Re: Approval for Revised SAV Specs, BASF OU2, HW#442027

O'neill, Christopher (DEC) <christopher.oneill@dec.ny.gov>

Thu 6/11/2020 12:09 PM

To: Bleiler, John <John.Bleiler@aecom.com>
Cc: Woodfield, Karen (DEC) <karen.woodfield@dec.ny.gov>; Tromp, David (DEC) <david.tromp@dec.ny.gov>; Sharma, Shailesh K (DEC) <Shailesh.Sharma@dec.ny.gov>; Gosier, Corbin J (DEC) <corbin.gosier@dec.ny.gov>; Fleck, Andrew (DEC) <andrew.fleck@dec.ny.gov>; Keough, Thomas <Thomas.Keough@aecom.com>; Ben R. Zimmerman <ben.zimmerman@appliedeco.com>; Will Lindheimer <wpl@land-remediation.com>; Gardner, Mike <mike.gardner@aecom.com>; douglas.reid-green@basf.com <douglas.reid-green@basf.com>; WAYNE ST CLAIR (wayne.stclair@basf.com) <wayne.stclair@basf.com>

5 attachments (746 KB)

2020-6-9--BASF OU2-APPROVED Revised SAV Spec.pdf; 2020-6-9--BASF OU2-Flagging Material Details For-Revised SAV Spec.pdf; 2020-6-9--BASF OU2-Jute Matting Details For Revised SAV Spec.pdf; 2020-6-9--BASF OU2-Jute Matting Photos For Revised SAV Spec.pdf; 2020-6-9--BASF OU2-RedlineVersion-Revised SAV Spec.pdf;

As per the request from BASF to revise the procedures and specifications for the planting of submerged aquatic vegetation (SAV) for the restoration of the OU2 BASF area (site No. 442027) in Rensselaer, NYSDEC has reviewed and hereby approves of the revised SAV specifications attached along with its supporting documentation.

Please provide email notification to me when the SAV planting has started.

Please setup a conference call for the project team on the first Tuesday following the start of planting, and also for the first Tuesday following completion of the planting work.

Please contact me at 518-376-7605 (mobile) or 518-357-2394 (office) if there are any questions or issues.

Chris O'Neill
NYSDEC -- Schenectady
518-376-7605 (mobile)
518-357-2394 (office)

From: Bleiler, John <John.Bleiler@aecom.com>
Sent: Tuesday, June 9, 2020 9:05 PM
To: O'neill, Christopher (DEC) <christopher.oneill@dec.ny.gov>
Cc: Woodfield, Karen (DEC) <karen.woodfield@dec.ny.gov>; Tromp, David (DEC) <david.tromp@dec.ny.gov>; Sharma, Shailesh K (DEC) <Shailesh.Sharma@dec.ny.gov>; Gosier, Corbin J (DEC) <corbin.gosier@dec.ny.gov>; Fleck, Andrew (DEC) <andrew.fleck@dec.ny.gov>; Keough, Thomas <Thomas.Keough@aecom.com>; Ben R. Zimmerman <ben.zimmerman@appliedeco.com>; Will Lindheimer <wpl@land-remediation.com>; Gardner, Mike <mike.gardner@aecom.com>; douglas.reid-green@basf.com <douglas.reid-green@basf.com>; WAYNE ST CLAIR

(wayne.stclair@basf.com) <wayne.stclair@basf.com>
Subject: RE: BASF SAV Followup Meeting

Chris:

As a followup to our discussion today, attached please find the revised design specification (redline and clean); a photo of the jute net product to be used in place of burlap; a jute mat cut sheet from the manufacturer; and a sheet on the biodegradable flagging tape.

We request your approval of our alternative SAV planting approach at your earliest convenience.

Please let us know if you have any further questions.

Thanks

John A. Bleiler
Practice Director, Remediation
M 978.621.7080
john.bleiler@aecom.com

AECOM
250 Apollo Drive
Chelmsford, MA 01824
T 978.905.2100
aecom.com

-----Original Appointment-----
From: Bleiler, John
Sent: Monday, June 08, 2020 1:48 PM
To: Bleiler, John; douglas.reid-green@basf.com; Gosier, Corbin J (DEC); O'neill, Christopher (DEC); Gardner, Mike; Will Lindheimer; Ben R. Zimmerman; andrew.fleck@dec.ny.gov; Keough, Thomas
Cc: Woodfield, Karen (DEC); Tromp, David (DEC); Sharma, Shailesh K (DEC)
Subject: BASF SAV Followup Meeting

When: Tuesday, June 09, 2020 3:30 PM-4:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting

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SECTION 02 91 00

SUBMERGED AQUATIC VEGETATION

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Submittals
B. Quality Assurance
C. Definitions
D. Warranty and Performance Criteria
E. Materials
F. Project Site Preparation
G. Plantings
H. Monitoring And Maintenance Of Planted Areas
I. Spring Replant

1.02 SUBMITTALS

A. Upon Project Award, Contractor shall submit the following to document the qualifications of the restoration specialist:

1. Installer Qualifications: The SAV Installer shall have a minimum of 3 years of experience performing similar restoration activities. The Contractor shall provide documentation summarizing the installer's qualifications including project descriptions where restoration efforts have been successful in establishment of SAV plantings.

B. Installer's Field Supervisor Qualifications: Provide resume for experienced Field Supervisor who shall be present full-time for the duration of the SAV planting.

C. Prior to initiation of planting work, Contractor shall request approval in writing from the Engineer to proceed with planting work. Pre-construction submittals shall include the following:

1. Contractor's Technical Execution Plan (TEP) - Contractor shall prepare, submit, and revise as required a Restoration Plan as a section of the Contractor's TEP for approval by the Engineer that includes the following:

a. For SAV plants to be provided from a commercial nursery or laboratory stock, provide the name, address, and contact information of the supplier and furnish copies of any required permits, registrations or certifications for the harvesting, propagation and distribution of the plants. SAV should be sourced from an Engineer-approved nursery located in the northeastern U.S, preferably in upstate New York. .

b. Detail regarding the growing medium (soil, coir, sand), pea gravel, biodegradable containers and stakes (no plastic) to be included as part of the Planting Units, including soil grain size and nutrient content, gravel size and container composition.

c. If an alternate planting methodology is proposed, include details on proposed installation methodology and materials to be used.

d. Procedures for transporting, storing and staging SAV prior to installation.

e. Equipment and procedures used to transfer materials, equipment, and SAV from staging areas to in-river vessels.

f. Procedures for installing and monitoring SAV.

g. Procedures for maintaining SAV, including maintenance instructions, and suppliers' recommendations.

h. Methods to remove non-native or invasive plants.

i. Methods to minimize herbivory including methods for installation and removal (prior to final acceptance) of protective material (e.g. fencing).

j. Procedures for monitoring plants and for replacing plant(s) that do not survive through the Warranty Period.

k. Contractor's plan to access the Contract Work Area per Specifications Section 01 14 00 Work Restrictions.

l. Contractor's location for staging and stockpiling plants, materials, and equipment, including circulating water tanks for temporary storage of SAV.

m. List of equipment to be used for the SAV work.

n. Planting Schedule: The planting schedule shall include a summary of proposed planting and replanting dates and the limits of the Warranty Period as described below in Section 1.06.

D. Amend the Restoration Plan and submit for Engineer approval prior to performing work not in compliance with the approved Plan.

E. Certificates From Plant Stock Suppliers

1. Submit certificates from each plant stock supplier for each specified plant species including the following:

a. Botanical name

b. Common name

c. Origin

d. Age

e. Date of packaging

f. Name and address of supplier

g. County and state of origin

2. Submit certificates to the Engineer a minimum of 30 days prior to planting or as otherwise directed in writing by the Engineer.

3. Contractor shall provide Engineer with planting material suppliers' qualifications and certifications a minimum of seven days prior to delivery to the site.

F. Following completion of the planting work, the contractor shall submit the following items to the Engineer.

1. Record Drawing

a. Submit drawings that depict the date, location and type of SAV Planting Unit installed, including methods, quantities and species.

b. Record Drawings shall be submitted with the Requests for Initial and Final Approval showing the initial plantings and any maintenance and re-planting, respectively.

2. Request for Initial Approval

a. Submit a request in writing to the Engineer for initial approval of the SAV Planting Area following completion of the initial plantings.

b. The request for initial approval shall include Record Drawings showing the planting area with initial plantings installed.

c. The Engineer shall approve the initial installation of the SAV Planting Areas upon completion, inspection and verification that the work was completed in accordance with the plans and specifications.

3. Request for Final Approval

a. Submit a request in writing to the Engineer for final approval of the SAV Planting Areas after the Warranty Period has expired and any maintenance and replanting efforts have been completed.

b. The Request for Final Approval shall include a Record Drawing showing the planting areas with final plantings and maintenance completed.

c. The Engineer shall approve the completed Work following completion, inspection and verification that the work was completed in accordance with the drawings and specifications.

d. Final approval will be granted upon achievement of the warranty requirements and performance criteria, as established in of Section 1.06, for Plantings in the Planting Area.

G. Monitoring Reports

1. Post Construction Monitoring Event Report:

a. Submit a Post-Construction monitoring report to the Engineer documenting the condition of planted material.

b. Conduct the Post Construction monitoring event within 10 days of completion of SAV installation. Submit the Post-Construction monitoring report within 10 days of completion of the Post-Construction monitoring event. The report shall describe:

i. Methods used to inspect installed material.

ii. Figures depicting inspected areas.

iii. Any maintenance activities completed.

2. Fall Plant Condition Survey Report

a. Submit a fall plant condition survey report to the Construction Manager documenting the survey results.

b. Submit reports within 10 days following the completion of the fall plant condition survey. The report shall provide:

i. Brief narrative description of the survey describing any issues encountered during the survey or since SAV installation.

ii. Map showing the location of planted SAV observed on the survey that met the acceptable plant material criteria. The engineer will determine the Spring Replant areas based on this figure.

1.03 QUALITY ASSURANCE:

A. Installer's Field Supervisor: Installer shall provide an experienced supervisor who shall be present full-time for the duration of the SAV Planting.

B. Contractor shall provide quality, size, genus, species, and variety of specified plants, as specified herein. Plant stock shall be acquired from an approved northeastern U.S. nursery specializing in wetland plants.

C. SAV Measurements: Plant height shall be measured according to ANSI Z60.1 Section 1.2.2.1 for SAV ("Unclassified" "Young Plants") per to ANSI Z60.1.

D. Observation: Engineer will provide a Wetland Scientist to observe Acceptable Plant Material either at the approved supplier or at the site prior to installation to assess compliance with specifications for genus, species, variety, size, and quality. Engineer's Wetland Scientist will evaluate SAV as needed for size and condition, root systems, insects, injuries, and latent defects, and may reject unsatisfactory or defective material during progress of Work. Contractor shall remove rejected SAV immediately from Project Site.

SECTION 02 91 00

SUBMERGED AQUATIC VEGETATION

1.04 DEFINITIONS:

A. Planting

1. Planting includes placement and maintenance of all SAV plants, bare-root, container or tubers (Acceptable Plant Material) within the Planting Area.

B. Acceptable Plant Material

1. Plants: SAV appear healthy and exhibit visible signs of growth such as green leaves and stems; plants do not appear chlorotic or exhibit signs of stress. Plants do not exhibit visible signs of herbivory. Plant stem height minimum of 4" to 8", as measured by ANSI Z60.1 standards.

2. Tubers: If used, tubers are firm and brownish-white in color. No soft areas are present.

C. Planting Unit

1. For wild celery (*Vallisneria americana*), a Planting Unit consists of Acceptable Plant Material with a minimum of two shoots containing green leaves and roots 4 to 8 inches in height, rhizomes and growing medium contained within a peat pot, plug tray or similar biodegradable container. Above grade size of the plants shall be similar to that of naturally occurring plants in the Project vicinity at the time of installation.

2. Planting Units shall be assembled onsite by the Installer. Each unit will include one tuber of Acceptable Plant Material, peat moss and pea gravel wrapped in a jute mat bag (specifications for the jute material are attached).

3. If Installer proposes an alternate installation method, a description of the Planting Unit, its materials and installation procedures shall be included in the TEP.

D. Planting Area

1. Planting Areas are the locations at which SAV (*Vallisneria americana* [water celery]) will be planted as shown on the Drawings.

2. The areal extent of the planting area is identified in the Drawings. The Engineer or Engineer's Wetland Specialist will oversee the installation of the planting within the designated Planting Area. The actual specific locations of the plants will be approved by the Wetland Specialist.

E. SAV Planting Season

1. Spring Planting: SAV shall be planted between 15 May and 15 July, as directed by the Engineer.

F. Spring Re-plant

1. Replanting activity to be undertaken by the Contractor during the SAV Planting Season of the calendar year following initial SAV installation.

2. Dead, missing or damaged SAV, as identified during the Fall Plant Conditions Survey and the Warranty and Performance Criteria, below, shall be replaced and planted during the Spring Re-Plant.

G. Fall Plant Conditions Survey

1. Boat based plant condition survey conducted by the Contractor and attended by the Engineer. Fall Plant Conditions Survey timing and objectives as established in Section 3.03.

2. The Contractor provided monitoring vessel shall be equipped with appropriate provisions for the Engineer's Wetland Scientist and the Installer's Restoration Specialist to visually observe SAV within the entire Planting Area, from the monitoring vessel.

H. Post Construction Monitoring Event

1. Boat based plant condition survey conducted by the Contractor and attended by the Engineer. Post Construction Monitoring Event to be completed within 10 days of installation completion.

2. The Contractor provided monitoring vessel shall be equipped with appropriate provisions for the Engineer's Wetland Scientist and the Installer's Restoration Specialist to visually observe SAV within the entire Planting Area, from the monitoring vessel.

1.05 WARRANTY AND PERFORMANCE CRITERIA:

A. Warranty: Warranty the Plantings, for the indicated Warranty Period for SAV, as defined below, against defects including death and unsatisfactory growth.

1. Warranty Period for SAV: Warranty period shall be one year from date of Initial Approval. Release from the one-year warranty for the SAV restoration project is contingent upon the vegetation meeting the following Performance Criteria. Replacements will be guaranteed / warrantied to one additional growing season beyond the original one-year period.

B. Performance Criteria and Replacement

1. By the end of the first full growing season, SAV shall exhibit a minimum survival rate of 75 percent. Plantings not meeting the above survival rate shall be replaced immediately. Plantings not meeting the above survival rate which are identified during the Fall Plant Conditions Survey shall be replaced during the Spring Replant.

2. During the Spring Replant, replace plants that are more than 25 percent dead or in an unhealthy condition as directed by the Engineer, as based upon results of the Fall Plant Condition Survey Report

3. A limit of one replacement of each plant will be required, except for losses or replacements due to failure to comply with requirements.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Planting Units

1. Planting Units shall include one tuber of Acceptable Plant Material, peat moss and pea gravel wrapped in a jute mat bag (specifications for the jute material are attached).

2. Planting Units shall be placed using PVC tube to guide the pea gravel weighted plant unit to the desired location.

3.

B. Submerged Aquatic Vegetation

1. SAV shall meet the specifications outlined in Table 02 91 00-01, below.

2. SAV shall be obtained from a northeastern U.S. nursery or laboratory stock, and shall be Acceptable Plant Material, as defined in Section 1.05.

3. Source of plant material shall be the northeastern United States

4. Source of plant material shall be submitted to the Engineer for approval.

5. SAV shall be handled and maintained appropriately throughout the delivery, storage and staging process to ensure that SAV is robust for planting and passes Engineer's Wetland Specialist's inspection. Planting Units shall be assembled and placed in onsite circulating water pools for at least 24 hours prior to installation.

6. Plants shall be free of insects and diseases.

7. All plant material delivered to the project shall be inspected to confirm they meet the definition of Acceptable Plant Material.

8. A minimum of 5% of the planting units in each delivery shall disassembled and be inspected to ensure they meet contract requirements.

9. If any planting unit fails to meet the contract requirements, all plant units in the delivery must be inspected.

C. All plant materials shall comply with state and federal laws with respect to inspection for plant diseases and insect infestations.

D. Each plant species shall be handled in a manner that is consistent with standard trade practice to ensure the arrival of the plants at the Project Site in good condition. Plants that do not meet the definition of acceptable plant material shall be rejected.

E. Means to anchor Planting Unit into substrate: Anchor material may not be metallic or plastic and must be able to remain intact for a minimum of 3 months. Anchor material shall be flush with or below the backfill surface with no above ground protrusions.

F. As part of the Spring Replant, and no later than one year from the date of initial installation (river conditions permitting), deceased planted stock must be replaced with the same size planted stock, based on the performance criteria.

PART 3 – EXECUTION

3.01 PROJECT SITE PREPARATION:

A. Project Site access shall be as specified in 01 14 00 Work Restrictions.

B. Provide the Engineer's Wetland Specialist with access to inspect plant material, field collection locations, nursery facilities, and attendance at monitoring events.

C. Maintain a staging area onsite to allow the assembled Planting Units to be placed into circulating water as noted in Section 2.01.B.5.

3.02 PLANTINGS:

A. Preparation for Planting

1. Assemble Planting Units: Contractor shall assemble Planting Units onsite. Planting Units shall contain elements noted in Part 1, Paragraph 1.04.C (i.e., SAV, Jute mat bag, appropriate planting matrix and pea gravel) and shall be assembled in accordance with the drawings and specifications.

2. Provide adequate facilities for the protection and temporary storage of all plant material.

3. All plant material shall be stored and maintained in conditions and temperature similar to those in the Hudson River at the Site.

B. Planting Schedule

1. Planting Wild celery (*Vallisneria americana*), shall be conducted during the SAV Planting Season subject to modification based on field conditions with the approval of the Engineer.

C. Planting

1. Planting Units shall be installed at the locations and densities as shown on the Drawings.

a. The required planting density shown on the Drawings shall be used to determine the quantity of Planting Units to be installed within the Planting Area. SAV planting areas (Habitat 2) shall be planted with V*allisneria americana* (water celery) at one plant per approximately every 5.5 square feet.

b. The Planting Units shall be installed at an approximate uniform spacing throughout the Planting Area.

c. Planting Units installed beyond the boundaries of the Planting Area will not be counted towards the measurement and payment, and may be subject to removal.

2. *Vallisneria americana* (Wild celery):

a. Planting units will be dropped from a support boat through PVC tubes used to guide the plant to the required spacing. The tube will be set to create a small indent in the sediment surface at the planting unit location.

b. For monitoring purposes, each planting units will be fashioned with a length of biodegradable fluorescent flagging (see attached product sheet) to ensure that the plants are not drifting in the river current.

c.

D. Alternative spacing arrangements and transplanting techniques may be submitted to the Engineer for review and approval. At a minimum, any proposed alternative methods for Planting must provide for uniform, comparable, spatial coverage of the Planting Area, and adherence to water depth and plant embedment requirements.

E. The Contractor shall maintain the SAV Planting Area in the condition it was in when first installed and accepted. Monitoring and maintenance of planted areas shall begin immediately after installation of plants in that area, and shall continue through the Planting Season of the year of initial planting. A Fall Plant Conditions Survey monitoring will be held at the end of the growing season, as outlined herein. No monitoring or maintenance is required for plants installed during the Spring Replant

F. Prior to the Notice of Initial Approval, the Contractor shall submit a detailed maintenance plan which includes a schedule showing the number of days personnel will be on Site, the type of Work to be performed, supervision, equipment and supplies to be used, response program with an identified responsible contact person, and inspection schedule. The detailed maintenance plan is subject to review and approval by the Engineer. The Engineer will not issue the Notice of Initial Approval until the Engineer has received and approved the maintenance plan.

G. The type, brand names, material safety data sheets, and rates of application for any proposed herbicides, pesticides, and fertilizers shall be submitted for approval with the detailed maintenance plan. Herbicides, pesticides, and fertilizers shall meet all local, state, and federal Regulations and shall be applied by a licensed applicator.

H. The Contractor shall document all landscape and irrigation maintenance activities including Work locations and time spent. The Contractor shall provide copies to the Engineer following completion of the work activities.

I. Post Construction Monitoring Events

1. A Post-Construction monitoring event of planted material shall occur within 10 days of completion of SAV installation.

2. The monitoring event shall include visual observations of the planted area from the shallow edge to the deep edge.

a. A minimum of three transects shall be traversed for each 0.25 acres of SAV or as directed by the Engineer.

b. The presence and condition of SAV shall be recorded, including the presence of any dead or diseased plants and non-native or invasive plants.

c. The Post Construction Monitoring Event results shall be Documented and submitted to the engineer as described in Section 1.03.

d. The Post Construction Monitoring Event vessel shall be equipped with means for the Engineer's Wetland Scientist and the Installer's Restoration Specialist to visually observe SAV within the entire Planting Area, from the monitoring vessel.

J. If non-native or invasive plants are observed in the Planting Areas, they shall be physically removed from all planting locations within seven days of the observation. Non-native plant species which may become established the project area include, but are not limited to:

Water Chestnut	*Trapa natans*
Yellow Floating Heart	*Nymphoides peltata*
Curly Pondweed	*Potamogeton crispus*
Eurasian Water Milfoil	*Myriophyllum spicatum*

K. Maintenance responsibilities include control of herbivores which threaten the establishment of the planting.

L. Notify the Engineer 48 hours prior to and following any maintenance activity.

M. Fall Plant Condition Survey:

1. A Fall Plant Condition Survey of all planted areas shall be completed on or before September 30 of the first growing season; earlier if the onset of plant senescence is observed.

2. The purpose of the Fall Plant Condition Survey is:

a. To define areas to be re-planted in the Spring Re-plant event based on contiguous areas where plants do not meet the acceptable plant material criteria.

b. To establish spring re- plant event quantities based on observed percent survival in each planted area.

3. The plant condition survey shall be conducted by the Contractor and attended by the Engineer

4. The monitoring event shall include visual observations of the planted area from the shallow edge to the deep edge.

a. A minimum of three transects shall be traversed for each 0.25 acres of SAV or as directed by the Engineer.

b. The presence and condition of SAV shall be recorded, including the presence of any dead or diseased plants and non-native or invasive plants.

c. The Fall Plant Conditions Survey results shall be Documented and submitted to the engineer as described in Section 1.03.

d. The Fall Plant Conditions Survey vessel shall be equipped with means for the Engineer's Wetland Scientist and the Installer's Restoration Specialist to visually observe SAV within the entire Planting Area, from the monitoring vessel.

5. If non-native or invasive plants are observed in the Planting Areas, they shall be physically removed from all planting locations within seven days of the observation.

3.03 SPRING REPLANT

A. A replanting effort will be conducted for areas not meeting the performance criteria established in Part 2, Paragraph 2.01 F. Spring Replanting areas and the required level of effort shall be established during the Fall Conditions survey. Plantings shall be conducted in accordance with this specification and conducted in required replanting areas, as directed by the Engineer. No subsequent monitoring or maintenance is required for plants installed during the Spring Re-Plant.

B. Replanting will be conducted by placing the planting units in hand dug holes if the Engineer determines that the planting units placed as described above failed to establish because of inadequate contact with the sediment surface.

C. The spring replanting will be conducted during the Planting Season in the calendar year following initial planting, or as soon after as river conditions allow.

END OF SECTION

SECTION 02 91 00-01 TABLE ATTACHED

SECTION 02 91 00

SUBMERGED AQUATIC VEGETATION

TABLE 02 91 00-01

SUBMERGED AQUATIC VEGETATION PLANTING SCHEDULE

Scientific Name	Common Name	Indicator Status	Number of Individuals	Area	Number of Bare-Root Plants	Number of Planting Units	Elevation Range
Vallisneria americana	Wild Celery	OBL	1 Planting Unit per 5.5 sf	57,000 sf	20,000	10,000	> -5 NAVD88

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Item # BT-1R	Color Red	Stock Status In Stock	$3.04	$2.89	QTY
Item # BT-4Y	Color Yellow	Stock Status In Stock	1 - 4 $3.04	5 + $2.88	QTY
Item # BT-5O	Color Orange	Stock Status Out of Stock Please call for availability	1 - 4 $3.04	5 + $2.88	QTY
Item # BT-2W	Color White	Stock Status In Stock	1 - 4 $3.04	5 + $2.88	QTY
Item # BT-3B	Color Blue	Stock Status In Stock	$3.04	$2.87	QTY

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SINCE 1885

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FOLLOW US

HANES GEO COMPONENTS
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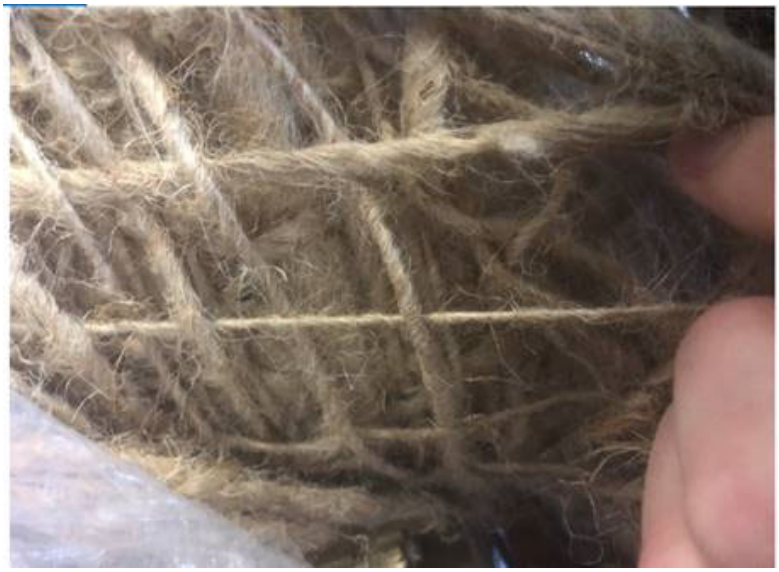
Typical Physical Properties

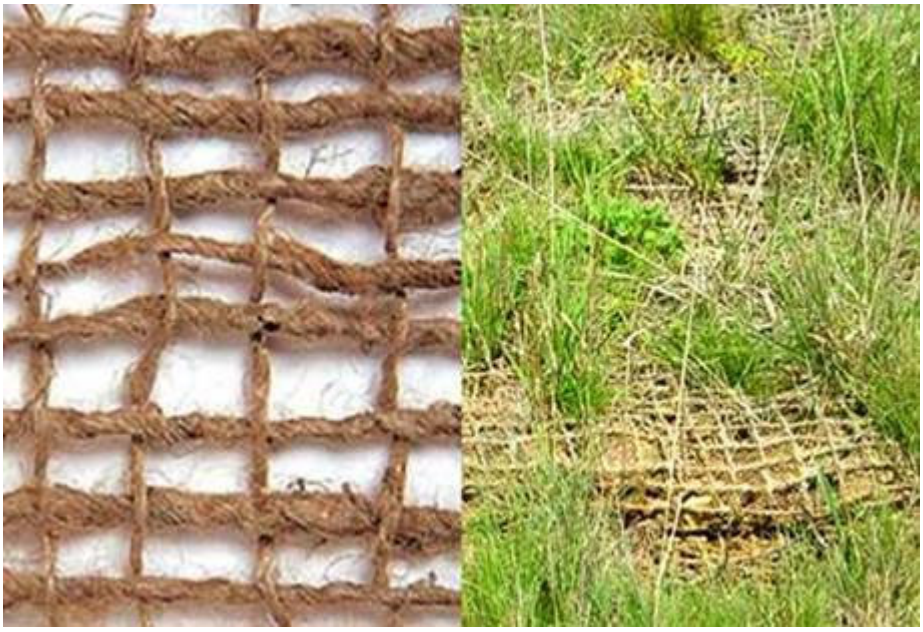
Jute Matting 4' x 225'

Specification	Test Method	Typical Values
Yarn Fiber		Woven, Jute undyed and unbleached
Yarn Count, Warp		78 per width, minimum , (.615)
Yarn Count, Weft		42 per liner yard, minimum(.857)
Color		Natural (Brown, Earth Tone)
Fabric Width (in)		48
Fabric Weight (lb/yd^2)		.92
Fabric Weight (lb/ln yd)		1.22
Length (ft)		225
Type		Regular
Area (yd^2)		100
Weight (lb)		92
Strands/ ft, Warp		19.5
Strands/ft, Weft		14
Mass/ Unit Area (oz/yd^2)		14.7
Wide Width Tensile, Dry (lb/ft) Warp x Fill	ASTM D 4595	300 x 175
Wide Width Tensile, Wet (lb/ft) Warp x Fill	ASTM D 4595	125 x 65
Elongation at Break (%)		10 x 10
Open Area (%)		60 – 63
Durability (yr)		1 – 2
Water Velocity (ft/sec)		8
Unit Shear Test (lb/ft^2)		0.45
"C" Factor, 1:5:1 Slope		0.005

*** The above data are typical physical properties and are not to be used for specification purposes.**

Jute Net Photos, BASF Rensselaer SAV Planting Bags





SECTION 02 91 00

SUBMERGED AQUATIC VEGETATION

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Submittals
B. Quality Assurance
C. Definitions
D. Warranty and Performance Criteria
E. Materials
F. Project Site Preparation
G. Plantings
H. Monitoring And Maintenance Of Planted Areas
I. Spring Replant

1.02 SUBMITTALS

A. Upon Project Award, Contractor shall submit the following to document the qualifications of the restoration specialist:

1. Installer Qualifications: The SAV Installer shall have a minimum of 3 years of experience performing similar restoration activities. The Contractor shall provide documentation summarizing the installer's qualifications including project descriptions where restoration efforts have been successful in establishment of SAV plantings.

B. Installer's Field Supervisor Qualifications: Provide resume for experienced Field Supervisor who shall be present full-time for the duration of the SAV planting.

C. Prior to initiation of planting work, Contractor shall request approval in writing from the Engineer to proceed with planting work. Pre-construction submittals shall include the following:

1. Contractor's Technical Execution Plan (TEP) - Contractor shall prepare, submit, and revise as required a Restoration Plan as a section of the Contractor's TEP for approval by the Engineer that includes the following:

a. For SAV plants to be provided from a commercial nursery or laboratory stock, provide the name, address, and contact information of the supplier and furnish copies of any required permits, registrations or certifications for the harvesting, propagation and distribution of the plants. SAV should be sourced from an Engineer-approved nursery located in the northeastern U.S, preferably in upstate New York. .

b. Detail regarding the growing medium (soil, coir, sand), pea gravel, biodegradable containers and stakes (no plastic) to be included as part of the Planting Units, including soil grain size and nutrient content, gravel size and container composition.

c. If an alternate planting methodology is proposed, include details on proposed installation methodology and materials to be used.

d. Procedures for transporting, storing and staging SAV prior to installation.

e. Equipment and procedures used to transfer materials, equipment, and SAV from staging areas to in-river vessels.

f. Procedures for installing and monitoring SAV.

g. Procedures for maintaining SAV, including maintenance instructions, and suppliers' recommendations.

h. Methods to remove non-native or invasive plants.

i. Methods to minimize herbivory including methods for installation and removal (prior to final acceptance) of protective material (e.g. fencing).

j. Procedures for monitoring plants and for replacing plant(s) that do not survive through the Warranty Period.

k. Contractor's plan to access the Contract Work Area per Specifications Section 01 14 00 Work Restrictions.

l. Contractor's location for staging and stockpiling plants, materials, and equipment, including circulating water tanks for temporary storage of SAV.

m. List of equipment to be used for the SAV work.

n. Planting Schedule: The planting schedule shall include a summary of proposed planting and replanting dates and the limits of the Warranty Period as described below in Section 1.06.

D. Amend the Restoration Plan and submit for Engineer approval prior to performing work not in compliance with the approved Plan.

E. Certificates From Plant Stock Suppliers

1. Submit certificates from each plant stock supplier for each specified plant species including the following:

a. Botanical name

b. Common name

c. Origin

d. Age

e. Date of packaging

f. Name and address of supplier

g. County and state of origin

2. Submit certificates to the Engineer a minimum of 30 days prior to planting or as otherwise directed in writing by the Engineer.

3. Contractor shall provide Engineer with planting material suppliers' qualifications and certifications a minimum of seven days prior to delivery to the site.

F. Following completion of the planting work, the contractor shall submit the following items to the Engineer.

1. Record Drawing

a. Submit drawings that depict the date, location and type of SAV Planting Unit installed, including methods, quantities and species.

b. Record Drawings shall be submitted with the Requests for Initial and Final Approval showing the initial plantings and any maintenance and re-planting, respectively.

2. Request for Initial Approval

a. Submit a request in writing to the Engineer for initial approval of the SAV Planting Area following completion of the initial plantings.

b. The request for initial approval shall include Record Drawings showing the planting area with initial plantings installed.

c. The Engineer shall approve the initial installation of the SAV Planting Areas upon completion, inspection and verification that the work was completed in accordance with the plans and specifications.

3. Request for Final Approval

a. Submit a request in writing to the Engineer for final approval of the SAV Planting Areas after the Warranty Period has expired and any maintenance and replanting efforts have been completed.

b. The Request for Final Approval shall include a Record Drawing showing the planting areas with final plantings and maintenance completed.

c. The Engineer shall approve the completed Work following completion, inspection and verification that the work was completed in accordance with the drawings and specifications.

d. Final approval will be granted upon achievement of the warranty requirements and performance criteria, as established in of Section 1.06, for Plantings in the Planting Area.

G. Monitoring Reports

1. Post Construction Monitoring Event Report:

a. Submit a Post-Construction monitoring report to the Engineer documenting the condition of planted material.

b. Conduct the Post Construction monitoring event within 10 days of completion of SAV installation. Submit the Post-Construction monitoring report within 10 days of completion of the Post-Construction monitoring event. The report shall describe:

i. Methods used to inspect installed material.

ii. Figures depicting inspected areas.

iii. Any maintenance activities completed.

2. Fall Plant Condition Survey Report

a. Submit a fall plant condition survey report to the Construction Manager documenting the survey results.

b. Submit reports within 10 days following the completion of the fall plant condition survey. The report shall provide:

i. Brief narrative description of the survey describing any issues encountered during the survey or since SAV installation.

ii. Map showing the location of planted SAV observed on the survey that met the acceptable plant material criteria. The engineer will determine the Spring Replant areas based on this figure.

1.03 QUALITY ASSURANCE:

A. Installer's Field Supervisor: Installer shall provide an experienced supervisor who shall be present full-time for the duration of the SAV Planting.

B. Contractor shall provide quality, size, genus, species, and variety of specified plants, as specified herein. Plant stock shall be acquired from an approved northeastern U.S. nursery specializing in wetland plants.

C. SAV Measurements: Plant height shall be measured according to ANSI Z60.1 Section 1.2.2.1 for SAV ("Unclassified" "Young Plants") per to ANSI Z60.1.

D. Observation: Engineer will provide a Wetland Scientist to observe Acceptable Plant Material either at the approved supplier or at the site prior to installation to assess compliance with specifications for genus, species, variety, size, and quality. Engineer's Wetland Scientist will evaluate SAV as needed for size and condition, root systems, insects, injuries, and latent defects, and may reject unsatisfactory or defective material during progress of Work. Contractor shall remove rejected SAV immediately from Project Site.

SECTION 02 91 00

SUBMERGED AQUATIC VEGETATION

1.04 DEFINITIONS:

A. Planting

1. Planting includes placement and maintenance of all SAV plants, bare-root, container or tubers (Acceptable Plant Material) within the Planting Area.

B. Acceptable Plant Material

1. Plants: SAV appear healthy and exhibit visible signs of growth such as green leaves and stems; plants do not appear chlorotic or exhibit signs of stress. Plants do not exhibit visible signs of herbivory. Plant stem height minimum of 4" to 8", as measured by ANSI Z60.1 standards.

2. Tubers: If used, tubers are firm and brownish-white in color. No soft areas are present.

C. Planting Unit

1. For wild celery (*Vallisneria americana*), a Planting Unit consists of Acceptable Plant Material with a minimum of two shoots containing green leaves and roots 4 to 8 inches in height, rhizomes and growing medium contained within a peat pot, plug tray or similar biodegradable container. Above grade size of the plants shall be similar to that of naturally occurring plants in the Project vicinity at the time of installation.

2. Planting Units shall be assembled onsite by the Installer. Each unit will ~~and~~ include one tuber of Acceptable Plant Material~~,coir,~~ peat moss and pea gravel wrapped in a jute mat bag (specifications for the jute material are attached).~~sand media mix, as well as sandstone pea gravel. During installation, Planting Units will be secured with acceptable (non-plastic) skewers flush with surrounding grades.~~

3. If Installer proposes an alternate installation method, a description of the Planting Unit, its materials and installation procedures shall be included in the TEP.

D. Planting Area

1. Planting Areas are the locations at which SAV (*Vallisneria americana* [water celery]) will be planted as shown on the Drawings.

2. The areal extent of the planting area is identified in the Drawings. The Engineer or Engineer's Wetland Specialist will oversee the installation of the planting within the designated Planting Area. The actual specific locations of the plants will be approved by the Wetland Specialist.

E. SAV Planting Season

1. Spring Planting: SAV shall be planted between 15 May and 15 July, as directed by the Engineer.

F. Spring Re-plant

1. Replanting activity to be undertaken by the Contractor during the SAV Planting Season of the calendar year following initial SAV installation.

2. Dead, missing or damaged SAV, as identified during the Fall Plant Conditions Survey and the Warranty and Performance Criteria, below, shall be replaced and planted during the Spring Re-Plant.

G. Fall Plant Conditions Survey

1. Boat based plant condition survey conducted by the Contractor and attended by the Engineer. Fall Plant Conditions Survey timing and objectives as established in Section 3.03.

2. The Contractor provided monitoring vessel shall be equipped with appropriate provisions for the Engineer's Wetland Scientist and the Installer's Restoration Specialist to visually observe SAV within the entire Planting Area, from the monitoring vessel.

H. Post Construction Monitoring Event

1. Boat based plant condition survey conducted by the Contractor and attended by the Engineer. Post Construction Monitoring Event to be completed within 10 days of installation completion.

2. The Contractor provided monitoring vessel shall be equipped with appropriate provisions for the Engineer's Wetland Scientist and the Installer's Restoration Specialist to visually observe SAV within the entire Planting Area, from the monitoring vessel.

1.05 WARRANTY AND PERFORMANCE CRITERIA:

A. Warranty: Warranty the Plantings, for the indicated Warranty Period for SAV, as defined below, against defects including death and unsatisfactory growth.

1. Warranty Period for SAV: Warranty period shall be one year from date of Initial Approval. Release from the one-year warranty for the SAV restoration project is contingent upon the vegetation meeting the following Performance Criteria. Replacements will be guaranteed / warrantied to one additional growing season beyond the original one-year period.

B. Performance Criteria and Replacement

1. By the end of the first full growing season, SAV shall exhibit a minimum survival rate of 75 percent. Plantings not meeting the above survival rate shall be replaced immediately. Plantings not meeting the above survival rate which are identified during the Fall Plant Conditions Survey shall be replaced during the Spring Replant.

2. During the Spring Replant, replace plants that are more than 25 percent dead or in an unhealthy condition as directed by the Engineer, as based upon results of the Fall Plant Condition Survey Report

3. A limit of one replacement of each plant will be required, except for losses or replacements due to failure to comply with requirements.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Planting Units

1. Planting Units shall include one tuber of Acceptable Plant Material, peat moss and pea gravel wrapped in a jute mat bag (specifications for the jute material are attached). ~~biodegradable planting pot, coir, peat moss, sand media mix, and/or sandstone pea gravel. Detail regarding the specifications of the proposed materials shall be included in the Pre-application TEP.~~

2. Planting Units shall be placed using PVC tube to guide the pea gravel weighted plant unit to the desired location. ~~secured with acceptable skewers, as defined below. Skewers used to anchor and secure Planting Units will be fully inserted into the river bottom such that the anchoring device does not protrude above the sediment surface. No plastic is to be used. Detail regarding the proposed skewers shall be included in the Pre-application TEP.~~

3. ~~If alternate installation methodologies are proposed for SAV installation, specifics on the materials to be utilized shall be included in the TEP.~~

B. Submerged Aquatic Vegetation

1. SAV shall meet the specifications outlined in Table 02 91 00-01, below.

2. SAV shall be obtained from a northeastern U.S. nursery or laboratory stock, and shall be Acceptable Plant Material, as defined in Section 1.05.

3. Source of plant material shall be the northeastern United States

4. Source of plant material shall be submitted to the Engineer for approval.

5. SAV shall be handled and maintained appropriately throughout the delivery, storage and staging process to ensure that SAV is robust for planting and passes Engineer's Wetland Specialist's inspection. Planting Units shall be assembled and placed in onsite circulating water pools for at least 24 hours prior to installation.

6. Plants shall be free of insects and diseases.

7. All plant material delivered to the project shall be inspected to confirm they meet the definition of Acceptable Plant Material.

8. A minimum of 5% of the planting units in each delivery shall disassembled and be inspected to ensure they meet contract requirements.

9. If any planting unit fails to meet the contract requirements, all plant units in the delivery must be inspected.

C. All plant materials shall comply with state and federal laws with respect to inspection for plant diseases and insect infestations.

D. Each plant species shall be handled in a manner that is consistent with standard trade practice to ensure the arrival of the plants at the Project Site in good condition. Plants that do not meet the definition of acceptable plant material shall be rejected.

E. Means to anchor Planting Unit into substrate: Anchor material may not be metallic or plastic and must be able to remain intact for a minimum of 3 months. Anchor material shall be flush with or below the backfill surface with no above ground protrusions.

F. As part of the Spring Replant, and no later than one year from the date of initial installation (river conditions permitting), deceased planted stock must be replaced with the same size planted stock, based on the performance criteria.

PART 3 – EXECUTION

3.01 PROJECT SITE PREPARATION:

A. Project Site access shall be as specified in 01 14 00 Work Restrictions.

B. Provide the Engineer's Wetland Specialist with access to inspect plant material, field collection locations, nursery facilities, and attendance at monitoring events.

C. Maintain a staging area onsite to allow the assembled Planting Units to be placed into circulating water as noted in Section 2.01.B.5.

3.02 PLANTINGS:

A. Preparation for Planting

1. Assemble Planting Units: Contractor shall assemble Planting Units onsite. Planting Units shall contain elements noted in Part 1, Paragraph 1.04.C (i.e., SAV, Jute mat bag ~~biodegradable pot~~, appropriate planting matrix and pea gravel ~~, skewers, etc.~~) and shall be assembled in accordance with the drawings and specifications.

2. Provide adequate facilities for the protection and temporary storage of all plant material.

3. All plant material shall be stored and maintained in conditions and temperature similar to those in the Hudson River at the Site.

B. Planting Schedule

1. Planting Wild celery (*Vallisneria americana*), shall be conducted during the SAV Planting Season subject to modification based on field conditions with the approval of the Engineer.

C. Planting

1. Planting Units shall be installed at the locations and densities as shown on the Drawings.

a. The required planting density shown on the Drawings shall be used to determine the quantity of Planting Units to be installed within the Planting Area. SAV planting areas (Habitat 2) shall be planted with V*allisneria americana* (water celery) at one plant per approximately every 5.5 square feet.

b. The Planting Units shall be installed at an approximate uniform spacing throughout the Planting Area.

c. Planting Units installed beyond the boundaries of the Planting Area will not be counted towards the measurement and payment, and may be subject to removal.

2. *Vallisneria americana* (Wild celery):

a. Planting units will be dropped from a support boat through PVC tubes used to guide the plant to the required spacing. The tube will be set to create a small indent in the sediment surface at the planting unit location.

b. For monitoring purposes, each planting units will be fashioned with a length of biodegradable fluorescent flagging (see attached product sheet) to ensure that the plants are not drifting in the river current.

~~**a.** Dig a small hole by hand or using a hand-tool within the Restoration Cover layer~~

~~**b.** Place the Planting Unit in the small hole~~

~~**c.** Cover the roots and rhizomes with habitat layer cover material, leaving the shoots, leaves and stems protruding above the backfill surface~~

~~**d.**~~**c.** ~~Install anchoring device, flush with or below the backfill surface, to hold the roots and rhizomes in contact with the river bed.~~

D. Alternative spacing arrangements and transplanting techniques may be submitted to the Engineer for review and approval. At a minimum, any proposed alternative methods for Planting must provide for uniform, comparable, spatial coverage of the Planting Area, and adherence to water depth and plant embedment requirements.

E. The Contractor shall maintain the SAV Planting Area in the condition it was in when first installed and accepted. Monitoring and maintenance of planted areas shall begin immediately after installation of plants in that area, and shall continue through the Planting Season of the year of initial planting. A Fall Plant Conditions Survey monitoring

will be held at the end of the growing season, as outlined herein. No monitoring or maintenance is required for plants installed during the Spring Replant

F. Prior to the Notice of Initial Approval, the Contractor shall submit a detailed maintenance plan which includes a schedule showing the number of days personnel will be on Site, the type of Work to be performed, supervision, equipment and supplies to be used, response program with an identified responsible contact person, and inspection schedule. The detailed maintenance plan is subject to review and approval by the Engineer. The Engineer will not issue the Notice of Initial Approval until the Engineer has received and approved the maintenance plan.

G. The type, brand names, material safety data sheets, and rates of application for any proposed herbicides, pesticides, and fertilizers shall be submitted for approval with the detailed maintenance plan. Herbicides, pesticides, and fertilizers shall meet all local, state, and federal Regulations and shall be applied by a licensed applicator.

H. The Contractor shall document all landscape and irrigation maintenance activities including Work locations and time spent. The Contractor shall provide copies to the Engineer following completion of the work activities.

I. Post Construction Monitoring Events

1. A Post-Construction monitoring event of planted material shall occur within 10 days of completion of SAV installation.

2. The monitoring event shall include visual observations of the planted area from the shallow edge to the deep edge.

a. A minimum of three transects shall be traversed for each 0.25 acres of SAV or as directed by the Engineer.

b. The presence and condition of SAV shall be recorded, including the presence of any dead or diseased plants and non-native or invasive plants.

c. The Post Construction Monitoring Event results shall be Documented and submitted to the engineer as described in Section 1.03.

d. The Post Construction Monitoring Event vessel shall be equipped with means for the Engineer's Wetland Scientist and the Installer's Restoration Specialist to visually observe SAV within the entire Planting Area, from the monitoring vessel.

J. If non-native or invasive plants are observed in the Planting Areas, they shall be physically removed from all planting locations within seven days of the observation. Non-native plant species which may become established the project area include, but are not limited to:

Water Chestnut	*Trapa natans*
Yellow Floating Heart	*Nymphoides peltata*
Curly Pondweed	*Potamogeton crispus*
Eurasian Water Milfoil	*Myriophyllum spicatum*

K. Maintenance responsibilities include control of herbivores which threaten the establishment of the planting.

L. Notify the Engineer 48 hours prior to and following any maintenance activity.

M. Fall Plant Condition Survey:

1. A Fall Plant Condition Survey of all planted areas shall be completed on or before September 30 of the first growing season; earlier if the onset of plant senescence is observed.

2. The purpose of the Fall Plant Condition Survey is:

a. To define areas to be re-planted in the Spring Re-plant event based on contiguous areas where plants do not meet the acceptable plant material criteria.

b. To establish spring re- plant event quantities based on observed percent survival in each planted area.

3. The plant condition survey shall be conducted by the Contractor and attended by the Engineer

4. The monitoring event shall include visual observations of the planted area from the shallow edge to the deep edge.

a. A minimum of three transects shall be traversed for each 0.25 acres of SAV or as directed by the Engineer.

b. The presence and condition of SAV shall be recorded, including the presence of any dead or diseased plants and non-native or invasive plants.

c. The Fall Plant Conditions Survey results shall be Documented and submitted to the engineer as described in Section 1.03.

d. The Fall Plant Conditions Survey vessel shall be equipped with means for the Engineer's Wetland Scientist and the Installer's Restoration Specialist to visually observe SAV within the entire Planting Area, from the monitoring vessel.

5. If non-native or invasive plants are observed in the Planting Areas, they shall be physically removed from all planting locations within seven days of the observation.

3.03 SPRING REPLANT

A. A replanting effort will be conducted for areas not meeting the performance criteria established in Part 2, Paragraph 2.01 F. Spring Replanting areas and the required level of effort shall be established during the Fall Conditions survey. Plantings shall be

conducted in accordance with this specification and conducted in required replanting areas, as directed by the Engineer. No subsequent monitoring or maintenance is required for plants installed during the Spring Re-Plant.

~~A.~~B. Replanting will be conducted by placing the planting units in hand dug holes if the Engineer determines that the planting units placed as described above failed to establish because of inadequate contact with the sediment surface.

~~B.~~C. The spring replanting will be conducted during the Planting Season in the calendar year following initial planting, or as soon after as river conditions allow. .

END OF SECTION

SECTION 02 91 00-01 TABLE ATTACHED

SECTION 02 91 00

SUBMERGED AQUATIC VEGETATION

TABLE 02 91 00-01

SUBMERGED AQUATIC VEGETATION PLANTING SCHEDULE

Scientific Name	Common Name	Indicator Status	Number of Individuals	Area	Number of Bare-Root Plants	Number of Planting Units	Elevation Range
Vallisneria americana	Wild Celery	OBL	1 Planting Unit per 5.5 sf	57,000 sf	20,000	10,000	> -5 NAVD88