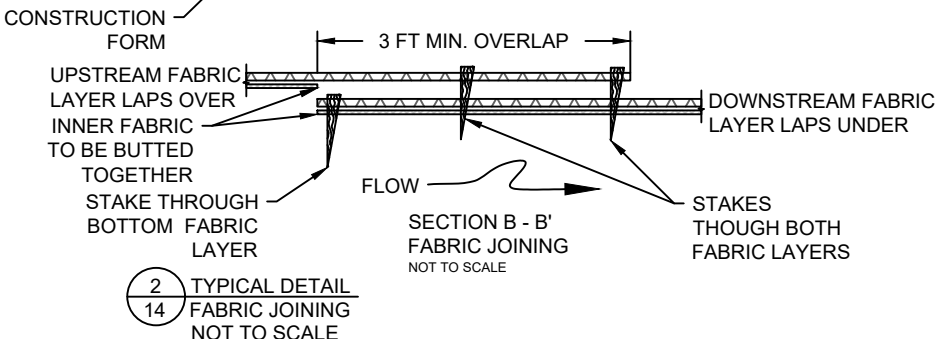
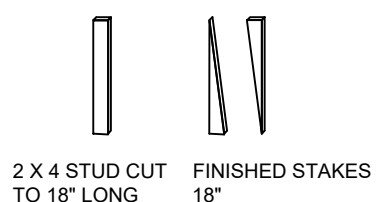
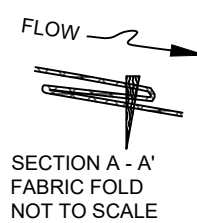
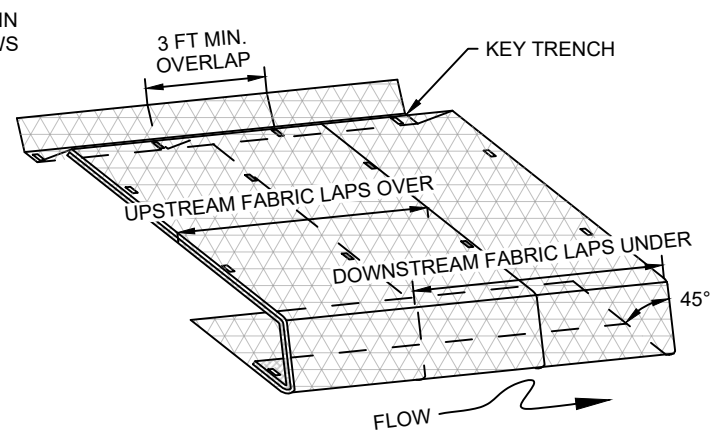
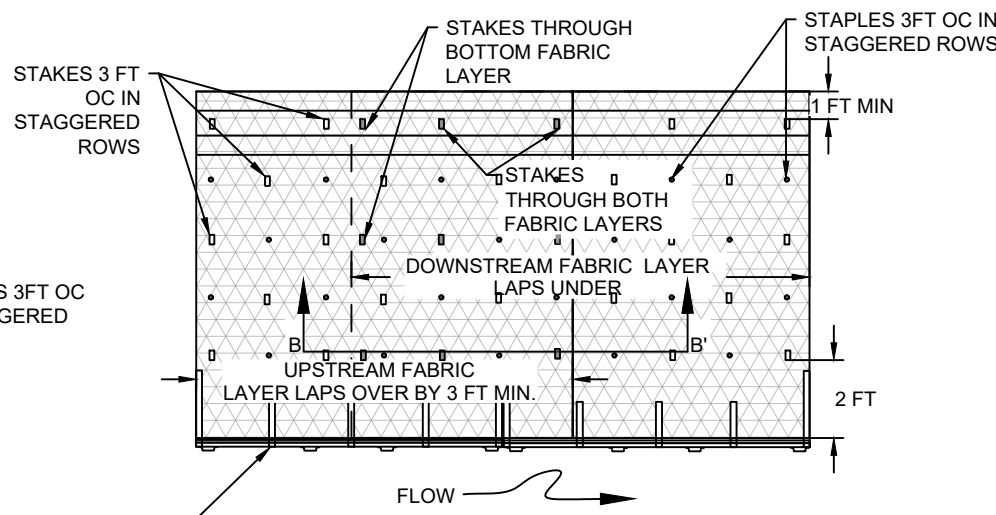
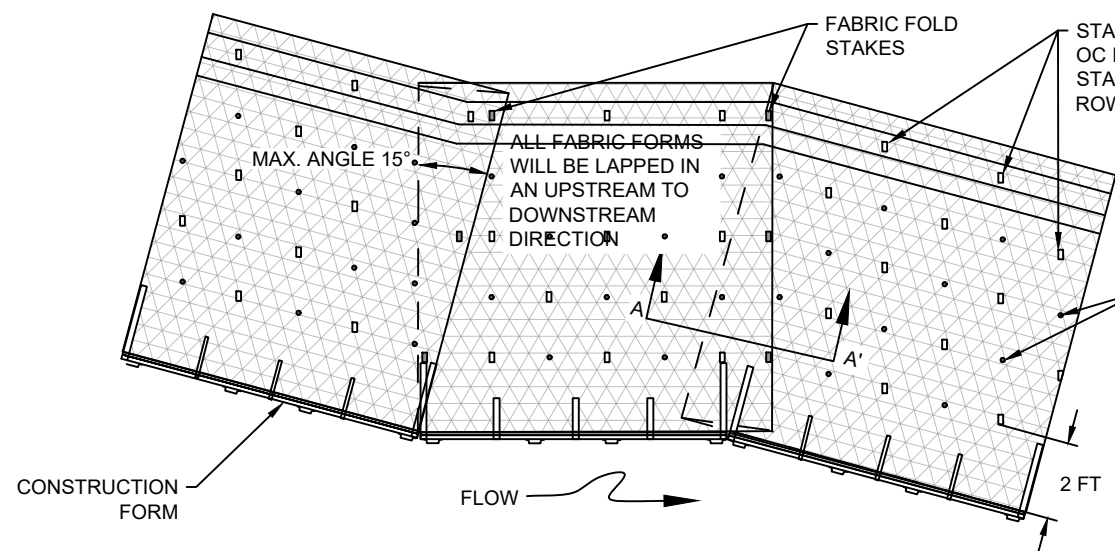
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FES LIFT DETAILS

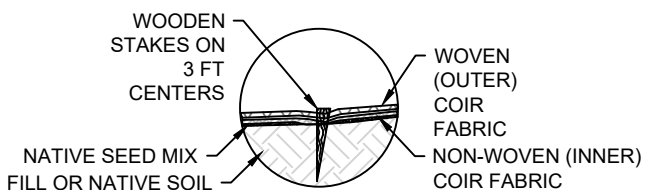


3 ISOMETRIC DETAIL FABRIC JOINING NOT TO SCALE

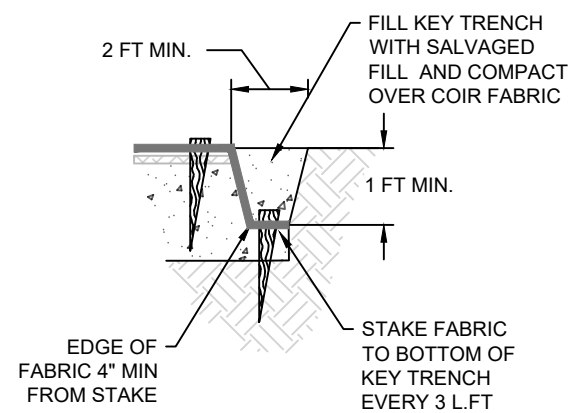
2 TYPICAL DETAIL FABRIC JOINING NOT TO SCALE

1 TYPICAL DETAIL FOLDING OF OUTER FABRIC NOT TO SCALE

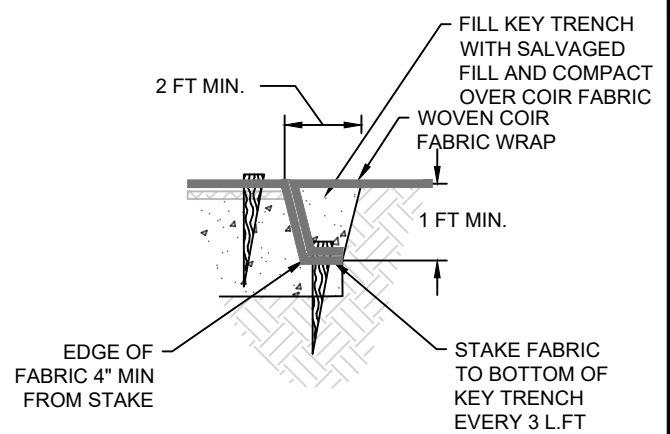
4 WOODEN STAKE FABRICATING DETAIL NOT TO SCALE



5 STAKE DETAIL BIODEGRADABLE FABRICS AND STAKES NOT TO SCALE



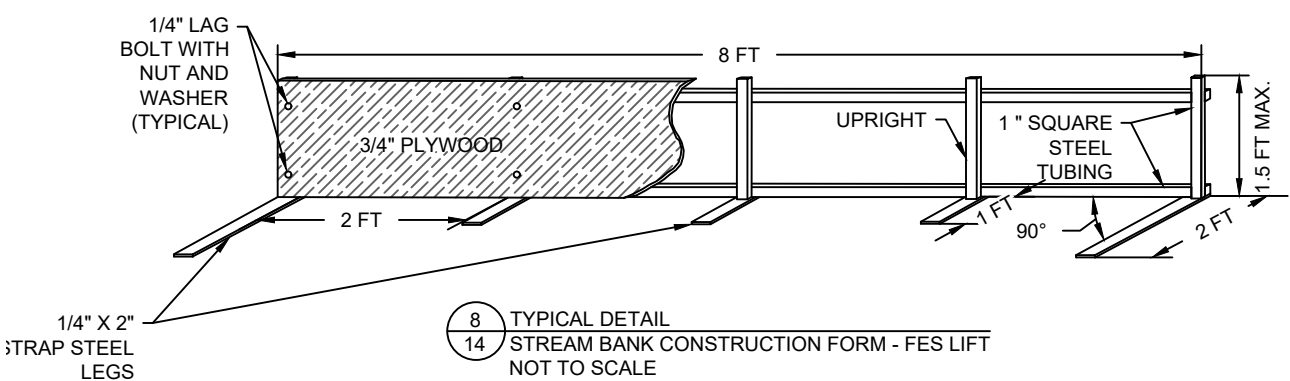
6 KEY TRENCH DETAIL TERMINATION TRENCH NOT TO SCALE



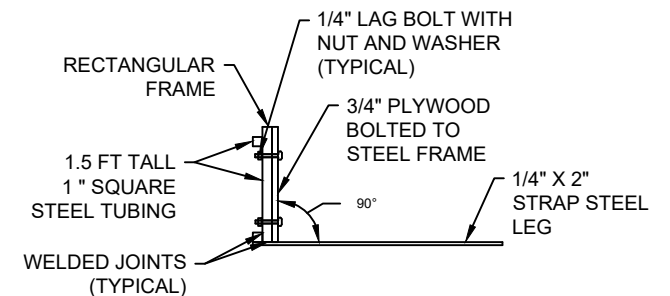
7 KEY TRENCH DETAIL TRANSITION TRENCH NOT TO SCALE

GENERAL NOTES ON SECURING COIR FABRIC

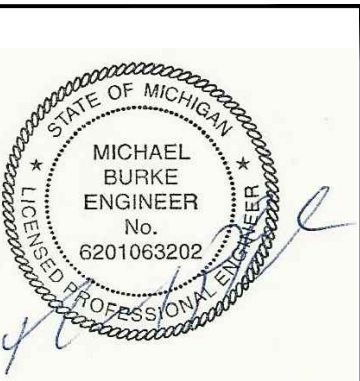
1. SECURE THE OUTER FABRIC (WOVEN, WHERE APPLICABLE), WITH A WOODEN STAKE THROUGH THE FABRIC ON 3 FT CENTERS (SEE DETAIL VIEWS 1 & 2)
NOTE: THE HOLES FOR STAKES SHALL NOT BE PRECUT. ALLOW THE STAKE TO BREAK THE MINIMUM NUMBER OF STRANDS AS IT IS BEING DRIVEN IN. DRIVE STAKES SO THAT 2" TO 3" OF THE TOP OF THE STAKE IS LEFT EXPOSED.
2. OUTER FABRIC ENDS SHALL BE JOINED BY LAPPING THE UPSTREAM PIECE OF FABRIC OVER THE DOWNSTREAM PIECE AS SHOWN IN DETAIL 2. OVERLAPS SHALL BE A MINIMUM OF 3 FT, INNER FABRIC ENDS SHALL BE BUTTED TOGETHER, NOT OVERLAPPED. OVERLAPS SHALL BE STAGGERED FROM LIFT TO LIFT BY A MINIMUM OF 15 FT.



8 TYPICAL DETAIL STREAM BANK CONSTRUCTION FORM - FES LIFT NOT TO SCALE



9 TYPICAL DETAIL STREAM BANK CONSTRUCTION FORM - FES LIFT NOT TO SCALE



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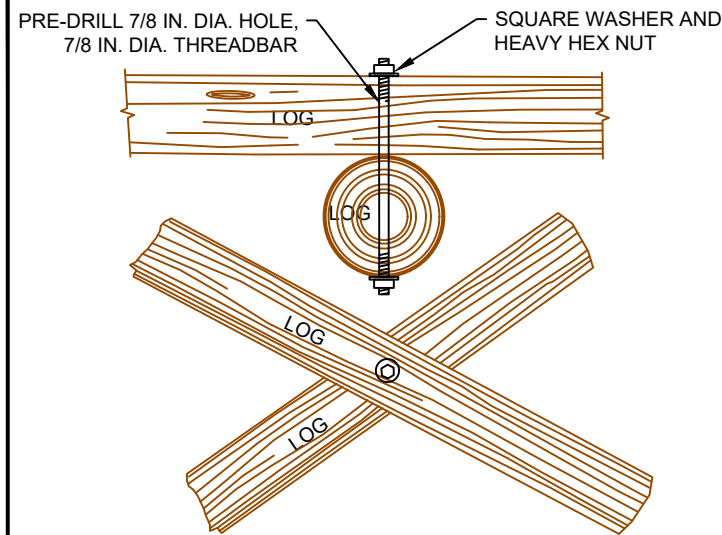
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FABRIC PLACEMENT DETAILS

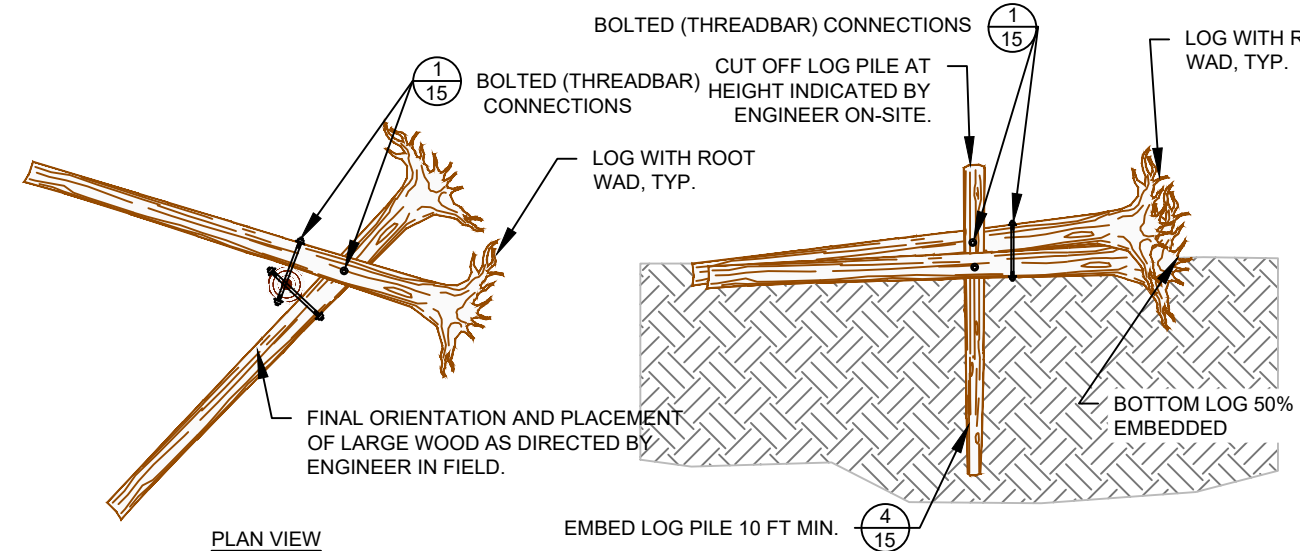


BOLTED CONNECT NOTES

PIN LOGS TO LOGS

1. DRILL 7/8" DIA HOLE THROUGH LOGS.
2. INSERT 7/8" DIA THREADBAR.
3. INSTALL STEEL PLATES AND HEAVY HEX NUTS. SECURE NUTS BY CHISELING THREADS OR MUSHROOMING EXPOSED ENDS OF ROD.
4. FILE OR GRIND OFF SHARP EDGES.

1/15 BOLTED (THREADBAR) CONNECTION NOT TO SCALE



2/15 FLOODPLAIN LARGE WOOD - 2 PIECE WITH 1 LOG PILE NOT TO SCALE

GENERAL NOTES

1. LARGE WOOD IS A FIELD SET ITEM.
2. FINAL LOCATIONS AND ORIENTATIONS OF LARGE WOOD TO BE INDICATED BY ONSITE ENGINEER.

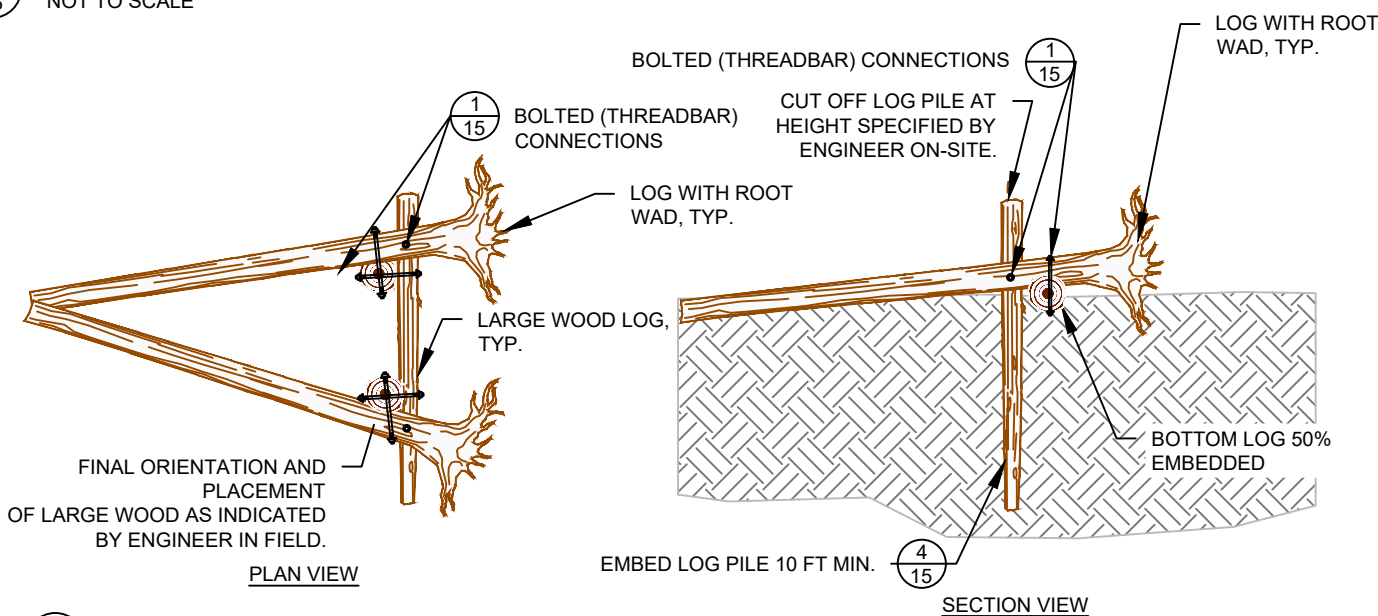
NOTES:

RIGGING

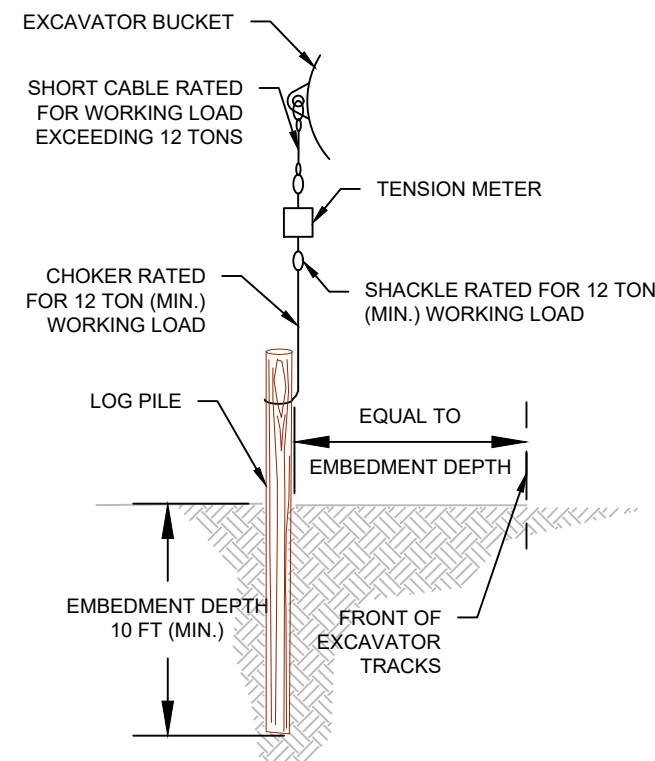
1. RIGGING FOR LOG PILE TESTING SHALL CONFORM TO THE TENSION SCALE MANUFACTURER'S RECOMMENDATIONS.
2. CHOKERS, CABLES AND SHACKLES SHALL HAVE MINIMUM WORKING LOAD RATING OF 12 TONS. FITTINGS SHALL BE SIZED ACCORDINGLY.

TESTING

1. TESTING OF LOG PILES SHALL BE PERFORMED IN THE PRESENCE OF THE ENGINEER. UP TO FOUR LOAD TESTS SHALL BE APPLIED TO EACH TESTED LOG PILE. EACH OF THE FOUR LOAD TESTS SHALL BE APPLIED TO THE LOG PILE WITH A DIFFERENT INSTALLED DEPTH.
2. EACH LOG PILE TEST SHALL HAVE UPWARD LOAD GRADUALLY INCREASED AND AS CLOSELY ALIGNED TO AXIS OF PILE AS POSSIBLE. RECORD THE PILE DIAMETER, EMBEDMENT DEPTH AND MAXIMUM FORCE REQUIRED TO MOVE THE LOG PILE VERTICALLY APPROXIMATELY 1 INCH. THEN DRIVE THE LOG PILE TO A NEW DEPTH TO BE DETERMINED BY THE CONTRACTOR'S ENGINEER IN CONSULTATION WITH THE ENGINEER. APPLY NEW LOAD AND RECORD MAX FORCE THAT CAUSES THE LOG PILE TO MOVE VERTICALLY 1 INCH. REPEAT FOR THIRD AND FOURTH TEST.
3. PROOF TESTS SHALL BE MADE AT UP TO FOUR EMBEDMENT DEPTHS FOR EACH LOG PILE. DEPTHS SHALL BE DETERMINED IN THE FIELD. AS A GUIDELINE, TEST EMBEDMENT DEPTHS MAY INCLUDE 8 FT, 10 FT, 12 FT, AND 14 FT. TESTS AT 12 FT AND 14 FT WILL ONLY BE REQUIRED IF PILES MUST BE DRIVEN DEEPER THAN 10 FT TO ACHIEVE TARGET PULLOUT RESISTANCE. SEE NOTE BELOW.
4. EXCAVATOR CONDUCTING PULL OUT LOADING SHALL BE POSITIONED NO CLOSER THAN EMBEDMENT DEPTH OF LOG PILE, IF POSSIBLE. IF A CLOSER POSITIONING IS REQUIRED, EXCAVATOR SHALL BE NO CLOSER THAN THAT REQUIRED TO GENERATE DESIRED LOADING WITH DISTANCE FROM LOG PILE NOTED IN THE TEST RECORD. LIMIT COMPRESSIVE LOADING OF THE TRACKS ON THE GROUND BY DRIVING THE EXCAVATOR ONTO LOGS LAID ON THE GROUND TO DISTRIBUTE THE WEIGHT OVER A LARGER AREA.
5. PULL OUT RESISTANCE READING SHALL BE COMPARED AGAINST EXCAVATOR MAX LIFT OFFSET TABLE.
6. UP TO 10% OF PRODUCTION PILING SHALL BE PROOF TESTED. IF RESULTS VARY MORE THAN 50% THEN IT SHOULD BE ANTICIPATED THAT UP TO 25% OF THE PRODUCTION PILING SHALL BE PROOF TESTED.
7. LOG PILE EMBEDMENT DEPTH SPECIFIED IN THESE DRAWINGS MAY BE INCREASED, AT NO ADDITIONAL COST, PENDING COMPARISON OF PULL OUT TEST RESULTS TO AN ASSUMED RAW PULLOUT RESISTANCE OF 15,000 POUNDS. IF TESTING REVEALS FIELD PULLOUT RESISTANCE VALUES THAT ARE LESS THAN THE ASSUMED VALUES, LOG PILES MAY BE REQUIRED TO BE DRIVEN UP TO 5 FT DEEPER THAN INDICATED. ENGINEER WILL DETERMINE WHETHER THE NUMBER OF LOG PILES MAY BE REDUCED IF TESTING YIELDS VALUES THAT EXCEED ASSUMED VALUES, BASED ON EVALUATION OF VERTICAL PULLOUT AND LATERAL BRACING OBJECTIVES AT EACH LOCATION.



3/15 FLOODPLAIN LARGE WOOD - 3 PIECE WITH 2 LOG PILES NOT TO SCALE



4/15 LOG PILE PULL OUT TEST NOT TO SCALE



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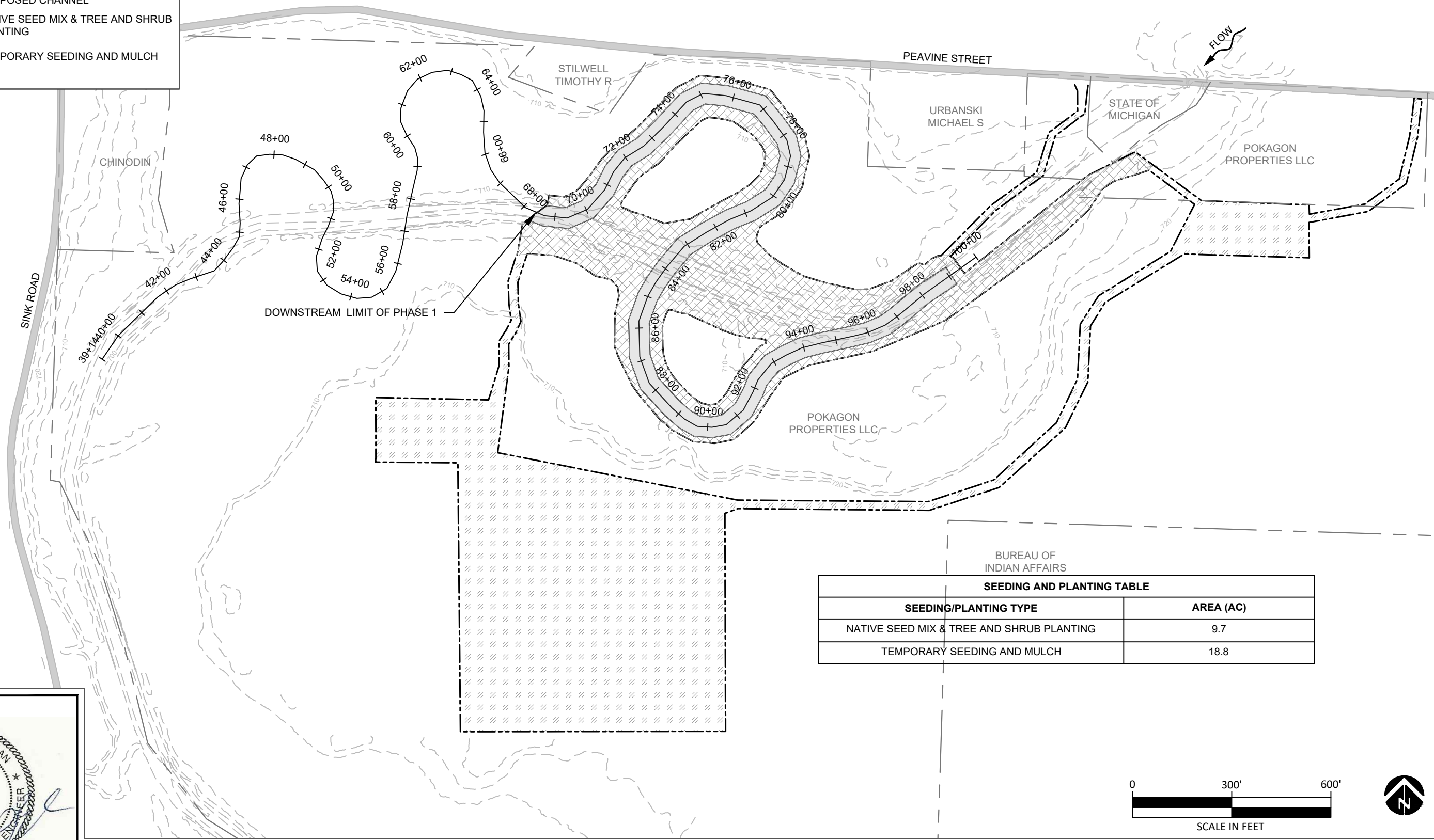


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TYPICAL LARGE WOOD DETAILS

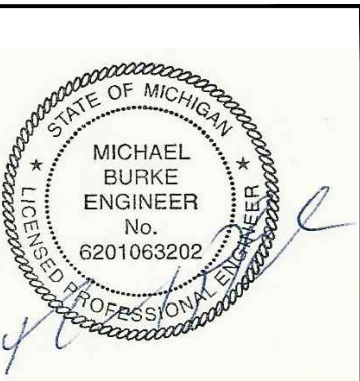
LEGEND

- EXISTING 5' CONTOUR
- PROPOSED CHANNEL ALIGNMENT
- PROPERTY BOUNDARY
- LIMITS OF DISTURBANCE
- PROPOSED CHANNEL
- NATIVE SEED MIX & TREE AND SHRUB PLANTING
- TEMPORARY SEEDING AND MULCH



BUREAU OF INDIAN AFFAIRS

SEEDING AND PLANTING TABLE	
SEEDING/PLANTING TYPE	AREA (AC)
NATIVE SEED MIX & TREE AND SHRUB PLANTING	9.7
TEMPORARY SEEDING AND MULCH	18.8

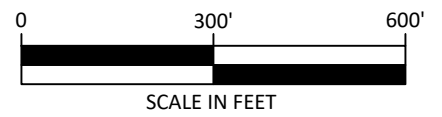


NO.	BY	DATE	REVISION DESCRIPTION

**DOWAGIAC RIVER RESTORATION
PHASE 1
POKAGON BAND OF POTAWATOMI
CASS COUNTY, MI**



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PLANTING PLAN