

**DRAFT
TECHNICAL SPECIFICATIONS
FOR**

**DETROIT RIVER AOC
STONY ISLAND HABITAT
RESTORATION PROJECT**

**THE DETROIT RIVER,
WAYNE COUNTY,
MICHIGAN**

**FOR INFORMATION
JANUARY, 2016**

Prepared for:

**FRIENDS OF THE
DETROIT RIVER**

Prepared by:



**Funded by the National Oceanic and Atmospheric Administration
through the Great Lakes Restoration Initiative**

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TECHNICAL SPECIFICATIONS

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Project Sign
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USACE Permit
MDEQ Permit
Grant Administrative Conditions
Drawings

ARTICLE 5 – BASIS OF BID

5.01 The undersigned, having familiarized himself with the local conditions affecting the cost of the work and with the Contract Documents for the designated project, hereby proposes to perform all work and furnish all labor, tools, equipment, and materials, including utility and transportation services, necessary to perform and complete in a workmanlike manner the construction itemized below, all in accordance with the Drawings, Specifications and other Contract Documents at the unit prices hereinafter set forth.

| | Description | Quantity | Unit | Unit Price | Item Cost |
|------------------|---|----------|------|------------|-----------|
| North Bay | | | | | |
| 1 | Mobilization | 1 | LS | | |
| 2 | Construction Staking/Control | 1 | LS | | |
| 3 | Soil Erosion and Sediment Control/Turbidity Control | 1 | LS | | |
| 4 | Permits | 1 | LS | | |
| 5 | Construction Photographs | 12 | EA | | |
| 6 | Site Restoration | 1 | LS | | |
| 7 | As-Built Drawings | 1 | LS | | |
| 8 | Shoal Restoration | 450 | LF | | |
| 9 | Shoal Islands | 600 | LF | | |
| South Bay | | | | | |
| 10 | Mobilization | 1 | LS | | |
| 11 | Construction Staking/Control | 1 | LS | | |
| 12 | Soil Erosion and Sediment Control/Turbidity Control | 1 | LS | | |
| 13 | Permits | 1 | LS | | |
| 14 | Construction Photographs | 12 | EA | | |
| 15 | Site Restoration | 1 | LS | | |
| 16 | As-Built Drawings | 1 | LS | | |
| | Proposed West Shoal | 1,365 | LF | | |
| 17 | Shoal - 578 | 430 | LF | | |
| 18 | Shoal - 577 | 481 | LF | | |
| 19 | Shoal - 576 | 354 | LF | | |
| 20 | Shoal - 575 | 100 | LF | | |
| | West Shoal Habitat | | | | |
| 21 | Mudpuppy Structures along Shoal | 16 | EA | | |
| 22 | Spawning Habitat along Shoal | 300 | CY | | |
| 23 | Slab Stone Habitat | 39 | EA | | |
| 24 | Native Material Excavation, Movement and Placement for Shoal Core (from deep depressions 1 and 2) | 2700 | CY | | |
| 25 | Native Vegetation Plugs | 2000 | EA | | |
| 26 | Live Stakes | 1000 | EA | | |
| 27 | Basking Logs at Shoals | 16 | EA | | |
| | Proposed South Shoal Restoration | 1,250 | LF | | |
| 28 | Shoal - 578 | 218 | LF | | |
| 29 | Shoal - 576 | 430 | LF | | |
| 30 | Shoal - 574 | 377 | LF | | |
| 31 | Shoal - 573 | 225 | LF | | |
| | South Shoal Habitat | | | | |

| | | | | | |
|--------------------------|---|------|----|---------------|---------------|
| 32 | Mudpuppy Structures along Shoal | 25 | EA | | |
| 33 | Spawning Habitat along Shoal | 475 | CY | | |
| 34 | Slab Stone Habitat | 62 | EA | | |
| 35 | Native Material Excavation, Movement and Placement for Shoal Core (from deep depressions 1 and 2) | 4350 | CY | | |
| 36 | Native Vegetation Plugs | 3200 | EA | | |
| 37 | Live Stakes | 1600 | EA | | |
| 38 | Basking Logs at Shoals | 25 | EA | | |
| Inner Bay Habitat | | | | | |
| 39 | Basking Log Bundles | 37 | EA | | |
| 40 | Mudpuppy Structures | 10 | EA | | |
| 41 | Mudpuppy Structure with Mussel Habitat | 4 | EA | | |
| Upland Habitat | | | | | |
| 42 | Vegetation Thinning | 10 | AC | | |
| 43 | Nesting Area | 3 | EA | | |
| 44 | Hibernacula | 1 | EA | | |
| Allowances | | | | | |
| 45 | Permanent Signage | 1 | LS | \$ 5,000.00 | \$ 5,000.00 |
| 46 | Unforeseen Site Conditions | 1 | LS | \$ 500,000.00 | \$ 500,000.00 |

Total Base Bid: \$ _____
(figures)

(words)

By signing and submitting, the undersigned has read and agreed to the provisions in the contract documents and the additional highlighted requirements below.

UNIT PRICING

Provide Unit Pricing for purchasing, furnishing, and installing the following items for shoal construction:

| Description | Unit | Unit Price |
|--------------------------|------|------------|
| 12" Limestone Riprap | CY | |
| 18" Limestone Riprap | CY | |
| 24" Limestone Riprap | CY | |
| 24"-36" Limestone Riprap | CY | |
| Base Geotextile Fabric | SY | |

SCHEDULE

The undersigned will achieve substantial completion of this Contract within _____ calendar days after receiving the Notice to Proceed.

DIVISION 1 – GENERAL REQUIREMENTS

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 LOCATION OF WORK

- A. The work of this Contract, Detroit River AOC – Stony Island Habitat Restoration Project, is located in the Township of Grosse Ile. Stony Island is a large, uninhabited 52-acre island in the Lower Detroit River. The proposed work is to be conducted on the portion of the island that is owned by the Michigan Department of Natural Resources.

1.02 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required to accomplish the habitat restoration as indicated on the Drawings and as specified herein.
- B. The Work includes, but is not necessarily limited to, the following items.
1. Mobilization.
 2. Acquire Soil Erosion and Control Permit, as required.
 3. Acquire additional permits, as required.
 4. Development and Implementation of a Work Plan.
 5. Development and Implementation of the following Technical Work Plans:
 - Health and Safety Plan
 - Soil Erosion and Sedimentation Control Plan
 6. Installation of soil erosion and sedimentation control measures including turbidity barrier.
 7. Installation and maintenance of construction staking.
 8. Installation of access measures as needed.
 9. Vegetation thinning as shown on the Drawings.
 10. Restoration and construction of shoal by placing geotextile fabric, native soil material, and riprap as shown on the Drawings.
 11. Excavation of native material to create deep water areas.
 12. Placement of native material adjacent to shoals as shown on the Drawings.
 13. Installation of vegetation as presented in the plans.
 14. Installation of habitat structures.
 15. Removal of soil erosion and sedimentation control measures including turbidity barrier.
 16. Site restoration.
 17. Demobilization and closeout.
 18. All other items as shown in the Contract Documents.
- C. The Contractor shall understand and acknowledge that the performance of the work is required to be performed within a river system and floodplain. The Contractor shall

further acknowledge that it is an active flowing river and the floodplain area may, from time to time, become wet with water during the performance of the work, and such accumulation of water shall not constitute a basis for any extension of time or damages on account of any delay in the performance of work.

1.03 WORK SEQUENCE

- A. The Work is to be performed as sequenced by the contractor.

Additionally, the following general sequence must be kept by the CONTRACTOR.

1. Mobilize, install temporary fencing, acquire necessary permits, and install and maintain construction staking.
2. Install soil erosion and sedimentation control measures including turbidity barrier.
3. Build any access measures as needed (removal and disposal upon completion).
4. Excavate native material at locations shown on the Drawings.
5. Place native material at locations shown on the Drawings.
6. Restore and construct shoal by placing geotextile fabric and riprap.
7. Place native material adjacent to shoal.
8. Place habitat structures.
9. Thin upland vegetation areas for restoration.
10. Install vegetation as presented in plans.
11. Remove soil erosion and sedimentation control measures including turbidity barrier.
12. Demobilize, including removal of temporary fencing and gates, site cleaning and restoration, seeding of area disturbed by the CONTRACTOR'S work, removal of any traffic control devices.
13. Contract closeout.

1.04 CONTRACTOR'S USE OF PREMISES

- A. The CONTRACTOR shall restrict the stockpiling and storage to the staging area indicated on the plans or as directed by OWNER or ENGINEER.
- B. Access to the site shall be as approved by OWNER and MDNR.

- C. The CONTRACTOR shall maintain his construction operations including areas for field offices, staging, and storage of materials and equipment within the locations approved by OWNER.
- D. The CONTRACTOR shall limit the use of premises for the work and shall coordinate the work with other contractors and OWNER.

1.05 COORDINATION

- A. It shall be the responsibility of the CONTRACTOR to coordinate his operations and those of his subcontractors in such a manner so as to avoid interference and delays in the areas of common construction activities.

1.06 RIGHT-OF-WAY JURISDICTION

The CONTRACTOR shall secure any permits required by the agencies having jurisdiction, shall abide by rules and regulations of each and pay all cost in connection with the permits. The CONTRACTOR shall pay for such permits, plan review, and inspection fees as the agencies may charge to insure compliance with their requirements.

1.08 WORK HOURS

- A. No Work shall be allowed on Sundays or holidays, unless otherwise approved by the OWNER.
- B. Holidays are defined as the following:
 - New Years Day
 - Memorial Day
 - Independence Day
 - Labor Day
 - Thanksgiving Day
 - Christmas Day

END OF SECTION

SECTION 01020

ALLOWANCES

PART 1 GENERAL

1.01 SCOPE OF WORK

This section details specific elements included in the allowances identified in the Bid form and in Section 01025, Measurement and Payment. The allowances shall be administered in accordance with the provisions of the General Conditions of the Contract. The CONTRACTOR shall be required to coordinate this work with the agency firm involved and pay all costs the agency firm may charge in connection with this work. If a markup is allowed on the allowance item, it will be identified so under that specific allowance. Thereafter, if the actual price for this work is more or less than the allowance, the Contract Price shall be adjusted accordingly by Change Order. The CONTRACTOR shall be responsible for all coordination with the Agency involved and for the timely completion of the Work to fit his schedule. The CONTRACTOR shall not be allowed any additional compensation for the failure of the Agency involved to meet any schedule.

1.02 RELATED WORK

- A. Bid Form.
- B. General Conditions of the Contract.
- C. Section 01010, Summary of Work.
- D. Section 01025, Measurement and Payment.

1.03 SPECIFIC ALLOWANCE ITEMS

- A. Permanent Sign/ Plaque
The CONTRACTOR shall furnish and install a sign or plaque, type as determined by the OWNER. The CONTRACTOR shall install at location as determined by the OWNER. The CONTRACTOR will be reimbursed at cost plus 5% for the sign/plaque work performed.
- B. Unforeseen Site Conditions
The CONTRACTOR will be paid for additional work required due to differing and/or unforeseen site conditions. The payment for these additional work items will be made based on lump sum or time and materials prices negotiated between the CONTRACTOR and the OWNER. In the event that unforeseen physical conditions should be encountered on the Project, this allowance item shall be used to remedy the situation. The CONTRACTOR shall comply with all provisions of the Contract Documents when encountering and contending with an unforeseen physical condition. The ENGINEER may require the CONTRACTOR to furnish a written report from a certified professional supporting his proposed scope and method for handling the unforeseen physical condition.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

This section describes the method of measurement and basis of payment for all items of work included in the Contract and listed in the Bid Form. The CONTRACTOR shall provide all labor, material, tools, equipment and services required to complete the Work as specified and as indicated on the Drawings. THE OWNER ONLY WILL PAY FOR ITEMS ON THE BID FORM, AND WILL MAKE NO PAYMENT FOR ITEMS NOT INCLUDED ON THE BID FORM.

1.02 RELATED WORK

- A. Bid Form.
- B. Section 01010, Summary of Work.
- C. Section 01240, Value Engineering Incentive.
- D. Section 01310, Work Plan.

1.03 PAYMENT ITEMS

NORTH BAY

ITEM NO. 1 – North Bay Mobilization

North Bay Mobilization will be paid for at the Contract lump sum (LS) amount (not to exceed 5% of the total Contract Price). Price paid shall be payment in full for all labor, material, and equipment necessary for all preparatory work and operations, including but not limited to, the movement of personnel, equipment, supplies, and incidentals to the project site. Mobilization shall include preconstruction costs, including premiums for insurance and bonds, exclusive of bidding costs, which are necessary direct costs to the project and are of a generalized nature rather than directly attributable to other pay items under this Contract. This pay item shall also include all costs associated with De-Mobilization. This pay item shall include:

- the establishment of staging/storage areas;
- the establishment of construction facilities and temporary controls;
- furnish and installation of project signage;
- installation and maintenance of construction fencing;
- protection of existing utilities as needed;
- installation and maintenance of tree protection;
- preparation of work schedules and schedule-of-values, and preparation of submittals;
- other work and operations which must be performed or for expenses incurred, prior to beginning work;
- All costs associated with De-Mobilization.

Payment for mobilization will be based upon the following schedule:

Partial Payment Schedule

| <u>Percentage of Total Contract Price Earned</u> | <u>Percentage of Bid Price for Mobilization Allowed</u> |
|--|---|
| 5 | 50 |
| 10 | 75 |
| 25 | 100 |

ITEM NO. 2- North Bay Construction Staking/ Control

North Bay Construction staking will be paid for at the Contract lump sum (L.S.) amount. Price paid shall be payment in full for all labor, material and equipment required for establishing staking and maintaining staking in the project area as required to control grades and lines per Drawings. All other staking required shall be considered incidental, and shall be included in the unit price.

ITEM NO. 3- North Bay Soil Erosion and Sediment Control/ Turbidity Control

North Bay Erosion and Sediment Control will be paid for at the Contract lump sum (L.S.) basis. Price paid shall be payment in full for all labor, material and equipment required to install soil erosion and sediment control measures to the extents shown on the Drawings and shall include, but is not limited to:

- acquiring and delivering barrier material to the site;
- acquiring approval of delivered stock from ENGINEER prior to installation;
- installing controls at locations shown on Drawings;
- maintaining controls throughout duration of project;
- removal of measures after completion of restoration project, and;
- all other items necessary to complete the work.

ITEM NO. 4 – North Bay Permits

North Bay Permits will be paid for at the Contract lump sum (L.S.) basis. Price paid shall be for the CONTRACTOR to apply for and obtain all permits required for traffic control, inspections, soil erosion and sedimentation control, site development and other work as required for the North Bay.

ITEM NO. 5 – North Bay Construction Photographs

Construction photographs will be paid for at the Contract unit price each (EA) basis. Price paid shall be payment in full for all labor, material and equipment required for the providing of 3 color photographs at intervals specified by the OWNER of the work during its progress and 3 color aerial photographs at intervals specified by the OWNER made of the work during its progress. The aerial photographs shall be low level aerial photographs. Such aerial photographs shall be done by a qualified, established commercial photographer directed by the ENGINEER. Three prints of each photograph shall be furnished promptly to the ENGINEER. A high resolution digital copy of each photograph shall also be furnished promptly to the ENGINEER.

ITEM NO. 6 – North Bay Site Restoration

North Bay Site Restoration shall be paid for on a Contract lump sum (L.S.) amount. Price paid shall be payment in full for all labor, material and equipment required to perform completion of site restoration within the Limits of Work/Disturbance shown on the Drawings or as directed by the ENGINEER and shall include, but is not limited to:

- restoration of all disturbed lawn areas to original grade with topsoil, seed and mulch;
- restoration of existing pavement;
- restoration of damaged utilities;
- restoration of any other structures; and
- all other items necessary to complete the work.

ITEM NO. 7 - North Bay As-Built Drawings

North Bay As-Built Drawings will be paid for at the Contract lump sum (L.S.) amount. Price paid shall be payment in full for all labor, material and equipment required for the providing certified as-built documents of the project following the completion of Work. Price paid shall also include intermediate as-built drawings for work elements upon completion of each element, as directed by the ENGINEER. As-built documents shall include 1 copy of marked up field drawings, 3 copies of certified as-built drawings by a professional surveyor, and 1 copy digital AutoCAD file containing as-built survey data. The base survey will be provided to the CONTRACTOR by the ENGINEER.

ITEM NO. 8 - North Bay Shoal Restoration

The North Bay Shoal Restoration will be paid for at the Contract unit price basis linear feet (L.F). Measurement shall be taken along the top of the shoal, as approved by ENGINEER.

Price paid shall be payment in full for all labor, material and equipment required for establishing grades shown on Drawings and shall include but is not limited to:

- furnish and placement of geotextile fabric;
- acquiring and hauling riprap to the site;
- placement of riprap for restoration of the shoal;
- riprap adjustments as directed by ENGINEER; and
- all other items necessary to complete the work.

ITEM NO. 9 - North Bay Shoal Islands

The North Bay Shoal Islands construction will be paid for at the Contract unit price basis linear feet (L.F). Measurement shall be taken along the top of the shoal, as approved by ENGINEER. Price paid shall be payment in full for all labor, material and equipment required for establishing grades shown on Drawings and shall include but is not limited to:

- acquiring and hauling aggregate, riprap, and geotextiles to the site;
- placement of geotextile for construction of the shoal island;
- placement of riprap for construction of the shoal island;
- placement of materials for avian nesting area shown on Drawings;
- riprap adjustments as directed by ENGINEER; and
- all other items necessary to complete the work.

SOUTH BAY

ITEM NO. 10 – South Bay Mobilization

South Bay Mobilization will be paid for at the Contract lump sum (LS) amount (not to exceed 5% of the total Contract Price). Price paid shall be payment in full for all labor, material, and equipment necessary for all preparatory work and operations, including but not limited to, the

movement of personnel, equipment, supplies, and incidentals to the project site. Mobilization shall include preconstruction costs, including premiums for insurance and bonds, exclusive of bidding costs, which are necessary direct costs to the project and are of a generalized nature rather than directly attributable to other pay items under this Contract. This pay item shall also include all costs associated with De-Mobilization. This pay item shall include:

- the establishment of staging/storage areas;
- the establishment of construction facilities and temporary controls;
- furnish and installation of project signage;
- installation and maintenance of construction fencing;
- protection of existing utilities as needed;
- installation and maintenance of tree protection;
- preparation of work schedules and schedule-of-values, and preparation of submittals;
- other work and operations which must be performed or for expenses incurred, prior to beginning work;
- All costs associated with De-Mobilization.

Payment for mobilization will be based upon the following schedule:

Partial Payment Schedule

| <u>Percentage of Total Contract Price Earned</u> | <u>Percentage of Bid Price for Mobilization Allowed</u> |
|--|---|
| 5 | 50 |
| 10 | 75 |
| 25 | 100 |

ITEM NO. 11 - South Bay Construction Staking/ Control

South Bay Construction staking will be paid for at the Contract lump sum (L.S.) amount. Price paid shall be payment in full for all labor, material and equipment required for establishing staking and maintaining staking in the project area as required to control grades and lines per Drawings. All other staking required shall be considered incidental, and shall be included in the unit price.

ITEM NO. 12 – South Bay Soil Erosion and Sediment Control/ Turbidity Control

South Bay Soil Erosion and Sediment Control will be paid for at the Contract lump sum (L.S.) basis. Price paid shall be payment in full for all labor, material and equipment required to install soil erosion and sediment control measures to the extents shown on the Drawings and shall include, but is not limited to:

- acquiring and delivering barrier material to the site;
- acquiring approval of delivered stock from ENGINEER prior to installation;
- installing controls at locations shown on Drawings;
- maintaining controls throughout duration of project;
- removal of measures after completion of restoration project, and;
- all other items necessary to complete the work.

ITEM NO. 13 - South Bay Permits

South Bay Permits will be paid for at the Contract lump sum (L.S.) basis. Price paid shall be for the CONTRACTOR to apply for and obtain all permits required for traffic control, inspections, soil erosion and sedimentation control, site development and other work as required for the South Bay.

ITEM NO. 14 – South Bay Construction Photographs

Construction photographs will be paid for at the Contract unit price each (EA) basis. Price paid shall be payment in full for all labor, material and equipment required for the providing of 3 color photographs at intervals determined by the OWNER of the work during its progress and 3 color aerial photographs at intervals determined by the OWNER made of the work during its progress. The aerial photographs shall be low level aerial photographs. Such aerial photographs shall be done by a qualified, established commercial photographer directed by the ENGINEER. Three prints of each photograph shall be furnished promptly to the ENGINEER. A high resolution digital copy of each photograph shall also be furnished promptly to the ENGINEER.

ITEM NO. 15- South Bay Site Restoration

South Bay Site Restoration shall be paid for on a Contract lump sum (L.S.) amount. Price paid shall be payment in full for all labor, material and equipment required to perform completion of site restoration within the Limits of Work/Disturbance shown on the Drawings or as directed by the ENGINEER and shall include, but is not limited to:

- restoration of all disturbed lawn areas to original grade with topsoil, seed and mulch;
- restoration of existing pavement;
- restoration of damaged utilities;
- restoration of any other structures; and
- all other items necessary to complete the work.

ITEM NO. 16 - South Bay As-Built Drawings

South Bay As-Built Drawings will be paid for at the Contract lump sum (L.S.) amount. Price paid shall be payment in full for all labor, material and equipment required for the providing certified as-built documents of the project following the completion of Work. Price paid shall include intermediate as-built drawings for work elements upon completion of each element, as directed by the ENGINEER. As-built documents shall include 1 copy of marked up field drawings, 3 copies of certified as-built drawings by a professional surveyor, and 1 copy digital AutoCAD file containing as-built survey data. The base survey will be provided to the CONTRACTOR by the ENGINEER.

PROPOSED SOUTH BAY- WEST SHOAL

ITEM NO. 17 – South Bay West Shoal 578

The South Bay Shoal 578 will be paid for at the Contract unit price basis linear foot (L.F). Measurement shall be taken along the top of the shoal, as approved by ENGINEER. Price paid shall be payment in full for all labor, material and equipment required for establishing grades shown on Drawings and shall include but is not limited to:

- acquiring and hauling aggregate, riprap, and geotextiles to the site;
- placement of geotextile for construction of the shoal;
- placement of riprap for construction of the shoal;
- riprap adjustments as directed by ENGINEER; and

- all other items necessary to complete the work.

ITEM NO.18 - South Bay West Shoal 577

The South Bay West Shoal 577 will be paid for at the Contract unit price basis linear foot (L.F). Measurement shall be taken along the top of the shoal, as approved by ENGINEER.

Price paid shall be payment in full for all labor, material and equipment required for establishing grades shown on Drawings and shall include but is not limited to:

- acquiring and hauling aggregate, riprap, and geotextiles to the site;
- placement of geotextile for construction of the shoal;
- placement of riprap for construction of the shoal;
- riprap adjustments as directed by ENGINEER; and
- all other items necessary to complete the work.

ITEM NO.19 - South Bay West Shoal 576

The South Bay West Shoal 576 will be paid for at the Contract unit price basis linear foot (L.F). Measurement shall be taken along the top of the shoal, as approved by ENGINEER.

Price paid shall be payment in full for all labor, material and equipment required for establishing grades shown on Drawings and shall include but is not limited to:

- acquiring and hauling aggregate, riprap, and geotextiles to the site;
- placement of geotextile for construction of the shoal;
- placement of riprap for construction of the shoal;
- riprap adjustments as directed by ENGINEER; and
- all other items necessary to complete the work.

ITEM NO.20 - South Bay West Shoal 575

The South Bay West Shoal 575 will be paid for at the Contract unit price basis linear foot (L.F). Measurement shall taken along the top of the shoal, as approved by ENGINEER.

Price paid shall be payment in full for all labor, material and equipment required for establishing grades shown on Drawings and shall include but is not limited to:

- acquiring and hauling aggregate, riprap, and geotextiles to the site;
- placement of geotextile for construction of the shoal;
- placement of riprap for construction of the shoal;
- riprap adjustments as directed by ENGINEER; and
- all other items necessary to complete the work.

WEST SHOAL HABITAT

ITEM NO. 21 - Mud Puppy Structures along Shoal

Mud Puppy Structures along the Shoal will be paid for at the Contract unit price basis each (EA). Price paid shall be payment in full for all labor, material and equipment required for establishing areas as shown on Drawings and shall include but is not limited to:

- acquiring and hauling limestone slabs to the site as needed;
- placement of limestone slabs for construction of Structures as shown on the Drawings, and;
- all other items necessary to complete the work

ITEM NO. 22 - Gravel Spawning along Shoal

Gravel Spawning along Shoal will be paid for at the Contract unit price basis cubic yard (C.Y.). Price paid shall be payment in full for all labor, material and equipment required

for establishing areas as shown on Drawings and shall include but is not limited to:

- acquiring and hauling crushed limestone to the site as needed;
- placement of crushed limestone for construction of Spawning Habitat as shown on the Drawings, and;
- all other items necessary to complete the work

ITEM NO. 23 - Stone Slab Habitat

Stone Slab Habitat will be paid for at the Contract unit price basis cubic yard (C.Y.). Price paid shall be payment in full for all labor, material and equipment required for establishing areas as shown on Drawings and shall include but is not limited to:

- acquiring and hauling limestone slabs and riprap to the site as needed;
- placement of limestone slabs and riprap for construction of Stone Slab Habitat as shown on the Drawings, and;
- all other items necessary to complete the work

ITEM NO. 24 – Native Material Excavation, Movement and Placement for Shoal Core
Native Material Excavation, Movement and Placement for Shoal Core will be paid for at the Contract unit price basis cubic yard (C.Y.). Price paid shall be payment for all labor, material, and equipment required to excavate, move, and place the native material as shown on the Plans for the Shoal Core. It also includes, but is not limited to;

- Excavation of native material;
- Movement of native material;
- Placement and grading of native material at the Shoal Core as shown on the Drawings;
- Stabilizing disturbed areas to the extents shown on the Drawings and as specified in the Specifications;
- All other items necessary to complete this item.

ITEM NO. 25- Native Vegetation Plugs

Native Vegetation Plugs will be paid for at the Contract unit price square yard (S.Y.). Measurement shall be based on Contract Drawings and installation approved by ENGINEER. Price paid shall be payment in full for all labor, material and equipment required to install the plugs at the spacing and to the extents shown on the Drawings and shall include, but is not limited to:

- acquiring and delivering plug material to the site;
- acquiring approval for alternate species from ENGINEER prior to installation;
- acquiring approval of delivered stock from ENGINEER prior to installation;
- installing plantings at approximate spacing and locations shown on Drawings;
- installing plugs using commonly accepted practices;
- 1-year warranty;
- Final weeding prior to end of 1-year warranty; and
- all other items necessary to complete the work.

ITEM NO. 26 - Live Stakes

Live Stakes will be paid for at the Contract unit price each (EA). Measurement shall be based on Contract Drawings and installation approved by ENGINEER. Price paid shall be payment in full for all labor, material and equipment required to install the live stakes at the spacing and to the extents shown on the Drawings and shall include, but is not limited to:

- acquiring and delivering live stakes material to the site;
- acquiring approval for alternate species from ENGINEER prior to installation;

- acquiring approval of delivered stock from ENGINEER prior to installation;
- installing live stakes at approximate spacing and locations shown on Drawings;
- installing live stakes using commonly accepted practices;
- 1-year warranty;
- Final weeding prior to end of 1-year warranty; and
- all other items necessary to complete the work.

ITEM NO. 27 – Habitat Logs at Shoals

Habitat Logs at Shoals will be paid for at the Contract unit price each (EA). Measurement shall be based on Contract Drawings and installation approved by ENGINEER. Price paid shall be payment in full for all labor, material and equipment required to install the debris at the spacing and to the extents shown on the Drawings and shall include, but is not limited to:

- acquiring and delivering wood debris material to the site;
- installing debris at approximate locations shown on Drawings;
- installing woody debris using commonly accepted practices;
- furnishing and installation of anchor materials; and
- all other items necessary to complete the work.

SOUTH BAY SOUTH SHOAL RESTORATION

ITEM NO. 28 – South Bay South Shoal 578

The South Bay South Shoal 578 will be paid for at the Contract unit price basis linear foot (L.F). Measurement shall be taken along the top of the shoal, as approved by ENGINEER.

Price paid shall be payment in full for all labor, material and equipment required for establishing grades shown on Drawings and shall include but is not limited to:

- furnishing and installation of geotextile;
- acquiring and hauling riprap to the site;
- placement of riprap for restoration of the shoal;
- riprap adjustments as directed by ENGINEER; and
- all other items necessary to complete the work

ITEM NO. 29 - South Bay South Shoal 576

The South Bay South Shoal 576 will be paid for at the Contract unit price basis linear foot (L.F). Measurement shall be taken along the top of the shoal, as approved by ENGINEER.

Price paid shall be payment in full for all labor, material and equipment required for establishing grades shown on Drawings and shall include but is not limited to:

- furnishing and installation of geotextile;
- acquiring and hauling riprap to the site;
- placement of riprap for restoration of the shoal;
- riprap adjustments as directed by ENGINEER; and
- all other items necessary to complete the work

ITEM NO. 30 - South Bay South Shoal 574

The South Bay South Shoal 574 will be paid for at the Contract unit price basis linear foot (L.F). Measurement shall be taken along the top of the shoal, as approved by ENGINEER.

Price paid shall be payment in full for all labor, material and equipment required for establishing grades shown on Drawings and shall include but is not limited to:

- furnishing and installation of geotextile;
- acquiring and hauling riprap to the site;

- placement of riprap for restoration of the shoal;
- riprap adjustments as directed by ENGINEER; and
- all other items necessary to complete the work

ITEM NO. 31 - South Bay South Shoal 573

The South Bay South Shoal 573 will be paid for at the Contract unit price basis linear foot (L.F). Measurement shall be taken along the top of the shoal, as approved by ENGINEER.

Price paid shall be payment in full for all labor, material and equipment required for establishing grades shown on Drawings and shall include but is not limited to:

- furnishing and installation of geotextile;
- acquiring and hauling riprap to the site;
- placement of riprap for restoration of the shoal;
- riprap adjustments as directed by ENGINEER; and
- all other items necessary to complete the work

SOUTH SHOAL HABITAT

ITEM NO. 32 - Mud Puppy Structures along Shoal

Mud Puppy Structures along the Shoal will be paid for at the Contract unit price basis each (EA). Price paid shall be payment in full for all labor, material and equipment required for establishing areas as shown on Drawings and shall include but is not limited to:

- acquiring and hauling limestone slabs to the site as needed;
- placement of limestone slabs for construction of Structures as shown on the Drawings, and;
- all other items necessary to complete the work

ITEM NO. 33 – Spawning Habitat along Shoal

Spawning Habitat along Shoal will be paid for at the Contract unit price basis cubic yard (C.Y.). Price paid shall be payment in full for all labor, material and equipment required for establishing areas as shown on Drawings and shall include but is not limited to:

- acquiring and hauling crushed limestone to the site as needed;
- placement of crushed limestone for construction of Spawning Habitat as shown on the Drawings, and;
- all other items necessary to complete the work

ITEM NO. 34 – Slab Stone Habitat

Slab Stone Habitat will be paid for at the Contract unit price basis cubic yard (C.Y.). Price paid shall be payment in full for all labor, material and equipment required for establishing areas as shown on Drawings and shall include but is not limited to:

- acquiring and hauling limestone slabs and riprap to the site as needed;
- placement of limestone slabs and riprap for construction of Slab Stone Habitat as shown on the Drawings or as determined by ENGINEER, and;
- all other items necessary to complete the work

ITEM NO. 35 – Native Material Excavation, Movement and Placement for Shoal Core

Native Material Excavation, Movement and Placement for Shoal Core will be paid for at the Contract unit price basis cubic yard (C.Y.) amount. Price paid shall be payment for all labor, material, and equipment required to excavate, move, and place the native material as shown on the Plans for the Shoal Core. It also includes, but is not limited to;

- Excavation of native material;
- Movement of native material;
- Placement and grading of native material at the Shoal Core as shown on the Drawings;
- Stabilizing disturbed areas to the extents shown on the Drawings and as specified in the Specifications;
- All other items necessary to complete this item.

ITEM NO. 36- Native Vegetation Plugs

Native Vegetation Plugs will be paid for at the Contract unit price square yard (S.Y.). Measurement shall be based on Contract Drawings and installation approved by ENGINEER. Price paid shall be payment in full for all labor, material and equipment required to install the plugs at the spacing and to the extents shown on the Drawings and shall include, but is not limited to:

- acquiring and delivering plug material to the site;
- acquiring approval for alternate species from ENGINEER prior to installation;
- acquiring approval of delivered stock from ENGINEER prior to installation;
- installing plantings at approximate spacing and locations shown on Drawings;
- installing plugs using commonly accepted practices;
- 1-year warranty;
- Final weeding prior to end of 1-year warranty; and
- all other items necessary to complete the work.

ITEM NO. 37 - Live Stakes

Live Stakes will be paid for at the Contract unit price each (EA). Measurement shall be based on Contract Drawings and installation approved by ENGINEER. Price paid shall be payment in full for all labor, material and equipment required to install the live stakes at the spacing and to the extents shown on the Drawings and shall include, but is not limited to:

- acquiring and delivering live stakes material to the site;
- acquiring approval for alternate species from ENGINEER prior to installation;
- acquiring approval of delivered stock from ENGINEER prior to installation;
- installing live stakes at approximate spacing and locations shown on Drawings;
- installing live stakes using commonly accepted practices;
- 1-year warranty;
- Final weeding prior to end of 1-year warranty; and
- all other items necessary to complete the work.

ITEM NO. 38 – Habitat Logs at Shoals

Habitat Logs at Shoals will be paid for at the Contract unit price each (EA). Measurement shall be based on Contract Drawings and installation approved by ENGINEER. Price paid shall be payment in full for all labor, material and equipment required to install the debris at the spacing and to the extents shown on the Drawings and shall include, but is not limited to:

- acquiring and delivering wood debris material to the site;
- installing debris at approximate locations shown on Drawings;
- installing woody debris using commonly accepted practices;
- furnishing and installation of anchor materials; and
- all other items necessary to complete the work.

INNER BAY HABITAT

ITEM NO. 39 - Habitat Log Bundles

Habitat Log Bundles will be paid for at the Contract unit price each (EA). Measurement shall be based on Contract Drawings and installation approved by ENGINEER. Price paid shall be payment in full for all labor, material and equipment required to install the logs at the spacing and to the extents shown on the Drawings and shall include, but is not limited to:

- acquiring and delivering log structures to the site;
- installing log structures at approximate spacing and locations shown on Drawings;
- installing logs using commonly accepted practices; and
- all other items necessary to complete the work.

ITEM NO. 40 - Mud Puppy Structures

Mud Puppy Structures will be paid for at the Contract unit price basis each (EA). Price paid shall be payment in full for all labor, material and equipment required for establishing areas as shown on Drawings and shall include but is not limited to:

- acquiring and hauling limestone slabs to the site as needed;
- placement of limestone slabs for construction of Structures as shown on the Drawings, and
- all other items necessary to complete the work.

ITEM NO. 41 - Mud Puppy Structures with Mussel Habitat

Mud Puppy Structures with Mussel Habitat will be paid for at the Contract unit price basis each (EA). Price paid shall be payment in full for all labor, material and equipment required for establishing areas as shown on Drawings and shall include but is not limited to:

- acquiring and hauling limestone slabs to the site as needed;
- acquiring and hauling aggregate to the site as needed;
- placement of aggregate and limestone slabs for construction of Structures as shown on Drawings; and
- all other items necessary to complete the work.

ITEM NO. 42 - Vegetation Thinning

Vegetation Thinning will be paid for at the Contract unit price basis acre (AC). Price paid shall be payment in full for all labor, material and equipment required for thinning of existing vegetation in the upland habitat areas as shown on Drawings and shall include but is not limited to:

- removal of existing vegetation within upland habitat area in location shown on the Drawings;
- disposal off-site or relocation within project boundaries as approved by the ENGINEER, and;
- all other items necessary to complete the work.

ITEM NO. 43 - Nesting Area

Nesting Area will be paid for at the Contract unit price basis each (EA). Price paid shall be payment in full for all labor, material and equipment required for establishing upland habitat nesting areas as shown on Drawings and shall include but is not limited to:

- acquiring and hauling sand material to the site;
- placement of sand material for construction of Nesting Area, and;
- all other items necessary to complete the work.

ITEM NO. 44 - Hibernacula

Hibernacula will be paid for at the Contract unit price basis each (EA). Price paid shall be payment in full for all labor, material and equipment required for establishing habitat areas as shown on Drawings and shall include but is not limited to:

- acquiring and hauling aggregate and rock to the site;
- installation of Hibernacula as shown on the Drawings to establish habitat; and
- all other items necessary to complete the work.

ALLOWANCES

ITEM NO. 45 – Permanent Signage

Permanent signage shall be paid for on a lump sum (LS) basis. Price paid shall be payment in full for all labor, material and equipment required to furnish and install grant required signage and DNR signage as directed by the ENGINEER, plus 5%.

ITEM NO. 46 – Allowance for Unforeseen Site Conditions

Unforeseen Site Conditions will be paid for at the negotiated price after the Work has been authorized by the ENGINEER. Price paid shall be payment in full for all labor, material, and equipment required for remedying unforeseen physical conditions and shall be based upon an agreement negotiated and approved prior to beginning this Work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01027

APPLICATIONS FOR PAYMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. All progress payments shall conform with of the General conditions.
- B. The CONTRACTOR shall submit draft Applications for Payment to the ENGINEER one week prior to final submittal for review along with a draft schedule.
- C. Applications for Payment shall be consistent with previous applications and payments as certified by the ENGINEER and paid for by the OWNER.
- D. Payment Application Forms: Use form for Applications for Payment as approved by the ENGINEER in advance.
- E. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
- F. Submit one draft and three executed original copies of each Application for Payment to the ENGINEER.
- G. Administrative actions and submittals that must precede or coincide with submittal of the final application for payment shall be in accordance with the Contract Documents.

1.02 RELATED WORK

- A. Bid Form.
- B. General Conditions.
- C. Supplementary Conditions.
- D. Section 01310, Work Plan.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01040

COORDINATION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The CONTRACTOR shall coordinate work under this Contract with operation and maintenance activities carried out by OWNER.

1.02 RELATED WORK

- A. Section 01010, Summary of Work.
- B. Section 01300, Submittals.
- C. Section 01310, Work Plan.
- D. Section 01700, Contract Closeout.

1.03 GENERAL PROVISIONS

- A. Cooperate with OWNER in the use of the site.
- B. Comply with the ENGINEER's procedures for Project communications, submittals, reports and records, schedules, and coordination drawings.
- C. Comply with instructions of OWNER for use of temporary utilities.
- D. Coordinate scheduling, and submittals, to assure efficient and orderly sequence of the Work.
- E. Coordinate sequence of Work to accommodate OWNER occupancy as specified in Section 01010.
- F. In addition to progress meetings specified in Section 01200, hold coordination meetings and pre-construction conferences with personnel and subcontractors to assure coordination of the Work. The ENGINEER shall be informed of these meetings in advance.
- G. Assemble and coordinate closeout submittals specified in Section 01700.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Preconstruction conference.
- B. Progress meetings.

1.02 RELATED WORK

- A. Instruction to Bidders: Pre-bid conference.
- B. General Conditions: Contractor's use of site; safety procedures; payments; claims; change orders.
- C. Section 01300, Submittals.
- D. Section 01310, Work Plan.
- E. Section 01400, Quality Control.
- F. Section 01500, Construction Facilities and Temporary Controls.
- G. Section 01600, Delivery, Storage, and Handling.

1.03 PRECONSTRUCTION CONFERENCE

- A. Following the Notice of Award, the ENGINEER will schedule a preconstruction conference.

1.04 PROGRESS MEETINGS

- A. Bi-weekly progress meetings will be scheduled.
- B. Attendance (as needed): CONTRACTOR, project superintendent, subcontractors, and suppliers, appropriate to agenda; the ENGINEER, the OWNER, his representatives, and consultants as appropriate.
- C. Minimum Agenda:
 - 1. Progress of Work in relation to schedule.
 - 2. CONTRACTOR's marked-up schedule.
 - 3. CONTRACTOR's payment estimate.
 - 4. Work progress and performance.
 - 5. Field observations, problems, and conflicts.
 - 6. Off-site and on-site fabrications, inspections and delivery schedules.

7. Corrective measures and procedures to regain projected schedule.
8. Planned progress and schedule during succeeding work period.
9. Coordination of schedules.
10. Submittals required.
11. Maintenance of quality standards.
12. Proposed changes; effect on construction schedule.
13. Any other appropriate items or subjects which require the attention and attendance of the CONTRACTOR with regard to the progress of the Work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01240

VALUE ENGINEERING INCENTIVE

PART 1 GENERAL

1.01 DESCRIPTION

This Section defines a Value Engineering Incentive Proposal and establishes procedures and policies for sharing Value Engineering savings between the OWNER and the CONTRACTOR.

1.0.2 DEFINITIONS

- A. Value Engineering Incentive Proposal: A formally written Proposal from the CONTRACTOR for a change in scope, materials, methods, techniques, procedures, etc., during the construction of a Project, which results in a savings to the Project while maintaining the design intent, function, serviceability, durability, longevity, etc.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. The Value Engineering Incentive Proposal must result in a net capital cost reduction while causing no increase in the total life cycle cost of the Project (i.e., shall not increase overall operation and maintenance costs).
- B. The function, reliability, and safety of the Project shall be maintained.
- C. The proposed change shall not result in any Contract rebidding.
- D. The proposed change shall be in compliance with all applicable laws, regulations, ordinances, and permits of all local, federal, and state agencies.
- E. The proposed change shall result in a gross savings of at least \$10,000.00 to be considered for Value Engineering Incentive sharing.

3.02 SUBMITTING PROPOSAL

The Value Engineering Incentive Proposal shall contain all pertinent information and supporting documentation for evaluation by the ENGINEER. As a minimum, the following information shall be included:

- A. Name of CONTRACTOR, subcontractors, suppliers, or others associated with the proposed change and preparation of the Value Engineering Incentive Proposal.
- B. A detailed description with plans and specifications of the present design and proposed changes. Designs shall be signed and sealed by a registered Professional Engineer.

- C. Clear identification of any advantages and disadvantages for each change proposal.
- D. A detailed procedure and schedule for implementing the proposed change. This shall include confirmation from suppliers of availability and proposed delivery dates of materials and equipment.
- E. All necessary Contract Change Order information and significant dates for implementation.
- F. A detailed listing of Project construction costs before (original construction cost as bid) and after the proposed change, broken down by trade and/or subcontractor. Markups for overhead and profit shall be equivalent to the markups included in the original Proposal submitted with the CONTRACTORs bid unless such markups are not in accordance with the Conditions of the Contract. The original as bid construction cost and the new construction cost shall be supported. Construction costs shall include, as a minimum, the following:
 - 1. Detailed listing of quantities of materials and equipment
 - 2. Unit prices of materials and equipment
 - 3. Labor hours and hourly rates for installation labor
 - 4. Detailed listing of equipment and equipment rates used in the installation
 - 5. Subcontractor and CONTRACTOR markups
 - 6. Permit fees and license costs
 - 7. Miscellaneous costs not included above with supporting documentation
- G. Operation and maintenance costs before and after the Value Engineering Change.
- H. Other costs for implementing the proposed change not included above.
- I. Other data required for funding approvals as may be required by funding agencies.
- J. Time required for executing the proposed change including time savings or time extensions if required.

3.03 REVIEW OF VALUE ENGINEERING CHANGE PROPOSAL

The OWNER may modify, accept, or reject the proposed change. However, if the proposed change is modified or is not acted upon within the time frame specified in the Value Engineering Incentive Proposal, the CONTRACTOR may withdraw in whole or in part, the Value Engineering Incentive Proposal. In any event, the OWNER and ENGINEER shall not be liable for any costs associated with development and submittal of the Value Engineering Incentive Proposal.

- A. The ENGINEER shall review all aspects of the Value Engineering Incentive Proposal and make a separate analysis of the costs, benefits, disadvantages, maintenance and operating costs, and life cycle costs based upon the design intent. The ENGINEER shall then make a recommendation, to the OWNER, based upon this review. Such recommendation shall accept or reject the Value Engineering Incentive Proposal in

whole or in part, or recommend modifications to the proposal, accompanied by such supporting documentation as is necessary to support the recommendation.

- B. The OWNER shall accept or reject the Value Engineering Incentive Proposal in whole or in part, or offer modifications to the proposal for consideration of the CONTRACTOR.
- C. The CONTRACTOR shall accept or reject the Value Engineering Incentive Proposal as accepted by the OWNER, or may counteroffer modifications to the proposal for the ENGINEER's review and OWNER's consideration.
- D. The ENGINEER shall record all costs for review on a time and materials basis. Such costs shall be deducted from the Value Engineering savings.

3.04 ACCEPTANCE OF VALUE ENGINEERING INCENTIVE PROPOSAL

Upon mutual acceptance of the Value Engineering Incentive Proposal by the OWNER and CONTRACTOR, the CONTRACTOR will share in the net savings based upon the following formula.

\$ (initial construction cost)
-\$ (revised construction cost)

\$ (Value Engineering Savings) = (\$10,000.00 or greater)
-\$ (ENGINEER's review costs)
\$ (net Value Engineering Savings)

\$ (net Value Engineering Savings) x 50% = CONTRACTOR's share in savings

When approved, the CONTRACTOR's share in the Value Engineering Incentive savings shall be reimbursed by an approved Change Order which shall also be authorization to proceed with the proposed change.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section specifies the requirements for the following submittals: Shop Drawings, Product Data, Samples, Construction Photographs, and Construction and Shop Drawing Submittal Schedules.
- B. All submittals shall be clearly identified by reference to Section Specification number, Paragraph, and Drawing number as applicable. Submittals shall be clear and legible and of sufficient size for clear presentation of data.

1.02 RELATED WORK

- A. Section 01200, Project Meetings.
- B. Section 01310, Work Plan.
- C. Section 01330, Construction Staking.
- D. Section 01700, Contract Closeout.
- E. Section 02205, Soil Materials
- F. Section 02207, Aggregate Materials.
- G. Section 02220, Soil Erosion Control.
- H. Section 02231, Shoal Construction
- I. Section 02300, Earthwork
- J. Section 02621, Geotextile for Separation
- K. Section 02950, Landscaping
- L. Section 02960, Habitat Structures

1.03 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, TECHNICAL WORK PLANS

- A. Shop Drawings
 - 1. Shop drawings as specified in individual Specification Sections include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation (working) drawings, scheduled information, setting diagrams, actual shopwork manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certifications, as applicable to the Work.
 - 2. All shop drawings submitted by subcontractors for approval shall be sent directly to the CONTRACTOR for checking. The CONTRACTOR shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.
 - 3. Check all subcontractor's shop drawings regarding measurements, size of members, materials and details to make sure that they conform to the intent of the Drawings and related Specification Sections. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before

submission thereof.

4. All details on shop drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure and where correct fabrication of the work depends upon field measurements; such measurements shall be made and noted on the shop drawings before being submitted for approval.

B. Product Data

1. Product data as specified in individual Specification Sections, include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing and printed product warranties, as applicable to the work.

C. Samples

1. Samples specified in individual Specification Sections, include, but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols and units of work to be used by the ENGINEER or OWNER for independent inspection and testing, as applicable to the work.

- D. The following Technical Work Plans shall be developed by the CONTRACTOR prior to initiating the Work covered by the Technical Work Plans. The Plans shall be submitted for review and approval and shall include: descriptions of CONTRACTOR's proposed means and methods; materials, products, and equipment data; assumptions, design data, and calculations; sketches, and fabrication and working drawings, sequence of work; and contingency plans. All designs and calculations included in the Plans shall be stamped by a Professional Engineer registered in the State of Michigan.

1. Soil Erosion and Sedimentation Control Plan (Section 02220, 02940).
2. Revegetation Plan (Section 02940)

1.04 CONTRACTOR'S RESPONSIBILITIES

- A. The CONTRACTOR shall review shop drawings, product data and samples, including those by subcontractors, prior to submission to determine and verify the following:
1. Field measurements
 2. Field construction criteria

3. Catalog numbers and similar data
 4. Conformance with related Sections
- B. Each shop drawing, sample and product data submitted by the CONTRACTOR shall have affixed to it the following Certification Statement including the CONTRACTOR's company name and signed by the CONTRACTOR: "Certification Statement: by this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements." Shop drawings and product data sheets 11-in x 17-in and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package.
- C. Project work, materials, fabrication, and installation shall conform to approved shop drawings, applicable samples, and product data.

1.05 SUBMISSION REQUIREMENTS

- A. Make submittals promptly in accordance with approved schedule and in such sequence as to cause no delay in the Work.
- B. Each submittal, appropriately coded, will be returned within 30 calendar days following receipt of submittal by the ENGINEER.
- C. Number of submittals required:
1. Shop Drawings as defined in Paragraph 1.02A: Three copies.
 2. Product Data as defined in Paragraph 1.02B: Three copies.
 3. Samples: Submit the number stated in the respective Specification Sections.
- D. Submittals shall contain:
1. The date of submission and the dates of any previous submissions.
 2. The Project title and number.
 3. Contractor identification and certification.
 4. The names of:
 - a. Contractor
 - b. Supplier
 - c. Manufacturer

5. Identification of the product, with the Specification Section number, page and paragraph(s).
6. Field dimensions, clearly identified as such.
7. Relation to adjacent or critical features of the Work or materials.
8. Applicable standards (such as ASTM, MDOT, or Federal Standards numbers.)
9. Identification of deviations from Contract Documents.
10. Identification of revisions on resubmittals.
11. A blank space suitably sized for ENGINEER stamp.

1.06 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, TECHNICAL WORK PLANS WORKING DRAWINGS AND SAMPLES

- A. The review of shop drawings, data and samples will be for general conformance with the design concept and Contract Documents. They shall not be construed:
 1. as permitting any departure from the Contract requirements;
 2. as relieving the CONTRACTOR of responsibility for any errors, including details, dimensions, and materials;
 3. as approving departures from details furnished by the ENGINEER, except as otherwise provided herein.
- B. The CONTRACTOR remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.
- C. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirements which ENGINEER finds to be in the interest of the OWNER and to be so minor as not to involve a change in Total Contract Price or Contract Time, the ENGINEER may return the reviewed drawings without noting an exception.
- D. Submittals will be returned/noted to the CONTRACTOR as:

"APPROVED" is assigned when there are no notations or comments on the submittal. When returned under this code the CONTRACTOR may release the equipment and/or material for manufacture.

"APPROVED AS NOTED". This code is assigned when a confirmation of the notations and comments IS NOT required by the CONTRACTOR. The CONTRACTOR may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.

"APPROVED AS NOTED/RESUBMIT". This combination of codes is assigned when

notations and comments are extensive enough to require a resubmittal of the package. This resubmittal is to address all comments, omissions and non-conforming items that were noted. Resubmittal is to be received by the ENGINEER within [15] calendar days of the date of the ENGINEER's transmittal requiring the resubmittal.

"NOT APPROVED" is assigned when the submittal does not meet the intent of the Contract Documents. The CONTRACTOR must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the Contract Documents.

"COMMENTS ATTACHED" is assigned where there are comments attached to the returned submittal which provide additional data to aid the CONTRACTOR.

- E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the CONTRACTOR shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the ENGINEER, on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the CONTRACTOR. The CONTRACTOR shall make corrections to any work done because of this type revision that is not in accordance to the Contract Documents as may be required by the ENGINEER.
- F. Partial submittals may not be reviewed. The ENGINEER will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the CONTRACTOR and will be considered "Not Approved" until resubmitted. The ENGINEER may at his/her option provide a list or mark the submittal directing the CONTRACTOR to the areas that are incomplete.
- G. If the CONTRACTOR considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the CONTRACTOR shall give written notice thereof to the ENGINEER at least 7 working days prior to release for manufacture.
- H. When the shop drawings have been completed to the satisfaction of the ENGINEER, the CONTRACTOR shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the ENGINEER.

1.07 DISTRIBUTION

- A. Distribute reproductions of approved shop drawings and copies of approved product data and samples, where required, to the job site file and elsewhere as directed by the ENGINEER. Number of copies shall be as directed by the ENGINEER but shall not exceed six (6).

1.08 SHOP DRAWING SUBMITTAL SCHEDULE

- A. Provide shop drawing submittal schedule required in Specification Section 01310, Work Plan.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01310

WORK PLAN

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The CONTRACTOR shall submit a Work Plan demonstrating fulfillment of all Contract requirements. The Work Plan shall be kept up to date in accordance with the requirements of this Section. The Work Plan shall be utilized for planning, scheduling, coordinating, and monitoring Work under this Contract, including but not limited to all activities of subcontractors, equipment vendors, suppliers, and approvals of the OWNER and of other agencies. The Work Plan, when approved, shall be jointly used by OWNER, ENGINEER, and CONTRACTOR to substantiate or mitigate the impact of delays and Change Orders and measure progress of the CONTRACTOR.
- B. This Specification also requires the CONTRACTOR to associate the Schedule of Values with the Work Plan; that the CONTRACTOR use the Work Plan to assist the OWNER in evaluating progress of the Work and in making payments for Work performed; and that the CONTRACTOR prepare record drawings and data showing how the Work is being performed as to sequencing, timing, and rate of progress.

1.02 RELATED WORK

- A. General Conditions of the Contract.
- B. Section 01010, Summary of Work.
- C. Section 01027, Applications for Payment.
- D. Section 01040, Coordination.
- E. Section 01200, Project Meetings.
- F. Section 01300, Submittals.

1.03 GENERAL PROVISIONS FOR DEVELOPMENT OF A WORK PLAN

- A. The CONTRACTOR shall prepare a detailed Work Plan consisting of Schedule, Schedule of Values (SOV), and a Detailed Cost Breakdown (DCB). In addition, the work plan shall include a detailed narrative, sketches, product data and other information describing details of the CONTRACTOR's means and methods to complete the work.
- B. All costs incurred by the CONTRACTOR to correctly develop, implement, coordinate, and administer the Work Plan shall be borne by the CONTRACTOR and shall be included in his bid and become part of his Contract. The CONTRACTOR shall be responsible for all his subcontractors and suppliers in the implementation of the Work Plan.

- C. The CONTRACTOR shall designate, within one week after Notice to Proceed, an authorized representative of his firm who shall be responsible for the development and maintenance of the Work Plan. This representative of the CONTRACTOR shall have direct project control and complete authority to act on behalf of the CONTRACTOR in fulfilling the commitments shown in the Work Plan. This representative shall not be changed during the term of this Contract without the prior consent of the ENGINEER unless he or she shall cease to be in the employ of the CONTRACTOR.
- D. The ENGINEER will be the final judge as to the acceptability of the Work Plan and is empowered under the terms of the Contract to call upon the CONTRACTOR to reschedule his Work and remedy the functioning of the systems whenever deficiencies of whatever nature occur during the course of the Work. Refusal by the CONTRACTOR to maintain the progress of his work consistent with the Schedule included in the Work Plan shall be interpreted as an obvious delay of the Contract by the CONTRACTOR. Adherence to the established Schedule shall be obligatory upon the CONTRACTOR and his subcontractors for the Work under this Contract.
- E. The ENGINEER's review of the CONTRACTOR's Schedules will be only for conformance with the Contract Times in the Agreement, and those sequences of Work indicated in or required by the Contract Documents. The ENGINEER's review, comments, and exceptions taken, if any, shall not, extend to, nor will constitute directions nor approval of, the means, methods, techniques, sequences, or procedures of construction or safety precautions, the corrections of which shall be the sole responsibility of the CONTRACTOR.
- F. The ENGINEER's approval of the CONTRACTOR's Work Plan shall not relieve the CONTRACTOR of any responsibilities otherwise designated under the Contract. Approval of a Schedule with undisclosed variations or errors such as omitted Work or erroneous sequences will not relieve the CONTRACTOR from completing the omitted or impacted Work within the Contract Time(s) at no change in the Contract Price.

1.04 SCHEDULE

- A. A Schedule representing all Work under this Contract and all interfaces required with each other contracts shall be prepared and submitted by the CONTRACTOR. This schedule shall show in sufficient detail the priority, sequencing and interdependence of activities and the sequence in which the Work is to be accomplished as planned by the CONTRACTOR to comply with the Contract Time(s), named allowances, and those sequences of Work indicated in or required by the Contract Documents. Each stage of Work shall be analyzed in sufficient detail by the CONTRACTOR to ensure reasonably accurate time durations. When completed, the Schedule shall represent the CONTRACTOR's own plan for the Project, consistent with Contract requirements.
- B. It shall be the CONTRACTOR's responsibility to ensure that all of his Work is described by the Schedule and that the schedules do correctly represent the sequence, means, methods, techniques, and procedures for completing his Work. In preparing the Schedule, the CONTRACTOR shall:
 - 1. Verify site conditions that may in any manner affect cost, progress, scheduling, performance, and furnishing of the Work.

2. Work with all major Subcontractors and Suppliers to obtain information on activities, sequencing, and activity durations for incorporation into the Schedule.
 3. Obtain written interpretations from the ENGINEER as warranted.
- C. The Schedule shall show sufficient detail for Work activities to clearly identify, separately and individually, those factors that may in any manner affect the cost, schedule, progress, performance, and furnishing of the Work. At a minimum, the activity breakdown shall delineate the following:
1. Work associated with the CONTRACTOR's installation, erection, and other field construction activities for the Contract as defined in Work Sequence in Specification Section 01010.
 2. Items pertaining to the approvals of regulatory agencies.
 3. The time required for the review and approval of shop drawings and schedules.
 4. All special Work sequences, schedule milestones, intermediate Contract Times, named allowances set forth in the Contract Documents.
- D. Activity durations shall be in calendar days and represent the CONTRACTOR's single best estimate based on the Work included and the resources planned for that activity.
- E. Supporting data shall be submitted in the form of a narrative and shall include:
1. The status of the Schedule in terms of number of calendar days ahead or behind the Contract Time(s).
 2. The progress status (i.e., progress achieved versus that forecasted) for:
 - a. Activities designating accomplishment of Substantial Completion milestones.
 - b. Critical and other significant activities.
 - c. Work related to achieving milestones set forth the Work Sequencing indicated in or required by the Contract Documents.
 3. The assumptions made in incorporating Work related to pending or authorized Change Orders.
 4. Actual or potential delays, including causes, the steps taken or anticipated to mitigate their impact and the anticipated effect on the Schedule as a whole.
 5. Any significant changes in Schedule sequences, and their basis thereof.
 6. OWNER and ENGINEER activities that become due over the next 2 months for CONTRACTOR to maintain the Schedule.
 7. CONTRACTOR's responses to ENGINEER's comments raised in the review of the previous Schedule submittal.

8. Actions taken to address schedule non-compliance.
- F. Any float in the CONTRACTOR's approved schedule belongs to the project, not the CONTRACTOR. The CONTRACTOR shall not be entitled to additional compensation due to loss of float caused by weather; wet conditions, lack of surface or groundwater controls, high or ponded water in work areas, coordination or for any other reason.

1.05 SCHEDULE OF VALUES (SOV)

- A. The Schedule of Values shall be a tabulation of each activity of the Schedule listed and the associated cost of each activity. The cumulative cost of all activities shall equal the total Contract price. Overhead, profit, and the costs of bonds, insurance, for the entire project, shall be tabulated. Separate cost activities will be allowed for such items, as mobilization, insurance, and bonds only if specified the Special Notice to Bidders. Each Schedule of Values activity shall be cross-referenced to an item of Work in the Detailed Cost Breakdown.
- B. The cost of the individual items in the Detailed Cost Breakdown shall be equal to the sum of costs of the activities in the Schedule of Values related to that item. The Schedule of Values and the Detailed Cost Breakdown, once approved by the ENGINEER, shall become the basis for progress payments under this Contract and cannot thereafter be changed without the written approval of the ENGINEER.
- C. Identify Schedule of Values with:
 1. Title of Project and location.
 2. Project number.
 3. Name and Address of CONTRACTOR.
 4. Contract designation.
 5. Date of submission.
 6. Submission number.
- D. Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.
- E. Identify each line item with the number and title of the respective major section of the specifications.
- F. For each major line item list subvalues of major products or operations under the item.
- G. For the various portions of the Work:
 1. Each item shall include a directly proportional amount of the CONTRACTOR's overhead and profit.

2. For items on which progress payments will be requested for stored materials, break down the value into the cost of the materials, delivered and unloaded, with taxes paid. Paid invoices are required for materials upon request by the ENGINEER.

1.06 DETAILED COST BREAKDOWN (DCB)

- A. The Detailed Cost Breakdown shall be a detailed tabulation of the unit price or lump sum bid. The breakdown will include, for each major operation to be performed under the Contract, the individual items of Work including quantities, unit prices, and total cost.

The sum of the total cost of the individual items shall be equal to the total Contract price.

1.07 COMPLETE WORK PLAN

- A. At the Pre-Construction Meeting, the CONTRACTOR shall deliver to the ENGINEER for review and acceptance, five (5) copies of the complete Schedule.
- B. The ENGINEER will review the Schedule submittal and return it approved or disapproved within a period of ten (10) working days. If disapproved, the CONTRACTOR shall promptly make corrections and resubmit within ten (10) working days for the ENGINEER's action within the following ten (10) working days.
- C. The ENGINEER will review the Schedule of Values and return same, approved or disapproved, within a period of ten (10) working days. If disapproved, the CONTRACTOR shall promptly make revisions and resubmit within five (5) working days for the ENGINEER's action within five (5) working days.
- D. Pursuant to Article 14 of the General Conditions, acceptance by the ENGINEER of the Schedule of Values will be a condition of progress payments for the Work.

1.08 PAYMENT AND PROGRESS REPORTING

- A. Pursuant to Section 01200 herein, the ENGINEER will schedule a monthly progress meeting between the ENGINEER and the CONTRACTOR.
- B. Five (5) working days prior to the scheduled monthly meeting, the CONTRACTOR will submit to the ENGINEER a "Marked-Up" Schedule, a "Marked-Up" Schedule of Values, and a Supporting Schedule Narrative, showing the anticipated status of each activity as of the schedule payment cut-off date. The "Marked-Up" Schedule shall be the latest version of the Schedule on which "Updates" and, where applicable, "Revisions" are graphically displayed. "Updates" are a graphic representation of the current Contract status, including completed activities, and remaining duration of those activities started but not completed as of the scheduled payment cutoff date. "Revisions" will be made when one or more of the following conditions occur, as determined by the ENGINEER, with the following effect:
 1. Progress falls behind schedule and monitoring becomes impractical.
 2. A Change Order significantly affects the Date of Substantial Completion of the sequence of activities. Change Order work for Change Orders that have not been issued are to be clearly noted as "proposed" or "pending". Change Order time shall

be shown as "proposed" or "pending" until the Change Order is issued. The Cost of the Change Order will be shown as \$0 on the Schedule of Values until the Change Order is issued.

3. The progress of the Work, or the planned sequence of the Work, does not conform to the CONTRACTOR's current Schedule. If the CONTRACTOR purposes change or revise his method of operating and it affects the approved Schedule, he shall notify the ENGINEER in writing and specifically delineate the reasons for and nature of such changes and revisions. If the ENGINEER approves such changes/revisions, the CONTRACTOR shall revise and submit for further approval, without any additional cost to the OWNER, all of the affected portions of the Schedule. The Schedule shall be revised by the CONTRACTOR only after prior written approval by the ENGINEER of the proposed changes or revisions. Revisions may consist of changing portions of approved activities or other revisions as approved by the ENGINEER.
 4. The completion of any activity, whether or not critical to performance of the Work, falls more than 100 percent behind its prior approved duration. The CONTRACTOR shall prepare and submit for approval proposed revisions showing each such activities reflecting completed and uncompleted Work.
 5. The progress of the Work is significantly and adversely affected as a result of any of the events, conditions, circumstances, acts of neglect, or acts of omissions as provided in the General Conditions that are incorporated by reference herein. Under such conditions, the ENGINEER shall direct the CONTRACTOR to reschedule the Work and/or the Date of Substantial Completion to reflect such conditions and the CONTRACTOR shall revise his/her schedule accordingly. As a result of such conditions, the CONTRACTOR shall take all possible action to minimize any time delays and costs to the OWNER.
- C. If the CONTRACTOR refuses, fails, or neglects to provide the required Schedules or related data pricing and Shop Drawings, and schedule recovery data:
1. The CONTRACTOR will be deemed not to have provided sufficient information to the ENGINEER upon which progress can be evaluated, and the ENGINEER may refuse to recommend the whole or part of any outstanding payment if, in the ENGINEER's opinion, it would be incorrect to make such representations to the OWNER. Further, the OWNER may refuse to make payments of those amounts recommended by the ENGINEER because of the CONTRACTOR's failure or refusal to provide the required Progress Schedule and related submittal data.
 2. The ENGINEER may perform, or may hire a specialist to perform, the Schedule, analysis and those parts deemed to be lacking, inadequate, or insufficient. The cost for this extra work by the ENGINEER will be charged against any future progress payment due to the CONTRACTOR.
- D. At the monthly progress meeting a review of the current status of the Work and the progress during the monitoring period will be made utilizing the "Marked-Up" Schedule.

Modification of the "Marked-Up" Schedule may be made during the progress meeting if it is

mutually agreed that these modifications will more accurately reflect actual Work status and progress.

- E. In the event of a dispute regarding the percentage of Work completed that the ENGINEER and the Contract cannot resolve at the monthly meeting, the ENGINEER will use his sole judgment in representing the quantity and fair value of the Work completed for those activities in dispute.
- F. After the monthly meeting, the ENGINEER will proceed processing the progress payment.
- G. Utilizing the information on the "Marked-Up" Schedule, the CONTRACTOR shall change the original or previous version of the Schedule. Changes to the Schedule shall be identified as Updates or Revisions numbered sequentially.
- H. Within five (5) working days after the monthly progress meeting, the CONTRACTOR shall transmit to the ENGINEER for approval, five (5) copies of the Updated or Revised Schedule as part of the "Update" submittal set(s). "Update" submittal sets shall consist of revised detailed Diagrams, Schedule of Values, all of the associated computer reports, and a Supporting Narrative. All Diagrams, Schedule of Values, and associated computer reports and Narratives submitted by the CONTRACTOR shall be consistent with the requirements of this Specification and shall reflect the current status as mutually agreed to at the monthly progress meeting.

1.09 SCHEDULE COMPLIANCE

- A. Whenever it appears from the current monthly Schedule that delays have resulted so that the Date of Substantial Completion will not be achieved or whenever directed by the ENGINEER, the CONTRACTOR shall submit a written statement to the ENGINEER. This statement shall describe the actions, activities, and steps he intends to take to remove, prevent, or arrest any delay in the approved schedule and, at no cost to the OWNER, the CONTRACTOR shall take one or more of the following actions:
 - 1. Increase construction labor and manpower in such quantities and crafts that will substantially eliminate, in the ENGINEER's judgment, the delay to the Work.
 - 2. Increase the number of working hours per shift; shifts per work day per week; the amount or type of construction equipment; or any appropriate combination of working hours, shift, or equipment that shall substantially eliminate, in the ENGINEER's judgment, the delay to the Work.
 - 3. Reschedule activities to achieve maximum practical concurrency of accomplishment of activities including, but not limited to, such actions as overlapping of dependent activities, sequencing changes to accommodate increased activity concurrency, assignment of additional labor or equipment, shift or overtime Work, expediting of submittals or deliveries, or any combination of the foregoing, and comply with the revised schedule.
- B. If the CONTRACTOR refuses, fails, or neglects to submit written statement, pursuant to Paragraph A, above, the ENGINEER may direct the level of effort in labor and manpower, equipment, and Work schedule including, but not limited to, overtime, weekend, and holiday

Work to be utilized or employed by the CONTRACTOR to remove, prevent, or arrest the delay to the critical path in the approved schedule. After notification by the ENGINEER, the CONTRACTOR shall promptly provide such level of effort in labor and manpower, equipment, and Work schedule at no additional cost or expense to the OWNER.

1.10 REVIEW OF SCHEDULES

- A. ENGINEER's review of Schedule submittals will be predicated on a CONTRACTOR's stamp of approval signed by the CONTRACTOR and the CONTRACTOR's subcontractors performing Work under an appropriate agreement with CONTRACTOR with subcontract price in excess of \$50,000.00. CONTRACTOR's stamp of approval on the Schedule shall constitute a representation to the OWNER that the CONTRACTOR has either determined or verified data on the Schedule, or assumes full responsibility for doing so, and that CONTRACTOR and his subcontractors have reviewed and coordinated the sequences shown in the Schedule with the requirements of the Work under the Contract Documents.
- B. The ENGINEER's review will not be intended to be for the purpose of determining the accuracy of other matters that may be contained in the Schedules. When the review of a Schedule results in a number of comments or exceptions taken, the ENGINEER does not warrant that these comments are inclusive of all variations, as it shall remain the responsibility of the CONTRACTOR to the requirements of the Contract Documents and to identify expressly any proposed variations.
- C. ENGINEER's review of the Schedules shall not relieve CONTRACTOR from responsibility for any variations from the Contract Documents unless CONTRACTOR has written by means of a specific notice, called the ENGINEER's attention to each variation, and the ENGINEER has given written approval of each such variation by a specific written notation thereof incorporated in or accompany the Schedules.
- D. ENGINEER's approval of the Schedules will not relieve the CONTRACTOR from responsibility for errors and omissions in the submittals or from responsibility for having complied with the provisions above. Approval of a Schedule with undisclosed variations or errors such as omitted Work or erroneous sequences will not relieve the CONTRACTOR from completing the omitted or impacted Work within the applicable Contract Time(s).
- E. If the CONTRACTOR considers any comment indicated on the returned Schedules to constitute an order to change the Contract Documents, he shall notify the ENGINEER immediately in accordance with the requirements for notices of apparent changes set forth in the General Conditions.
- F. The ENGINEER will review a submittal/resubmittal a maximum of two times, after which the cost of the review shall be borne by the CONTRACTOR. The ENGINEER's cost of additional reviews will be equal to the ENGINEER's charges to the OWNER under the terms of the ENGINEER's agreement with the OWNER.
- G. No partial submittals will be reviewed. Submittals not complete will be returned to the CONTRACTOR for resubmittal.

1.11 ALTERNATIVES

- A. Proposals from the CONTRACTOR to substitute means, methods, techniques, Work sequences, or procedure of construction indicated in or required by the Contract Documents that affect the selection of activities and sequences in the Schedule shall be submitted in accordance with the General Conditions. The CONTRACTOR agrees and understands that application for such substitution will not be considered until after the CONTRACTOR has submitted and the ENGINEER has approved the Complete Work Plan as provided by these Contract Documents.
- B. Schedules anticipating achievement of Substantial Completion ahead of the corresponding Contract Time, and therefore incorporating Contract Float Time for the Work, or parts thereof, shall be considered equivalent or equal to Schedules anticipating Substantial Completion exactly on Contract Time.
- C. Upon approval by the ENGINEER of a Schedule with Contract Float Time, and if the CONTRACTOR proposes that compensation for delay must be measured from the anticipated early schedules ahead of the Contract Time, the CONTRACTOR agrees and understands that said proposal will represent to the OWNER that the approved Schedule be evaluated as a substitute Schedule for the purposes of changing the Contract Time to that supported by the approved CONTRACTOR's Schedule. Evaluation of that substitution will be in accordance with the General Conditions, and the Supplementary Conditions, and will require additional supporting data explains and substantiates the basis of the anticipated early schedule. Such supporting data shall consist of:
 - 1. Notice of scheduled Work hours.
 - 2. Information related to the rates of production including pertinent quantities, crew sizes, man power requirements, major items of equipment, etc. for critical and other significant activities.
 - 3. Express or implied contingency allowances figured for activities for such factors as weather, delays, activities of the OWNER and ENGINEER to respond to reports of differing site conditions, and other relevant factors.

Acceptance of that substitution will be evidenced by a Change Order shortening the Contract Time accordingly but maintaining the Contract prices and the level of liquidated damages and incentive set forth in the Agreement.

1.12 TIME ALLOWANCE REQUIREMENTS

- A. Reference is made to:
 - 1. The time allowance required for the ENGINEER's review and approval of submittals of Shop Drawings and samples.
 - 2. The requirements for anticipated repeat submission for particular items of materials or equipment.
 - 3. The requirements for anticipated or required time intervals for the performance of specific parts of the Work by the CONTRACTOR.

B. Reference is made to:

1. Those other activities indicated in or required by the Contract Documents that are responsibility of the OWNER and ENGINEER.
2. The potential time requirements of the OWNER and ENGINEER to investigate instances of potential differing site conditions.
3. The time requirements for the ENGINEER to obtain and receive laboratory analysis of removal areas to allow for environmental closure of the site.
4. Those other named time allowances required by the Contract Documents.

It is understood that the Contract has included in the Total Contract Price the effect of accommodating all of these time allowances and requirements in the planning, scheduling, and execution of the Work; that the CONTRACTOR's Work plan will incorporate activities and sequences contemplated by the time allowances based on the information indicated in or required by the Contract Documents; and that the CONTRACTOR shall cause the Work or requirements covered by such time allowances to be done within the limits of the Contract Time.

1.13 SCHEDULE OF SUBMITTALS

The following tabulation denotes schedule, information, and documentation required to be supplied by the CONTRACTOR:

| ITEMS | SCHEDULE |
|--|---|
| 1. Description of first two weeks work. | At the Preconstruction Conference. |
| 2. Initial submittal of Schedule, Schedule of Values, and Detailed Cost Breakdown. | Within twenty (20) working days after Notice to Proceed. |
| 3. "Marked-Up" Schedule. | Five (5) working days before monthly progress meeting. |
| 4. Updated or Revised Schedule. | Five (5) working days after monthly progress meeting. |
| 5. Shop Drawings Submittal Schedule. | Preliminary Schedule within twenty (20) days of Notice to Proceed; updated for each progress meeting. |

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01330

CONSTRUCTION STAKING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The CONTRACTOR shall set stakes and markers in the work area as required to control all work as presented in the contract documents.
- B. The CONTRACTOR shall utilize means and methods appropriate for the Work, lasers, or surveying instruments operated by qualified competent personnel to control the construction Work. If the method being used by the CONTRACTOR fails to give proper alignment and grade control to the Work, the ENGINEER shall be empowered to order the CONTRACTOR to use such other method(s) as will provide adequate control.
- C. The ENGINEER may require the CONTRACTOR, at the CONTRACTOR's expense to provide such masts, scaffolds, batter-boards, straightedges, templates, or other devices as may be necessary to facilitate laying out, inspecting and constructing the Work.
- D. The ENGINEER will provide the CONTRACTOR with the AutoCAD files of project layout plans for CONTRACTOR'S use in construction staking and layout.

1.02 RELATED WORK

- A. Section 01025, Measurement and Payment.
- B. Section 01300, Submittals.
- D. Section 02300, Earthwork.

1.03 SUBMITTALS

- A. The CONTRACTOR shall submit for ENGINEER's review and approval a Staking Schedule showing the order in which the CONTRACTOR proposes to control and conduct the construction operation and his means and methods prior to the start of Work.

1.04 RELOCATION AND RE-ESTABLISHMENT

- A. Where change of location of stakes is required by the CONTRACTOR, or where the CONTRACTOR fails to properly preserve construction survey stakes, such resetting or relocations of stakes shall be done by the CONTRACTOR at no additional cost to OWNER.
- B. The CONTRACTOR shall bear all expenses involved in re-establishing and/or resetting any survey control point, land survey point or monument lost or disturbed during his/her construction operation. Such Work shall be done under the direct supervision of a licensed land surveyor.

1.05 STAKING REQUIRED

- A. The CONTRACTOR is required to stake for all access routes.
- B. The CONTRACTOR is required to stake for the installation of the proposed shoals.
- C. The CONTRACTOR is required to stake for the installation of the proposed habitat structures.
- D. The CONTRACTOR is required to stake locations of all revegetation areas, including seeding and planting zones.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Quality assurance - control of construction
- B. Tolerances.
- C. References.
- D. Inspecting and testing laboratory services.
- E. CONTRACTOR'S field services and reports.

1.02 QUALITY ASSURANCE - CONTROL OF CONSTRUCTION

- A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Works of specified quality.
- B. Comply with specified standards as minimum quality for Works except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- C. Perform by persons qualified to produce workmanship of specified quality. Use persons licensed to perform Works where required by these Specifications or Laws and Regulations.
- D. Secure products and Works in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- E. Materials furnished and finished or intermediate stages of Works shall be sampled, tested, and inspected as specified individual Sections of these Specifications and as required by reference standards.
- F. Performance of tests or observations by ENGINEER or OWNER is sole benefit of ENGINEER and OWNER and are not intended to replace CONTRACTOR's quality control program. CONTRACTOR is solely responsible for establishing and implementing quality control program to ensure that Works are in accordance with Contract Documents.
- G. It is CONTRACTOR's responsibility to notify ENGINEER when CONTRACTOR believes Works (or intermediate stages or parts of Works) are of specified quality and to permit ENGINEER or OWNER to perform independent tests or analyses.
- H. Testing by ENGINEER or failure to detect defective work shall not prevent rejection when defect is discovered, nor shall it obligate OWNER for final acceptance.

1.03 TOLERANCES

- A. Monitor tolerance control of installed products to produce acceptable Works. Do not permit tolerances to accumulate.

- B. Adjust products to appropriate dimensions; position before securing products in place.

1.04 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of specified standard, except when more rigid requirements are specified or required by applicable codes.
- B. Conform to reference standard by date of issue current on date of Notice of Award, except where specific date established by code or by individual specification Section.
- C. Contractual relationship, duties, and responsibilities of parties in Contract and those of ENGINEER shall not be altered from Contract Documents by mention or inference otherwise in any reference document.
- D. Publications referred to in these Specifications form part of Specifications to extent specified in individual specification Sections.
- E. All plant materials shall comply with the American Nurseryman Association standards for quality control.

1.05 INSPECTING AND TESTING LABORATORY SERVICES

- A. The OWNER may choose to perform inspections, tests and other services within the duration of the project, independent from those required of the CONTRACTOR. As such, the CONTRACTOR shall coordinate with the OWNER'S testing firm in the performance of inspections, tests, or approvals required by Contract Documents except as otherwise specifically provided in Contract Documents.
- B. The OWNER'S testing firm and services performed by such firm in no way relieves CONTRACTOR of obligation to perform Works in accordance with requirements of Contract Documents.
- C. Inspecting, testing, and source quality control may occur on or off Site.
- D. Reports shall be submitted by independent firm to ENGINEER, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- E. Cooperate with personnel of independent inspecting and testing firm, and provide safe access to Works.
- F. Provide incidental labor and facilities.
 - 1. To provide access to Works to be tested.
 - 2. To obtain and handle samples at Site or at source of products to be tested.
 - 3. To facilitate tests and inspections.
 - 4. To provide storage and curing or preservation, as required, of test samples.

- G. Notify ENGINEER and independent firm 48 hours prior to expected time for operations requiring inspecting and testing services.
- H. Retesting required because of non-conformance to specified requirements will be performed by the same independent firm on instructions by ENGINEER.
- I. If defects or deficiencies are revealed during testing or inspecting, correct such defects and deficiencies.

1.06 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, test, adjust, and calibration of equipment, and to initiate instructions when necessary.
- B. Submit qualifications of observer to ENGINEER 30 days in advance of required observations. Observer subject to approval of ENGINEER.
- C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.
- D. Submit report in duplicate within 30 days of observation to ENGINEER for information.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish, install and maintain temporary facilities required for construction; remove upon completion of the Work unless otherwise specified.

1.02 RELATED WORK

- A. Section 01010, Summary of Work.
- B. Section 01025, Measurement and Payment.
- C. Section 01200, Project Meetings.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with National Electric Code, OSHA, MIOSHA, and City codes.

1.04 TEMPORARY POWER

- A. The CONTRACTOR shall make his own arrangements to provide power distribution as required throughout the Project. Termination of power distribution for each voltage shall be in convenient locations. The CONTRACTOR shall provide at each termination, circuit breakers, disconnect switches, and other electrical devices as required to protect the power supply system.
- B. All temporary equipment and wiring for power shall be in accordance with the applicable provisions of governing codes, and shall be subject to inspection and approval of the local Department of Buildings and Safety Engineering. Temporary wiring shall be maintained in a safe condition and shall be utilized so as not to create a hazard to persons or property.
- C. When permanent electrical power and lighting systems are in operating condition, they may be used for temporary power and lighting for construction purposes provided that the CONTRACTOR:
 - 1. Obtains the approval of the ENGINEER.
 - 2. Assumes full responsibility for power and lighting systems.
 - 3. Installs necessary meters and pays all costs for operation and restoration of the systems and for all electrical power consumed.

1.05 TEMPORARY LIGHTING

- A. The CONTRACTOR shall install and maintain a temporary lighting system as required to satisfy minimum requirements of safety and security.
- B. The CONTRACTOR shall make all necessary applications, obtain and pay for required permits for the temporary service and pay all fees and charges for the electrical energy used.
- C. The CONTRACTOR shall furnish all wiring, switches, fuses, receptacles, lamps and other temporary electric and light equipment, as may be required for his Work. Temporary power and light circuits shall be thoroughly insulated and waterproof. No voltage higher than 120 volts shall be used on any lighting circuitry, unless specifically approved by the ENGINEER. All 15 and 20 ampere receptacle outlets on single-phase circuits shall have approved ground fault circuit protection. All switches shall be of the enclosed safety type. The temporary lighting system shall be subject to inspection and approval of the local Department of Building and Safety Engineering.

1.06 TEMPORARY SANITARY REQUIREMENTS

- A. Committing a nuisance on the Site is prohibited and any employee who violates such provisions shall be promptly removed from the Work and shall not again be employed on the Work without the written consent of the ENGINEER. At the start of the Work, suitable and adequate toilet facilities shall be provided for all employees, subject to the approval of the ENGINEER as to the type, size, and location. All temporary sanitary facilities cost is the responsibility of the CONTRACTOR.

1.07 TEMPORARY FIRST-AID

- A. A completely equipped first-aid kit shall be provided and maintained in a clean and orderly condition at the Site of each location where Work is progressing. The first-aid kit shall be readily accessible at all time where people are employed on the Work. The required number of employees who have been properly instructed shall be designated in charge of first-aid Work. The CONTRACTOR shall designate a responsible person on site who shall be in charge of administering first aid when needed.
- B. Telephone numbers for summoning aid from the Police Department, the Fire Department, physicians, ambulances, inhalator, and rescue squads from outside sources shall be conspicuously posted at each Site of the Work.
- C. Provide portable UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide portable UL-rated Class ABC dry chemical extinguishers or a combination of NFPA recommended Classes for the exposure. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

1.08 TEMPORARY CONSTRUCTION

- A. If during construction, existing fences are damaged or destroyed, the CONTRACTOR shall restore them to the satisfaction of the ENGINEER. The CONTRACTOR shall bear all expense and supply whatever labor and material necessary to restore these fences, at no

change in Contract sum.

- B. The CONTRACTOR shall, where necessary, construct and maintain temporary access roads and drives to all construction facilities with approval by the ENGINEER. The temporary access roads and drives shall be removed by the CONTRACTOR. The areas to be restored shall be compatible with the adjacent undisturbed areas.
- C. The CONTRACTOR shall complete all restoration Work as soon as possible so as to cause a minimum of interference with the normal usage of the land by OWNER for the control of soil erosion and siltation. The restoration or reconstruction of drainage structures and other facilities, if any, shall be performed as soon as practicable and in cooperation and compliance with the OWNER and as directed by the ENGINEER.
- D. All temporary construction facilities shall be neatly constructed and arranged on the Site in an orderly manner. The general arrangement of such facilities shall be subject to approval by the ENGINEER. The CONTRACTOR shall prepare and submit to the ENGINEER, for approval prior to starting Work, a construction plan layout, showing arrangement of storage areas, temporary buildings, construction equipment, and storage and Work areas.
- E. Construction equipment and other facilities such as ladders and ramps shall be strong, substantial, safe and suitable for the purpose intended and shall meet all the applicable requirements of the State of Michigan and the authorities having jurisdiction in the area of the Work.
- F. When temporary building, construction equipment, and other facilities are no longer needed for the Work, they shall be promptly dismantled and removed from the Site.

1.10 EXISTING UTILITIES

- A. Some underground utilities and underground structures such as pipe lines, electric conduit, and sewers may be shown on the Drawings. Although neither the correctness nor the completeness of such information is guaranteed by the OWNER, the information shown is considered to be reasonably correct and complete.
- B. All underground structures whenever or whatever nature encountered, shall be preserved and restored by the CONTRACTOR unless otherwise shown on the Drawings and all Work necessary therefore shall be included in the Work under the Contract.
- C. Whenever, in judgment of the ENGINEER, such facility need not be removed or relocated, but may be maintained or protected by normal methods without unduly interfering with the proper execution of the Work, such maintenance or protections shall be performed by the CONTRACTOR. In lieu thereof, the CONTRACTOR may arrange with the utility concerned to maintain or protect its facility and he shall bear all expense in connection therewith.
- D. All damages, cracks, settlements, movements, or service disruptions to underground facilities or surface features created or caused by the construction operations shall be corrected without loss of useful life of the facility by adequate repair and/or replacement to the satisfaction of the ENGINEER at no additional cost to the OWNER.

- E. The CONTRACTOR will not be entitled to extension of time for completion on account of delaying any required movement of utility facilities if he was late in providing the original notification to the ENGINEER.
- F. The cost of moving, altering, relocating or maintaining public and private utilities shall be considered incidental to the total Contract sum. The CONTRACTOR shall make all arrangements involving utilities with the respective owner.
- G. No payment will be made where utilities shown in the approximate location have to be removed and replaced or supported within the excavation made for the Work under the Contract.
- H. Whenever pipelines and structures under construction cross existing sewers, utility pipes, or conduit, special precautions shall be taken and protective measures used to avoid damage to the existing facilities. Under no circumstances shall the CONTRACTOR manipulate utility switches, valves, pipes, conduit and the like.
- I. While working near a water main that is considered a hazard, the CONTRACTOR should request the owner to cut off the pressure in such main. Wherever it is possible to do so, the OWNER will cooperate by taking such mains out of service while the construction Work is progressing. Under no circumstances shall the CONTRACTOR operate water main valves.

1.11 FENCING

- A. The CONTRACTOR shall be responsible for securing the materials and equipment to secure the staging/ storage areas.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01540

HEALTH & SAFETY PLAN

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Prepare and maintain on-site Health and Safety Plan (HASP) for CONTRACTOR's operations at the Work site as required in this section.
- B. All grading shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926.650 Subpart P), and State and local requirements. Where there is conflict between OSHA and State and local regulations exists, the more stringent requirements shall apply.

1.02 REFERENCES

- A. Michigan Occupational Health and Safety (MIOSHA); Chapter 29, Code of Federal Regulations (CFR).
 - 1. Exposure to gases, vapors, dusts and mists (MIOSHA 6201; 29 CFR 1926.55).
 - 2. Exposure to lead (MIOSHA 325.51991-51992; 29 CFR 1926.62).
 - 3. Exposure to cadmium (MIOSHA 325.51851-51885; 29 CFR 1926.1127).
 - 4. Exposure to inorganic arsenic (29 CFR 1926.1118).
 - 5. Occupational noise exposure (MIOSHA 6260; 29 CFR 1926.52).
 - 6. Protective equipment (MIOSHA 6501; 29 CFR 1926, Subpart E).
 - 7. Excavation (MIOSHA IX, X, XIII; 29 CFR 1926, Subpart P).
- B. Copies of MIOSHA safety standards for general industry and construction can be obtained from the Michigan Department of Labor, Safety Standards Division, in Lansing, Michigan. Copies of MIOSHA health construction standards can be obtained from the Michigan Department of Public Health, Division of Occupational Health Standards, in Lansing. OSHA safety and health standards for the construction industry are obtained from the U.S. Government Printing Office, Washington, D.C.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 PREPARATION

- A. The CONTRACTOR shall prepare a site Health and Safety Plan before any mobilization or work can begin. There shall be a copy of the CONTRACTOR's HASP on site at all times.

END OF SECTION

SECTION 01600

DELIVERY, STORAGE AND HANDLING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The general requirements for the delivery handling, storage and protection for all items required in the construction of the Work, as specified herein. Specific requirements, if any, are specified with the related item.

1.02 RELATED WORK

- A. Section 02205, Soil Materials.
- B. Section 02207, Aggregate Materials.
- C. Section 02220, Soil Erosion and Control
- D. Section 02231, Shoal Construction
- E. Section 02621, Geotextile for Separation
- F. Section 02950, Landscaping
- G. Section 02980, Habitat Structures

1.03 GENERAL TRANSPORTATION, DELIVERY, STORAGE AND PROTECTION

- A. Transport and handle items in accordance with manufacturer's instructions.
- B. Schedule delivery to reduce long term on-site storage prior to installation.
- C. Coordinate delivery with installation to ensure minimum holding time for items that are hazardous, flammable, easily damaged or sensitive to deterioration.
- D. Deliver products to the site in manufacturer's original sealed containers or other packing systems, complete with instructions for handling, storing, unpacking, protecting and installing.
- E. All items delivered to the site shall be unloaded and placed in a manner which will not hamper the CONTRACTOR's normal construction operation or those of subcontractors and other contractors and will not interfere with the flow of necessary traffic.
- F. Provide necessary equipment and personnel to unload all items delivered to the site.
- G. Promptly inspect shipment to assure that products comply with requirements, quantities are correct and items are undamaged. For items furnished by others (i.e. OWNER or other contractors), perform inspection in the presence of the ENGINEER. Notify ENGINEER

immediately both verbally and in writing, of any problems.

- H. Store and protect products in accordance with the manufacturer's instructions, with seals and labels intact and legible. Storage instructions shall be studied by the CONTRACTOR and reviewed by the ENGINEER. Instructions shall be carefully followed and a written record kept by the CONTRACTOR. Arrange storage to permit access for inspection.
- I. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
1. Closeout procedures.
 2. Inspection procedures
 3. Final cleaning
 4. Project as-built documents
 5. Spare parts and maintenance materials.
- B. The following course of action shall be followed for project close out:
1. Request for Intermediate Completion inspection
 2. Development of Punch List by ENGINEER, acknowledged by CONTRACTOR.
 3. Completion of items on Punch List.
 4. Intermediate Completion Obtained.
 5. As-Builts provided
 6. Substantial Completion as defined in Project Schedule
 7. Final payment per General Conditions.

1.02 RELATED WORK

- A. Section 01010, Summary of Work.
B. Section 01040, Coordination.
C. Section 01300, Submittals.

1.03 AS-BUILT DOCUMENTS

- A. Maintain on site, one set of contract documents with actual revisions to the Work recorded in these documents.
- B. Contract Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
1. Field changes of dimension and detail.
 2. Details not on original Contract Drawings.
- C. Provide one (1) copy of marked up field plans, three (3) copies of certified as-built drawings by a professional surveyor and one (1) copy digital AutoCad file containing as-built information.
- D. Submit all documents (field, certified, and digital as listed above) to ENGINEER with

Application for Final Payment.

1.04 CLOSEOUT PROCEDURES

- A. Close out procedures shall be in accordance with General Conditions.

1.05 INTERMEDIATE COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Intermediate Completion, complete the following. List items below that are incomplete in request.
1. Request an inspection for which the ENGINEER will complete a punch list to be acknowledged by the CONTRACTOR.
 2. Submit a list of items to be completed and corrected (punch list) as provided by the ENGINEER, the value of items on the list, and reasons why the Work is not complete.
 3. Advise Owner of pending insurance changeover requirements.
 4. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 5. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

DIVISION 2 – SITE WORK

SECTION 02031

CONSTRUCTION PHOTOGRAPHS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The CONTRACTOR shall have an average of 3 color photographs, at intervals determined by the OWNER, made of the work during its progress and 3 color aerial photographs, at intervals determined by the OWNER, made of the work in progress and of the final work. The photographs shall be of such views and taken at such times as the ENGINEER directs. The aerial photographs shall be low level aerial photographs.
- B. All photographic work shall be done by a qualified, established commercial photographer directed by the ENGINEER. High Resolution digital files of all photographs shall be furnished to the ENGINEER. Three prints of each photograph shall be furnished promptly to the ENGINEER, and each print shall have a glossy finish and be mounted in plastic sleeve on a substantial backing. The overall dimensions of each mounted print shall be 8-in by 10-in with 1-1/4-in flexible binding margin on the long top side to permit storage in standard 3-ring binders.
- C. The film negatives/ digital files shall be retained in the files of the photographer until the completion of the Project and shall then be turned over to the ENGINEER.
- D. Each photograph shall have attached to the backing a paper label, approximately 2-1/4-in wide by 1-3/4-in high containing thereon in neat lettering:
 - 1. CONTRACTOR's name
 - 2. ENGINEER's name
 - 3. Short Description of View
 - 4. Photo Number and Date Taken
 - 5. Photographer's Firm Name
- E. Each digital file shall have naming convention or attributes or similar to adequately describe the view and date taken.

1.02 RELATED WORK

- A. Section 01010, Summary of Work.
- B. Section 01020, Allowances.
- C. Section 01025, Measurement and Payment.
- D. Section 01300, Submittals.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 02100

SITE PREPARATION

PART 1 GENERAL

1.01 SUMMARY

The contractor shall coordinate his work with the Michigan Department of Natural Resources.

A. Section Includes:

1. Demolition
2. Clearing and grubbing
3. Protection and salvaging of existing elements to remain
4. Trash and debris removal
5. Soil erosion control

B. Related Sections:

1. Section 01025, Measurement and Payment
2. Section 01040, Coordination
3. Section 01200, Project Meetings
4. Section 01300, Submittals
5. Section 01500, Construction Facilities and Temporary Controls
6. Section 01700, Contract Closeout
7. Section 02220, Soil Erosion Control
8. Section 02300, Earthwork

1.02 JOB CONDITIONS

- A. Safety: Ensure safe passage of persons around area of site preparation work. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons.
- B. Repairs: Promptly repair damages caused to adjacent facilities by site preparation work.
- C. Services Interruptions: Do not interrupt existing utilities serving occupied facilities, except when authorized by Owner. Provide temporary services, acceptable to Owner, during interruptions to existing facilities.
- D. Reused Materials: Carefully remove, store, and protect for reuse designated materials and equipment.

1.03 DEFINITIONS

- A. Acceptance: Wherever the terms "acceptance" or "accepted" are used herein, they mean acceptance of the Engineer in writing.

PART 2 PRODUCTS

2.01 SAFETY FENCE

- A. Fabric: ALPI Safety Fence, 4 foot height, by American Tenax Products or approved substitute.
- B. Posts: Heavy duty "T" posts, 6 foot long.
- C. Supplier: Construction Supply, Highland, Michigan; (313) 887-6767

2.02 SILT FENCE

- A. Material: As approved by ENGINEER.
- B. Supplier: As approved by ENGINEER.

2.03 TURBIDITY BARRIER

- A. Material: As approved by ENGINEER.
- B. Supplier: As approved by ENGINEER.

PART 3 EXECUTION

3.01 DEMOLITION

- A. General:
 - 1. Unless otherwise noted, demolition shall include the removal of items which would interfere with or be incongruous to construction of the project and as specified in the Contract Documents.
 - 2. Use water sprinkling, temporary dust proof enclosures and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.
 - 3. Do not use water when it may create hazardous or objectionable conditions.
- B. Verification of Conditions:
 - 1. In company with the Owner and Engineer, visit the site and verify the extent and location of selective demolition required.
 - 2. Carefully identify limits of selective demolition.
 - 3. Mark interface surfaces as required to enable workmen also to identify items to be removed and items to be left in place intact.
- C. Utilities:
 - 1. Protect existing public utility lines in accordance with the requirements of the public agency or utility having jurisdiction.
- D. Conditions to Remain:
 - 1. Protect from damage all adjoining property and adjacent areas not scheduled for construction.
 - 2. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to the start of work.

3.02 REMOVAL OF DEBRIS

- A. General: Rubbish or debris shall be removed from the site daily and legally disposed. No large quantities will be allowed to accumulate.
- B. Burning: No burning or rubbish or debris will be permitted.
- C. Salvaged Items: Stockpile all salvaged items for pick-up by Owner.

3.03 ADJUSTMENT OF EXISTING UTILITIES

- A. General: All manholes, valve boxes, gate valves, etc., (if any) shall be adjusted to conform to the shape and grade of finished grade. This adjustment shall be in accordance with the regulating agency of the utility involved.

3.04 SOIL EROSION AND SEDIMENTATION CONTROL

- A. General Requirements:
 - 1. Public Act 346, the Soil Erosion and Sedimentation Control Act of 1972, must be followed. Should the local regulatory agency determine that the construction operations is in violation of the Soil Erosion Act, the Contractor shall take immediate action to remedy the situation.
 - 2. Responsibility to render the site erosion free rests with the Contractor. Approval by the Owner of any method to accomplish this does not relieve the Contractor of full responsibility.
 - 3. Delays due to shut down from non-compliance with the Soil Erosion Act are the responsibility and at the expense of the Contractor.
- B. Operations:
 - 1. The soil erosion measures shall be installed prior to any work.
 - 2. Operations shall be conducted in such a manner as to reduce and contain erosion. The amount of time land is exposed to the elements by grading operations shall be the minimum.
 - 3. Temporary sediment traps, diversion ditches, silt fence, turbidity barriers etc., shall be constructed at locations where necessary in a timely fashion so as to minimize sedimentation of water courses.

END OF SECTION

SECTION 02110

CLEARING AND GRUBBING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This section covers all clearing, grubbing, chipping and vegetative thinning within the Contract Limits shown on the Drawing and as required, complete with cutting and removal of trees, shrubs, vegetation, stumps, logs, brush, roots, undergrowth, trash and other discarded materials and disposal of those materials.

1.02 RELATED WORK

- A. Section 01010, Summary of Work.
- B. Section 01025, Measurement and Payment.
- C. Section 02300, Earthwork.

1.03 REGULATORY REQUIREMENTS

- A. Conform to applicable regulatory criteria for environmental requirements, disposal of debris, and use of herbicides, if required.
- B. Coordinate clearing work with utility companies.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Implement sedimentation and erosion control plan as called for on the drawing and prepared by CONTRACTOR for fulfillment of permit requirements.
- B. Clearing and Grubbing: The CONTRACTOR shall remove completely those trees marked for removal or as indicated on the Drawings. All woody debris shall be properly disposed of off-site or on-site as directed by the ENGINEER.
- C. Clearing and Grubbing: The CONTRACTOR shall remove completely and dispose of any other trees, stumps, brush, shrubs, hedges, roots, logs, debris, trash and discarded materials as indicated on the Drawings.
- D. Depth of Removal: For areas to be excavated, the trees, stumps, and roots shall be removed to a depth of not less than 12 inches below the final grade, or as approved by the ENGINEER.
- E. Removal of Trees, Stumps, and Other Vegetation: Where trees cannot be felled without danger to traffic or injury to other trees, structures, or property, these trees shall be cut down in sections. The removal of stumps and roots may be accomplished by the use of a shredding

machine meeting the approval of the ENGINEER.

- F. The burial of trees, stumps and other vegetations, will not be permitted. The trees, stumps, and other vegetation may be disposed of on-site if approved by the ENGINEER. Otherwise, they shall be hauled for proper disposal if not salvaged by the CONTRACTOR.
- G. Holes and Trenches: All holes and trenches remaining after the grubbing operation in embankment areas shall have the sides broken down or leveled, and shall be refilled with earthfill material.
- H. Salvaging Timber: Trees required to be removed and having a diameter of four (4) inches, or more, are classed as merchantable timber and shall become the property of the CONTRACTOR.
- I. Stabilization of Cleared Areas: The CONTRACTOR shall ensure that all cleared slopes shall be stabilized to prevent erosion. This may include the use of soil erosion matting to hold slopes in place, as approved by the ENGINEER.
- J. Do not grub root structures and stumps from streambanks where vegetation is called out for removal on the DRAWINGS.
- K. CONTRACTOR to stake OHWM mark line on streambanks where vegetation is called out for clearing on drawings prior to beginning clearing. Do not clear vegetation above the OHWM.

END OF SECTION

SECTION 02205

SOIL MATERIALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Soil material for avian nesting habitat.
- B. Soil material for nesting areas.

1.02 RELATED WORK

- A. Section 01400, Quality Control
- B. Section 02207, Aggregate Materials
- C. Section 02220, Soil Erosion Control.
- D. Section 02231, Shoal Construction
- E. Section 02300, Earthwork
- F. Section 02621, Geotextile for Separation
- G. Section 02950, Landscaping
- H. Section 02980, Habitat Structures

1.03 REFERENCES

- A. ASTM D2487 – Classification of Soils for Engineering Purposes.

1.04 SUBMITTALS FOR REVIEW

- A. Samples: Submit 50 lb (4.5 kg) sample of each type of fill to testing laboratory.

1.05 QUALITY ASSURANCE

PART 2 PRODUCTS

2.01 SOIL MATERIALS

- A. Material for avian nesting – Coarse sand with less than 10% organic content
- B. Material for nesting areas - Fine sand with less than 5% clay content and less than 10% gravel content.

2.02 SOURCE QUALITY CONTROL

- A. Section 01400 – Quality Control
- B. If tests indicate materials do not meet specified requirements, change material and retest.
- C. Provide materials of each type from same source throughout the work.

PART 3 EXECUTION

3.01 STOCKPILING

- A. Stockpile materials on site at locations designated by ENGINEER.
- B. Stockpile sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Prevent intermixing of soil types or contamination.
- E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.02 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.

3.03 PLACEMENT SAND

- A. Sites for soil material placement to be field located by ENGINEER prior to placement.
- B. Sites for avian nesting habitat to be as shown on the Drawings on North Bay Shoal Islands over 8" limestone base.
- C. Sites for nesting areas to be located within 300 feet of the wetland edge, and above the floodplain. Site shall be on level ground with full southern exposure. The site should get sun, in a 180 degree arc from east to west, throughout the day.

END OF SECTION

SECTION 02207

AGGREGATE MATERIALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aggregate materials for avian nesting habitat.
- B. Aggregate materials for spawning habitat.
- C. Aggregate materials for hibernacula.
- D. Aggregate materials for mudpuppy structure with mussel habitat detail.

1.02 RELATED WORK

- A. Section 01300, Submittals
- B. Sections 01400, Quality Control
- C. Section 02205, Soil Material
- D. Section 02231, Shoal Construction
- E. Section 02980, Habitat Structures

1.03 REFERENCES

- A. ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ASTM D2487 - Classification of Soils for Engineering Purposes.
- C. Michigan Department of Transportation (MDOT) 2003 Standard Specifications for Construction plus updates.

1.04 SUBMITTALS FOR REVIEW

- A. Submittals: Procedures for placing aggregates.
- B. Samples: Submit 50 lb sample of each aggregate type less than 6". For larger material, arrange for engineer to visit supplier quarry to inspect material prior to shipment to project site.

1.05 SUBMITTALS FOR INFORMATION

- A. Materials Source: Submit name of imported materials suppliers and most recent test results from supplier.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with the Michigan Department of Environmental Quality permit.

PART 2 PRODUCTS

2.01 AGGREGATE MATERIALS

- A. Aggregate for avian nesting area: MDOT #9 Limestone.
- B. Aggregate for spawning habitat: 4-inch to 6-inch limestone aggregate.
- C. Aggregate for hibernacula habitat: 6-inch to 2-foot diameter natural stone, cleaned.
- D. Aggregate for mudpuppy structure with mussel habitat: MDOT 23A Natural Sand/ Gravel.

2.02 SOURCE QUALITY CONTROL

- A. Section 01400, Quality Control.
- B. If tests indicate materials do not meet specified requirements, change material or material source and retest
- C. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 STOCKPILING

- A. Stockpile materials on site at locations designated on the plans or as directed by ENGINEER.
- B. Do not stock pile in areas where aggregates can be washed into the Detroit River or storm drains.

3.02 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in a clean and neat condition.

END OF SECTION

SECTION 02220

SOIL EROSION CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This specification section provides certain requirements, techniques, and measures to minimize erosion damage to the construction site and sedimentation into the Detroit River.

1.02 GENERAL

- A. In general, the Contractor shall conduct his operations in such a manner as to limit any exposed area of any disturbed land for the shortest practicable period of time and any sediment caused by soil erosion due to his operations shall be restricted and reduced to a non-polluting minimum before it leaves the site.
- B. The Contractor shall comply with all requirements under the *Natural Resources and Environmental Protection Act, Act 451 of 1994 as amended by PA 504 of 2000*, and local ordinances. Where these Specifications are more stringent, then these Specifications shall govern.
- C. All temporary stabilization work done shall be coordinated with Section 02940, Site Restoration so that this work does not interfere with the final site restoration.

1.03 RELATED WORK

- A. Section 01300, Submittals
- B. Section 02060, Demolition
- C. Section 02110, Clearing and Grubbing
- D. Section 02205, Soil Materials
- E. Section 02207, Aggregate Materials
- F. Section 02231, Shoal Construction
- G. Section 02300, Earthwork
- H. Section 02950, Landscaping
- I. Section 02980, Habitat Structures

1.04 INLAND LAKES AND STREAMS ACT

- A. All waterway crossings are subject to the provisions of the *Inland Lakes and Streams Act, 1972 Public Act 346, as amended and the Administrative Rules*. The Contractor's activities shall adhere to the provisions of this act and the Contractor shall hold the Owner harmless from any violations, civil action or penalties arising from the Contractor's actions.
- B. The CONTRACTOR shall comply with all requirements of the MDEQ and USACE permits.

PART 2 PRODUCTS

2.01 MATERIALS

- A Coordinate this work with Section 02940, Site Restoration.
- B Silt Fence – Silt fence shall be standard geotextile product on wood stakes. Fabric height shall be 36” (6 inch buried, 30” above ground) and post spacing at 6.5 feet. Material and Supplier as approved by the ENGINEER.
- C Turbidity Barrier – Material and Supplier as approved by the ENGINEER.

PART 3 EXECUTION

3.01 EROSION PROTECTION

- A. In order to limit the length of time that the exposed area is subject to the elements and the subsequent conditions causing erosion, the contractor shall take steps to minimize and keep within the bounds of permits.
- B. Any unforeseen situations that may be encountered during the course of construction, that may cause accelerated erosion and deposition of sediment into waterways and/or lakes, will be controlled by methods that may include sediment traps, sediment basins, or holding ponds. Any slope failures or development of gullies after construction has been completed will be corrected immediately.

3.02 SILT FENCE

- A. Silt fence shall be installed at locations as identified in the plans prior to any movement of soil.
- B. Silt fence shall be installed per manufacturer’s recommendations. Silt fence should have the bottom of the geotextile be trenched into the grade a minimum of six inches and backfilled appropriately to ensure flow stabilization of surface drainage. Both ends of silt fence shall wrap up-slope slightly to hold flow of water in drainage feature.
- C. Silt fence shall be maintained by specifications for the duration of the project. Silt fence shall not be removed until the end of the warranty period, as defined in Section 02930 Landscaping.

3.02 TURBIDITY BARRIER

- A. Use of Turbidity Barrier shall be as required in the MDEQ, USACE and Soil and Erosion and Sediment Control Permits.
- B. With the exception of the placement of clean rock and gravel for the shoal construction, no work or dredging within the water is allowed from May 1 through July 30 without the use of a turbidity curtain/ containment.

- C. When using, turbidity barrier shall be installed to enclose the entire work area. The turbidity curtain shall be installed to extend from the bed of the waterbody to a point above the existing water's surface. The turbidity curtain shall be maintained for the duration of the project and shall be left in place after completion of dredging until all disturbed sediments have settled.

3.03 APPLICATION OF PERMANENT STABILIZATION

- A. Permanent stabilization shall be applied to all areas disturbed by the Contractor during completion of the work required by the Contract.
- B. The stabilization shall be accomplished within five days of completion of final grading, provided that change is made within the stated season for such stabilization.
- C. If the final earth change is accomplished at a time outside of the stated seeding season, temporary stabilization shall be applied within seven days of completion of the final earth change and shall be replaced with permanent stabilization as soon after the following April 20 as the ground is workable.

3.04 APPLICATION OF TEMPORARY STABILIZATION

- A. Temporary stabilization shall be applied to areas where initial work has caused disturbance and the final change will not be completed immediately and to areas where the final earth change is completed between October 1 and April 20.
- B. Temporary stabilization shall be applied to areas where the final earth change has been completed, including final grading and top soil placement, between the dates of October 1 and April 20. The disturbed areas shall have mulch placed and anchored as described in the following paragraphs. After April 20, areas to be seeded shall be seeded through the mulch. Mulch shall be added and anchored as necessary to replace that lost prior to April 20. Temporary cover seeding shall be utilized, such as annual rye.
- C. Areas disturbed by construction activities but on which the final earth change has not been made shall be graded to provide positive drainage and shall be stabilized to prevent erosion.
- D. Areas which receive an initial change and on which further work is to be done within three months shall be graded to provide positive drainage and shall have mulch placed and anchored.
- E. Refer to Section 02930, Landscaping and Section 02422, Erosion Control Blanket.

3.05 SEEDING FOR TEMPORARY AND PERMANENT STABILIZATION

- A. Site Preparation – The seedbed immediately before seeding shall be firm but not so compact as to prohibit the seed from securing adequate germination or root penetration. Topsoil shall be replaced after grading operations for permanent

stabilization. No topsoil is required for temporary stabilization. Tillage implements shall be used as necessary to provide at least a 3-inch depth of firm but friable soil, free of large clods and stones and other debris. All seeding shall be protected by mulching. See Section 02930 of these specifications for details of permanent stabilization which include spreading topsoil, seeding, mulching, establishment and guarantee. Mulching work shall also be included in temporary stabilization.

- B. Seeding Dates – Seed shall be applied from April 20 to October 1 for permanent stabilization and from April 20 to October 15 for temporary stabilization and the seeded areas shall be kept moist for fourteen (14) days to insure growth. If the site is readied for seeding and during non-seeding months, it shall be protected by mulching. The site can be seeded later through the mulch. Seeding shall not be done on frozen soil or if the soil is snow covered, or when environmental conditions prohibit germination, as per Section 02950.

END OF SECTION

SECTION 02231

SHOAL CONSTRUCTION

PART 1 GENERAL

1.01 DESCRIPTION

- A. This item shall consist of furnishing and the placement of the shoal materials, including:
- geotextile
 - native material
 - and rip-rap
 - slab stone
 - avian nesting habitat

1.02 RELATED REQUIREMENTS

- A. Section 02205, Soil Material
B. Section 02207, Aggregate Material
C. Section 02300, Earthwork
D. Section 02621, Geotextile for Separation
E. Section 02980, Habitat Structures

1.03 SUBMITTALS

- A. Prior to delivery of materials, the Contractor shall designate in writing the source from which he intends to obtain the materials and submit information satisfactory to the Engineer that the material meets the requirements of the contract.

PART 2 PRODUCTS

2.01 SOIL MATERIALS

- A. Soil material for avian nesting habitat shall be as indicated in Section 02207.
- B. The sand shall be deposited in stockpiles in such a way as to prevent it from segregating.
- C. The sand shall be loaded from an approved stockpile in such a way as to obtain a material having a uniform grading.

2.02 AGGREGATES

- A. The aggregate for the avian nesting habitat shall be MDOT #9 crushed limestone aggregate..
- B. The crushed limestone shall consist of hard, durable particles or fragments of stone, free from dirt or other objectionable matter, and shall contain not more than 15% of thin, elongated pieces.

- C. The crushed gravel shall consist of hard, durable stones, rocks, and boulders crushed to specified sizes and shall be free from excess flat, elongated, soft or disintegrated pieces, dirt, or other objectionable matter.
- E. The aggregate shall be deposited in stockpiles.
 - 1. The aggregate shall be stockpiled in such a way as to prevent it from segregating.
 - 2. The aggregate shall be loaded from an approved stockpile in such a way as to obtain a material having a uniform grading.

2.03 RIP-RAP

- A. The rip-rap for the shoal construction shall be limestone riprap conforming to the sizes as indicated on the Drawings.
- B. The maximum to minimum dimension ratio must be no greater than 3:1
- C. The individual pieces of stone are free of defects such as seams or cracks than will cause rapid or excessive deterioration or degradation during service.
- D. The riprap is free of soil or other debris before placement.

2.04 SLAB STONE

- A. The material for the slab stones shall be limestone ranging in size from 2'x4'x4" to 1'x2'x2".
- B. The limestone slabs shall consist of large pieces in the dimensions as indicated on the Drawings.
- B. The individual slabs of limestone are free of defects such as seams or cracks than will cause rapid or excessive deterioration during service.
- C. The slabs shall be free of soil or other debris before placement.

2.05 GEOTEXTILE MATERIALS

- A. Geotextile materials shall consist of materials as detailed out in Section 02621 and shown on the Drawings.
- B. Materials shall be stockpiled in a manner that is consistent with approved practices as to ensure no damage will incur prior to or during installation.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Placement shall conform to the requirements of the Contract Documents.

- B. All soil materials will be placed in a manner that is consistent with approved practices to ensure no contamination occurs with surrounding base layers. The aggregate will be placed by equipment to the depth and at location on specified on the Drawings to create avian nesting areas. Care must be taken not to disrupt geotextile materials during installation and while moving around construction areas. Contractor is responsible for ensuring aggregate is distributed in a way that creates a neat and uniform surface.
- C. The rip-rap shall be placed by equipment to the depth specified. It shall be installed to the full course thickness in one operation and in such a manner as to avoid serious displacement of the underlying material. The rock for riprap shall be delivered and placed in a manner that ensures the riprap in place is reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another with the smaller rocks and spalls filling the voids between the larger rocks. Contractor may be required to visually inspect each piece of riprap as it is placed during construction and then hand select each piece as it best fits with surrounding pieces. This will provide a neat and uniform wall and ensure stability with riprap pieces “locking” together. Contractor to take due care in placing appropriate riprap sizing and depths as shown on the Plans for both the secondary riprap areas, and outer rock riprap for shoal construction.
- D. The shoal riprap materials shall be vibrated into place during construction with a vibrating impact compactor, such as a Hoe-Pak type piece of equipment; or seated into place by mechanical push with an excavator bucket.
- E. The limestone slabs shall be placed by equipment to the depth and locations as specified on the Drawings to create habitat. Contractor shall take utmost care in delivery as to avoid any damage to the limestone slabs. These slabs shall be installed in such a manner as to create gaps and nestle them into the natural river bottom, underlying material, and/or riprap for stability as shown on the Drawings. The limestone slabs shall be placed in a manner that ensures the slabs are firmly in contact with one another, with the voids as specified for each habitat. Some hand movement/placing may be required to achieve specific habitat goals. Contractor will take into account location of the sun/shade as necessary and detailed on the Drawings.
- F. Placement of the geotextile materials will be done in a manner that will create separation between the native and/or clean sand fill material and the existing base as shown on the Drawings. Contractor to ensure care taken during installation as to avoid any rips, tears, or other defects present when installing geotextile. Material must be properly secured along all edges to avoid rolling up or creating gaps. Contractor is responsible for ensuring all edges are “locked in” through approved practices with trenching in and backfilling.

END OF SECTION

SECTION 02300

EARTHWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Native Material Excavation
- B. Fill Placement

1.02 RELATED WORK

- A. Section 01330, Construction Staking
- B. Section 01400, Quality Control
- C. Section 02205, Soil Materials
- D. Section 02207, Aggregate Materials
- E. Section 02220, Soil Erosion and Sedimentation Control
- F. Section 02231, Shoal Construction
- G. Section 02940, Site Restoration
- H. Section 02950, Landscaping

1.03 REFERENCES

- A. MDOT- Michigan Department of Transportation, "Standard Specifications for Construction", current edition.
- B. ASTM- American Society of Testing Materials, latest edition.

1.04 SUBMITTALS FOR REVIEW

- A. Section 01300, Submittals:
 - 1. Procedures for placing fill.
 - 2. Procedures for placing aggregates.

1.05 SUBMITTALS FOR INFORMATION

- A. Materials Source: Submit name of imported materials suppliers and most recent test results from supplier.

1.06 QUALITY ASSURANCE

- A. Codes and Standards
 - 1. Testing and Analysis of fill soil: All testing shall be performed by the CONTRACTOR and in accordance with ASTM for verification of material compliance and sufficient compaction.
 - 2. If tests indicate materials do not meet specified requirements, change material and retest.

- 1.07 DELIVERY AND STORAGE
- A. Deliver and store materials in a manner to prevent contamination or segregation. Storage areas will be as designated by the ENGINEER and OWNER. All site material shall be stored in areas that are not prone to flooding.
 - B. Stockpile sufficient quantities to meet Project schedule and requirements.
 - C. Separate differing materials with dividers or stockpile apart to prevent mixing.
 - D. Prevent intermixing of soil types or contamination.
 - E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

1.08 SITE CONDITIONS

- A. Site Information
 - 1. Examine the site to ascertain the state and conditions under which work is to be done.
- B. Existing Utilities
 - 1. Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
 - 2. Contact MISS DIG min of 3 working days prior to starting work.
 - 3. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the utility owner immediately for directions.
 - 4. Cooperate with Owner and utility companies in keeping respective services and facilities in operation.
 - 5. Repair damaged utilities to satisfaction of utility owner.
- C. Protection of Persons and Property
 - 1. Protect utilities, pavements, and other facilities from damages caused by settlement, lateral movements, undermining, washout and other hazards created by excavation operations.
- D. Defective Work: If during progress of the work, testing indicates that materials do not meet specified requirements, remove defective work and replace at no cost to the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

- A. General:

1. Soil materials shall be free of contaminants, debris, roots, wood, scrap material, vegetative matter, refuse, soft unsound particles, and frozen, deleterious or objectionable materials.

B. Fill:

1. Materials for Shoals – Limestone riprap per Section 02231 Shoal Construction.
2. Materials for Slab Stone Habitat – Limestone slabs per Section 02231 Shoal Construction.
3. Materials for Mudpuppy Habitat – Limestone slabs per Section 02980 Habitat Structures.
4. Materials for Mudpuppy with Mussel Habitat – Limestone slabs and limestone gravel per Section 02980 Habitat Structures.
5. Materials for Spawning Habitat – Limestone gravel per Section 02980 Habitat Structures.
6. Materials for Avian Nesting Habitat – Limestone gravel and coarse sand per Section 02231 Shoal Construction.
7. Materials for Hibernacula – River rock per Section 02980 Habitat Structures.
8. Materials for Nesting Areas – Sand per Section 02980 Habitat Structures.
9. Topsoil: Imported topsoil for placement shall meet the following additional requirements:
 - i. Topsoil shall not contain a mixture of natural underlying soils, subbase materials, or other foreign material.
 - ii. Topsoil shall consist of natural loam, sandy loam, silty loam, or clay loam, humus bearing soils adapted to the sustenance of plant life, and such soils shall be neither excessively acid nor alkaline.
 - iii. Topsoil shall have a minimum organic matter content of 3%. CONTRACTOR shall provide fertility test for selected material(s) at the request of the OWNER/ENGINEER at no additional cost to the OWNER.
 - iv. Gradation: topsoil shall contain no materials larger than 1 inch in size.

2.02 ACCESSORIES

- A. Geotextile Fabric: See Section 02622, Geotextile for Separation.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine site and verify that conditions are suitable to receive work and that no defects or errors are present which would cause defective installation of products or cause latent defects in workmanship and function.
- B. Unsuitable Conditions: Before proceeding with work, notify Owner and Engineer in writing of all unsuitable conditions and conflicts.

- C. Verify that survey bench mark and intended elevations for the Work are as indicated.

3.02 PREPARATION

- A. Protection of Existing Conditions:
 - 1. General: Use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, irrigation systems, plant materials and paving on or adjacent to the site of the work.
 - 2. Barriers: Provide barricades, fences or other barriers as necessary to protect existing conditions to remain from damage during construction.
 - 3. Lines and Levels: Identify required lines, levels, contours, and datum locations.
 - 4. Utilities: Locate, identify, and protect utilities that remain from damage.
 - 5. Landscaping: Protect plant life, lawns, and other features remaining as a portion of final landscaping.
 - 6. Other features: Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
 - 7. Notification of Damages: Submit written notifications of all conditions damaged during construction to the Owner and Engineer immediately.

3.03 EXCAVATION

- A. General
 - 1. Excavate as required for construction of the work.
 - 2. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer shall be at the Contractor's expense.
- B. Stockpiling Excavated Material for Filling or Backfilling (If Needed)
 - 1. Stockpile excavated materials where directed by OWNER/ENGINEER until required for backfill or fill.
 - 2. Locate and retain fill materials away from edges of excavations.
 - 3. Dispose of excess soil material and waste materials legally.
- C. Unauthorized Excavation
 - 1. Care shall be taken not to excavate below the depths indicated. Excessive or unauthorized excavations shall be filled at no cost to the OWNER.
 - 2. Unauthorized excavations shall be filled with site fill as directed by ENGINEER.

3.04

BACKFILL AND FILL

A. General

1. Place acceptable soil material in layers to required subgrade elevations.

B. Timing:

1. Backfill excavations as promptly as work permits, but not until completion of the following:
2. Inspection, testing approval, and recording locations of underground utilities.
3. Removal of trash and debris.

C. General Placement:

1. Fill material shall be free of debris or other detrimental material.
2. Where excavations or previously placed material have been softened or eroded, remove soft and yielding material or otherwise objectionable or damaged areas and replace with compacted fill as directed by ENGINEER.
3. Employ a placement method that does not disturb or damage other work.

3.04

MATERIAL DISPOSAL

A. Unsuitable Material, Debris and Refuse

1. Excess excavated material or material unsuitable for filling or grading operations, trees not indicated to remain on site, stumps, debris, miscellaneous refuse and other items indicated to be removed shall be disposed of off the Owner's property in compliance with local codes and ordinances.

3.05

STOCKPILE CLEANUP

- A. Remove stockpile, leave area in a clean and neat condition.

3.06

PROTECTION OF FINISHED WORK

- A. Protect finished work from construction traffic or other means of damage.
- B. Reshape and re-compact fills subjected to vehicular traffic.

END OF SECTION

SECTION 02621

GEOTEXTILE FOR SEPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This section is applicable to the use of a geotextile for separation, as indicated in project drawings for the construction of the shoals.

1.02 RELATED WORK

- A. Section 01300, Submittals
- B. Section 01600, Delivery, Storage and Handling
- C. Section 02231, Shoal Construction

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 1. D 123 – Standard Terminology Relating to Geotextiles
 2. D 276 – Standard Test Method for Identification of Fibers in Textiles
 3. D 4354 - Practice for Sampling of Geosynthetics for Testing.
 4. D 4355 - Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus).
 5. D 4439 - Terminology for Geotextiles.
 6. D 4491 - Test Methods for Water Permeability of Geotextiles by Permittivity.
 7. D 4533 - Test Method for Index Trapezoid Tearing Strength of Geotextiles.
 8. D 4632 - Test Method for Grab Breaking Load and Elongation of Geotextiles.
 9. D 4759 - Practice for Determining the Specification Conformance of Geosynthetics.
 10. D 4751 - Test Method for Determining Apparent Opening Size of a Geotextile.
 11. D 4873 - Guide for Identification, Storage, and Handling of Geotextiles.

1.04 SUBMITTALS

- A. Submit the following :
 1. Certification: The contractor shall provide to the Engineer a certificate stating the name of the manufacturer, product name, style number, chemical composition of the filaments or yarns and other pertinent information to fully describe the geotextile. The Certification shall state that the furnished geotextile meets MARV requirements of the specification as evaluated under the Manufacturer's quality control program. The Certification shall be attested to by a person having legal authority to bind the Manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Geosynthetic Accreditation Institute (GAI)- Laboratory Accreditation Program (LAP)
 - 2. American Association for Laboratory Accreditation (A2LA)

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Geotextiles labeling, shipment, and storage shall follow ASTM D 4873. Product labels shall clearly show the manufacturer or supplier name, style name, and roll number.
- B. Each geotextile roll shall be wrapped with a material that will protect the geotextile from damage due to shipment, water, sunlight, and contaminants.
- C. During storage, geotextile rolls shall be elevated off the ground and adequately covered to protect them from the following: site construction damage, precipitation, extended ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, flames including welding sparks, excess temperatures, and any other environmental conditions that may damage the physical property values of the geotextile.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. US Fabrics Inc
3904 Virginia Ave
Cincinnati, OH 45227
800-518-2290
513-271-4420, fax
<http://www.usfabricsinc.com/>
- B. Substitutions: Alternative product data may be submitted by the Contractor for Engineer review for equivalent products.

2.02 MATERIALS

- A. Geotextile:
 - 1. Geotextile shall be US Fabrics, Inc. product US 205NW, or approved equivalent.

2.03 QUALITY CONTROL

- A. Manufacturing Quality Control: Testing shall be performed at a laboratory accredited by GAI-LAP and A2LA for tests required for the geotextile, at frequency meeting or exceeding ASTM D 4354.

- B. Geotextile properties, other than Burst Strength and Ultraviolet Stability shall be tested by NTPEP to verify conformance with this specification.
- C. Ultraviolet Stability shall be verified by an independent laboratory on the geotextile or a geotextile of similar construction and yarn type.

PART 3 EXECUTION

3.01 PREPARATION

- A. The installation site shall be prepared by clearing, grubbing, and excavation or filling the area to the design grade. The river bottom on which the fabric is to be placed must be flat. Non-natural protuberances extending up from the bottom of the river shall be removed prior to placing the fabric to avoid damaging the fabric. Non-natural objects include, but are not limited to, pieces of concrete, rebar, or demolition debris.

3.02 INSTALLATION

- A. The geotextile shall be placed loosely with no wrinkles or folds, and with no void spaces between the geotextile and the river bottom. Successive sheets of geotextiles shall be overlapped a minimum of 24 in, with the upstream sheet overlapping the downstream sheet.
- B. Prior to covering, the geotextile shall be inspected by a certified inspector of the Engineer to ensure that the geotextile has not been damaged during installation. Damaged geotextiles, as identified by the Engineer, shall be repaired immediately. Cover the damaged area with a geotextile patch which extends an amount equal to the required overlap beyond the damaged area 24 inches.

END OF SECTION

SECTION 02940

SITE RESTORATION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and maintenance necessary to provide finished site restoration. Work includes restoring vegetation, and any other existing improvements or structures.

1.02 REFERENCES

- A. Related Work
 - 1. Section 02220 Soil Erosion and Sedimentation Control
 - 2. Section 02950 Landscaping

1.03 SUBMITTALS

- A. Procedures for any restoration work.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All materials for restoration shall be in accordance with respective specification section included here within.

PART 3 EXECUTION

3.01. GENERAL

- A. Execution for restoration shall be in accordance with respective specification section included here within.
 - 1. All paved areas shall be swept free of soil, stains and debris.
 - 2. All disturbed vegetated, asphalt path, pavement, curb and gutter, structure, or any other pre-existing condition shall be restored to original condition at expense of the Contractor.
 - 3. Return stockpile and storage areas to their original grade and restore ground surfaces after stored material has been removed.
 - 4. Mark restored areas to prevent intrusion by foot traffic and/or equipment as necessary.
 - 5. Immediately restore areas disturbed by continuing operations.

END OF SECTION

SECTION 02950

LANDSCAPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. All labor, materials, equipment and maintenance necessary to provide finished site revegetation. Work includes planting preparation, topsoil, seeding, planting accessories, and herbaceous planting installation.

1.02 RELATED WORK

- A. Section 01025, Measurement and Payment
- B. Section 01040, Coordination
- C. Section 01200, Project Meetings
- D. Section 01300, Submittals
- E. Section 01500, Construction Facilities and Temporary Controls
- F. Section 01700, Contract Closeout
- G. Section 02100, Site Preparation
- H. Section 02207, Aggregate Materials
- I. Section 02216, Topsoil and Topsoil Placement
- J. Section 02220, Soil Erosion Control
- K. Section 02300, Earthwork
- L. Section 02975, Landscape Maintenance Period

1.03 DEFINITIONS

- A. Plant Stock: This includes plant material that is to be introduced to Site regardless of its form or maturity. Plant stock may be referred to as woody, such as trees, shrubs, and some varieties of vines, or herbaceous, such as forbs, grasses, sedges, and some varieties of vines. Immature plant stock may be in form of germinated and ungerminated seeds. Mature herbaceous plant stock is generally in form of potted or containerized whole plants. Mature woody plant stock is generally in form of containerized, balled and burlapped, or bare root trees and shrubs.
- B. Weeds: Include, but are not limited to, *Phragmites australis* (Common Reed), *Typha spp* (Cattail species), *Phalaris arundinacea* (Reed Canary Grass), *Lythrum salicaria* (Purple Loosestrife), *Rhamnus frangula* (Glossy Buckthorn), *Rhamnus cathartica* (Common Buckthorn), *Lonicera spp.* (Exotic bush honeysuckle species), *Morus alba* (White Mulberry), *Ailanthus altissima* (Tree of Heaven), *Ulmus pumila* (Siberian Elm), *Viburnum opulus* (European Highbush Cranberry), *Cirsium arvense* (Canada thistle), *Carduus nutans* (Musk Thistle), *Centaurea maculosa* (Spotted Knapweed), *Alliaria petiolata* (Garlic Mustard), *Lotus corniculatus* (Birdsfoot Trefoil), *Coronilla varia* (Crown Vetch), *Melilotus spp.* (Sweet Clover species), *Poa pratensis* (Kentucky Bluegrass), and *Poa compressa* (Canada bluegrass).

- C. Non-native, Invasive Species and Early Colonizing Species: These are undesirable, hard to control, and/or not native to the region or nonindigenous and include but are not limited to, *Abutilon theophrasti* (Velvet Leaf), *Ailanthus altissima* (Tree of Heaven), *Alliaria petiolata* (Garlic Mustard), *Cirsium arvense* (Canada Thistle), *Dipsacus laciniatus* (Cut-Leaved Teasel), *Dipsacus sylvestris* (Common Teasel), *Hibiscus trionum* (Flower-of-an-Hour), *Lonicera* spp. (Honeysuckle), *Lythrum salicaria* (Purple Loosestrife), *Malus* spp. (Crabapple), *Melilotus alba* (Sweet Clover), *Morus alba* (White Mulberry), *Phalaris arundinacea* (Reed Canary Grass), *Phragmites australis* (Common Reed), *Poa pratensis* (Kentucky Bluegrass), *Rhamnus* spp. (Buckthorn), *Rosa multiflora* (Multiflora Rose), *Salix interior* (Sandbar Willow), *Typha* spp. (Cattails), *Ulmus pumila* (Siberian Elm), and *Viburnum opulus* (European Highbush Cranberry).

1.04 SUBMITTALS

- A. All Submittals shall be made in accordance with specified Submittal Procedures and as described herein.
- B. The CONTRACTOR shall submit the Maintenance Plan within 90 calendar days after receiving Notice to Proceed from OWNER, or prior to 30 days of beginning the maintenance period; whichever is sooner.
- C. Submit a Landscaping Work Plan for approval prior to mobilization to Site for landscaping.
- D. Plant Stock Suppliers: Submit Plant Stock Certificates from woody and herbaceous plant stock suppliers for inspection by OWNER REPRESENTATIVE a minimum of 1 week prior to time of planting.
1. Plant Stock Certificates from suppliers shall include:
 - a. Botanical name, including cultivar, and common name.
 - b. Quantity.
 - c. Size.
 - d. Type (B&B, Container, Bare Root...etc.)
 - e. Origin (Location grown).
 - f. Name, address, and phone number of supplier.
- E. Seeding Plan: Submit Seed Certificates for inspection by the OWNER REPRESENTATIVE a minimum of 1 month prior to initiation of work.
1. Seed Mixture Certificates from seed suppliers shall include:
 - a. Botanical names and common names.
 - b. Net weight.
 - c. Percentage of seeds by weights.
 - d. Purity of seed.
 - e. Germination percentage.
 - f. Amount of undesirable plant seeds present in mixture.
 - g. Date of production.
 - h. Date of packaging.

- i. Location of packaging.
 - j. Name, address, and phone number of supplier.
- F. Mulch: Submit for approval the name and address of mulch supplier(s) and a small physical sample of the material to be used, minimum 1 month prior to beginning installation. This includes mulch to be used for seeding, and tree, shrub and herbaceous plantings.
- G. Provide all relevant permits, licenses, and authorizations to OWNER REPRESENTATIVE before initiation of work.
- H. All substitutions, materials or execution, shall be approved by the OWNER REPRESENTATIVE, in writing, a minimum of 1 month prior to construction. The OWNER REPRESENTATIVE reserves the right to require a sample of substituted material(s) prior to approval for construction.

1.05 QUALIFICATIONS

- A. Plant Stock Suppliers: Obtain plant stock only from established suppliers capable of providing quantities adequate to complete this project. Suppliers shall be required to provide data requested for required submittals prior to use of stock. Suppliers shall be located in southeast Michigan, when possible.
- B. All landscaping work shall be performed by a Landscape Contractor. The CONTRACTOR shall be required to demonstrate experience in planting and establishing the specified plant stock herein. Personnel used to perform installation of plant materials shall have occupational experience in landscape planting projects similar to the scope and size of this project.

1.06 REGULATORY REQUIREMENTS

- A. Anticipate field conditions that may result in erosion, fires, noise, dust, and other potentially problematic situations and take steps necessary to reduce or eliminate these conditions in compliance with relevant ordinances and regulations.
- B. All plant stock, original and replacement, shall comply with state and federal Laws and Regulations with respect to inspection for plant diseases and insect infestations. Quality and size shall conform to the current edition of "Horticultural Standards" for number one grade nursery stock as adopted by the American Association of Nurserymen.
- C. Adhere to all federal, state, and local regulations for all phases of the project regarding erosion and sediment control measures.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Pack, handle, and transport plant stock in a manner approved for that species and size by OWNER REPRESENTATIVE. Take precautions that are customary in good trade practice to ensure proper transport and arrival of plant stock.

- B. Store plant stock in a manner to prevent damage or deterioration. Plant stock stored for excessive lengths of time or at a time of year which is not suitable by standard horticultural practice shall not be accepted for planting.
- C. Store plant stock in aboveground locations in non-construction areas approved by OWNER REPRESENTATIVE if not transplanted directly. Keep woody and herbaceous plant stock stored cool and sheltered from drying effects of direct sunlight, unless specifically required by plant stock, and prevailing winds. Place sufficient soil or mulch about roots of plant stock to protect them from desiccation and to provide nourishment during storage. Supply adequate water to maintain plant stock in a healthy and vigorous state suitable for transplanting.
- D. The following conditions shall render Plant Stock Unacceptable:
 - 1. Plant stock that arrives dried out, exposed to excessive heat, wind burn or that has been in storage for extended periods of time.
 - 2. Plants stocks displaying mold, decay, or physical damage.
 - 3. Seeds in damaged packaging are not acceptable.
- E. Deliver and store seed mixtures in original sealed containers. Each bag shall be tagged or labeled. If it is necessary to store the seeds after their arrival on the work site, they shall be stored in an approved weatherproof enclosure in such a manner as to protect the seeds from rot, decay, germination, mold, deterioration and rodents, and to permit easy access for inspection. Remove seed from site when it becomes wet, moldy, or otherwise damaged.
 - 1. Label seed containers with the following minimum information:
 - a. Botanical name and common name.
 - b. Net weight.
 - c. Percentages of seeds by weight.
 - d. Percentage of germination.
 - e. Amount of undesirable plant seeds present in mixture.
 - f. Date of production.
 - g. Name and address of supplier.
- F. The OWNER REPRESENTATIVE shall reserve the right to refuse any plant material that is unacceptable upon delivery to site.
- G. Changes and/or substitutions of plant materials from what is specified on the drawings are unacceptable without prior written authorization from OWNER REPRESENTATIVE.
- H. All plant materials shall be inspected and approved by OWNER REPRESENTATIVE prior to installation on-site.

PART 2 PRODUCTS

2.01 IMPORTED SOILS

- A. Topsoil: Refer to Section 02216 for topsoil specifications.

2.02 PLANT STOCK

- A. Furnish plant species and sizes as indicated on the Plans. Substitutions in plant species or size can be made only by written approval of the OWNER REPRESENTATIVE.
- B. Plant stock shall be true to their name as specified.
- C. Use commercially available plant stock that has been raised in local (southeast Michigan) nurseries under similar climatic conditions. No plant stock or seeds shall be accepted from outside the Great Lakes ecoregion without prior written approval from the OWNER REPRESENTATIVE.
- D. Plants and seeds shall be free of insects and diseases.
- E. Plants shall exhibit a balanced growth habit, and shall show appearance of healthy growth and vigor.
- F. Acceptable nurseries include, but are not limited to:
1. Genesis Nursery – Tampico, Illinois 1-815-438-2220
 2. The Native Plant Nursery – Ann Arbor, Michigan 734-677-3260
 3. Wildtype Native Plant Nursery – Mason, Michigan 517-244-1140
 4. Michigan Wildflower Farm – Portland, Michigan 517-647-6010
 5. Wetlands Nursery – Saginaw, Michigan 989-752-3492

2.03 SEED STOCK

- A. Seed Mix shall include species and LBS/AC as indicated on the plans. The seed quantities indicated per acre in the plans shall be the amounts of pure, live seed per acre per acre for each species listed.
1. Seed mixtures shall be blended by supplier at specified ratios of various species and shall be guaranteed by supplier as being true to specifications.
 2. Seed shall be “clean” according to industry quality standards.
- B. Seed Mixes shall contain no more than 1 percent by weight of undesirable plants species, as defined below, determined by standard purity tests.
1. Undesirable species for native seed areas and turf grass areas: Black Bentgrass (*Agrostis gigantea*), Bermuda Grass (*Cynodon dactylon*), Field Bindweed (*Convolvulus arvensis*), Blackberry (*Rubus V. Eubatus Flagellares spp.*), Burdock (*Arctium spp.*), Canada Thistle (*Cirsium arvense*), Chickweed (*Stellaria media*), Common Buckthorn (*Rhamnus cathartica*), Crabgrass (*Digitaria sanguinalis*), Cress (*Barbareaa spp.*), Dandelion (*Taraxacum officinale*), Dog Strangling Vine (*Cynanchum spp.*), Garlic Mustard (*Alliaria petiolata*), Glossy Buckthorn (*Rhamnus*

frangula), Lambsquarters (*Chenopodium album*), Jimsonweed (*Datura stramonium*), Johnson Grass (*Sorghum vulgare*), Morning Glory (*Ipomoea sp.*), Mustards (*Cruciferae sp.*), Nimble Will (*Polygonum auberti*, *P. convolvulus*, *P. cristatum*, *P. cuspidatum*, *P. sachalinense*, *P. scandens*), Nutgrass (*Cyperus rotundus*), Poison Sumac (*Rhus vernix*), Poison Ivy (*Toxicodendron radicans*), Quackgrass (*Agropyron repens*, *A. pseudorepens*), Ragweed (*Ambrosia artemisiifolia*, *A. trifida*), Rush Grass (*Sporobolus spp.*), Sheep Sorrel (*Rumex acetosella*), Sweet Clover (*Melilotus spp.*), Tansy (*Tanacetum vulgare*), Tatarian Honeysuckle (*Lonicera tatarica*), Teasel (*Dipsacus laciniatus*, *D. sylvestris*), Wild Garlic (*Allium canadense*).

- C. Seed shall contain no federal or state listed noxious or invasive weeds (an amount within the tolerance of zero percent) as determined by a standard purity test.
- D. Seed mix substitutions can be made only by written approval of the OWNER REPRESENTATIVE.

2.04 MULCH

- A. Mulch for all woody and herbaceous plant stock shall be composed of shredded hardwood bark. Mulch shall not contain any foreign material, debris, or compounds that may be detrimental to plant growth.
- B. Straw mulch shall be seed-free wheat straw. Mulch shall be clean, and free of weeds or other undesirable species. Mulch shall not be brittle, molded, or rotted, and shall be in air-dry condition suitable for placing with mulch blower equipment. The mulch will be subject to inspection and approval by the OWNER REPRESENTATIVE prior to the application of mulch by the CONTRACTOR.
- C. Obtain OWNER REPRESENTATIVE's approval prior to use of other types of mulch.

2.07 HERBICIDES AND PESTICIDES

- A. Any herbicide or pesticide intended for use on site must be approved by the OWNER REPRESENTATIVE prior to use.
- B. Herbicides shall have Glyphosate as the primary active ingredient.
- C. The use of pesticides is not recommended and will only be approved under extreme circumstances. Under no circumstances will pesticide application be allowed in detention areas, swales, or other areas where the risk of surface water contamination exists.

2.08 EQUIPMENT

- A. Seeding Equipment: Obtain OWNER REPRESENTATIVE's approval prior to use. The following requirements apply to specific equipment that may be used in seeding activities:

1. Tractors and Crawlers: Shall have low-pressure flotation tires or broad tracks so that soil compaction is minimized in areas of Site preparation or seeding activities.
2. Disc: In good repair with sound unbroken blades; weighted as necessary to achieve required tillage depth.
3. Rollers or Cultipackers: Minimum 6-inch diameter rollers; of sufficient weight to pulverize clods of soil. To be used following rough grading on subgrade soils as a preparation for installation of seedbed soils.
4. Airway Shattertyne: Roller tynes shall be 10 to 12 inch OD so that topsoil or organic-rich common fill and surface mulches are mixed into top 2 to 4 inches of subgrade. Weighting of this equipment should be minimal so as to avoid compaction of organic-rich common fill.
5. Hydraulic Seeder: Hydraulic seeding equipment shall include a pump rated and operated at no less than 100 gpm and no less than 100 psi pressure. Tank shall have a mechanical agitator powerful enough to keep seed in suspension in mixture.
6. Spinning Disc Seeder: When spinning disc seeders are used, mix individual seeds comprising mixture with an appropriate dispersal medium such as damp sterile sand or sawdust prior to sowing.
7. Tractor-drawn or Mounted Seeders: Provide with a calibrated adjustable gate opening providing uniform flow over a width adapted to work and able to drop seed directly on prepared seedbed. Obtain OWNER/ENGINEER'S approval prior to using this system. Equipment shall be equipped with low pressure/high flotation tires or wide tracks which shall result in minimal disruption and compaction of graded wetland surfaces.
8. Broadcast Seeders: Hand methods (cyclone seeders) and mechanical tractor-drawn methods.
9. No-Till Planters and Drills: Rangeland type grass drills and no-till rangeland grass drill planters shall be designed specifically for seeding native grasses and forbs.

PART 3 EXECUTION

3.01 SEQUENCING AND SCHEDULING

- A. Submit a Landscaping Work Plan for approval prior to mobilization to Site for landscaping.
- B. Incorporate sequencing and scheduling aspects of Sediment and Erosion Control Plan, refer to Section 02220 – Soil Erosion Control.
- C. Schedule topsoil placement to permit seeding and planting operations under optimum growing conditions during specified planting time frames. Plant and seed soils within 7 days of topsoil placement.

- D. Plant stock shall be installed according to the following time frames:
1. Woody and herbaceous plant stock May 15 through June 15 or September 1 through September 30.
 2. Spring Seeding Schedule: After May 1, (when soil is free of frost and in workable condition), but before June 15 or as directed by consultant.
 3. Fall Seeding Schedule: After September 15, but before November 30 (or prior to freeze-up) or as directed by consultant

3.02 PLANTING - GENERAL

- A. Do not proceed with planting in any area until necessary modifications and/or corrections determined during pre-planting examination are completed and approved by OWNER REPRESENTATIVE. Begin installation within 48 hours after approval by OWNER REPRESENTATIVE. If conditions detrimental to installation or plant growth or safety of planting crew are encountered, immediately notify OWNER REPRESENTATIVE prior to planting. Support approvals, disapprovals, and notifications by written documents containing details of circumstances involved.
- B. Maintain Sediment and Erosion Control Plan in conformance with applicable regulations and as approved by OWNER REPRESENTATIVE. Refer to Section 02220 – Soil Erosion and Sedimentation Control.
- C. Protect finish-graded areas from damage by vehicular or pedestrian traffic and erosion. Maintain drainage patterns as indicated on the drawings. Re-till areas compacted by construction to a minimum depth of 6 inches. Rework and restore any areas compacted or damaged by rain, traffic, or other cause, prior to planting.
- D. The CONTRACTOR is responsible for all labor and materials to install and maintain adequate systems for protection of the installed plants from predation by herbivores. The CONTRACTOR shall include proposed protection systems in the Landscaping Work Plan.
- E. Environmental Requirements
1. Do not conduct seeding or planting operations when soil is frozen. Materials shall not be applied over snow or ice.
 2. Do not undertake seeding and planting activities during stormy weather when excessive precipitation may result in washing of seed away from location intended.
 3. Do not install plant materials during periods of temperature extremes when atmospheric temperature may drop below 36 degrees F or rise above 90 degrees F.
 4. Do not apply seeds, seed mixtures, slurries with seeds, or mulch when wind conditions are such that materials would be carried beyond designated areas or materials would not be uniformly applied.

5. When drought, excessive moisture, or other unsatisfactory conditions prevail, as determined by the OWNER REPRESENTATIVE, the CONTRACTOR will stop work.

3.04 SEEDING

- A. Perform seeding within time guidelines specified. Seed must be applied to seedbed within 7 days after topsoil placement. If spring seeding, all forb seed (non-grass seed) must be moist stratified.
- B. All areas intended for seeding shall be free of weeds and other vegetation. Where necessary, infested areas shall be treated by the CONTRACTOR with an approved selective herbicide as approved by OWNER REPRESENTATIVE.
- C. Seedbed soil shall be finely divided, loose, and free of clods. Lumps, stone, litter, and other foreign non-organic material larger than 1 inch shall be removed. Non-desirable organic matter, including plants, roots, weeds, and perennial rhizomes shall also be removed.
- D. Use seeding rates as indicated by seed manufacturer recommendations unless alternative mixtures and application formulas are reviewed and approved by OWNER REPRESENTATIVE.
- E. Follow seed manufacturer recommendations for seed installation. Seeding method selected shall ensure complete coverage of designated area. Re-seed areas with gaps in seeding at no additional cost to OWNER.
- F. All equipment shall be approved for use and shall be calibrated and adjusted to sow seeds at the required seeding rate. Equipment shall be operated in a manner to ensure complete coverage of the entire area to be seeded and proper incorporation of the seed into the surface of the soil. All equipment mobilized to the site shall be washed prior to being brought on the site in order to prevent the possible spread of invasive species from other areas.
- G. Where obstacles, saturated soils, or other site conditions make use of mechanical seeding equipment impractical, hand broadcast techniques shall be used. When seed is applied by broadcast methods, the CONTRACTOR shall mix the seed with a carrier of vermiculite, sawdust, sand, or other carrier so as to uniformly distribute the seed throughout the carrier mix. Broadcasted seed shall be uniformly applied across the area to be seeded.
- H. For hand broadcasting, broadcast seed into soil to a maximum depth of ¼ inch within 12 hours by raking soil or chain dragging, then lightly compacting seedbed with roller or approved equivalent.
- I. All seeded areas with slopes 3:1 or steeper shall be covered with approved Straw Erosion Control Blanket. Erosion control blanket shall be installed within 48 hours of installation of seed or sooner if a rain event or high winds are anticipated. Use specified stakes to secure blanket to slope per manufacturer's recommendation. Provide 2-4 inches of overlap along edges of blanket sections, and 6 inches of overlap at blanket ends.

3.04 LIVE STAKES

- A. Plant live stakes as shown on Plans or as directed by OWNER REPRESENTATIVE.
- B. Plant live stakes from October 15th to frost set. If construction delays planting past the acceptable fall window, plant live stakes from frost off to May 15th.
- C. If not planted during normal dormant season, live stakes must be kept in cold storage until time of planting and must be planted in saturated soils.
- D. Plant live stakes perpendicular to ground surface. Install only when ground is not frozen. Push into ground by hand where possible. Use dead blow hammer as needed. Puncture live stake through erosion control blanket. Do not cut the erosion control blanket.
- E. Install live stake with buds oriented up and bury 4/5ths of stake in ground.
- F. Remove any dead or broken material from plant stock upon completion of planting.

3.05 ESTABLISHMENT AND PERFORMANCE STANDARDS

- A. Maintenance and warranty work will be as described in Section 02975 Landscape Maintenance Period, unless otherwise described herein.
- B. The CONTRACTOR is expected to conduct plant management activities throughout the contract period of performance to meet the performance standards.
- C. Installation Acceptance- An Installation Acceptance Inspection shall be conducted by the OWNER REPRESENTATIVE within 30 days of installation completion (if installation is completed within the growing season – May through September). If installation is completed outside of the growing season, the Installation Acceptance Inspection shall occur once weather permits germination and growth but prior to May 31st. If the appropriate plant material is present at the time of the Installation Acceptance Inspection, written approval shall be provided to the CONTRACTOR.
- D. Maintenance and Warranty Period shall be from the receipt of written Installation Acceptance Approval until the end of the second full growing season (maintenance shall occur for two full growing seasons – May through September).
- E. Interim performance standards
 - 1. Seeded Areas: Interim performance standards for seeded areas require that numerous diverse native seedlings must be present showing evidence that the seeding has successfully germinated and started to develop by the end of the first growing season (May through September).
 - 2. Woody and herbaceous plant material: Interim performance standards for woody and herbaceous plant material require that a minimum of 75 percent of the plant shall

show sprouting and/or leaf production, and 90 percent areal coverage of herbaceous plantings.

- F. Final performance standards
1. Seeded Areas: Final performance standards for seeded areas require that 60 percent representation and 50 percent areal coverage of those native species specified in the seeding list should be present by the end of the second growing season. There should be no single area of bare ground greater than 1 square meter.
 2. Woody and Herbaceous plant material: Final performance standards for woody and herbaceous plant material require that a minimum of 90 percent of the plant shall show leaf production and 90 percent areal coverage of the herbaceous plantings with no bare areas greater than 1 square foot.
- G. At any time during the Maintenance and Warranty period no greater than 10 percent relative ground coverage is permitted by any of the listed invasive species. Coverage will be determined by using 1-meter quadrants placed along transects across the entirety of each planting zone per the Landscaping Work Plan. The CONTRACTOR shall be responsible for sampling and preparing a report of the data to prove the performance standards have been met.
- H. The OWNER REPRESENTATIVE shall conduct an inspection of each planting zone at the end of the first full growing season (interim performance inspection) and the end of the second growing season (final performance inspection) to ensure that the performance standards have been met.
- I. The OWNER REPRESENTATIVE shall determine the viability of the plant material during a site visit with the CONTRACTOR. The CONTRACTOR will remove dead or dying plant material and replace them in sufficient quantity to meet the above standards at the CONTRACTOR's expense. All replacement plantings during the final year of the contract need not undergo a period of establishment to be accepted. However, replacement plants must be properly installed and in a live healthy condition at the time of inspection.
- J. The CONTRACTOR shall be responsible, at no additional cost to the OWNER, for the reseeded and replanting, where appropriate, and for maintenance and stewardship of areas that do not meet these performance standards during the Interim and Final Inspections.
- K. To verify conformance with Interim and Final Performance Standards for seeded areas, transect surveys shall be established by sampling plots of one square meter in size located at regular intervals along transects. The number of plots shall be as needed to sample a minimum of 0.2% of the total seeded area in each seeded zone. Sampling transects shall not be placed to span more than one habitat. To verify conformance with Interim and Final Performance Standards for planted areas, 30-foot radius (263M²) circular plots shall be established along a transect as needed to sample a minimum of 0.2% of the total planted area in each planting zone to estimate vegetation density and percent cover.

- L. For each planting zone, Final Performance criteria shall be met during the second growing season. Maintenance inspections shall be conducted and Maintenance Plan reports shall be prepared by the CONTRACTOR during spring, mid-summer and late-summer of each growing season documenting the site monitoring activities and sampling conducted to verify conformance with performance standards. The reports should also provide specifics on reseeding, replanting or other activities that may be required to meet the performance standards. If the performance criteria are not met for any of the planting zones, corrective actions are to be performed in those areas before the end of the warranty period. Corrective actions shall be in the form of overseeding in underperforming areas, removal of undesirable species or herbicide treatments, and additional plantings. All corrective actions shall be performed with no further cost to the OWNER.
- M. If performance standards are not met, the CONTRACTOR shall be responsible for supplemental seedings or plantings in accordance with specifications. The CONTRACTOR would perform any corrective action required as per the specification and conduct the final monitoring of the restoration site at the end of the establishment period. If the CONTRACTOR fails to comply with the requirements for satisfactory performance, the OWNER REPRESENTATIVE has the right to make other arrangements, as it may deem necessary to correct the deficiency, and charge the cost of such remedies to the account of the CONTRACTOR. The CONTRACTOR shall be exempt from failures due to extremes in weather or precipitation or other factors beyond the reasonable control of the CONTRACTOR.

3.06 SITE CLEAN UP

- A. Immediately clean up excess soil, mulch, or other debris and properly dispose of deleterious materials legally off-site in a manner consistent with local laws. Take necessary precautions to prevent contamination of clean areas as a result of cleaning operations.
- B. All paved areas shall be swept free of soil, stains and debris.
- C. Promptly remove equipment and unused materials at completion of activities in given area.
- D. Return stockpile and storage areas to their original grade and restore ground surfaces after stored material has been removed.
- E. Immediately repair damaged vegetation and aerate soil over root zone of negatively impacted vegetation.

3.07 PROTECTION OF FINISHED WORK

- A. Mark seeded and planted areas to prevent intrusion by foot traffic and/or equipment.
- B. Immediately restore areas disturbed by continuing operations.
- C. Maintenance Guarantee shall conform to Section 02975.

END OF SECTION

SECTION 02975

LANDSCAPE MAINTENANCE PERIOD

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Weed Control and Prevention
2. Pest Control and Prevention
3. Disease Control and Prevention
4. Pruning of Plant Material
5. Replacement of Dead or Unhealthy Plant Material
6. Repair of Staking and Guying System
7. Watering Plant Material

B. Related Sections:

1. Section 01025 Measurement and Payment
2. Section 01040 Coordination
3. Section 01700 Contract Closeout
4. Section 02930 Landscaping

1.02 REFERENCES

A. ANSI - American National Standards Institute:

1. American Standard for Nursery Stock, ANSI Z60.1-1990

B. NAAPS - National Arborist Association Pruning Standards

C. ICBN - International Code of Botanical Nomenclature

D. ICNCP - International Code of Nomenclature of Cultivated Plants

1.03 DEFINITIONS

A. Acceptance: Wherever the terms "acceptance" or "accepted" are used herein, they mean acceptance of Landscape Architect in writing.

B. Product Purchase and Delivery Documentation:

C. Documentation of Accepted Conditions: Within 7 working days after Final Acceptance, submit color photographs and a written report documenting the accepted conditions of the plant material.

1.04 SUBMITTALS

- A. General: Meet requirements of Section 01300
- B. Documentation of Accepted Conditions for Interim and Final Performance Standards: Within 7 working days after Interim and Final Inspections, submit color photographs and a written report documenting the accepted conditions of the plant material.
- C. The CONTRACTOR shall submit the Maintenance Plan within 90 calendar days after receiving Notice to Proceed from OWNER, or prior to 30 days of beginning the maintenance period; whichever is sooner.

1.05 QUALITY ASSURANCE

- A. Contractor Qualifications:
 - 1. Maintenance Contractor: Minimum 10 years experience in maintenance of commercial landscape projects.
 - 2. Maintenance Supervisor: Minimum of 10 years experience in landscape maintenance supervision, with experience or training in turf management, entomology, pest control, soils, fertilizers and plant identification.
 - 3. Labor Force: Thoroughly familiar and trained in the work to be accomplished and perform the task in a competent, efficient manner acceptable to the Owner.
 - 4. Supervision: The foreman shall directly employ and supervise the work force at all times.
- B. Notification of Change in Supervision: Notify Owner of all changes in supervision.
 - 1. Identification: Provide proper identification at all times for landscape maintenance firm's labor force.
- C. Regulatory Requirements:
 - 1. Perform all work in accordance with all applicable laws, codes, and regulations required by authorities having jurisdiction over such work.
 - 2. Provide for all inspections and permits required by Federal, State, or local authorities in furnishing, transporting, and installing of all agricultural chemicals.
 - 3. Submit a record of all herbicides, insecticides and disease control chemicals used to the local regulatory agency as required by law.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Labeling: Furnish standard products in unopened manufacturer's standard containers bearing original labels showing quantity, analysis and name of manufacturer.

- B. Storage: Store products with protection from weather or other conditions that would damage or impair the effectiveness of the product.
- C. Handling: Do not lift or handle container plants by tops, stems or trunks at any time. Do not bind or handle plants with wire or rope at any time.
- D. Anti-Desiccant: Spray all evergreen or deciduous plant material in full leaf immediately before transporting with anti-desiccant. Apply an adequate film over trunks, branches, twigs and foliage.
- E. Digging: Dig ball and burlap (B & B) plants with firm, natural balls of earth of diameter meeting requirements of ANSI Z60.1-1990, and of sufficient depth to include the fibrous and feeding roots.

1.07 SEQUENCING AND SCHEDULING

- A. Work Schedule:
 1. Work Hours: Perform all maintenance during hours accepted by Owner.
 2. Maintenance Period: Work force shall be present at the project site as often as necessary to perform specified maintenance in accordance with the accepted maintenance plan. This period begins at installation and continues through two full growing seasons (May through September) until final acceptance.
 4. Guarantee: The CONTRACTOR shall guarantee all landscaping specified herein for one (2) full growing seasons (May through September) following approval of Installation Acceptance Inspection. The CONTRACTOR shall respond within two (2) weeks of written requests by the OWNER for replacement/repair. If the CONTRACTOR fails to respond within this time, the OWNER may proceed with replacement work and bill the Contractor.
 5. Verification: Verification of visits may be required by the OWNER in the form of reports and/or certified payroll covering the visits.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Replacement Plant Material:
 1. Match existing genus, species, cultivar and size.
 2. Meet requirements of these specifications.
 3. Meet requirements of ANSI Z60.1-1990, ICBN and ICNCP.
- B. Upland Seed:
 1. Match existing genus, species, cultivar and size.

- C. Herbicides, Insecticides, and Fungicides: Legal commercial quality non-staining materials with original manufacturers' containers, properly labeled with guaranteed analysis, as recommended by licensed applicators.
- D. Mulch: Same as original installation.

PART 3 EXECUTION

3.01 PREPARATION

A. Protection of Existing Conditions:

1. General: Use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, plant materials and walks on or adjacent to the site of the work.
2. Barriers: Provide barricades, fences or other barriers as necessary to protect existing conditions from damage during maintenance operations.
3. Hazardous Operations: Do not store materials or equipment, permit burning, or operate or park equipment under the branches of existing plants.
4. Notification: Give written notification of all damaged plants and structures.
5. Replacement of plant material: Replace existing plants which are damaged during maintenance with plants of the same species and size as those damaged at no cost to the Owner.

3.03 MAINTENANCE AND WARRANTY PERIOD

Maintain each plant and each portion after Installation Acceptance Approval for the period of time specified herein.

A. Maintenance Plan:

1. The Maintenance Plan shall detail the CONTRACTOR's technical approach to completing the maintenance period work required by the contract documents while providing the best value to the OWNER.
2. The CONTRACTOR shall submit the Maintenance Plan within 90 calendar days after receiving Notice to Proceed from OWNER, or prior to 30 days of beginning the maintenance period; whichever is sooner. No adjustments for time or money will be made if resubmittals of the Maintenance Plan are required due to deficiencies in the plan.
3. The Maintenance Plan shall coordinate different work items and address the technical requirements listed in the specifications, drawings, and permits to ensure undesired plan species are not establishing in the work area, and the desired species are maintained and replaced. The Maintenance Plan shall include, but is not limited to, the following:

- a. Means and methods for pest control, watering, inspection, reporting and replacement of plantings.
- b. Site inspection forms.
- c. Vegetation maintenance log.
- d. Pesticide application forms.
- e. Inspector license qualifications and experience.

3.04 TREE AND PLANT MAINTENANCE

A. Watering:

- 1. Watering of all plant material. For optimum plant growth, plant material shall be kept moist (1" total water per week, including rainfall) until vegetation is 4" high typical.
- 2. Maintain watering basins around all trees and shrubs so that enough water can be applied to establish moisture through major root zones.
- 4. Adjust frequency and length of time for watering cycles according to changing soil and weather conditions.
- 5. Maintain originally specified depth of mulch to reduce evaporation and frequency of watering.

B. Settled or Leaning Plants: Reset plants to proper grades or upright position.

C. Weed Control:

- 1. Weeding and control of undesirable plants by approved methods. Spot spraying or hand wicking of an herbicide application may be required to deter aggressive persistent non-native species. Avoid herbicide contact with native plant material.
- 2. Use only legally accepted herbicides to control weed growth.
- 3. Avoid frequent soil cultivation that destroys shallow roots and breaks the seal of pre-emergent herbicides.

D. Mulching: Re-mulch at the beginning of each growing season according to Section 02930. At the end of the guarantee, all mulch shall be at required depths and widths around all plant materials.

E. Pest Control: Apply sprays and treatments as necessary for scale insects, leaf eating insects and fire blight control. Apply according to manufacturer's current printed instructions and in accordance with local ordinances.

F. Pruning:

- 1. General: Meet requirements of NAAPS.
- 2. Prune trees to select and develop permanent scaffold branches that are smaller in diameter than the trunk or branch to which they are attached, and which have vertical spacing of 18 inches to 48 inches and radial orientation so as not to overlay one another.

3. Prune trees to eliminate diseased or damaged growth, and narrow V-shaped branch forks that lack strength. Reduce toppling and wind damage by thinning out crowns.
4. Prune trees to maintain growth within space limitations, maintaining a natural appearance and balancing crown with roots.
5. Retain lower branches in a "tipped back" or pinched condition to promote caliper trunk growth (tapered trunk). Do not cut back to fewer than six buds or leaves on such branches. Only cut lower branches flush with the trunk after the tree is able to stand erect without staking or other support.
6. Prune damaged trees or those that constitute health or safety hazards at any time of year as required.
7. Make all cuts clean and close to the trunk, without cutting into the branch collar. "Stubbing" will not be permitted. Cut smaller branches flush with trunk or lateral branch. Make larger cuts (one inch in diameter or larger) parallel to shoulder rings, with the top edge of the cut at the trunk or lateral branch.

G. Staking:

1. Remove all stakes at the end of the Maintenance and Warranty Period.

H. Replacement of Plants: Replace, without cost to OWNER, and as soon as weather conditions permit, all plants not in a vigorous, thriving condition, during and at the end of the maintenance period.

3.05 INSECTS, PESTS, AND DISEASE CONTROL

- A. Inspection: Inspect all plant materials weekly for signs of stress and damage.
- B. Treatment: Treat as required to prevent and control insects, pests and diseases.

3.06 FIELD QUALITY CONTROL

A. Maintenance Monitoring

1. Though the CONTRACTOR shall provide continued maintenance throughout Maintenance and Warranty Period, CONTRACTOR to perform monitoring visits at a minimum of 3 times throughout each growing season to monitor the condition of the vegetation and its performance relative to performance criteria (interim and final).
2. A comprehensive report shall be updated and submitted to the Owner following each maintenance inspection. The report shall document all actions conducted by the Contractor during the maintenance period. The report shall include:
 - a. Summary of inspection and maintenance logs, and pesticide applications.
 - b. Summary of pest control measures and schedule of operations.
 - c. Map detailing location of maintenance performed.
 - d. Summary of correspondence.

- e. Detailed discussion of work completed during maintenance inspection and comparison to work required to be completed during maintenance inspection.
- f. Detailed discussion of work required for the next maintenance inspection.
- g. Quantify the percentage of vegetation planted by Contractor that is healthy and meets Contract Document requirements for closeout of the maintenance period.
- h. Quantify the percentage of invasive species at areas vegetated by the Contractor. Estimate monthly and quantify by owner approved method for maintenance period closeout.
- i. Provide rainfall and irrigation during the period
- j. Provide copies of inspection and maintenance logs, and pesticide application forms in an appendix.
- k. Provide photographs of each area vegetated.

3.07

PERFORMANCE STANDARDS INSPECTIONS

- A. Installation Acceptance Inspection:
 - 1. Upon the complete installation of the landscape work, request a review by the OWNER REPRESENTATIVE to conduct the Installation Acceptance Inspection to determine whether all landscape work conforms to the requirements of the Contract Documents.
 - 2. Submit a written request at least five working days prior to the anticipated date of review.
 - 3. If it is found that the landscape work does not conform to the requirements of the Contract Documents, the CONTRACTOR will receive written notification from the OWNER REPRESENTATIVE of all corrective work preventing Installation Acceptance of the landscape work.
 - 4. Perform corrective work within ten calendar days after the Installation Acceptance Inspection.
 - 5. Upon completion of the corrective work, request another Installation Acceptance Inspection to determine whether all landscape work conforms to the requirements of the Contract Documents.
 - 6. Corrective work followed by review will be required until the corrective work is found to be complete by the OWNER REPRESENTATIVE.
- B. Payment for Additional Installation Acceptance Inspections: Reimburse OWNER for expenses and fee required to have OWNER REPRESENTATIVE make additional field trips for Installation Acceptance.
- C. Installation Acceptance Approval:
 - 1. When the OWNER REPRESENTATIVE determines that the landscape work conforms to the requirements of the Contract Documents the Contractor will receive a written notification of Installation Acceptance.
 - 2. The Maintenance Period will commence upon the date specified by the notification of Installation Acceptance.
- D. Interim and Final Review:
 - 1. At the end of each growing season, request a review by the OWNER REPRESENTATIVE to determine whether all landscape and maintenance work conforms to the requirements of the Contract Documents.

2. Submit a written request at least five working days before the expected date of review.
 3. If it is found that all landscape and maintenance work does not conform to the requirements of the Contract Documents, the Contractor will receive written notification from the OWNER REPRESENTATIVE of all corrective work preventing acceptance of the landscape and maintenance work.
 4. Perform corrective within ten calendar days after the Review.
 5. Upon completion of the corrective work, request another Review to determine whether all landscape and maintenance work conforms to the requirements of the Contract Documents.
 6. Corrective work followed by review will be required until the corrective work is found to be complete by the OWNER REPRESENTATIVE.
- E. Payment for Additional Review Field Trips: Reimburse Owner for expenses and fee required to have OWNER REPRESENTATIVE make additional field trips for review.
- F. Final Acceptance:
1. When the OWNER REPRESENTATIVE determines that the landscape and maintenance work conforms to the requirements of the Contract Documents the CONTRACTOR will receive a written notification of Final Acceptance.
 2. Continue maintenance of all landscape work until the date that the OWNER accepts maintenance at the end of the Maintenance and Warranty Period.
 3. The OWNER will accept maintenance responsibility upon the date specified in the notification of Final Acceptance.

END OF SECTION

SECTION 02980

HABITAT STRUCTURES

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

- A. Furnish all labor, materials, equipment necessary to provide habitat structures, including (but not limited to):
- Slab stones
 - mudpuppy structures
 - spawning habitat
 - habitat logs
 - hibernacula habitat
 - avian nesting areas
 - habitat log bundles,
 - sand nesting areas,
 - and mudpuppy structures with mussel habitat.

1.02 RELATED WORK

- A. Section 01025, Measurement and Payment
B. Section 02110, Clearing and Grubbing
C. Section 02205, Soil Material
D. Section 02207, Aggregate Material
E. Section 02231, Shoal Construction
F. Section 02300, Earthwork
G. Section 02621, Geotextile for Separation

PART 2 PRODUCTS

2.01 GENERAL

- A. Woody material for habitat structure construction shall be obtained from approved locations and approved by the ENGINEER. Habitat structure materials shall not be cut for the sole purpose of providing the raw materials, unless explicitly approved by the ENGINEER and the Owner.
- B. Some materials within the project boundaries may be considered for use if designated for removal or clearing and approved by the ENGINEER in habitat structure construction.
- C. Log Habitat Anchoring: CONTRACTOR to secure habitat logs using slab stones or anchors or other approved method. CONTRACTOR to submit proposed anchor method to approval by ENGINEER prior to start of work. Anchor technique must have 800 lb capacity, per tree. Securing cable shall be a galvanized steel cable, as approved by ENGINEER and shall be securely anchored to the log with galvanized nut and bolt system.

3.01 AVIAN NESTING HABITAT

- A. Soil materials must be coarse sand with less than 10% organic content.
- B. Aggregate materials must be MDOT #9 limestone.

4.01 SLAB STONES

- A. The material for the slab stones shall be limestone ranging in size from 2'x4'x4" to 1'x2'x2".

5.01 SPAWNING HABITAT

- A. Aggregate for spawning habitat must be 4-inch to 6-inch limestone aggregate.

6.01 HABITAT LOGS

- D. Habitat logs shall be a minimum of 20 feet in length, 8-12" DBH. Tree branches to remain for fish shelter. CONTRACTOR to secure habitat logs using slab stones or anchors or other approved method. CONTRACTOR to submit proposed anchor method to approval by ENGINEER prior to start of work. Anchor technique must have 800 lb capacity, per tree. Securing cable shall be a galvanized steel cable, as approved by ENGINEER and shall be securely anchored to the log with galvanized nut and bolt system.

7.01 HABITAT LOG BUNDLES

- E. Trees considered for habitat log habitat bundle structures must have 4-6 limbs in tact minimum, with each limb 5'-8' long minimum. Diameter shall be 8"-12", and 20' long and all limbs to remain in place for shelter. CONTRACTOR to secure habitat logs using slab stones or anchors or other approved method. CONTRACTOR to submit proposed anchor method to approval by ENGINEER prior to start of work. Anchor technique must have 800 lb capacity, per tree. Securing cable shall be a galvanized steel cable, as approved by ENGINEER and shall be securely anchored to the log with galvanized nut and bolt system.
- A.

8.01 MUDPUPPY STRUCTURES

- A. Mud puppy structures to be constructed of limestone slabs, approximately 1'x2'x2" in size.

9.01 MUDPUPPY STRUCTURES WITH MUSSEL HABITAT

- A. Slabs for mudpuppy structures to be limestone, approximately 1'x2'x2" in size.

- B. Aggregate for mudpuppy structures with mussel habitat must be MDOT 23A Natural Sand/ Gravel.

10.01 HIBERNACULA

- A. Aggregate for hibernacula habitat must be 6-inch to 2-foot river rock, cleaned.

11.01 SAND NESTING AREAS

- A. Soil materials must be fine sand with less than 5% clay content and less than 10% gravel.

PART 3 EXECUTION

3.01 HABITAT STRUCTURES

A. GENERAL

1. The proposed location for each habitat structure shall be staked and labeled by the Contractor as directed by the ENGINEER prior to installation. Distribute required habitat structures evenly throughout the approved habitat locations as shown on the Drawings. Provide random spacing between individual structures.
2. Habitat structures shall be provided in the quantities shown on the plans. Habitat structures shall be located as shown on the plans or as directed by the ENGINEER.
3. Log habitat structures must stay out of the river current in approved locations to protect their longevity and promote use.
4. The Contractor shall replace and/or repair any and all damage to existing site features resulting from wildlife habitat structure construction operations at no additional cost to the contract.

B. AVIAN NESTING HABITAT

1. Geotextile fabric to be placed over riprap at proposed avian nesting habitat locations on the North Shoal Islands and as shown on the Drawings.
2. 8” of coarse sand shall be placed on the geotextile fabric.
3. 4” of #9 limestone aggregate to be placed overtop the sand.

C. SLAB STONES

1. Slab stones to be arranged to provide gaps in approximately 4” in height and 2” in the rock filled area.
2. Structures to be placed along the facing of the proposed shoal.

D. SPAWNING HABITAT

1. All spawning habitat gravel beds shall be installed as per the Plan details. Depth of gravel bed shall be a minimum of 1-2 feet. Spawning habitat shall be an average of 10-15 feet in width, running an average of 20 feet along the shoal. Contractor to ensure spawning habitat remains an average of 5-10 feet away from the toe/shoal.

E. HABITAT LOGS

- F. Habitat log and log bundles shall be placed individually. Logs shall be placed horizontally with the trunk end touching the ground. Log and bundle habitat structures shall be placed, as directed by the ENGINEER, in all proposed habitat areas including those areas where grading is not proposed. Structures shall be placed on the ground surface prior to planting. Orientation of horizontally placed logs and bundles shall be random. CONTRACTOR to secure habitat logs using slab stones or anchors or other approved method. CONTRACTOR to submit proposed anchor method to approval by ENGINEER prior to start of work. Anchor technique must have 800 lb capacity, per tree. Securing cable shall be a galvanized steel cable, as approved by ENGINEER and shall be securely anchored to the log with galvanized nut and bolt system.

F. HABITAT LOG BUNDLES

- G. Habitat log and log bundles shall be placed individually. Logs shall be placed horizontally with the trunk end touching the ground. Log and bundle habitat structures shall be placed, as directed by the ENGINEER, in all proposed habitat areas including those areas where grading is not proposed. Structures shall be placed on the ground surface prior to planting. Orientation of horizontally placed logs and bundles shall be random. CONTRACTOR to secure habitat logs using slab stones or anchors or other approved method. CONTRACTOR to submit proposed anchor method to approval by ENGINEER prior to start of work. Anchor technique must have 800 lb capacity, per tree. Securing cable shall be a galvanized steel cable, as approved by ENGINEER and shall be securely anchored to the log with galvanized nut and bolt system.

G. MUDPUPPY STRUCTURES

1. 8-12" Limestone slabs shall be placed together with approximately 4" gaps between to ensure adequate fish cover.

H. MUDPUPPY STRUCTURES WITH MUSSEL HABITAT

1. Mudpuppy habitats shall be constructed with limestone slabs placed on top of 8-12 inches of approved sand/gravel material as shown on the Drawings. Limestone slabs shall be placed together with approximately 4" gaps between to ensure adequate fish cover.

I. HIBERNACULA

1. Hibernacula habitat shall be built approximately 3-4 feet in height using approved river rock materials and covered in geotextile, and topsoil per the Plans. River rock material shall be cleaned 6" to 2 feet in diameter and placed to ensure spacing not

exceeding 6 inches. All hibernacula habitats to be covered in clean topsoil and seeded with approved mix.

J. SAND NESTING AREAS

1. Sand nesting areas shall be constructed approximately 1-2' in height, 10-15' in length, 4-5' in width at locations shown on the Drawings or as directed by the ENGINEER.

END OF SECTION