

DETROIT RIVER AOC- SOUTH HENNEPIN MARSH HABITAT RESTORATION PROJECT

THE DETROIT RIVER, WAYNE COUNTY, MICHIGAN
CONSTRUCTION DOCUMENTS - APRIL 2021

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GREAT LAKES RESTORATION INITIATIVE (GLRI)
GRANT #NA19NMF4630266



PREPARED FOR FRIENDS
OF THE DETROIT RIVER BY:



2200 Commonwealth Boulevard, Suite 300
Ann Arbor, Michigan 48105
Phone: 734.769.3004
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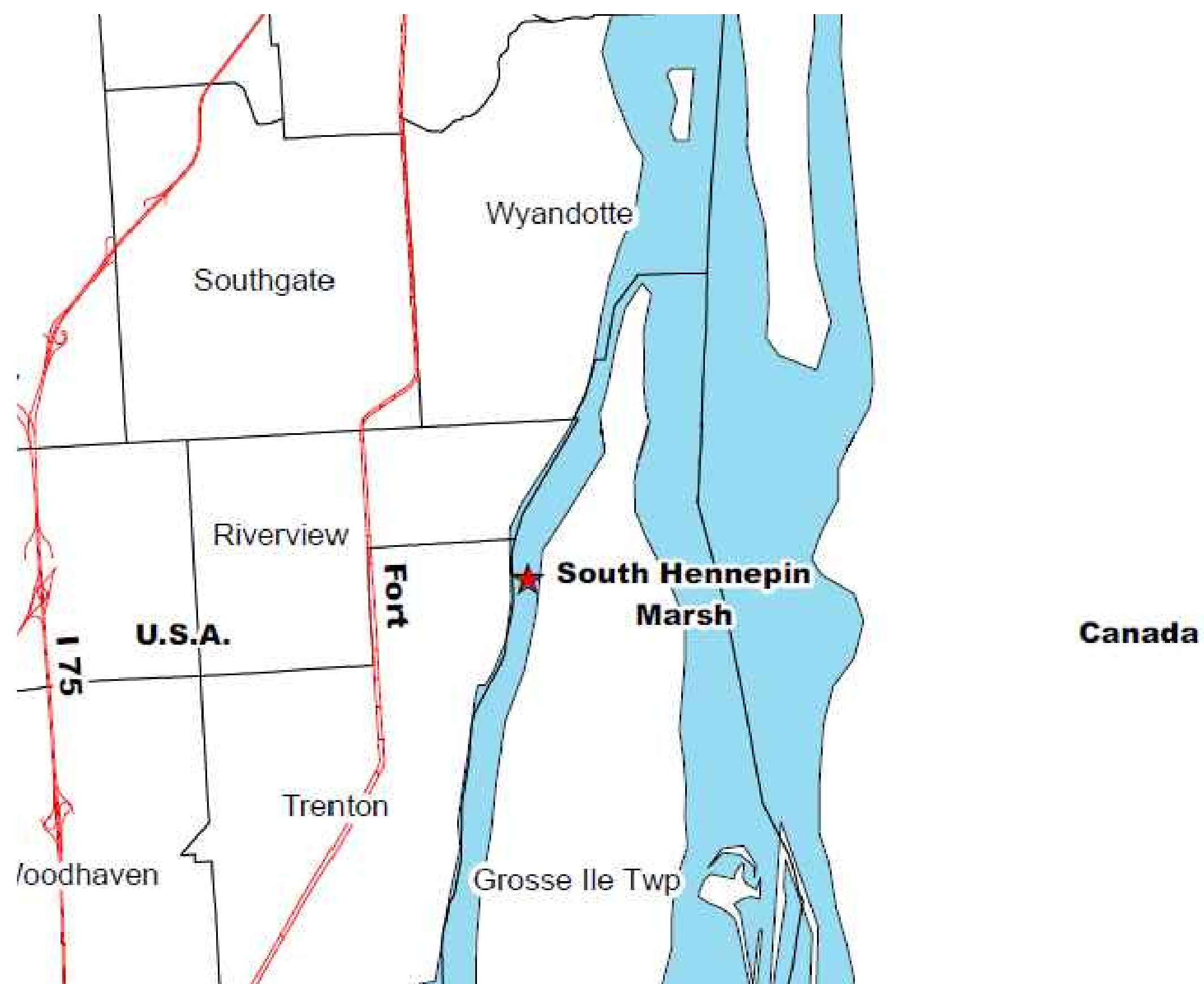
WITH:



Herpetological Resource and Management



DETROIT RIVER
WAYNE COUNTY, MI
NOT TO SCALE



PROJECT VICINITY MAP
NOT TO SCALE



DRAWING INDEX

1. COVER SHEET
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10. REVEGETATION DETAILS

EXISTING CONDITIONS NOTES:

1. THE CONTRACT DOCUMENTS REFLECT SURVEYS AND ELEVATIONS AT THE WORK AREA AS FOUND IN CONDITIONS SURVEYS MADE AS STATED ON THE DRAWINGS. THE CONDITIONS SHOWN ARE INDICATIVE OF THOSE THAT PREVAILED AT THE TIME OF THE SITE INVESTIGATIONS AND MAY BE DIFFERENT THAN THOSE AT THE TIME OF CONSTRUCTION. GENERAL LOCATIONS OF APPLICABLE EXISTING UTILITIES, VEGETATION, STRUCTURES, EQUIPMENT AND IMPROVEMENTS, BASED UPON LATEST INFORMATION AVAILABLE HAVE BEEN SHOWN ON THE DRAWINGS.
2. UTILITY LINES, VEGETATION, STRUCTURES, EQUIPMENT OR IMPROVEMENTS SHALL BE PROTECTED FROM DAMAGE, AND IF DAMAGED, SHALL BE REPAIRED BY THE CONTRACTOR AT ITS OWN EXPENSE.
3. THE WATER SURFACE ELEVATION AT THE TIME OF THE SURVEY WAS 574.2 AND IS SHOWN ON THE PROJECT DRAWINGS. WATER LEVELS HAVE FLUCTUATED SINCE THE SURVEY WAS CONDUCTED. CONTRACTOR TO USE BEST AVAILABLE INFORMATION TO UNDERSTAND THE CONDITIONS OF THE WATER LEVELS.
4. SEE ALSO WATER LEVEL NOTES, THIS SHEET.
5. CONTRACTOR TO CONDUCT BATHYMETRIC SURVEY PRIOR TO CONSTRUCTION AND TO NOTIFY ENGINEER OF ANY SIGNIFICANT DIFFERENCES IN DATA FROM THAT WHICH IS SHOWN HERE.

SURVEY NOTES:

1. HORIZONTAL DATUM IS ACCORDING TO MICHIGAN STATE PLANE COORDINATES, SOUTH ZONE (2113), INTERNATIONAL FEET AS LINEAR UNIT OF MEASURE.
2. VERTICAL DATUM IS ACCORDING TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), WITH PRIMARY BENCHMARKS AND DATUM CONVERSIONS LISTED HEREON.
3. THIS SURVEY DOES NOT CONSTITUTE A TITLE SEARCH BY THE SURVEYOR. ALL INFORMATION REGARDING LAND BOUNDARY, EASEMENTS, AND OTHER INFORMATION THAT MAY AFFECT TITLE WAS GAINED FROM A CLIENT PROVIDED ALTA SURVEY, PROPERTY INFORMATION REFERENCE.
4. NO UNDERGROUND UTILITIES WERE RESEARCHED AS PART OF THIS EFFORT. NO EXCAVATIONS WERE MADE AS PART OF THIS SURVEY TO LOCATE BURIED STRUCTURES AND OR UTILITIES.
5. SUBSURFACE AND ENVIRONMENTAL CONDITIONS WERE NOT EXAMINED AND ARE NOT CONSIDERED A PART OF THIS SURVEY. NO STATEMENT IS MADE CONCERNING THE EXISTENCE OF UNDERGROUND OR OVERHEAD CONTAINERS OR FACILITIES THAT MAY AFFECT THE USE AND OR DEVELOPMENT OF THIS SITE.
6. MIDWESTERN CONSULTING PERFORMED A BATHYMETRIC SURVEY OF A PORTION OF THE DETROIT RIVER, ADJACENT TO SOUTH HENNEPIN MARSH, AS ILLUSTRATED HEREON. THE RESULTANT ONE-FOOT CONTOURS ARE BASED ON SOUNDINGS, COMBINED WITH SHORE TOPOGRAPHY COLLECTED USING GLOBAL POSITIONING RECEIVERS REFERENCING THE MICHIGAN CONTINUOUSLY OPERATING REFERENCE SYSTEM (CORS) FOR PROJECT SITE CONTROL.

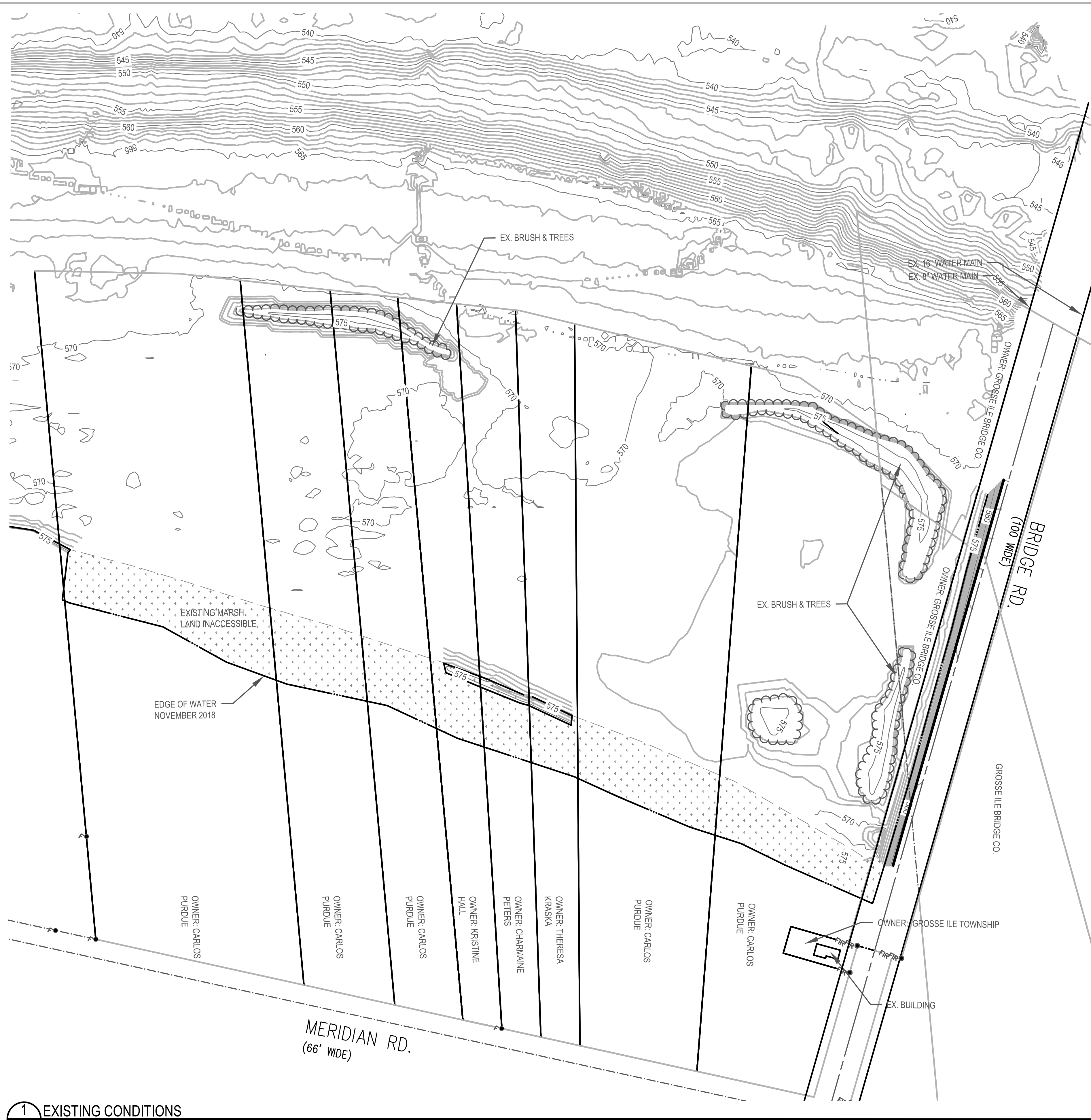
DATUM CONVERSIONS:

NAVD88 = IGLD85 + 0.27 FEET
 NAVD88 = NGVD29 - 0.56 FEET

FLOODPLAIN NOTES:

THE ENTIRETY OF SOUTH HENNEPIN LIES WITHIN FEMA FIRM ZONE AE, ACCORDING TO FEMA FIRM MAPS 26163C0413E. COMMUNITY 280227, PANEL NO. 416 OF 575, MAP REVISED FEBRUARY 2, 2012. THE FOLLOWING STATEMENTS APPLY:

- ZONE AE IS DEFINED AS "BASE FLOOD ELEVATIONS DETERMINED."
- FLOODWAY AREAS IN ZONE AE MUST BE KEPT FREE OF ENCROACHMENT SO THAT THE 1% ANNUAL CHANCE FLOOD CAN BE CARRIED WITHOUT SUBSTANTIAL INCREASES IN FLOOD HEIGHTS.



LEGEND

	838	EXIST. CONTOUR
		EDGE OF WATER (ON DATE OF FIELD WORK)
		EXIST. WATER MAIN
		EXIST. PARCEL BOUNDARY
		TREE OR BRUSH LIMIT
		INACCESSIBLE MARSH LAND
	F	FOUND IRON PIPE
	FPK	FOUND P.K.
	FIR	FOUND IRON ROD

BASE SURVEY CONDUCTED BY MIDWESTERN CONSULTING, NOVEMBER 20, 2018
WATER ELEVATION AT TIME OF SURVEY = 574.2 (NAVD88 DATUM)

DATA COLLECTION:
 GRID: STATEPLANE NAD83 (MI SOUTH 2113) INTERNATIONAL FEET
 GPS: LEICA GS20 RTK
 FATHOMETER: TELEDYNE EV 100 WITH 3 DEGREE TRANSDUCER

BENCHMARK SOUTH SURVEY:
 T/IRON PIPE CP#5 LOCATED AT WATERS EDGE ON TAX PARCEL 75 006 01 0003 001
 ELEVATION = 577.38 (NAVD88 DATUM)

WATER LEVEL NOTES:

THE CONTRACTOR UNDERSTANDS AND ACKNOWLEDGES THAT THE PERFORMANCE OF THE WORK IS REQUIRED WITHIN THE DETROIT RIVER SYSTEM AND FLOODPLAIN AND THAT THE DETROIT RIVER WATER LEVEL FLUCTUATES FREQUENTLY. THE CONTRACTOR UNDERSTANDS AND ACKNOWLEDGES THAT THEY HAVE TAKEN INTO ACCOUNT THE POTENTIAL FOR ANY WATER LEVEL CHANGES THAT MIGHT OCCUR IN COSTING AND PERFORMING THE CONTRACT WORK. THEREFORE, THE CONTRACTOR ACKNOWLEDGES THAT ANY FLUCTUATION IN WATER LEVELS DURING/OVER THE COURSE OF THE PROJECT WILL MOST LIKELY HAPPEN AND DOES NOT CONSTITUTE A CHANGE IN CONDITIONS OR AN UNFORESEEN SITE CONDITION.

THE CONTRACTOR SHALL BE FULLY AWARE OF THE DETROIT RIVER HYDROLOGY AND CURRENT WEATHER CONDITIONS SO THAT WORK IN PROGRESS CAN BE SECURED AND PROTECTED, SO THAT SAFE JOB SITE WORKING CONDITIONS ARE MAINTAINED, AND SO THAT SOIL EROSION IS MINIMIZED.

THE CONTRACTOR ACKNOWLEDGES THAT DELAYS IN THE START OF, OR COMPLETION OF, WORK DUE TO FLUCTUATIONS IN THE WATER LEVEL THROUGHOUT THE DURATION OF THE PROJECT SHALL NOT CONSTITUTE A CHANGE IN CONDITIONS NOR SHALL BE A BASIS FOR ANY EXTENSION OF TIME OR DAMAGES. IF THE CONTRACTOR SHALL BE UNAVOIDABLY DELAYED IN BEGINNING OR FULFILLING THIS CONTRACT BY REASONS OF CHANGING WATER LEVELS, EXCESSIVE STORMS OR FLOODS, THE CONTRACTOR SHALL HAVE NO VALID CLAIM FOR DAMAGES, BUT IT SHALL IN SUCH CASE BE ENTITLED TO AN EXTENSION OF TIME AS THE ENGINEER SHALL ADJUDGE TO BE JUST AND REASONABLE, PROVIDED THAT FORMAL CLAIM FOR AN EXTENSION OF TIME IS MADE IN WRITING BY THE CONTRACTOR WITHIN ONE WEEK OF THE ALLEGED DELAY.

DETROIT RIVER AOC-SOUTH HENNEPIN MARSH HABITAT RESTORATION PROJECT

FRIENDS OF THE DETROIT RIVER
WAYNE COUNTY, MICHIGAN

CONSTRUCTION DOCUMENTS 04-2021
 FOR AGENCY REVIEW 10-2020

180841
 ECT PROJECT NUMBER
 DESIGNED BY: AB/SR CHECKED BY: JO
 DRAWN BY: SR APPROVED BY: JO

SHEET TITLE
EXISTING CONDITIONS

SCALE: 1" = 100' @ 22" x 34"
 0 50 100 200

NORTH SHEET NUMBER
2

TEMPORARY CONSTRUCTION SIGN:

WHITE BACKGROUND

South Hennepin Marsh Habitat Restoration Project
Detroit River AOC
 Friends of the Detroit River

This project is funded by the U.S. National Oceanic and Atmospheric Association. A \$XXXXXXX Great Lakes Restoration Initiative Grant (Grant No. NA19NMF4630266) funds project implementation. The grant was received by Friends of the Detroit River.

Engineer: **ECT** Environmental Consulting & Technology, Inc. Contractor: (Insert Logo Here)

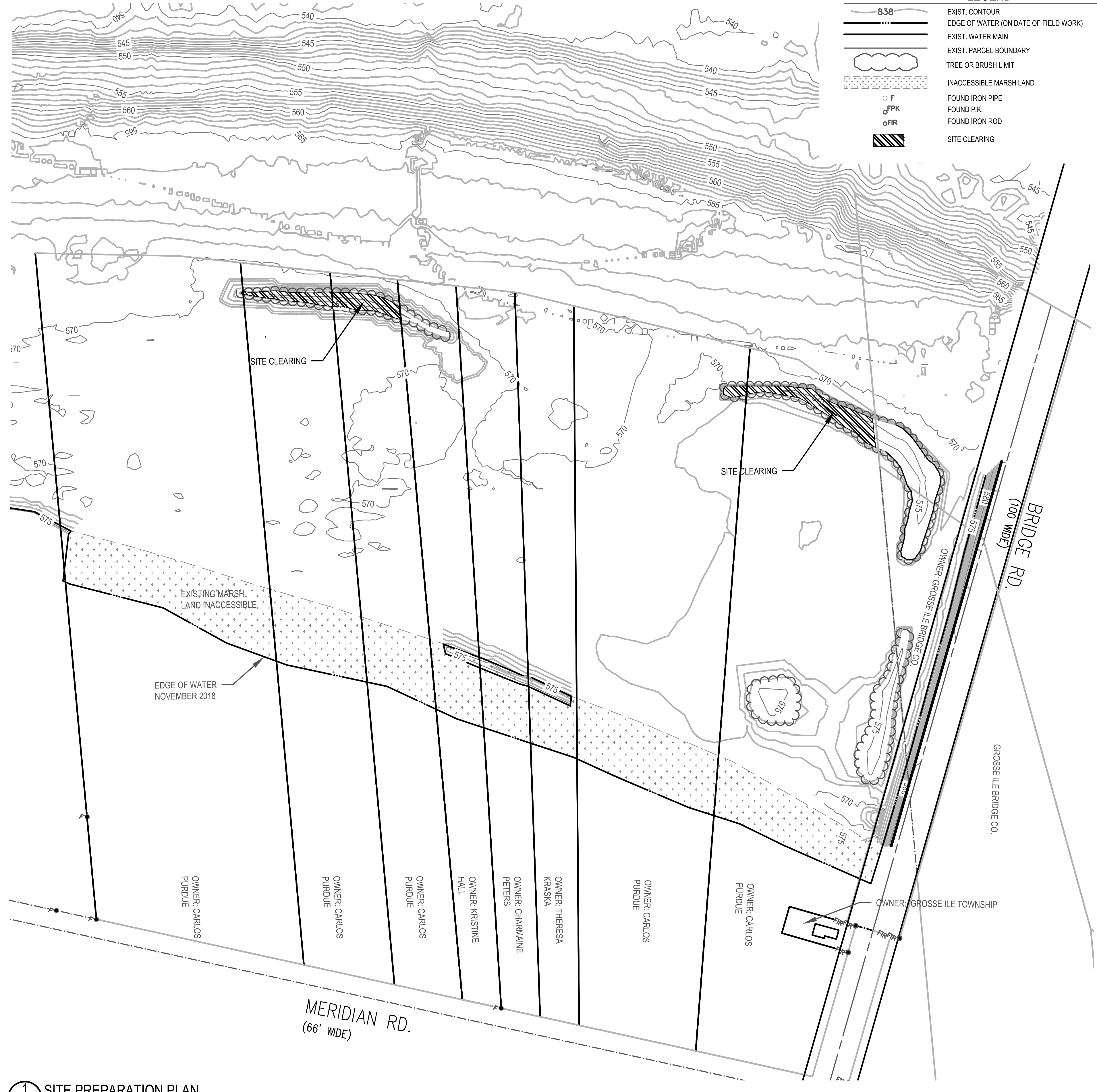
SIGN DIMENSIONS: 1200 mm x 2400 mm x 19 mm (approx. 4' x 8' x 3/4")
 VINYL, PLASTIC, OR SIMILAR MATERIAL AS APPROVED
 BY ENGINEER PRIOR TO FABRICATION

- SIGN NOTES:**
- SIGN LOCATION TO BE DETERMINED WITH ENGINEER PRIOR TO CONSTRUCTION.
 - CONTRACTOR TO CONFIRM DOLLAR AMOUNTS PRIOR TO CONSTRUCTION.

- SITE CLEARING NOTES:**
- TOTAL SITE CLEARING AREA: 0.3 ACRES
- SCHEDULING NOTES:**
- DUE TO FISH SPAWNING AND MIGRATION, NO IN-STREAM WORK SHALL OCCUR BETWEEN MARCH 15 AND JUNE 15.
- TREE REMOVAL NOTES:**
- ALL TREES TO BE REMOVED AND ALL CLEARING TO BE FIELD VERIFIED BY ENGINEER PRIOR TO WORK ACTIVITIES.
 - ALL EXCESS WOODY DEBRIS TO BE DISPOSED OF LEGALLY OFFSITE.
 - ANY MERCHANTABLE TIMBER MAY BE CONSIDERED PROPERTY OF THE CONTRACTOR.
- FLOODPLAIN NOTE:**
- THE CONTRACTOR UNDERSTANDS AND ACKNOWLEDGES THAT THE PERFORMANCE OF WORK IS REQUIRED WITHIN THE DETROIT RIVER SYSTEM AND FLOODPLAIN AND THAT THE DETROIT RIVER WATER LEVEL FLUCTUATES FREQUENTLY. THE CONTRACTOR UNDERSTANDS AND ACKNOWLEDGES THAT THEY HAVE TAKEN INTO ACCOUNT THE POTENTIAL FOR ANY WATER LEVEL CHANGES THAT MIGHT OCCUR IN COSTING AND PERFORMING THE CONTRACT WORK. THEREFORE, THE CONTRACTOR ACKNOWLEDGES THAT ANY FLUCTUATION IN WATER LEVELS DURING/OVER THE COURSE OF THE PROJECT WILL MOST LIKELY HAPPEN AND DOES NOT CONSTITUTE A CHANGE IN CONDITIONS OR UNFORESEEN SITE CONDITION.

LEGEND

- 838 EXIST. CONTOUR
- EDGE OF WATER (ON DATE OF FIELD WORK)
- EXIST. WATER MAIN
- EXIST. PARCEL BOUNDARY
- TREE OR BRUSH LIMIT
- INACCESSIBLE MARSH LAND
- F FOUND IRON PIPE
- FPK FOUND P.K.
- FIR FOUND IRON ROD
- ▨ SITE CLEARING



1 SITE PREPARATION PLAN
 3

ECT Environmental Consulting & Technology, Inc.
 2200 Commonwealth Blvd, Suite 300
 Ann Arbor, Michigan 48105
 734.769.3004
 734.769.3164 fax
 www.ectinc.com

HRM
 Herpetological Resource and Management

SE Somat Engineering

M MIDWESTERN CONSULTING

FRIENDS of the DETROIT RIVER

DETROIT RIVER AOC- SOUTH HENNEPIN MARSH HABITAT RESTORATION PROJECT

FRIENDS OF THE DETROIT RIVER
 WAYNE COUNTY, MICHIGAN

CONSTRUCTION DOCUMENTS		04-2021
130641 ECT PROJECT NUMBER		
DESIGNED BY	AB/SR	JO
CHECKED BY		
DRAWN BY	SR	JO
APPROVED BY		

SHEET TITLE

SITE PREPARATION PLAN

SCALE: 1" = 100' @ 22" x 34"

NORTH

SHEET NUMBER

3

P:\Friends of Detroit River -Hennepin\CAD\Hennepin.dwg

GENERAL NOTES

1. ALL WORK TO BE PERFORMED IN ACCORDANCE WITH THE EGLE AND USACE PERMITS, AND ALL OTHER PERMITS TO BE ISSUED FOR THIS PROJECT. PERMITS HAVE BEEN APPLIED FOR, BUT HAVE NOT BEEN ISSUED YET. A COPY OF THE PERMIT WILL BE PROVIDED TO THE CONTRACTOR ONCE RECEIVED.

STAGING AND ACCESS NOTES

1. THE PROJECT TO BE ACCESSED AND CONSTRUCTED VIA THE RIVER. NO STAGING OR ACCESS ON THE ISLAND.

TURBIDITY CONTROL NOTES

1. NO WORK OR DREDGING WITHIN THE WATER IS ALLOWED FROM MAY 1 THROUGH JULY 30 WITHOUT THE USE OF A TURBIDITY CURTAIN/CONTAINMENT. THIS RESTRICTION DOES NOT APPLY TO THE PLACEMENT OF CLEAN ROCK AND GRAVEL.
2. WHEN REQUIRED, USE TURBIDITY CURTAIN TO ENCLOSE THE WORK AREA ENTIRELY. CURTAIN TO BE INSTALLED TO EXTEND FROM THE BED OF THE WATER BODY TO A POINT ABOVE THE EXISTING WATER'S SURFACE.
3. WHEN USED, TURBIDITY CURTAIN TO BE MAINTAINED FOR THE DURATION OF THE PROJECT AND LEFT IN PLACE AFTER COMPLETION OF DREDGING UNTIL ALL DISTURBED SEDIMENTS HAVE SETTLED. AT APPROPRIATE TIME, TURBIDITY CURTAIN SHALL BE REMOVED.



LEGEND

- 838 EXIST. CONTOUR
- EDGE OF WATER (ON DATE OF FIELD WORK)
- EXIST. PARCEL BOUNDARY
- [Stippled] INACCESSIBLE MARSH LAND
- [Hatched] VEGETATED PORTION OF NEW/RESTORED HABITAT SHOAL
- [Diagonal Hatched] NEW/RESTORED ROCK SHOAL
- [Hatched with Cross] MUDPUPPY STRUCTURE
- [Tree] HABITAT LOG

NOTES
SEE HABITAT STRUCTURE TABLE ON SHEET 6

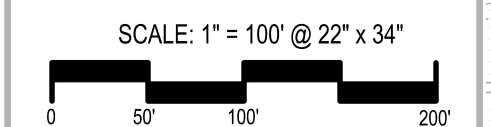
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WAYNE COUNTY, MICHIGAN

CONSTRUCTION DOCUMENTS	04-2021
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SR	DRAWN BY
JO	APPROVED BY

SHEET TITLE
PROPOSED CONDITIONS - OVERALL



DETROIT RIVER AOC-SOUTH HENNEPIN MARSH HABITAT RESTORATION PROJECT

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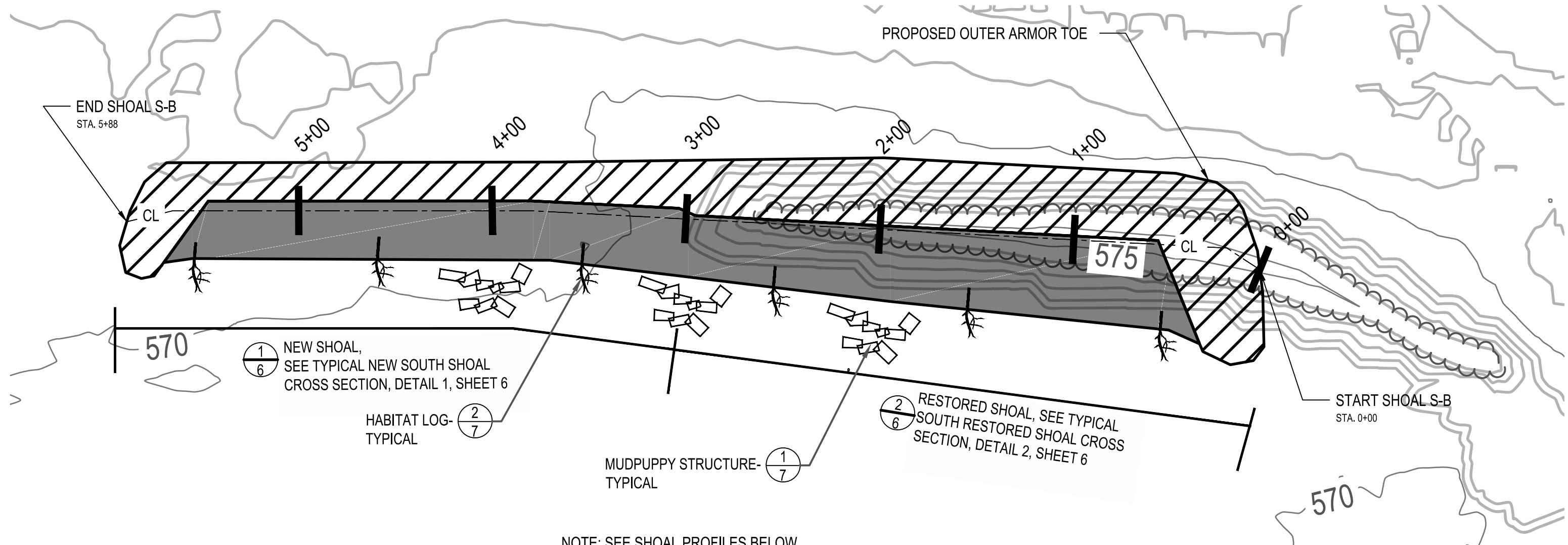
180641
 ECT PROJECT NUMBER
 AB/SR JO
 DESIGNED BY CHECKED BY
 SR JO
 DRAWN BY APPROVED BY

SHEET TITLE
SHOAL PLAN AND PROFILES

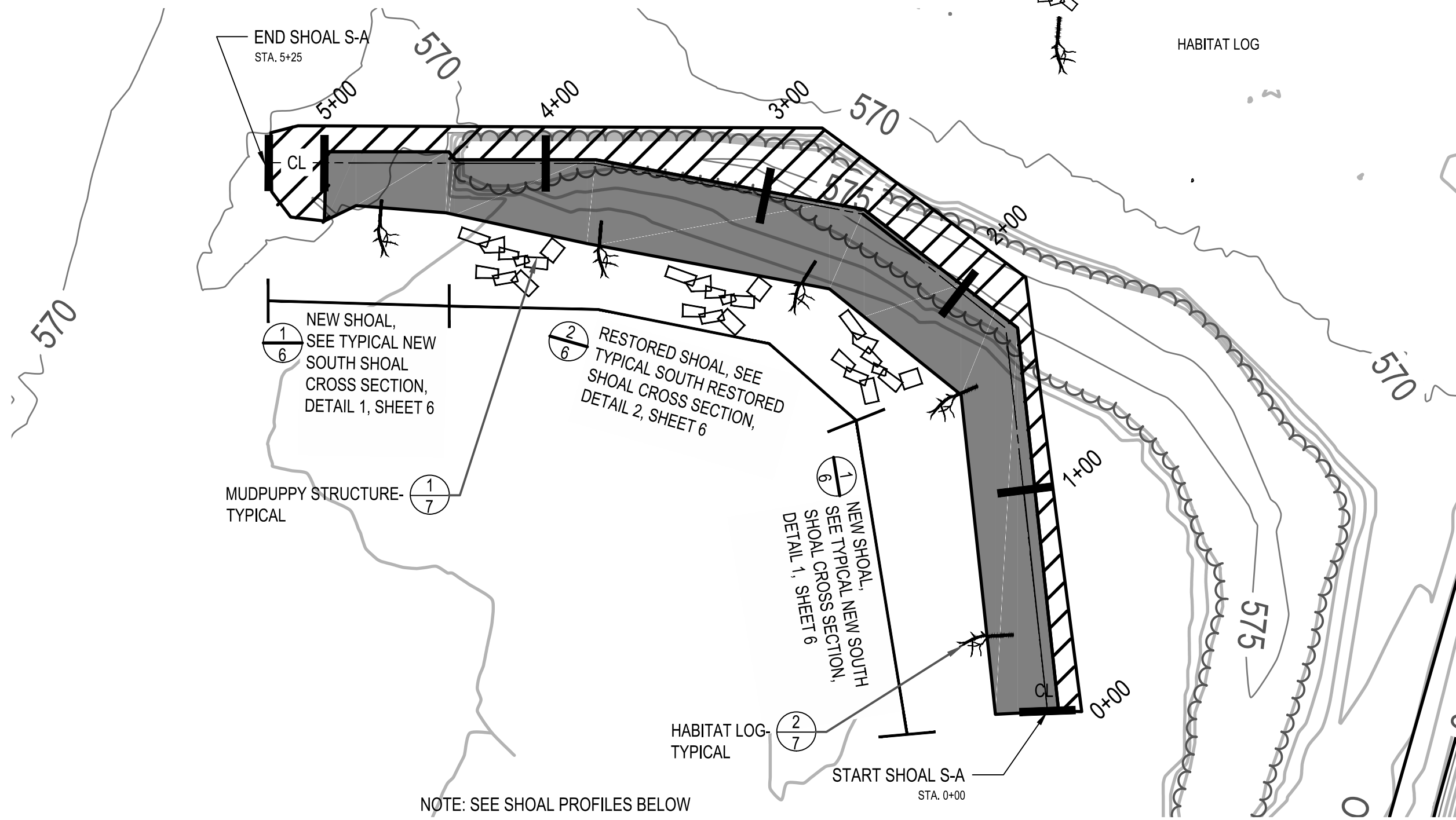
SCALE: AS SHOWN @ 22" x 34"

NORTH
 SHEET NUMBER
5

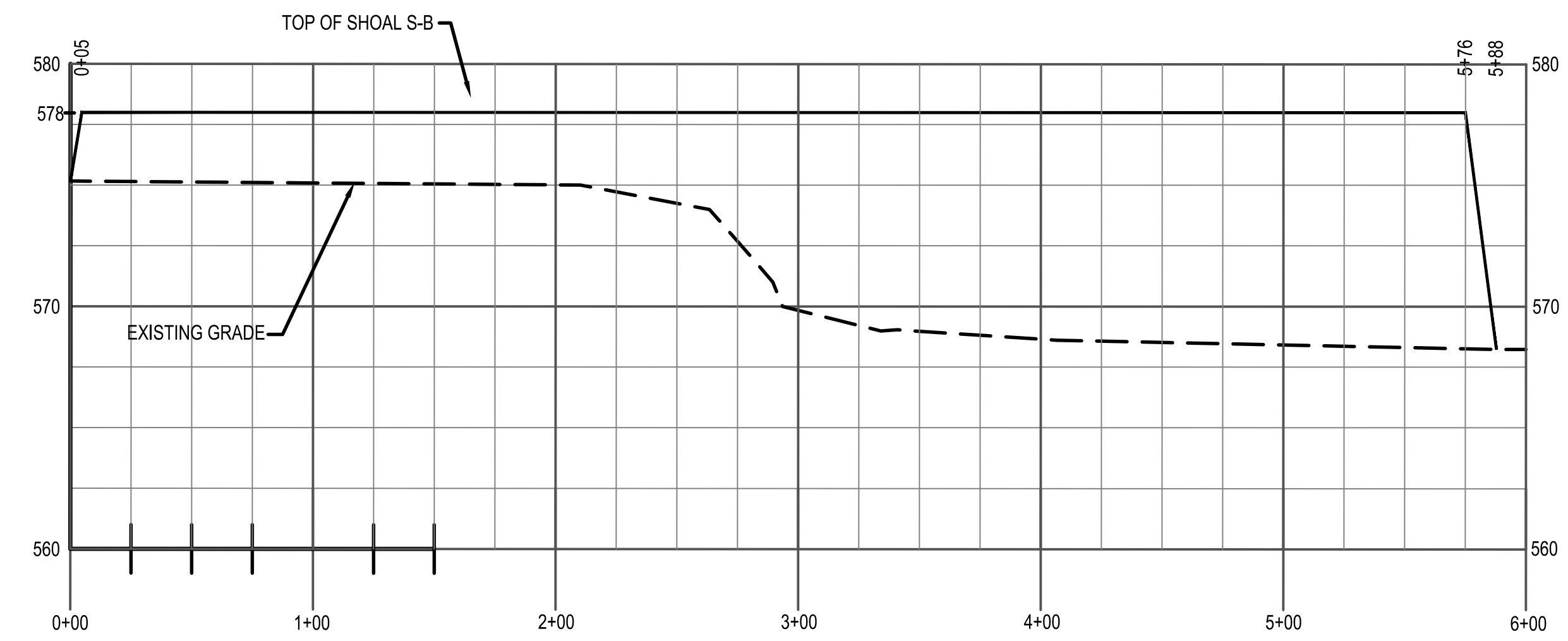
- LEGEND**
- 838 EXIST. CONTOUR
 - EDGE OF WATER (ON DATE OF FIELD WORK)
 - EXIST. PARCEL BOUNDARY
 - TREE OR BRUSH LIMIT
 - NEW HABITAT EMERGENT SHOAL SECTION
 - NEW/RESTORED SHOAL
 - MUDPUPPY STRUCTURE
 - HABITAT LOG



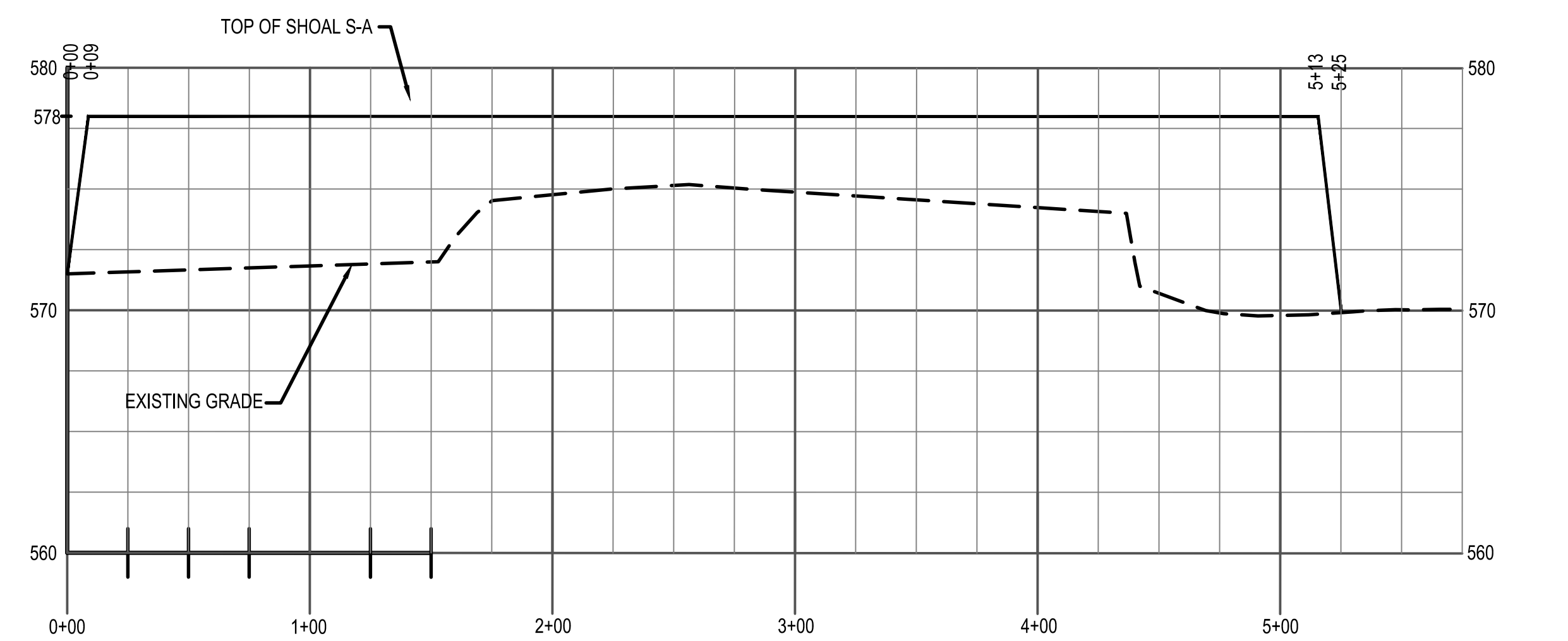
1 SHOAL S-B PLAN VIEW
 SCALE: 1" = 50' @ 22" x 34"



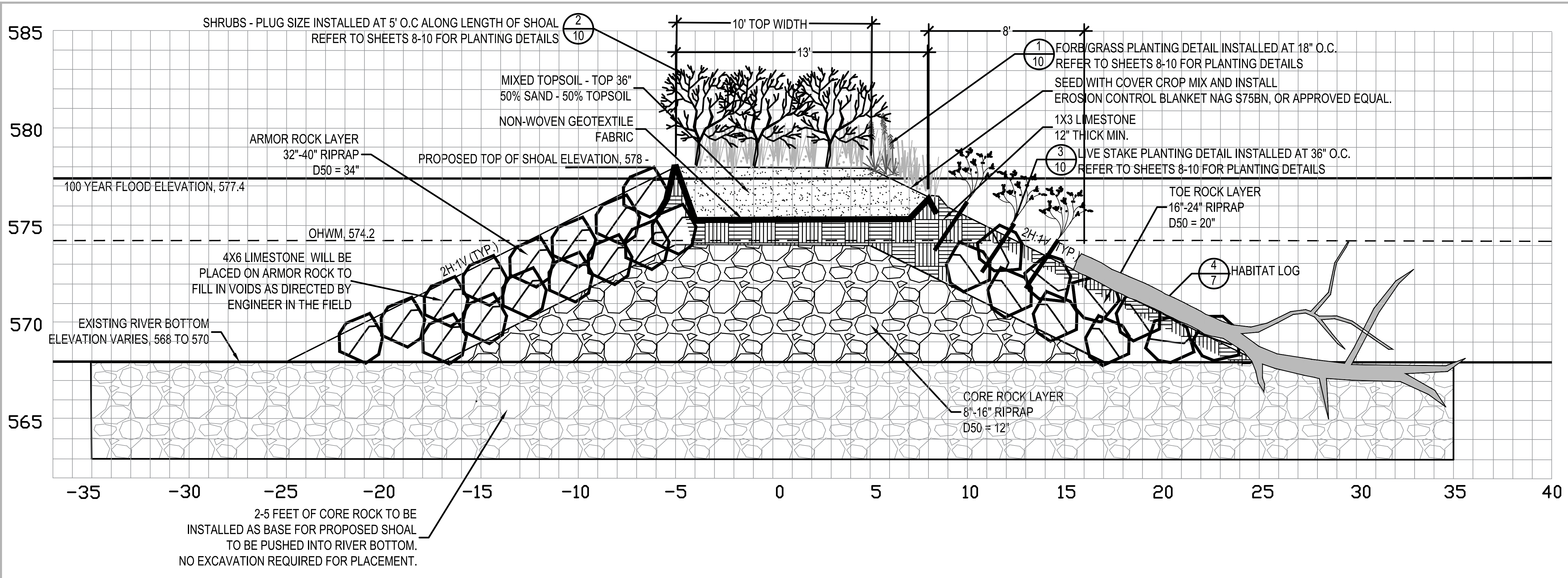
2 SHOAL S-A PLAN VIEW
 SCALE: 1" = 50' @ 22" x 34"



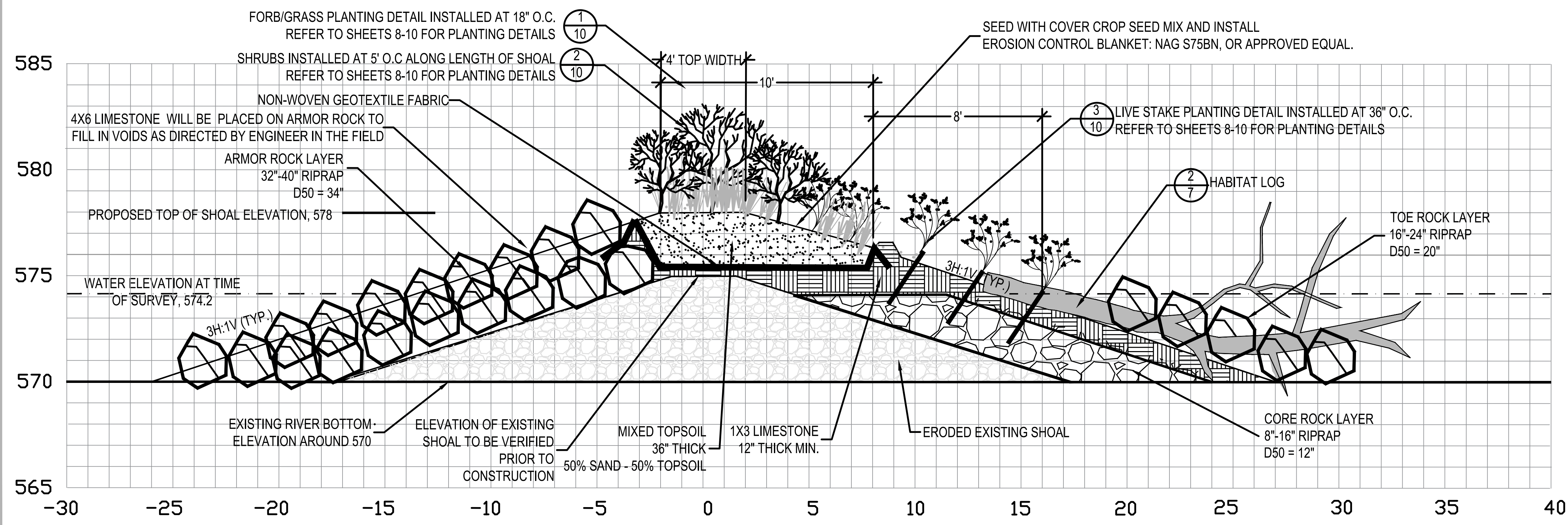
3 SHOAL S-B PROFILE
 SCALE: 1" = 50' HORIZONTAL, 1" = 5' VERTICAL



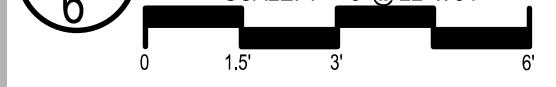
4 SHOAL S-A PROFILE
 SCALE: 1" = 50' HORIZONTAL, 1" = 5' VERTICAL



1 TYPICAL NEW SOUTH SHOAL CROSS SECTION - PORTIONS OF SHOAL A AND B



2 TYPICAL SOUTH RESTORED SHOAL CROSS SECTION - PORTIONS OF SHOAL A AND B

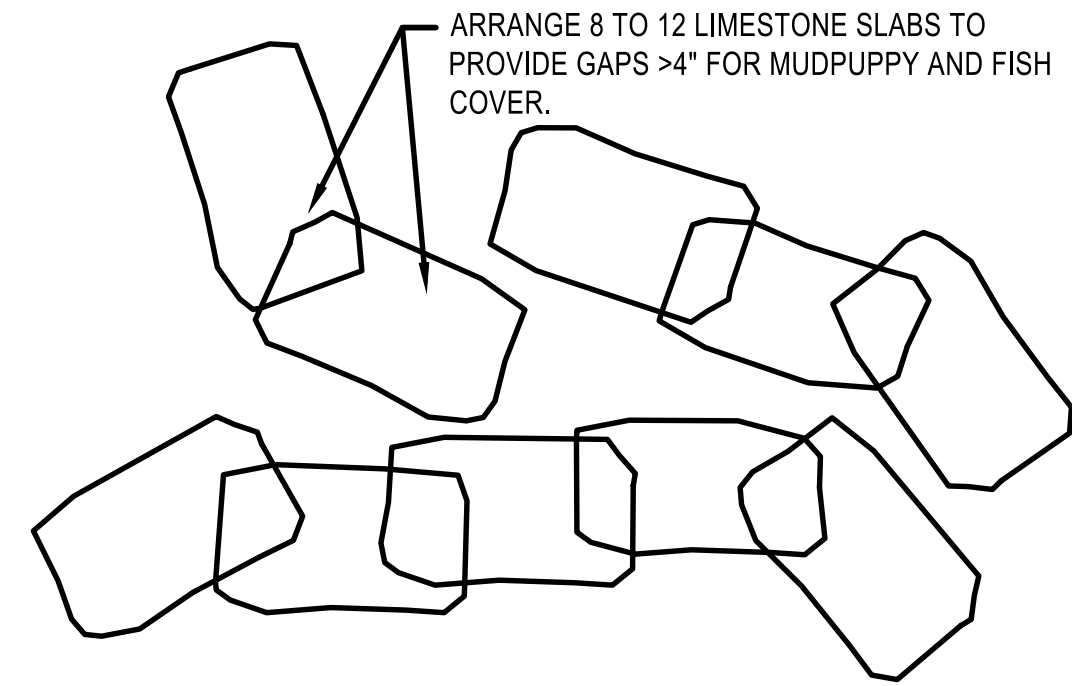


PROPOSED HABITAT STRUCTURE TABLE:

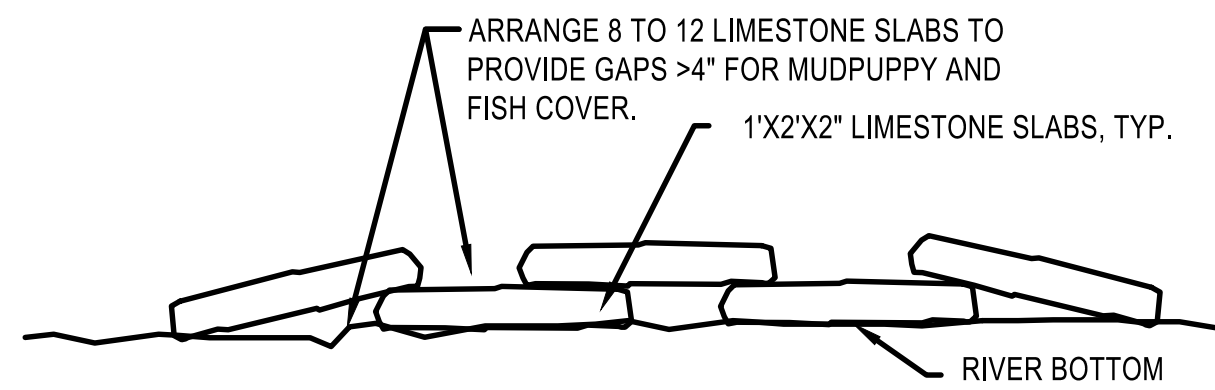
PROPOSED SHOAL - TYPICAL	HABITAT LOGS AT SHOAL	SINGLE MUDPUPPY STRUCTURE AT SHOAL
0+75	2+00	
1+25	3+00	
1+75	4+00	
2+25		
2+75		
3+25		

ROCK TOLERANCE: NO MORE THAN 10% OF THE RIPRAP QUANTITY SHALL EXCEED THE MAXIMUM RIPRAP SIZE AND NO MORE THAN 10% OF THE RIPRAP QUANTITY SHALL BE SMALLER THAN THE MINIMUM RIPRAP SIZE. THE LARGEST ROCK DIMENSION SHALL BE NO MORE THAN 1.5 TIMES THE SPECIFIED D50.

SURVEY PROVIDED BY MIDWESTERN CONSULTING, NOVEMBER 2018



PLAN VIEW

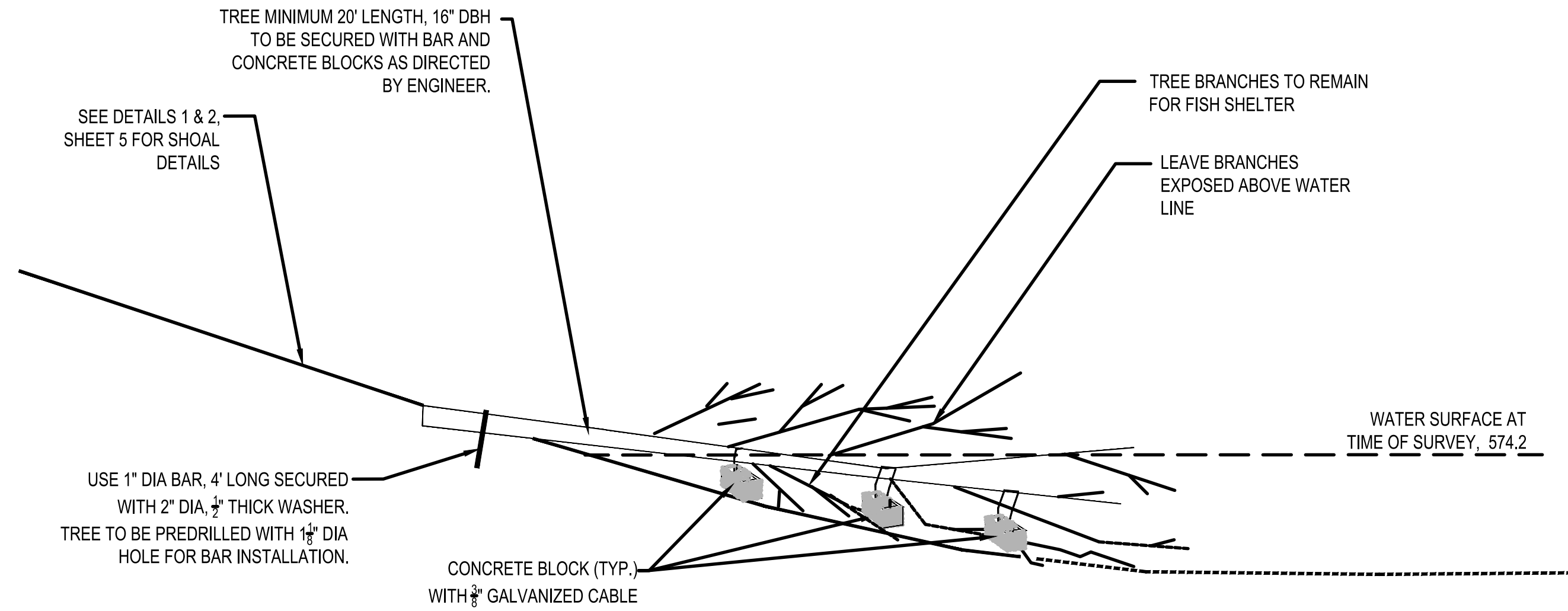


SECTION VIEW

NOTES

- ① GROUPINGS OF 8 TO 12 STONE SLABS SHOULD BE PLACED.
- ② PLACEMENT OF MUDPUPPY AND FISH COVER STRUCTURE TO BE DETERMINED ON SITE BY WILDLIFE BIOLOGIST.
- ③ CARE SHALL BE TAKEN DURING PLACEMENT TO AVOID HIGH QUALITY AQUATIC VEGETATION.
- ④ MUDPUPPY AND FISH COVER STRUCTURES SHOULD BE PLACED IN NEARSHORE.
- ⑤ DO NOT STACK STONES MORE THAN 2 HIGH.

①
⑦ MUDPUPPY STRUCTURE DETAIL
NOT TO SCALE



②
⑦ HABITAT LOG DETAIL
NOT TO SCALE

DETROIT RIVER ACC-SOUTH HENNEPIN MARSH HABITAT RESTORATION PROJECT

FRIENDS OF THE DETROIT RIVER

WAYNE COUNTY, MICHIGAN

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SHEET TITLE
DETAILS

SHEET NUMBER
7

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SHEET TITLE

SHOAL S-B REVEGETATION PLAN

SCALE: AS SHOWN @ 22" x 34"

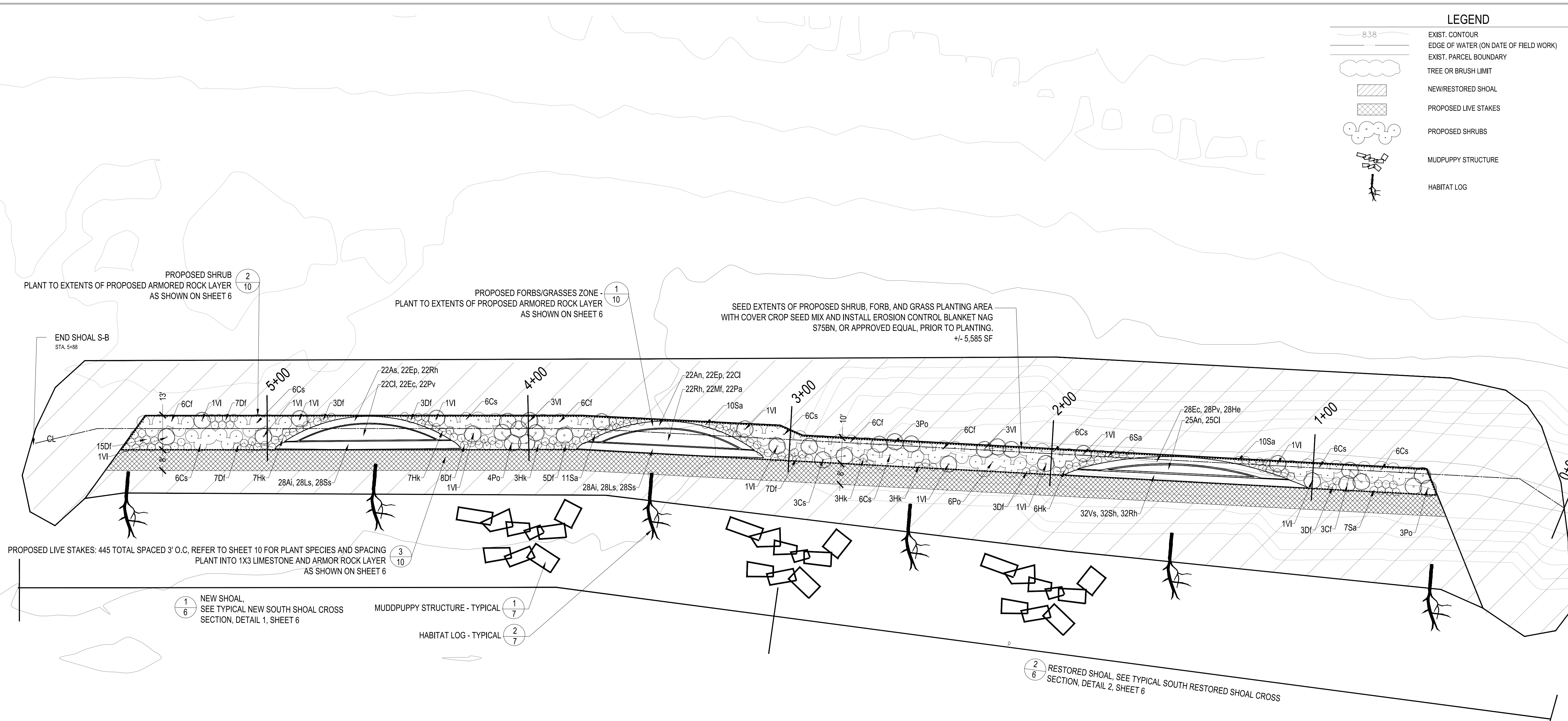
NORTH SHEET NUMBER



8

LEGEND

	EXIST. CONTOUR
	EDGE OF WATER (ON DATE OF FIELD WORK)
	EXIST. PARCEL BOUNDARY
	TREE OR BRUSH LIMIT
	NEW/RESTORED SHOAL
	PROPOSED LIVE STAKES
	PROPOSED SHRUBS
	MUDDPUPPY STRUCTURE
	HABITAT LOG



- NOTES:**
1. SEED EXTENTS OF PROPOSED SHRUB, FORB, GRASS PLANTING AREA WITH COVER CROP SEED MIX AND INSTALL EROSION CONTROL BLANKET NAG S75BN, OR APPROVED EQUAL, PRIOR TO PLANTING.
 2. REFER TO PLANTING DETAILS ON SHEET 10 FOR PLANT SPECIES AND SPACING NOTES.
 3. REFER TO SHOAL CROSS SECTIONS ON SHEET 6.

1
8 SHOAL S-B REVEGETATION PLAN VIEW
 SCALE: 1" = 20' @ 22" x 34"

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ECT PROJECT NUMBER	
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SHEET TITLE

SHOAL S-A REVEGETATION PLAN

SCALE: AS SHOWN @ 22" x 34"

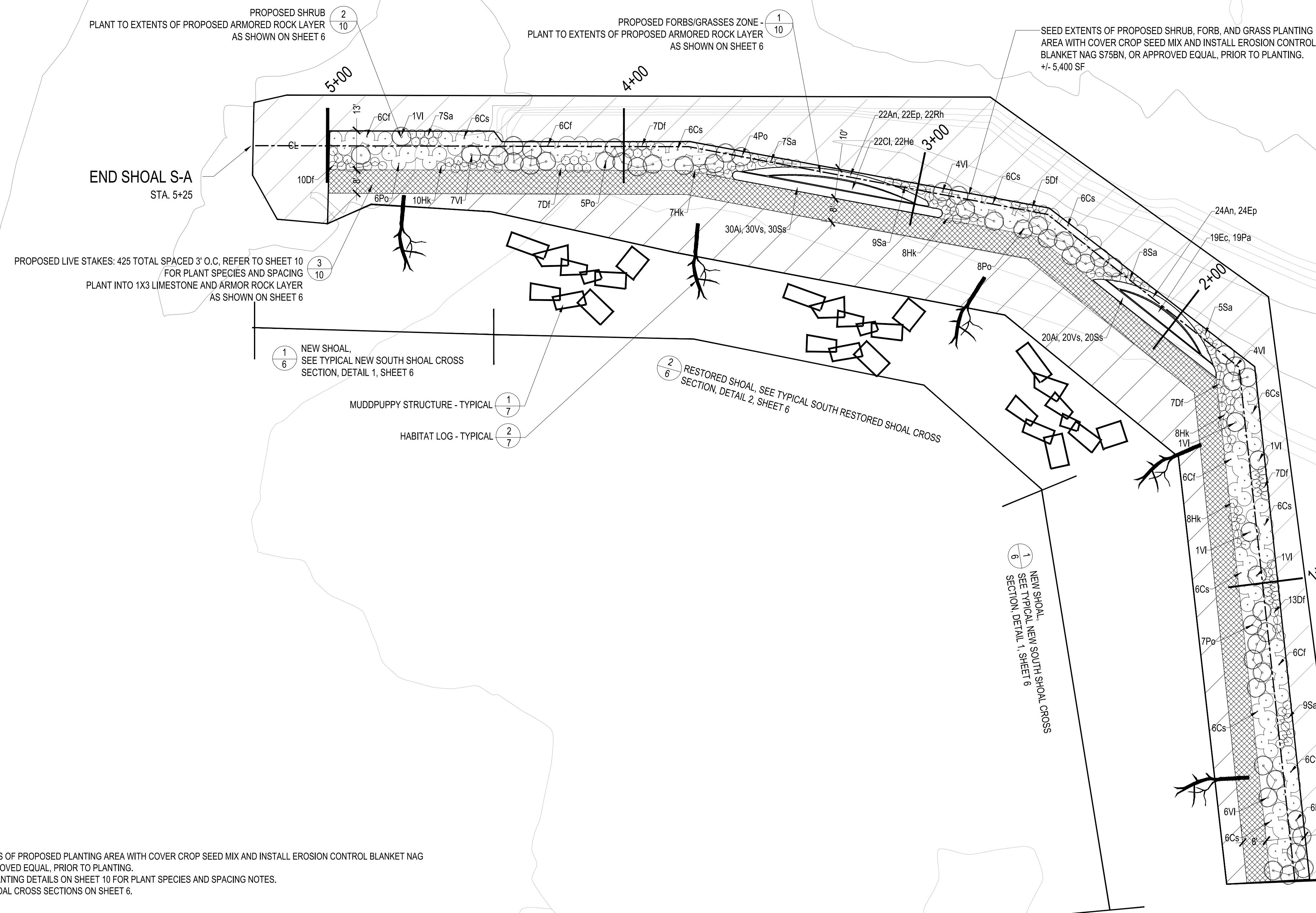
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9

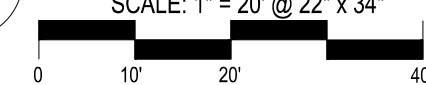
LEGEND

	EXIST. CONTOUR
	EDGE OF WATER (ON DATE OF FIELD WORK)
	EXIST. PARCEL BOUNDARY
	TREE OR BRUSH LIMIT
	NEW/RESTORED SHOAL
	PROPOSED LIVE STAKES
	PROPOSED SHRUBS
	MUDPUPPY STRUCTURE
	HABITAT LOG



- NOTES:**
1. SEED EXTENTS OF PROPOSED PLANTING AREA WITH COVER CROP SEED MIX AND INSTALL EROSION CONTROL BLANKET NAG S75BN, OR APPROVED EQUAL, PRIOR TO PLANTING.
 2. REFER TO PLANTING DETAILS ON SHEET 10 FOR PLANT SPECIES AND SPACING NOTES.
 3. REFER TO SHOAL CROSS SECTIONS ON SHEET 6.

1
9 SHOAL S-A REVEGETATION PLAN VIEW
 SCALE: 1" = 20' @ 22" x 34"



REVEGETATION NOTES:

MAINTENANCE AND WARRANTY PERIOD:

1. MAINTENANCE PERIOD: ENSURE THAT ALL SHRUBS, SEEDING, AND HERBACEOUS PLANTS INSTALLED UNDER THIS CONTRACT WILL BE HEALTHY AND IN FLOURISHING CONDITION OF ACTIVE GROWTH FOR ONE (1) FULL GROWING SEASON (MAY THROUGH OCTOBER) FROM DATE OF PLANTING INSTALLATION ACCEPTANCE. THE CONTRACTOR SHALL RESPOND WITHIN TWO (2) WEEKS OF WRITTEN REQUESTS BY THE OWNER FOR REPLACEMENT OR REPAIR. IF THE CONTRACTOR FAILS TO RESPOND WITHIN THIS TIME, THE OWNER MAY PROCEED WITH REPLACEMENT WORK AND BILL THE CONTRACTOR.
2. WARRANTY PERIOD: ENSURE THAT ALL SHRUBS, SEEDING, AND HERBACEOUS PLANTS INSTALLED UNDER THIS CONTRACT WILL BE HEALTHY AND IN FLOURISHING CONDITION OF ACTIVE GROWTH FOR ONE (1) FULL GROWING SEASON (MAY THROUGH OCTOBER) FROM DATE OF MAINTENANCE PERIOD ACCEPTANCE. THE CONTRACTOR SHALL RESPOND WITHIN TWO (2) WEEKS OF WRITTEN REQUESTS BY THE OWNER FOR REPLACEMENT OR REPAIR. IF THE CONTRACTOR FAILS TO RESPOND WITHIN THIS TIME, THE OWNER MAY PROCEED WITH REPLACEMENT WORK AND BILL THE CONTRACTOR.
3. ALL DELAYS IN COMPLETION OF PLANTING OPERATIONS WHICH EXTEND THE PLANTING INTO MORE THAN ONE PLANTING SEASON SHALL EXTEND THE WARRANTY PERIOD CORRESPONDINGLY.
4. REPLACEMENTS: AS SOON AS WEATHER CONDITIONS PERMIT, REPLACE, WITHOUT COST TO OWNER, ALL DEAD PLANTS AND ALL PLANTS NOT IN A VIGOROUS, THRIVING CONDITION, AS DETERMINED BY THE ENGINEER DURING AND AT THE END OF THE MAINTENANCE AND WARRANTY PERIODS.
5. PATCHY OR BARE AREAS (IN EXCESS OF 8 SQUARE FEET) WHERE SEED MIX FAILED TO CREATE SUFFICIENT DENSITY OF COVER SHALL BE RESEEDED BY HAND AT THE RECOMMENDED APPLICATION RATE AT NO ADDITIONAL COST TO OWNER.
6. INCORRECT MATERIALS: DURING WARRANTY PERIOD, REPLACE AT NO COST TO OWNER ALL PLANTS REVEALED AS BEING UNTRUE TO NAME. PROVIDE REPLACEMENTS OF A SIZE AND QUALITY TO MATCH THE PLANTED MATERIALS AT THE TIME THE MISTAKE IS DISCOVERED.
7. ALL PLANT STOCK SHALL BE WATERED BY THE CONTRACTOR TO ENSURE THE HEALTH AND VIGOR OF THE PLANTED MATERIALS. THE CONTRACTOR SHALL WATER AS NEEDED BASED ON NATURAL RAINFALL DURING THE MAINTENANCE AND WARRANTY PERIODS. WATERING SHALL CONTINUE SO SEEDLINGS DO NOT DRY OUT ONCE WATERING HAS BEGUN. THE WATERING SHALL BE DONE FROM SURFACE METHODS AT A PRESSURE NOT TO EXCEED THE INFILTRATION RATE OF THE SOIL, LIMITING RUNOFF DURING THE WATERING PERIOD. EACH AREA WILL BE WATERED WITH SUFFICIENT WATER TO COMPLETELY SATURATE THE ROOT ZONE. THE CONTRACTOR SHALL INSPECT ALL PLANTS FOR INSECT INFESTATION AND DAMAGE.
8. EROSION SHALL BE REPAIRED BY THE CONTRACTOR.
9. PROTECTION FROM EROSION IN NEWLY SEEDED AREAS IS THE RESPONSIBILITY OF THE CONTRACTOR. SAFETY FENCES AND/OR OTHER BARRIER METHODS WITH APPROPRIATE SIGNAGE MAY BE USED FOR ONE YEAR FROM COMPLETION OF CONSTRUCTION ACTIVITIES. ALL COSTS ASSOCIATED WITH THIS IS INCLUSIVE OF CONTRACTOR'S PRICING.
10. NOTIFY THE OWNER PRIOR TO AND FOLLOWING ANY MAINTENANCE ACTIVITY.
11. FINAL ACCEPTANCE OF WORK WILL BE SUBJECT TO ACCEPTANCE BY PROJECT MANAGER AND OWNER AT THE END OF WARRANTY PERIOD.

NATIVE PLANTINGS:

1. ALL PLANTS SHALL BE OF NATIVE PLANT MATERIAL OF GENOTYPES FROM THE NORTH CENTRAL STATES ONLY (IL, IN, IA, MI, OH), AND FROM A RECOGNIZED NURSERY OF THIS REGION. MICHIGAN SOURCES FOR SHRUBS, AND PLUGS SHALL BE LOCATED BEFORE BRANCHING OUT TO OTHER NORTH CENTRAL STATES. NATIVE PLANTINGS INCLUDE ALL SHRUBS AND PLUGS INSTALLED AS PART OF THIS PROJECT.
2. PLANTS SHALL BE NURSERY GROWN IN ACCORDANCE WITH GOOD HORTICULTURAL PRACTICES AND MUST MEET APPLICABLE REQUIREMENTS OF ICBN AND ICNCP. PLANTS SHALL BE SOUND, HEALTHY AND VIGOROUS, WELL BRANCHED AND DENSELY FOLIATED WHEN IN LEAF. PLANTS SHALL BE FREE OF DISEASE, INSECT PESTS, EGGS, OR LARVAE. PLANTS SHALL BE FREE OF KINKED, CIRCLING OR GIRDLING TRUNK SURFACE AND CENTER ROOTS, AND SHALL NOT BE ROOT-BOUND. RESPECT MAXIMUM STORAGE TIMES FOR PLANT STOCK.
3. NATIVE PLANTING AREAS SHALL BE INSTALLED AFTER MAY 15 (WHEN SOIL IS FREE OF FROST AND IN WORKABLE CONDITION), BUT BEFORE JUNE 30 OR AFTER SEPT. 1 BUT BEFORE OCTOBER 30 OR AS APPROVED BY THE LANDSCAPE ECOLOGIST.
4. FURNISH PLANT SPECIES AND SIZES AS INDICATED ON THE PLANS. PLANT STOCK SHALL BE TRUE TO THEIR NAME (GENUS AND SPECIES), AS SPECIFIED. CULTIVARS AND SPECIMENS SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY LANDSCAPE ECOLOGIST.
5. NATIVE PLANTINGS TO BE INSTALLED PER DETAILS.
6. REMOVE ALL CONTAINERS, TAGS AND PACKAGING MATERIAL AND DISPOSE OF LEGALLY OFF-SITE.
7. WATER PLANT STOCK IMMEDIATELY AFTER PLANTING SUCH THAT ROOT ZONE IS THOROUGHLY SOAKED. CONTRACTOR SHALL BE RESPONSIBLE TO KEEP PLUGS ADEQUATELY WATERED, IF NECESSARY, TO ENSURE THEIR SURVIVAL.
8. INSTALL EROSION CONTROL BLANKET AFTER SEEDING, BUT PRIOR TO PLANTING. EROSION CONTROL BLANKET SHALL BE INSTALLED WHERE THE CONTRACTOR FEELS IT NECESSARY TO STABILIZE THE SITE AT NO ADDITIONAL COST TO THE OWNER.

SEEDING:

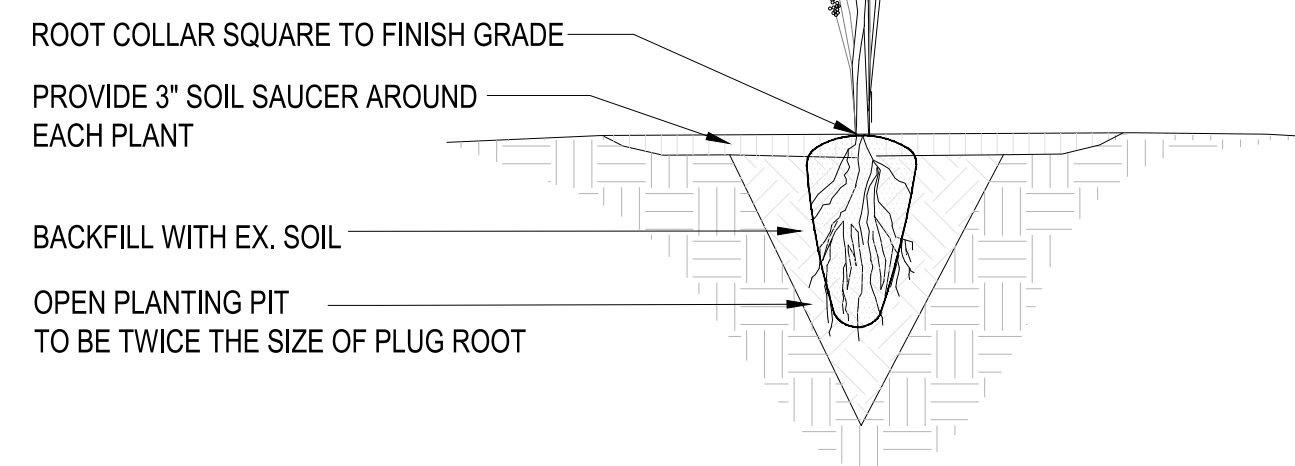
1. SEED SHALL BE FRESH, CLEAN, NEW SEED OF NATIVE PLANT MATERIAL OF GENOTYPES FROM THE NORTH CENTRAL STATES ONLY (IL, IN, IA, MI, OH), AND FROM A RECOGNIZED NURSERY OF THIS REGION - REFER TO SPECIFICATION 02930.
2. SEED AREAS SHALL BE SEEDED AFTER MAY 1, (WHEN SOIL IS FREE OF FROST AND IN WORKABLE CONDITION), BUT BEFORE JUNE 30 OR AFTER OCTOBER 1, BUT BEFORE NOVEMBER 30 (OR PRIOR TO FREEZE-UP) OR AS APPROVED BY THE LANDSCAPE ECOLOGIST.
3. SEEDBED PREPARATION: PRIOR TO SOWING SEED, LIGHTLY SCARIFY SO THAT THE BED IS SMOOTH AND FREE OF LARGE CLUMPS. SEED BED SHALL BE FIRM, BUT NOT COMPACT. SEED IMMEDIATELY AFTER SCARIFYING AND ENSURE GOOD SOIL TO SEED CONTACT. DO NOT FERTILIZE.
4. DO NOT SOW SEED WHERE STANDING WATER IS PRESENT.
5. SOW PROPOSED SEED AT A SPECIES RATE OF POUNDS PER ACRE INDICATED ON THE DRAWING AND PER SUPPLIERS RECOMMENDATIONS. LIGHTLY RAKE TO INCORPORATE SEED INTO SOIL. DO NOT COVER SEED MORE THAN 1/4 INCH WITH SOIL.
6. CONTRACTOR SHALL REPAIR DAMAGED VEGETATION AND AERATE SOIL OVER ROOT ZONE OF NEGATIVELY IMPACTED VEGETATION. RE-SEED ALL DISTURBED AREAS TO PRE-EXISTING CONDITIONS.

EXISTING SITE CONDITIONS:

1. CONTRACTOR SHALL BECOME FAMILIAR WITH ALL EXISTING SITE CONDITIONS PRIOR TO STARTING WORK.
2. THE CONTRACTOR UNDERSTANDS AND ACKNOWLEDGES THAT THE PERFORMANCE OF THE WORK IS REQUIRED WITHIN A RIVER SYSTEM AND FLOODPLAIN.
3. THE CONTRACTOR SHALL BE FULLY AWARE OF THE DETROIT RIVER HYDROLOGY AND CURRENT WEATHER CONDITIONS SO THAT WORK IN PROGRESS CAN BE SECURED AND PROTECTED, SO THAT SAFE JOB SITE WORKING CONDITIONS ARE MAINTAINED, AND SO THAT SOIL EROSION IS MINIMIZED DURING AND FOLLOWING A RAIN EVENT.
4. THE CONTRACTOR ACKNOWLEDGES THAT DELAYS IN THE START OF OR COMPLETION OF WORK DUE TO TYPICAL SEASONAL RAINFALL AND DUE TO TYPICAL PERIODIC HIGH FLOWS IN THE ROUGE RIVER SHALL NOT CONSTITUTE A BASIS FOR ANY EXTENSION OF TIME OR DAMAGES. IF THE CONTRACTOR SHALL BE UNAVOIDABLY DELAYED IN BEGINNING OR FULFILLING THIS CONTRACT BY REASONS OF EXCESSIVE STORM OR FLOODS THE CONTRACTOR SHALL HAVE NO VALID CLAIM FOR DAMAGES, BUT THEY SHALL IN SUCH CASE BE ENTITLED TO AN EXTENSION OF TIME AS THE ENGINEER SHALL ADJUDGE TO BE JUST AND REASONABLE; PROVIDED THAT FORMAL CLAIM FOR AN EXTENSION OF TIME IS MADE IN WRITING BY THE CONTRACTOR WITHIN ONE WEEK OF THE ALLEGED DELAY.

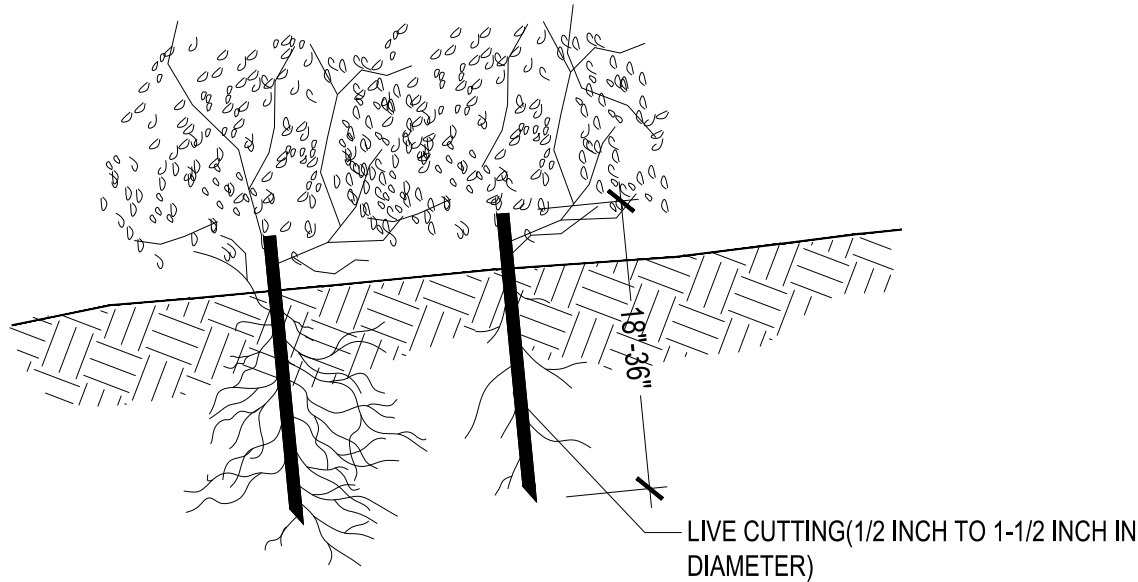
NOTES:

1. ENSURE THAT ROOTS ARE POINTING DOWNWARD IN THE HOLE. WHEN CLOSING PLANTING HOLE, ENSURE NO AIR POCKETS ARE LEFT IN HOLE.
2. WATER TO SATURATE BACKFILL MATERIAL WITHIN 1 HOUR OF PLANTING



1 PLUG PLANTING DETAIL

10 NOT TO SCALE

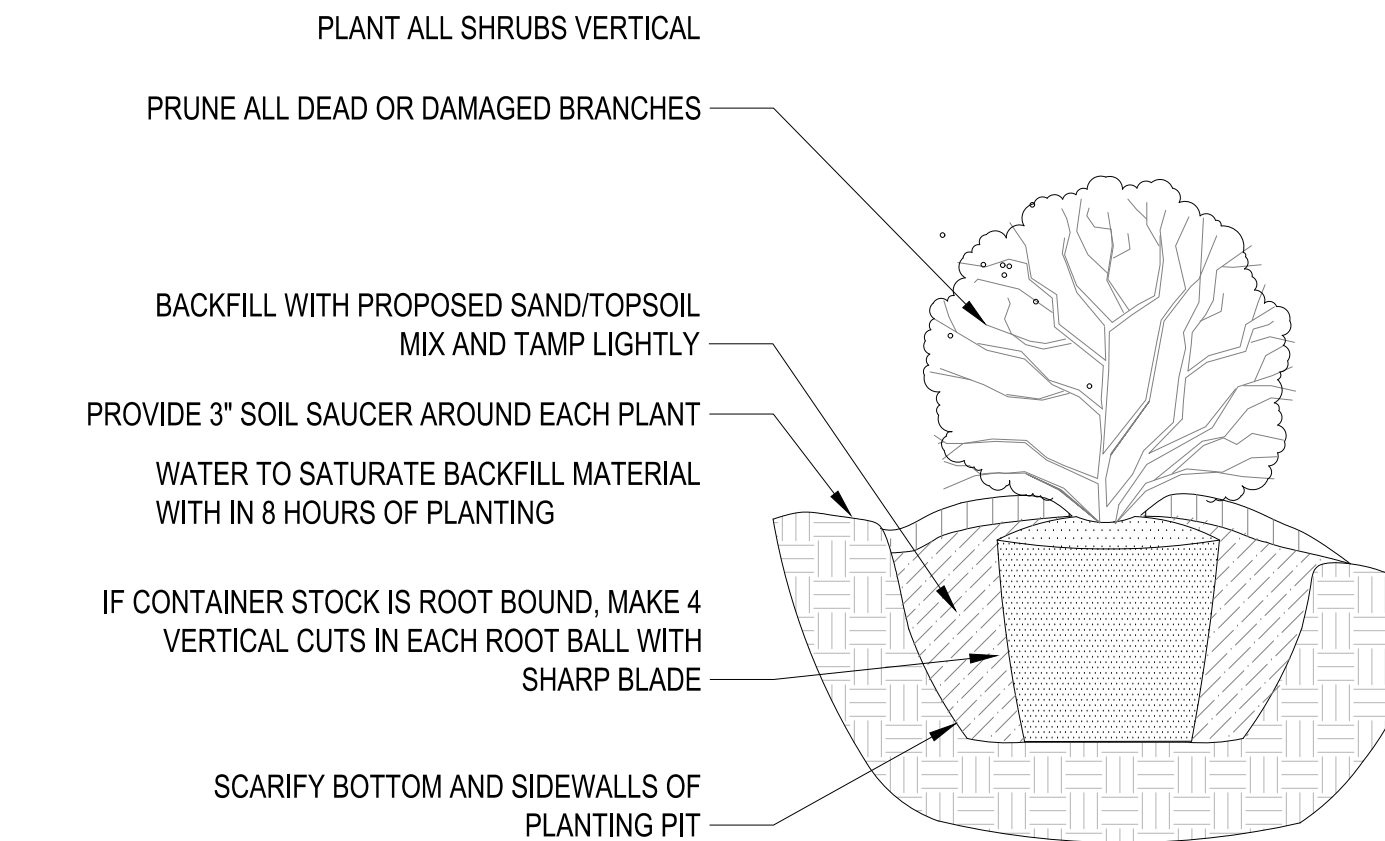


NOTES:

1. INSTALL AS DIRECTED BY LANDSCAPE ECOLOGIST, DURING FIRST DORMANT SEASON FOLLOWING SEEDING.
2. DO NOT ALLOW LIVE STAKES TO DRY OUT. SOAK PRIOR TO INSTALLATION PER SUPPLIERS RECOMMENDATION.
3. ROOTED/LEAFED CONDITION OF THE LIVING PLANT MATERIAL IS NOT REPRESENTED AT THE THE TIME OF INSTALLATION.
4. INSTALL LIVE STAKES AT RIGHT ANGLES PUSH INTO THE GROUND BY HAND. DRIVE A PILOT HOLE USING A DEAD BLOW HAMMER AS NEEDED.
5. BURY FOUR-FIFTHS OF THE STAKE IN THE GROUND, AND FIRMLY PACK AROUND IT. ORIENT THE BUDS UP.
6. INSTALL STAKE ROWS 1.5' APART AND INSTALL LIVE STAKES AT 3' SPACING ALONG ROWS. STAGGER ROWS TO CREATE TRIANGULAR SPACING PATTERN.
7. SPECIES LIST ON THIS SHEET. LISTED SPECIES ARE TO BE EQUALLY REPRESENTED.
8. PLANT ALONG LENGTH OF SHOAL AS SHOWN IN DRAWINGS DISTRIBUTING SPECIES IN 9-12 PLANT GROUPINGS TO MAXIMIZE DIVERSITY.

3 LIVE STAKE DETAIL

10 NOT TO SCALE



2 SHRUB PLANTING DETAIL

10 NOT TO SCALE

PLANT LIST AND SEED MIX

NOTES:

1. SEED EXTENTS OF PROPOSED PLANTING AREA WITH COVER CROP SEED MIX, AND INSTALL EROSION CONTROL BLANKET: NAG S75BN, OR APPROVED EQUAL.
2. INSTALL PROPOSED FORBS, GRASSES, SHRUBS, AND LIVE STAKES AS DIRECTED BY LANDSCAPE ECOLOGIST, DURING FIRST GROWING SEASON FOLLOWING SEEDING.
3. SPECIES LIST AS SHOWN ON THIS SHEET, OR APPROVED EQUAL.
4. PLANT FORBS/GRASSES AT 18" O.C. IN STAGGERED ROWS ALONG LENGTH OF SHOAL IN ZONES AS SHOWN AND NOTED ON DRAWINGS. DISTRIBUTE SPECIES EVENLY THROUGHOUT DESIGNATED ZONES, IN 5-9 PLANT GROUPINGS TO MAXIMIZE DIVERSITY.
5. PLANT SHRUBS AT 3'-5' O.C. ALONG LENGTH OF SHOAL IN ZONES AS SHOWN IN DRAWINGS.
6. SHRUB SIZE SHALL BE 5 GALLON SIZE AS AVAILABLE, OR APPROVED EQUAL.
7. FORB AND GRASS SIZE SHALL BE PLUG SIZE AS AVAILABLE, OR APPROVED EQUAL.

PLANT LIST: (OR APPROVED EQUALS)

Symbol	Quantity	Scientific Name	Common Name	Size	*Cont.	Spacing
FORBS						
Ai	106	<i>Asclepias incarnata</i>	Swamp Milkweed	Plug	Plug	18" o.c.
As	22	<i>Asclepias syriaca</i>	Common Milkweed	Plug	Plug	18" o.c.
An	93	<i>Aster novae-angliae</i>	New England Aster	Plug	Plug	18" o.c.
Ci	91	<i>Coresopsis lanceolata</i>	Lanceleaf Coresopsis	Plug	Plug	18" o.c.
Ep	90	<i>Echinacea purpurea</i>	Purple Coneflower	Plug	Plug	18" o.c.
Ec	69	<i>Euphorbia corollata</i>	Flowering Spurge	Plug	Plug	18" o.c.
He	50	<i>Helipopsis helianthoides</i>	False Sunflower	Plug	Plug	18" o.c.
Ls	56	<i>Liatris spicata</i>	Blazing Star	Plug	Plug	18" o.c.
Mf	22	<i>Monarda fistulosa</i>	Beebalm	Plug	Plug	18" o.c.
Pv	50	<i>Pycnanthemum virginianum</i>	Common Mountain Mint	Plug	Plug	18" o.c.
Rh	98	<i>Rudbeckia hirta</i>	Blackeyed Susan	Plug	Plug	18" o.c.
Vs	82	<i>Verbena stricta</i>	Hoary Vervain	Plug	Plug	18" o.c.

GRASSES

Pa	41	<i>Panicum virgatum</i>	Switchgrass	Plug	Flat	18" o.c.
Sh	32	<i>Sporobolus heterolepis</i>	Prairie Dropseed	Plug	Flat	18" o.c.
Ss	106	<i>Schyzachyrium scoparium</i>	Little Bluestem	Plug	Flat	18" o.c.

Symbol	Quantity	Scientific Name	Common Name	Size	Cont.	Spacing
SHRUBS						
Cf	57	<i>Cornus foemina</i>	Gray Dogwood	Min. 30" ht.	5 Gal.	5' o.c.
Cs	105	<i>Cornus sericea</i>	Red-osier Dogwood	Min. 30" ht.	5 Gal.	5' o.c.
Df	117	<i>Dasiphora fruticosa</i>	Shrubby Cinquefoil	Min. 24" ht.	5 Gal.	3' o.c.
Hk	70	<i>Hypericum kalmianum</i>	Kalm's St. John's Wort	Min. 24" ht.	5 Gal.	3' o.c.
Po	52	<i>Physocarpus opulifolius</i>	Common Ninebark	Min. 30" ht.	5 Gal.	5' o.c.
Sa	89	<i>Spiraea alba</i>	Meadowsweet	Min. 24" ht.	5 Gal.	3' o.c.
Vi	40	<i>Viburnum lentago</i>	Nannyberry	Min. 30" ht.	5 Gal.	5' o.c.

Quantity	Scientific Name	Common Name	Size	Cont.	Spacing
LIVE STAKES					
145	<i>Cornus foemina</i>	Gray Dogwood	Min. 36" ht.		3' o.c.
145	<i>Cornus sericea</i>	Red-osier Dogwood	Min. 36" ht.		3' o.c.
145	<i>Physocarpus opulifolius</i>	Common Ninebark	Min. 36" ht.		3' o.c.
145	<i>Hypericum kalmianum</i>	Kalm's St. John's Wort	Min. 36" ht.		3' o.c.
145	<i>Salix exigua</i>	Sandbar Willow	Min. 36" ht.		3' o.c.
145	<i>Salix discolor</i>	Pussy Willow	Min. 36" ht.		3' o.c.

COVER CROP SEED MIX: 10,985 SF (+/- 0.25 ACRES TOTAL)

Scientific Name	Common Name
<i>Avena sativa</i>	Seed Oats
<i>Lolium multiflorum</i>	Annual Rye