MINNESOTA DEPARTMENT OF TRANSPORTATION
CARNELIAN - MARINE - ST. CROIX WATERSHED DISTRICT
CONSTRUCTION PLAN FOR MARINE RAVINE STABILIZATION

LOCATED ON T.H. 95 FROM CHESTNUT STREET TO 1/2 MILES NE OF CHESTNUT STREET IN MARINE ON ST. CROIX

STATE PROJ. NO. 8210-109
GROSS LENGTH 170 FEET 0.03 MILES
NET LENGTH 170 FEET 0.03 MILES
REF POINT 092+00.368

PROJECT LOCATION

AGREEMENT NO. 1033420
CARNELIAN - MARINE - ST. CROIX WATERSHED DISTRICT
STATE FUND STATE FUND (TH 95 = 95)
METRO DISTRICT

DESIGN DESIGNATION

<table>
<thead>
<tr>
<th>PLAN</th>
<th>SHEET NO.</th>
<th>APPR.</th>
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| DATE |  |  |

STATE PROJ. NO. 8210-109
CHARGE IDENTIFIER 8210-109

STATE PROJ. NO. 8210-109 (T.H. 95 = 95) SHEET NO. 01 OF 12 SHEETS
## SCHEDULE OF ESTIMATED QUANTITIES

### Base Bid

<table>
<thead>
<tr>
<th>Item #</th>
<th>MnDOT Item No.</th>
<th>Item</th>
<th>Unit</th>
<th>Estimated</th>
<th>Notes</th>
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### Bid Substitute

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<td>24&quot; Pipe Culvert - HDPP</td>
<td>LIN FT</td>
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### General Notes:

1. **There are 35 trees (6" or greater) noted to be removed per the plans; any additional trees within the construction limits shall be approved by the engineer and shall be incidental to the line item.**
2. **18" CS pipe apron.**
3. **Striping, stockpiling and re-spreading topsoil shall be considered part of common excavation with no additional measurement or payment.**
4. **Excavated material deemed unsuitable for reuse on site shall become the property of the contractor and shall be removed from the site.**
5. **Contractor shall be responsible to import suitable clean fill as necessary beyond suitable excavated onsite soil.**
6. **Manhole lengths listed on sheet 07 are for informational purposes, manholes shall be paid for as "each".**
7. **This allowance is only intended to be utilized for items and quantities beyond what is listed in the SEQ. Please see special provisions for a full breakdown on the allowance.**
8. **This quantity represents 4,000 lb/acre throughout per sheet 08 and the lower 300 foot of both ravine banks.**
9. **Application rate: 7 lb/acre.**
10. **Application rate: 4 lb/acre.**
11. **Warranty is 100% watershed district cost and encompasses two years following final payment.**
12. **Storm sewer in the bid substitution shall replace the HDPP pipe in the base bid (line items 11 & 12).**

### SCHEDULE OF ESTIMATED QUANTITIES

**CARNELIAN MARINE ST CROIX WATERSHED DISTRICT**

**MARINE RAVINE STABILIZATION**

**MARINE ON ST CROIX, WASHINGTON COUNTY, MINNESOTA**

**STATE PROJECT NO.: SP8210-109**

**T.H.: 95**

**Emmons & Olivier Resources, Inc.**

**7030 6th Street North**

**Oakdale, MN 55128**

**Tele: 651.770.8448**

**www.eorinc.com**

**DATE: 04/12/2019**

**LICENSE # 54906**

**HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.**

**KYLE D. CRAWFORD, P.E.**

**DATE: 04/12/2019**
1. CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES AS SHOWN ON THE CONTRACT DOCUMENTS. PRIOR TO THE START OF GRADE WORK, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS.

2. CONTRACTOR SHALL PROVIDE HORIZONTAL AND VERTICAL CONTROL BENCHMARKS. CONTRACTOR SHALL SET 2" CLASS II BENCHMARKS OR EQUIVALENT AT A MINIMUM INTERVAL OF 500 FEET AND NOTIFY THE PROJECT ENGINEER OF THEIR LOCATION PRIOR TO THE START OF GRADE WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF THE BENCHMARKS.

3. SEE RESTORATION, SHEET 08 FOR VEGETATION RESTORATION REQUIREMENTS.

4. TOPOGRAPHIC SURVEY BY EOD, INC.

5. A CONSTRUCTION STAGING PLAN SHALL BE PREPARED AND SUBMITTED BY THE CONTRACTOR FOR REVIEW PRIOR TO THE START OF WORK. THE STAGING PLAN SHALL ACCOUNT FOR ALL UTILITY CONNECTIONS OR EXISTING CONDITIONS BETWEEN PLANS AND FIELD CONDITIONS SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY.

6. ALL UTILITY WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CITY OF MARINE ON ST. CROIX AND MINNETONKA SPECIFICATIONS AND BENCHMARK SET REQUIREMENTS.

7. UTILITY TRENCHES SHALL BE COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY AT MINIMUM, TO A MAXIMUM DEPTH OF TWO FEET FROM THE GROUND SURFACE AND 10% STANDARD PROCTOR IN THE UPPER THREE FEET.

8. FIELD ADJUST ALL CASTINGS AND STRUCTURES TO MATCH FINAL GRADES.

9. CONTRACTOR SHALL NOTIFY NSGW ON 48 HOURS ADVANCE OF WORKING WITHIN THE EXISTING RIGHT OF WAY.

10. UTILITIES SHOWN ARE PRESENTED AT QUALITY LEVEL 2 AS defined by ASCE STANDARD 38-02.

STORM SEWER NOTES

1. STORM SEWER CONSTRUCTION IS IN ACCORDANCE WITH MINN 2501-2011 SPECIFICATIONS.

2. STORM SEWER SHALL BE AS SPECIFIED.

3. PIPE LENGTHS ON THE PLAN ARE FROM CENTER TO CENTER OF STRUCTURES.

4. APPLY SEAL TO ALL JOINTS, SEAMS, RINGS, MORTAR, ETC. PER MANUFACTURER'S INSTRUCTIONS.

GENERAL LANDSCAPE NOTES

1. CONTRACTOR SHALL INSPECT THE SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS RELATING TO SITE CONDITIONS. CONTRACTOR SHALL VERIFY PLAN LAYOUT AND BEING TO THE ATTENTION OF THE ENGINEER DISCREPANCIES WHICH MAY COMPROMISE THE DESIGN OR INTENT OF THE LAYOUT.

2. CONTRACTOR SHALL ASSURE COMPLIANCE WITH APPLICABLE CODES AND REGULATIONS GOVERNING THE WORK TO BE PERFORMED AND MATERIALS SUPPLIED.

3. CONTRACTOR SHALL PROTECT EXISTING ROADS, CURB/SURFACES, TREES, AND SITE ELEMENTS DURING CONSTRUCTION OPERATIONS. DAMAGE TO SAME SHALL BE REPAIRED AT NO ADDITIONAL COST TO THE OWNER.

4. CONTRACTOR SHALL REVIEW THE SITE FOR DISCREPENCIES IN SITE CONDITIONS WHICH MIGHT NEGATIVELY AFFECT EXISTING SAFETY HAZARDS. MAY OCCUR DURING CONSTRUCTION, IMMEDIATELY NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS.

5. CONTRACTOR SHALL REVIEW THE SITE FOR DISCREPENCIES IN SITE CONDITIONS WHICH MIGHT NEGATIVELY AFFECT EXISTING SAFETY HAZARDS. MAY OCCUR DURING CONSTRUCTION, IMMEDIATELY NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS.

6. CONTRACTOR IS RESPONSIBLE FOR ONGOING MAINTENANCE OF NEWLY INSTALLED MATERIALS UNTIL TIME OF FINAL COMPLETION. REPAIR OF ACTS OF VANDALISM OR DAMAGE WHICH MAY OCCUR FROM SUBSTANTIAL COMPLETION SHALL BE THE RESPONSIBILITY OF THE LANDSCAPE CONTRACTOR.

7. CONTRACTOR SHALL BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO REMOVAL.

8. CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES AS SHOWN ON THE CONTRACT DOCUMENTS. PRIOR TO THE START OF GRADE WORK, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS.

9. CONTRACTOR SHALL PROVIDE HORIZONTAL AND VERTICAL CONTROL BENCHMARKS. CONTRACTOR SHALL SET 2" CLASS II BENCHMARKS OR EQUIVALENT AT A MINIMUM INTERVAL OF 500 FEET AND NOTIFY THE PROJECT ENGINEER OF THEIR LOCATION PRIOR TO THE START OF GRADE WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF THE BENCHMARKS.

10. SEE RESTORATION, SHEET 08 FOR VEGETATION RESTORATION REQUIREMENTS.

11. TOPOGRAPHIC SURVEY BY EOD, INC.

12. A CONSTRUCTION STAGING PLAN SHALL BE PREPARED AND SUBMITTED BY THE CONTRACTOR FOR REVIEW PRIOR TO THE START OF WORK. THE STAGING PLAN SHALL ACCOUNT FOR ALL UTILITY CONNECTIONS OR EXISTING CONDITIONS BETWEEN PLANS AND FIELD CONDITIONS SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY.

13. ALL UTILITY WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CITY OF MARINE ON ST. CROIX AND MINNETONKA SPECIFICATIONS AND BENCHMARK SET REQUIREMENTS.

14. UTILITY TRENCHES SHALL BE COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY AT MINIMUM, TO A MAXIMUM DEPTH OF TWO FEET FROM THE GROUND SURFACE AND 10% STANDARD PROCTOR IN THE UPPER THREE FEET.

15. FIELD ADJUST ALL CASTINGS AND STRUCTURES TO MATCH FINAL GRADES.

16. CONTRACTOR SHALL NOTIFY NSGW ON 48 HOURS ADVANCE OF WORKING WITHIN THE EXISTING RIGHT OF WAY.

17. UTILITIES SHOWN ARE PRESENTED AT QUALITY LEVEL 2 AS defined by ASCE STANDARD 38-02.

18. STORM SEWER CONSTRUCTION IS IN ACCORDANCE WITH MINN 2501-2011 SPECIFICATIONS.

19. STORM SEWER SHALL BE AS SPECIFIED.

20. PIPE LENGTHS ON THE PLAN ARE FROM CENTER TO CENTER OF STRUCTURES.

21. APPLY SEAL TO ALL JOINTS, SEAMS, RINGS, MORTAR, ETC. PER MANUFACTURER'S INSTRUCTIONS.

22. CONTRACTOR SHALL INSPECT THE SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS RELATING TO SITE CONDITIONS. CONTRACTOR SHALL VERIFY PLAN LAYOUT AND BEING TO THE ATTENTION OF THE ENGINEER DISCREPANCIES WHICH MAY COMPROMISE THE DESIGN OR INTENT OF THE LAYOUT.

23. CONTRACTOR SHALL ASSURE COMPLIANCE WITH APPLICABLE CODES AND REGULATIONS GOVERNING THE WORK TO BE PERFORMED AND MATERIALS SUPPLIED.

24. CONTRACTOR SHALL PROTECT EXISTING ROADS, CURB/SURFACES, TREES, AND SITE ELEMENTS DURING CONSTRUCTION OPERATIONS. DAMAGE TO SAME SHALL BE REPAIRED AT NO ADDITIONAL COST TO THE OWNER.

25. CONTRACTOR SHALL REVIEW THE SITE FOR DISCREPENCIES IN SITE CONDITIONS WHICH MIGHT NEGATIVELY AFFECT EXISTING SAFETY HAZARDS. MAY OCCUR DURING CONSTRUCTION, IMMEDIATELY NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS.

26. CONTRACTOR SHALL REVIEW THE SITE FOR DISCREPENCIES IN SITE CONDITIONS WHICH MIGHT NEGATIVELY AFFECT EXISTING SAFETY HAZARDS. MAY OCCUR DURING CONSTRUCTION, IMMEDIATELY NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS.

27. CONTRACTOR IS RESPONSIBLE FOR ONGOING MAINTENANCE OF NEWLY INSTALLED MATERIALS UNTIL TIME OF FINAL COMPLETION. REPAIR OF ACTS OF VANDALISM OR DAMAGE WHICH MAY OCCUR FROM SUBSTANTIAL COMPLETION SHALL BE THE RESPONSIBILITY OF THE LANDSCAPE CONTRACTOR.

28. CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES AS SHOWN ON THE CONTRACT DOCUMENTS. PRIOR TO THE START OF GRADE WORK, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS.

29. CONTRACTOR SHALL PROVIDE HORIZONTAL AND VERTICAL CONTROL BENCHMARKS. CONTRACTOR SHALL SET 2" CLASS II BENCHMARKS OR EQUIVALENT AT A MINIMUM INTERVAL OF 500 FEET AND NOTIFY THE PROJECT ENGINEER OF THEIR LOCATION PRIOR TO THE START OF GRADE WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF THE BENCHMARKS.

30. SEE RESTORATION, SHEET 08 FOR VEGETATION RESTORATION REQUIREMENTS.

31. TOPOGRAPHIC SURVEY BY EOD, INC.

32. A CONSTRUCTION STAGING PLAN SHALL BE PREPARED AND SUBMITTED BY THE CONTRACTOR FOR REVIEW PRIOR TO THE START OF WORK. THE STAGING PLAN SHALL ACCOUNT FOR ALL UTILITY CONNECTIONS OR EXISTING CONDITIONS BETWEEN PLANS AND FIELD CONDITIONS SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY.

33. ALL UTILITY WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CITY OF MARINE ON ST. CROIX AND MINNETONKA SPECIFICATIONS AND BENCHMARK SET REQUIREMENTS.

34. UTILITY TRENCHES SHALL BE COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY AT MINIMUM, TO A MAXIMUM DEPTH OF TWO FEET FROM THE GROUND SURFACE AND 10% STANDARD PROCTOR IN THE UPPER THREE FEET.

35. FIELD ADJUST ALL CASTINGS AND STRUCTURES TO MATCH FINAL GRADES.

36. CONTRACTOR SHALL NOTIFY NSGW ON 48 HOURS ADVANCE OF WORKING WITHIN THE EXISTING RIGHT OF WAY.

37. UTILITIES SHOWN ARE PRESENTED AT QUALITY LEVEL 2 AS defined by ASCE STANDARD 38-02.
**Storm Water Pollution Prevention Plan (SWPPP) Narrative**

1. **Property Description/Location:**
   - The property is located on the coast between the city of Duluth and the city of Superior.
   - The project includes an area where the property is located.

2. **Stormwater Management:**
   - The area is subject to stormwater management practices.
   - Stormwater management practices include:
     - Drainage systems
     - Wetland management
     - Sediment control measures

3. **Design and Construction:**
   - The design and construction of the project is being managed by a licensed professional engineer.
   - The project is being managed by Emmons & Olivier Resources, Inc.

4. **Permits and Approvals:**
   - The project requires permits and approvals from local and state agencies.
   - The project was approved by the local permitting authority.

5. **Construction Materials:**
   - The project uses materials such as concrete, asphalt, and rock.

6. **Environmental Considerations:**
   - The project is designed to minimize environmental impact.
   - The project includes measures to protect waterways and wetlands.

7. **Inspections:**
   - Inspections are required throughout the construction process.
   - Inspections are conducted by a licensed professional engineer.

8. **Maintenance:**
   - Maintenance of the project is ongoing.
   - Maintenance includes:
     - Cleaning
     - Repairs
     - Repainting

9. **Contact Information:**
   - For more information, contact Emmons & Olivier Resources, Inc.
   - Contact information:
     - Phone: (651) 770-8448
     - Website: www.eorinc.com

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**State Project No.: 8210-109**

**T.H. 95**

**Emmons & Olivier Resources, Inc.**

7030 6th Street North
Oakdale, MN 55128

Tele: 651.770.8448

www.eorinc.com

**CARNELIAN MARINE ST CROIX WATERSHED DISTRICT**

21150 OZARK AVENUE N
SCANDIA, MN 55073

**KYLE D. CRAWFORD, P.E.**

DATE: 04/12/2019

LICENSE # 54906

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**MARINE RAVINE STABILIZATION**

MARINE ON ST CROIX, WASHINGTON COUNTY, MINNESOTA

**CARNELIAN MARINE ST CROIX WATERSHED DISTRICT**

21150 OZARK AVENUE N
SCANDIA, MN 55073

**KYLE D. CRAWFORD, P.E.**

DATE: 04/12/2019

LICENSE # 54906
NOTE:
1. CONTRACTOR SHALL CUT TREES FLUSH WITH GROUND ALONG RAVINE BANKS; ENGINEER WILL PROVIDE FIELD DIRECTION.
2. ADDITIONAL REPAIRS TO CONCRETE AND GRAVEL DRIVEWAY SHALL BE DONE AT THE CONTRACTOR'S EXPENSE.
3. CONTRACTOR SHALL APPLY STUMP HERBICIDE (TRICLOPYR OR EQUIVALENT PRODUCT) TO PREVENT SUCKERING OF ALL BLACK LOCUST, BOX ELDER AND ELM STUMPS. THIS SHALL BE INCIDENTAL TO CLEARING AND GRUBBING.

EXISTING CONDITIONS & REMOVALS

- TREE REMOVAL (6"-16") : 70
- TREE REMOVAL (16"-32") : 13
- TREE REMOVAL (32"+) : 2

NOTES:
- CONTRACTOR SHALL SAWCUT AND REMOVE CONCRETE DRIVEWAY AFTER CONSTRUCTION HAS BEEN COMPLETED (50 SY).
- CONSTRUCTION LIMITS (TYP.):
  - TREE REMOVAL (6"-16") : 70
  - TREE REMOVAL (16"-32") : 13
  - TREE REMOVAL (32"+) : 2

- SALVAGE EXISTING RIPRAP AND STOCKPILE ONSITE
- EX. GARAGE
- EX. RETAINING WALL
- STAGING AND STOCKPILE AREA
- EX. GARDEN
- CONSTRUCTION LIMITS (TYP.)
- TREE REMOVAL (TYP.)
NOTES:
1. INSTALLATION OF MANHOLES AND PORTIONS OF STORM SEWER MAY REQUIRE ROCK EXCAVATION. THIS SHALL BE INCIDENTAL TO INSTALLATION. LIKELIEST LOCATIONS FOR BEDROCK CONFLICTS ARE STA 0+80 TO 1+50 AND 2+50 TO 3+00.
2. ALL PIPE JOINTS SHALL BE WRAPPED W/ INFI-SHIELD GATOR WRAP (12' WIDTH) OR APPROVED EQUIVALENT.
3. PIPE LENGTHS DO NOT INCLUDE APRON.
4. BRUSH PILES SHALL BE COORDINATED IN FIELD W/ ENGINEER. THESE SHALL CONSIST OF ALL TRIMMINGS, BRUSH, TWIGS AND LEFTOVER LOGS NOT UTILIZED ON THE DITCH CHECKS, TOE STABILIZATION AND SIDE SLOPE GRADE CONTROLS. BRUSH PILES SHALL BE INCIDENTAL TO CLEARING AND GRUBBING.
5. MOUNDING OF PIPE BACKFILL SHALL BE INCIDENTAL TO INSTALLATION OF STORM SEWER.

CONSTRUCTION LIMITS (TYP.)
INSTALL RIPRAP CL. IV APRON - 56 CY
SEDIMENT REMOVAL FROM WETLAND (ESTIMATED 2' DEPTH)

DELINEATED WETLAND BOUNDARY

Spatial Data Provided by 811, Inc. (Call Before You Dig)
MANHOLE COVER SHALL BE STAMPED "STORM SEWER".
MANHOLE BASE SHALL BE 8" CONCRETE AND SHALL HAVE GALVANIZED STEEL SCOUR PLATE INSTALLED AT ELEVATIONS SHOWN IN DETAIL 07/10.
MANHOLE HEIGHTS LISTED ABOVE ARE FOR INFORMATIONAL PURPOSES; MANHOLES SHALL BE PAID FOR AS "EACH" AS LISTED IN THE BID FORM AND SEO.
PIPE AND STRUCTURE BEDDING SHALL BE INCIDENTAL TO INSTALLATION OF STORM SEWER.
INSTALLATION OF MANHOLES AND PORTIONS OF STORM SEWER MAY REQUIRE ROCK EXCAVATION, THIS SHALL BE INCIDENTAL TO INSTALLATION.

NOTES:
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The Contractor shall mound backfill 4½" above existing grade over pipe between STMH-02 and STMH-03.

Scales:
- Horizontal - 1" = 40'
- Vertical - 1" = 20'

**Pipe Table**

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<th>STEPS REQUIRED</th>
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<td>STMH-03</td>
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**SCALE IN FEET**

**CONSTRUCTION LIMITS (TYP.)**

**STN** | **T.H.** | **95** | **CARNELIAN MARINE ST CROIX WATERSHED DISTRICT**
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<td>03</td>
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<td>11</td>
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<td>21150 OZARK AVENUE N</td>
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<tr>
<td>12</td>
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**EXISTING GRADE**

**PROPOSED GRADE**

**CONTRACTOR SHALL MOUND BACKFILL 4½" ABOVE EXISTING GRADE OVER PIPE BETWEEN STMH-02 AND STMH-03**

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**Scales:**
- **Horizontal - 1" = 40'**
- **Vertical - 1" = 20'**

**Emmons & Olivier Resources, Inc.**

**7030 6TH STREET NORTH**

**OAKDALE, MN 55128**

**Tele: 651.770.8448**

**www.eorinc.com**

**KYLE D. CRAWFORD, P.E.**

**DATE: 04/12/2019**

**LICENSE # 54906**

**HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.**

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NOTES:
1. SIGNAGE SHALL FOLLOW MMUTCD FIELD MANUAL, SPECIFICALLY 6K-29 FOR LANE SHIFT ON A TWO-WAY ROAD.
**LOG BANK TOE STABILIZATION**

**LOG CHECK DETAIL**

**SECTION**

**PROFILE**

**PLAN VIEW**

**PLAN**

**NOTES:**

1. SPECIFIC ORIENTATION OF LOGS AND BALLAST MATERIALS MAY VARY FROM TYPICAL DRAWINGS DEPENDING ON SIZE AND SHAPE OF MATERIAL DELIVERED OR SALVAGED.
2. WOOD PLACEMENT TO BE DIRECTED BY ENGINEER IN THE FIELD AT THE TIME OF CONSTRUCTION. EXACT PLACEMENT LOCATION AND NUMBER OF PIECES PER BANK TO BE DICTATED BASED ON FIELD CONDITIONS.
3. UPSTREAM LOG TO OVERLAP START OF DOWNSTREAM LOG MINIMUM 12 INCHES.

**EXISTING GROUND SURFACE**

**COMPACTED SUBGRADE**

**TRENCH LOGS 6-INCHES INTO SUBGRADE**

**OVERLAP LOG SEAMS MIN. 6"**

**12-INCH RISE**

**12-INCH CREST HEIGHT**

**FLOW**

**EXISTING GROUND SURFACE**

**TRENCH LOG 6-INCHES INTO SUBGRADE**

**LOG CHECK CREST HEIGHT: 12-INCHES**

**EXISTING GROUND SURFACE**

**LOG CHECK CREST HEIGHT: 12-INCHES**

**TIGHTLY PACKED FILL INCLUDING SOIL AND SLASH**

**FOOTER LOG**

**STABILIZE BANKS W/ RFM**

**CROSS SECTION**

**EXISTING TOE OF SLOPE**

**TOE OF SLOPE**

**OVERLAP LOG SEAMS MIN. 6"**

**FLOW**

**EXISTING GROUND SURFACE**

**TOE OF SLOPE**

**NOTE:**

1. POSITION OF LOGS TO BE DETERMINED BY ENGINEER IN THE FIELD.
2. MINIMUM LOG DIAMETER 18", LENGTHS VARY AND DEPEND ON CHANNEL WIDTH.
3. LOGS SHALL BE FROM A HARDWOOD SOURCE AS VERIFIED IN FIELD BY ENGINEER.
4. ALL LOGS SHALL COME FROM THE PROJECT SITE.
REINFORCING BAR LIST

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Lengths:
- 7'-6" (3 sheets)
- 3'-8" (6 sheets)
- 8'-1" (3 sheets)
- 3'-8" (6 sheets)
- 9'-8" (3 sheets)
- 3'-8" (7 sheets)
- 10'-3" (3 sheets)
- 3'-8" (1 sheet)
- 10'-9" (3 sheets)
- 3'-8" (1 sheet)
- 2'-4" (3 sheets)
- 2'-10" (2 sheets)
- 3'-5" (1 sheet)
- 4'-6" (1 sheet)
- 5'-7" (1 sheet)
- 6'-8" (1 sheet)
- 7'-3" (1 sheet)

48" - 54" - 60" - 66" - 72" - 78" - 84"

HDPP INLET
HDPP OUTLET

5 GAUGE 1/4" GALV. STEEL SCOUR PLATE 3.5" W X 3.5" H

CONCRETE MANHOLE BASE SLAB
CONCRETE MANHOLE COVER SLAB
CONCRETE MANHOLE
METAL APRON
PIPE BEDDING
APRON FOOTING
MANHOLE SCOUR PROTECTION PLATE - STHM 02 & 03

1. SCOUR PLATE SHALL BE SECURED TO THE MANHOLE BY 1" DIA. 4" MIN. LENGTH STAINLESS STEEL BOLTS and BRACKETS (A MINIMUM OF 6 TOTAL)

3.5"
1. SPACE STAKES AS FOLLOWS:
   - FILTER SOCKS: 2"X2" NOMINAL WOOD STAKES AT 8 FOOT MAXIMUM STAKING.
   - WOOD EXCELSIOR LOGS AND STRAW WATTLES: 1"X1" NOMINAL WOOD STAKES AT 8 FOOT MAXIMUM SPACING.

2. INSTALL SLOPE PROTECTION PERPENDICULAR TO SLOPE (PARALLEL TO CONTOURS). OVERLAP JOINTS PER DETAIL 'A'. RUN THE LAST 10 FEET OF EACH DEVICE UP THE SLOPE TO PREVENT FLOW RUNAROUND.

3. STAKES ARE NOT TO PROTRUDE THROUGH LOGS, BUT RATHER PLACED ON THE DOWNSTREAM SIDE AT A 45 DEGREE ANGLE SO AS TO "PINCH" THE LOG TIGHT TO THE GROUND SURFACE.

4. 100% COIR/WOOD FIBER LOGS 9" DIA. ROLL (CURLEX SEDIMENT LOG OR APPROVED EQUAL.) TOP OF SLOPE OR UNDISTURBED AREA INSTALLATION LENGTH (MEASURED ALONG DEVICE) 212" MIN.

INSET

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