Fill type retaining walls are retaining structures constructed from the base of the wall to the top (i.e. “bottom-up” construction). Fill type retaining walls are further classified according to the basic mechanism of lateral load support. These classifications include internally stabilized fill structures and externally stabilized fill structures. The following definitions were developed to categorize an individual fill type retaining wall:

**a. Wall System.** A wall system is either (1) a series of open top face units assembled to form bins which are connected in unbroken sequence or (2) a combination of specific solid face units with a characteristic alignment and connection method, which utilize the weight of the wall system elements and the weight of the infill to resist lateral soil pressure. For open top face units, the bin volume is infilled with backfill material to supplement the face unit geometry, adding to the stability of the system.

**b. Internally Stabilized Wall System.** A wall system which, when constructed beyond wall heights exceeding the maximum allowable unreinforced height per the Approved List, relies on reinforcing elements within the backfill to provide stability.

**c. Internally Stabilized Earth System.** A series of tensile reinforcing elements which, when placed in multiple layers within the backfill volume, improves the strength such that the vertical face of the stabilized earth volume is essentially self supporting.

**Geosynthetically Reinforced Soil System (GRSS)**

A GRSS (formerly known as “GRES”) is an internally stabilized fill structure comprised of earth backfill, geosynthetic reinforcing elements used for internal stabilization and surface protection to resist erosion. GRSS is not a proprietary system and will be designed and detailed in the contract documents by the Department or its representatives.

**a. GRSS Wall.** For wall applications, the surface protection is the permanent facing elements (excluding precast units) or a geotextile face wrap which typically includes welded wire forms remaining from the installation operation.

**b. GRSS Slope.** For slope applications, the surface protection consists of a secondary reinforcing element to aid in stability of the slope face between primary reinforcing layers. To protect against erosion, the GRSS slope is covered by either a non-degradable erosion control mat or a granular fill slope protection blanket.

**Proprietary Walls**

Proprietary retaining wall systems are vendor designed retaining wall systems that are protected by specific patents that make them unique from other retaining wall systems. Because putting an unnecessary limit on the number of competitors is essentially unfair and can potentially lead to higher prices, the policy of both the federal government and the State is not to use proprietary specifications. Therefore, the Department has compiled all approved proprietary fill type retaining walls on a single Approved List to allow the Contractor the ability to select any system, based on the maximum wall height and any Special Notes identified in the contract documents.

Proprietary Fill Type Retaining Walls include:

**a. Prefabricated Wall System (PWS).** A PWS is an externally stabilized fill structure comprised of prefabricated face units & coping units, leveling pads, unit infill, earth backfill, joint filler material and geotextile, and a subsurface drainage system to reduce hydrostatic pressure on the wall system. Prefabducted wall units may be drycast or precast concrete.

**b. Mechanically Stabilized Wall System (MSWS).** When reinforcement is introduced to a PWS, they shall be reclassified as Mechanically Stabilized Wall System.
c. Mechanically Stabilized Earth System (MSES). An MSES is an internally stabilized fill structure comprised of an unreinforced concrete leveling pad, precast concrete face panel units and coping units, earth backfill, subsurface drainage system, and reinforcing elements used to stabilize the backfill.

All approved proprietary fill type retaining walls have been identified on the Approved List. The Contractor has the option of selecting the particular wall system to be installed based on the maximum wall height and any Special Notes identified in the contract documents.

The Fill Type Retaining Wall specification identifies a default treatment for the finished face of the chosen wall system. Aesthetic treatments applied to the face either during or after the manufacture of the units to modify the appearance of the units and of the wall as a whole may be identified in the contract documents and paid for under a separate item.

GENERAL REQUIREMENTS – GRSS

Geosynthetically Reinforced Soil System (GRSS) are earthen structures that rely on the reinforced backfill behind the wall facing or slope rolled erosion control product for their structural stability. Proper compaction of the backfill is of paramount importance in the construction of these systems.

GRSS Walls: Guidelines for the placement and inspection of welded wire faced GRSS walls:

1. Prepare the foundation soil under the area of the proposed GRSS in accordance with §203-3.03 A. Embankment Foundation.

2. Place the welded wire forms to the line and grade identified in the contract documents. Overlap the forms a minimum of 2 in. and wire tie together.

- Geogrid as Primary Reinforcement:

3. Verify that the manufacturer’s certified geogrid strength meets the strength requirements identified in the contract documents. Cut the geogrid reinforcement of sufficient overall length to ensure that the required embedment length is met. Place the primary geogrid reinforcement perpendicular to the face in continuous strips cut to the required embedment length.

4. Cut the geotextile face wrap to ensure that the required length of embedment at the top and bottom of the reinforced layer is met. Place the geotextile so that it conforms to the inside of the form (maintaining the required length of embedment along the bottom of the reinforced layer). Fold the wrap over the form to allow backfill placement.

5. Butt adjacent reinforcement strips side by side without overlap. Remove slack from the reinforcement and anchor in place (using staples, pins, and bags, small mounds of backfill, etc.). Do not operate tracked equipment directly on the reinforcement. Provide a minimum 6 in. thick layer of backfill between tracked equipment and the reinforcement.

6. Install the wire struts at a minimum 2 ft. spacing to provide added stiffness to the forms. Cut small slits in the geotextile to allow the installation of the struts. Hook the struts to the bottom and face of the welded wire forms.

7. Place and compact the GRSS backfill until the required thickness between
reinforcements is achieved. To prevent movement and/or distortion of the GRSS face, do not use heavy compaction equipment within 3 ft. of the face. Compact the 3 ft. of backfill directly behind the GRSS face using hand compaction equipment. To achieve the required degree of compaction, the lift thicknesses in this zone may have to be reduced. In order to maintain a near vertical and in-line GRSS face, the compacted backfill should be level and to the top of the face unit prior to installing the succeeding face units. Backfill should be compacted to 95% Standard Proctor.

8. Fold the geotextile face wrap over the compacted backfill and repeat steps 2 through 8 as required to reach the final design height.

9. Refer to Standard Sheet No. 554-02 for additional construction details of GRSS Walls. Note different facing systems may have unique attachment details.

- Geotextile as Primary Reinforcement:
  3. Verify that the manufacturer’s certified geotextile strength meets the strength requirements identified in the contract documents. Cut the geotextile reinforcement of sufficient overall length to ensure that the required embedment length, face wrap length, and the 2 ft. return length at the top of the layer is met. Place the geotextile reinforcement perpendicular to the face in continuous strips maintaining the required embedment length.

  4. Wrap the excess geotextile along the inside of the form (maintaining the required length of embedment along the bottom of the reinforced layer). Fold the wrap over the form to allow backfill placement.

  5. Butt adjacent reinforcement strips side by side without overlap. Remove slack from the reinforcement and anchor in place (using staples, pins, and bags, small mounds of backfill, etc.). Do not operate tracked equipment directly on the reinforcement. Provide a minimum 6 in. thick layer of backfill between tracked equipment and the reinforcement.

  6. Install the wire struts at a minimum 2 ft. spacing to provide added stiffness to the forms. Cut small slits in the geotextile to allow the installation of the struts. Hook the struts to the bottom and face of the welded wire forms.

  7. Place and compact the GRSS backfill until the required thickness between reinforcements is achieved. To prevent movement and/or distortion of the GRSS face, do not use heavy compaction equipment within 3 ft. of the face. Compact the 3 ft. of backfill directly behind the GRSS face using hand compaction equipment. To achieve the required degree of compaction, the lift thicknesses in this zone may have to be reduced. In order to maintain a near vertical and in-line GRSS face, the compacted backfill should be level and to the top of the face unit prior to installing the succeeding face units. Backfill should be compacted to 95% Standard Proctor.

  8. Fold the excess geotextile over the compacted backfill and repeat steps 2 through 8 as required to reach the final design height.

  9. Refer to Standard Sheet No. 554-02 for additional construction details of GRSS Walls. Note different facing systems may have unique attachment details.

GRSS Slopes: Guidelines for the placement and inspection of GRSS slopes:
1. Prepare the foundation soil under the area of the proposed GRSS in accordance with §203-3.03 A. *Embankment Foundation*.

2. Verify that the manufacturer’s certified geosynthetic strength meets the strength requirements identified in the contract documents. Cut the primary geosynthetic reinforcement of sufficient overall length to ensure that the required embedment length is met.

3. Place the reinforcement strips perpendicular to the slope face, maintaining the required embedment length. Butt adjacent reinforcement strips side by side without overlap. Remove slack from the reinforcement and anchor in place (using staples, pins, and bags, small mounds of backfill, etc.). Do not operate tracked equipment directly on the reinforcement. Provide a minimum 6 in. thick layer of backfill between tracked equipment and the reinforcement.

4. Place and compact the GRSS slope backfill until the elevation of the secondary geosynthetic reinforcement is reached.

5. To aid in compaction and to provide additional stability at the slope face, secondary geosynthetic reinforcement is incorporated in the fills between the primary reinforcement. The secondary reinforcement is placed in a continuous sheet, rolled out parallel to the slope face and typically embedded 4 ft. into the fills. To achieve the required degree of compaction, the lift thicknesses in this zone may have to be reduced. Continue backfill and secondary reinforcement placement until the next level of primary reinforcement is reached.

6. Repeat steps 2 through 5 as required to reach the final design height.

7. Place topsoil and seed as identified in the contract documents. Place rolled erosion control product over the slope and secure in accordance with the manufacturers recommendations.

8. Refer to Standard Sheet No. 554-02 for additional construction details of GRSS Slopes.

**GENERAL REQUIREMENTS – Proprietary Walls**

**PWS:** Guidelines for the placement and inspection of PWS:

Prefabricated Wall System (PWS) are wall systems which depend on its weight to achieve stability. In addition, some systems rely on a frictional component between the wall unit and infill material to aid in their structural stability. Proper compaction of the backfill is of paramount importance in the construction of these walls.

1. Obtain the Installation Manual from the chosen wall designer. This is part of the design package submitted by the Contractor for review and approval of the chosen wall system.

**MSWS:** Guidelines for the placement and inspection of MSWS:

Mechanically Stabilized Wall System (MSWS) are wall systems that rely on the reinforced backfill behind the wall units for their structural stability. Proper compaction of the backfill is of paramount importance in the construction of these walls.

1. Obtain the Installation Manual from the chosen wall designer. This is part of the design package submitted by the Contractor for review and approval of the chosen wall system.
MSES: Guidelines for the placement and inspection of MSES:

Mechanically Stabilized Earth System (MSES) are earthen structures that rely on the reinforced backfill behind the wall panels for their structural stability. Proper compaction of the backfill is of paramount importance in the construction of these walls.

1. Obtain the Installation Manual from the chosen wall designer. This is part of the design package submitted by the Contractor for review and approval of the chosen wall system.

2. See the Geotechnical Engineering Bureau, Geotechnical Engineering Manual GEM-16, MECHANICALLY STABILIZED EARTH SYSTEM INSPECTION MANUAL, for guidance on installation and backfilling MSES.

PROJECT PROCEDURES

The Contract Sampling and Testing Requirements in SiteManager had to be modeled in a very generic way. Every Material for each type of system (GRSS, MSES, etc.) is associated to each 554.3xx, 554.4x and 554.50xx Item. Based on the Contract Documents and/or Contractor’s option, many Materials can be “turned off” (CF = 0). The chart below, and the Special Instructions in the Contract Sampling and Testing window will assist in knowing which materials to turn off and which to leave on.

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<th>554.3001</th>
<th>554.3002</th>
<th>554.3003</th>
<th>554.3004</th>
<th>554.31</th>
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<td>ON</td>
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<tr>
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<tr>
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NOTE:  
ON means Conversion Factor = 1.0
OFF means Conversion Factor = 0.0
### Material Acceptances for Fill Type Retaining Walls 554.4x

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<tr>
<th>MATL_CD</th>
<th>Material Name</th>
<th>Type</th>
<th>MSES</th>
<th>MSWS</th>
<th>PFWS</th>
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<td>703-02CA2</td>
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<tr>
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<td>Cushion Sand</td>
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<td>704-0620</td>
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<tr>
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<td>Segmental Retaining Wall Block</td>
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<td>ON</td>
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<tr>
<td>704-1420</td>
<td>Precast Concrete Panel Units-MSES</td>
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<td>ON</td>
<td>ON</td>
</tr>
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<td>709-0200</td>
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<tr>
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<tr>
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### Material Acceptances for Fill Type Retaining Wall Aesthetic Treatment 554.50xx

<table>
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<th>MATL_CD</th>
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<td>Precast Conc. Cribbing - Modular Walls</td>
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<td>704-0710</td>
<td>Segmental Retaining Wall Block</td>
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<tr>
<td>704-1420</td>
<td>Precast Concrete Panel Units-MSES</td>
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**NOTE:**

- **ON** means Conversion Factor = 1.0
- **OFF** means Conversion Factor = 0.0

For Projects with 554.50xx Items, leave the Material Requirements turned "on" for the Aesthetic Treatment Item(s) and turn "off" those Materials in the Wall Item(s), 554.4x.
SECTION 554 – FILL TYPE RETAINING WALLS

PROJECT PROCEDURES – GRSS

GRSS Walls:

The following guidelines pertain to the inspection of backfill material.

1. The Engineer confirms the source of the GRSS wall backfill material. Record the material source on DWR in SiteManager. The Engineer shall request approval of the source from the Regional Geotechnical Engineer.

   A. GRSS wall backfill material does not require stockpiling. However, a Contractor may choose to stockpile this item, and if so, that material will be sampled, tested and evaluated as a stockpiled item. If the Contractor elects to stockpile GRSS wall backfill material, the EIC and RGE should inspect the construction of the stockpile(s) to assure that it is constructed according to Departmental requirements (Reference: GCP-17 Procedure for the Control and Quality Assurance of Granular Materials). Record the material source and stockpile construction features on DWR in SiteManager. Final approval of the stockpile is requested and obtained from the RGE. The RGE will supervise the sampling and arrange for the testing of stockpiles. Test results will be reported on Form SM-454 “GRANULAR MATERIAL DOCUMENTATION FORM.” The Inspector shall record in SiteManager.

   B. Non-stockpiled GRSS wall backfill material, which require soundness and plasticity index determinations, will be sampled by the RGE for testing in accordance with established Departmental procedures. Test results will be returned on Form SM-454, “GRANULAR MATERIAL DOCUMENTATION FORM”. For projects that obtain material from sources which were tested under other projects, a copy of a letter approving transfer from the RGE, as well as a copy of the original SM-454, shall be in SiteManager.

2. GRSS wall backfill material requires conformance to a particular gradation. Therefore, sieve tests shall be performed by earthwork inspection personnel in accordance with Departmental instructions (Reference: GTM-20 Test Method for the Grain Size Analysis of Granular Soil Materials) and reported in SiteManager/LIMS.

3. The major controls of granular backfill placement are lift thickness, moisture content, compactive effort and density requirements. Maximum lift thickness and moisture content are stated in the specification.

4. Compactive effort depends on the compaction equipment supplied by the Contractor. A current list of evaluated compaction equipment is available from the Regional Geotechnical Engineer. For assistance in evaluating compaction equipment that is not on the current list, call the Geotechnical Engineering Bureau. Minimum effort, however, is also stated in the specification. The Inspector shall document on DWR in SiteManager the equipment used for the compaction, the number of passes applied and the thickness of the lift prior to compaction, and if the Contractor applied water to the lift.

5. Moisture content is specified as being less than, or equal to, the Optimum Moisture Content. The Optimum Moisture Content shall be determined in accordance with GTM-9 / 10,
incorporate moisture content determination. The Regional Geotechnical Engineer can specify appropriate test(s).

6. Minimum densities shall be verified with compaction control tests performed on the job by the project’s earthwork inspection personnel. These tests shall be performed in conformance with the procedures contained in GTM-9 / 10.

7. Test results shall be documented in SiteManager/LIMS. Retests of previously failing tests should be cross referenced to the original tests.

8. **Density** requirements will be determined by the specification.

**GRSS Slopes:**

The following guidelines pertain to the inspection of backfill material.

1. GRSS slope backfill material need not come from an approved source. Record the material source on DWR in SiteManager.

   A. GRSS slope backfill material does not require stockpiling. However, a Contractor may choose to stockpile this item, and if so, that material will be sampled, tested and evaluated as a stockpiled item. If the Contractor elects to stockpile GRSS slope backfill material, the EIC and RGE should inspect the construction of the stockpile(s) to assure that it is constructed according to Departmental requirements (Reference: GCP-17 Procedure for the Control and Quality Assurance of Granular Materials). Record the material source and stockpile construction features on DWR in SiteManager. Final approval of the stockpile is requested and obtained from the RGE. The RGE will supervise the sampling and arrange for the testing of stockpiles. Test results will be reported on Form SM-454 "GRANULAR MATERIAL DOCUMENTATION FORM." The Inspector shall record in SiteManager.

2. **GRSS material** requires conformance to a particular gradation. Therefore, sieve tests shall be performed by earthwork inspection personnel in accordance with Departmental instructions (Reference: GTM-20 Test Method for the Grain Size Analysis of Granular Soil Materials) and reported in SiteManager/LIMS.

3. The major controls for granular backfill placement are lift thickness, moisture content, compactive effort and density requirements. Maximum lift thickness and moisture content are stated in the specification.

4. Compactive effort depends on the compaction equipment supplied by the Contractor. A current list of evaluated compaction equipment is available from the Regional Geotechnical Engineer. For assistance in evaluating compaction equipment that is not on the current list, call the Geotechnical Engineering Bureau. Minimum effort, however, is also stated in the specification. The Inspector shall document on DWR in SiteManager the equipment used for the compaction, the number of passes applied and the thickness of the lift prior to compaction, and if the Contractor applied water to the lift.

5. Moisture content is specified as being less than, or equal to, the Optimum Moisture Content.
The Optimum Moisture Content shall be determined in accordance with GTM-9 / 10, which incorporate moisture content determination. The Regional Geotechnical Engineer can specify appropriate test(s).

6. Minimum densities shall be verified with compaction control tests performed on the job by the project’s earthwork inspection personnel. These tests shall be performed in conformance with the procedures contained in GTM-9 / 10.

7. Test results shall be documented in SiteManager/LIMS. Retests of previously failing tests should be cross referenced to the original tests.

8. Density requirements will be determined by the specification.

PROJECT PROCEDURES – Proprietary Walls

PWS:

The following guidelines pertain to the inspection of PWS backfill material.

1. The Engineer confirms the source of the PWS material. Record the material source on DWR in SiteManager. The Engineer shall request approval of the source from the Regional Geotechnical Engineer.

A. PWS backfill material does not require stockpiling. However, a Contractor may choose to stockpile this item, and if so, that material will be sampled, tested and evaluated as a stockpiled item. If the Contractor elects to stockpile PWS material, the EIC and RGE should inspect the construction of the stockpile(s) to assure that it is constructed according to Departmental requirements (Reference: GCP-17 Procedure for the Control and Quality Assurance of Granular Materials). Record the material source and stockpile construction features on DWR in SiteManager. Final approval of the stockpile is requested and obtained from the RGE. The RGE will supervise the sampling and arrange for the testing of stockpiles. Test results will be reported on Form SM-454 “GRANULAR MATERIAL DOCUMENTATION FORM.” The Inspector shall record in SiteManager.

B. Non-stockpiled PWS backfill material, which require soundness and plasticity index determinations, will be sampled by the RGE for testing in accordance with established Departmental procedures. Test results will be returned on Form SM-454, "GRANULAR MATERIAL DOCUMENTATION FORM”. For projects that obtain material from sources which were tested under other projects, a copy of a letter approving transfer from the RGE, as well as a copy of the original SM-454, shall be in SiteManager.

2. PWS material requires conformance to a particular gradation. Therefore, sieve tests shall be performed by earthwork inspection personnel in accordance with Departmental instructions (Reference: GTM-20 Test Method for the Grain Size Analysis of Granular Soil Materials) and reported in SiteManager.

3. The major controls of granular backfill placement are lift thickness, moisture content, compactive effort and density requirements. Maximum lift thickness and moisture content are stated in the specification.
4. Compactive effort depends on the compaction equipment supplied by the Contractor. A current list of evaluated compaction equipment is available from the Regional Geotechnical Engineer. For assistance in evaluating compaction equipment that is not on the current list, call the Geotechnical Engineering Bureau. Minimum effort, however, is also stated in the specification. The Inspector shall document on DWR in SiteManager the equipment used for the compaction, the number of passes applied and the thickness of the lift prior to compaction, and if the Contractor applied water to the lift.

5. Moisture content is specified as being less than, or equal to, the Optimum Moisture Content. The Optimum Moisture Content shall be determined in accordance with GTM-9 / 10, which incorporate moisture content determination. The Regional Geotechnical Engineer can specify appropriate test(s).

6. Minimum densities shall be verified with compaction control tests performed on the job by the project’s earthwork inspection personnel. These tests shall be performed in conformance with the procedures contained in GTM-9 / 10.

7. Test results shall be documented in SiteManager. Retests of previously failing tests should be cross referenced to the original tests.

8. Density requirements will be determined by the specification.

MSWS:

The following guidelines pertain to the inspection of MSWS backfill material.

1. The Engineer inspects the construction of stockpiles. Record the material source and stockpile construction features on DWR in SiteManager. Request approval of the stockpile from the Regional Geotechnical Engineer in accordance with GCP-17, GEOTECHNICAL CONTROL PROCEDURE Procedure for the Control and Quality Assurance of Granular Materials. Inspection of the construction of stockpiles may also be performed by the Regional Geotechnical Engineer.

2. The Regional Geotechnical Engineer will supervise the sampling and arrange for the testing of the stockpiles. Test results will be reported on Form SM-454 "GRANULAR MATERIAL DOCUMENTATION FORM." The Inspector shall record on DWR in SiteManager that only material from an approved source or stockpile is incorporated into the project.

3. Additionally, acceptance/rejection of the stockpile as MSWS backfill will be reported in a letter from the Director of the Geotechnical Engineering Bureau.

4. Obtain the delivery tickets for the supply of the backfill material and record them in SiteManager.

5. The major controls of granular backfill placement are lift thickness, moisture content, compactive effort and density requirements. Maximum lift thickness and moisture content are stated in the specification.
6. Compactive effort depends on the compaction equipment supplied by the Contractor. A current list of evaluated compaction equipment is available from the Regional Geotechnical Engineer. For assistance in evaluating compaction equipment that is not on the current list, call the Geotechnical Engineering Bureau. Minimum effort, however, is also stated in the specification. The Inspector shall document on DWR in SiteManager the equipment used for the compaction, the number of passes applied and the thickness of the lift prior to compaction, and if the Contractor applied water to the lift.

7. Moisture content is specified as being less than, or equal to, the Optimum Moisture Content. The Optimum Moisture Content shall be determined in accordance with GTM-9/10, which incorporate moisture content determination. The Regional Geotechnical Engineer can specify appropriate test(s).

8. Minimum densities shall be verified with compaction control tests performed on the job by the project’s earthwork inspection personnel. These tests shall be performed in conformance with the procedures contained in GTM-9/10.

9. Test results shall be documented in SiteManager. Retests of previously failing tests should be cross referenced to the original tests.

10. For rock backfill, the major controls are lift thickness and compaction. Maximum lift thickness is stated in the specification. The lift thickness shall be recorded on DWR in SiteManager.

11. Density requirements will be determined by the specification.

MSES:

The guidelines outlined for the inspection of MSWS backfill material also pertain to the inspection of MSES backfill material.

EVIDENCE OF ACCEPTABILITY – GRSS

GRSS Walls:

1. Compliance with all specification requirements for the item(s) involved, as well as conformance to the pertinent Departmental procedures manuals.

2. Geogrid/Geotextile material certification in compliance with the specification, including an evaluation that the information on the material certification meets the minimum requirements stated in the contract documents. The acceptance of the material shall be documented on the DWR in SiteManager.

   A. Geogrid as Primary Reinforcement: Material for the geotextile face wrap shall be accompanied with certification that the material conforms to the specification and that it is the same one appearing on the Approved List for Geotextile Separation. Each roll of material shall be properly identified either by a label on the geosynthetic or the container. The container may be either the cover wrapping or the core around which the geosynthetic is rolled. If the material is not labeled, it shall be rejected immediately. No attempt should be made to identify unlabeled material.

3. Source approval documentation and test results identifying successful completion of
the field gradation tests and compaction tests, reported in SiteManager.

4. **Material certification of facing system materials** in accordance with the contract documents.

5. **Material certification of the** drainage system components including test results of the stockpile evaluation (Form SM-454, "GRANULAR MATERIAL DOCUMENTATION FORM") for the underdrain filter material and material certification for the geotextile drainage fabric stating it conforms to the specification and that it is the same one appearing on the Approved List for Geotextile Drainage.

6. **Installation of the identification markers including positioning of the sign and burial of the marking tape.**

**GRSS Slopes:**

1. Compliance with all specification requirements for the item(s) involved, as well as conformance to the pertinent Departmental procedures manuals.

2. Geogrid/Geotextile material certification in compliance with the specification, including an evaluation that the information on the material certification meets the minimum requirements stated in the contract documents. The acceptance of the material shall be documented on the DWR in SiteManager.

3. **Test results identifying** successful completion of the field gradation tests and compaction tests, reported in SiteManager.

4. **Material certification** for the rolled erosion control product stating it conforms to the specification and that it is the same one appearing on the Approved List for Class III, Type C.

5. **Material certification of the** drainage system components including test results of the stockpile evaluation (Form SM-454, "GRANULAR MATERIAL DOCUMENTATION FORM") for the underdrain filter material and material certification for the geotextile drainage fabric stating it conforms to the specification and that it is the same one appearing on the Approved List for Geotextile Drainage.

6. **Installation of the identification markers including positioning of the sign and burial of the marking tape.**

**EVIDENCE OF ACCEPTABILITY – Proprietary Walls**

**PWS:**

1. Compliance with all specification requirements for the item(s) involved, as well as conformance to the pertinent Departmental procedures manuals.

2. **Contractors chosen system appears on the Approved List and** conforms to the specification and contract document requirements.

3. **Design package approval for the chosen system.**
4. Source approval documentation and test results identifying successful completion of the field gradation tests and compaction tests, reported in SiteManager.

5. Material certification for the geotextile fabric stating it conforms to the specification and that it is the same one appearing on the Approved List for Geotextile Separation.

6. Material certification of the drainage system components including test results of the stockpile evaluation (Form SM-454, "GRANULAR MATERIAL DOCUMENTATION FORM") for the underdrain filter material, material certification for the geotextile drainage fabric stating it conforms to the specification and that it is the same one appearing on the Approved List for Geotextile Drainage, and material certification for the prefabricated composite structural drain stating it conforms to the specification and that it is the same one appearing on the Approved List for PCSD.

7. Aesthetic treatment approval for the chosen system.

MSWS:

1. Compliance with all specification requirements for the item(s) involved, as well as conformance to the pertinent Departmental procedures manuals.

2. Contractors chosen system appears on the Approved List and conforms to the specification and contract document requirements.

3. Design package approval for the chosen system.

4. Reinforcing element material certification in compliance with the specification, including an evaluation that the information on the material certification meets the minimum requirements stated in the contract documents. The acceptance of the material shall be documented on the DWR in SiteManager.

5. Stockpile test results (SM-454, "GRANULAR MATERIAL DOCUMENTATION FORM") and, when applicable, a copy of the letter approving stockpile transfer, as well as the original SM-454. A copy of the letter from the Director of the Geotechnical Engineering Bureau specifying the acceptance/rejection of the stockpile as MSWS backfill material.

6. Test results identifying successful completion of the field gradation tests and compaction tests, reported in SiteManager.

7. Material certification for the geotextile fabric stating it conforms to the specification and that it is the same one appearing on the Approved List for Geotextile Separation.

8. Material certification of the drainage system components including test results of the stockpile evaluation (Form SM-454, "GRANULAR MATERIAL DOCUMENTATION FORM") for the underdrain filter material, material certification for the geotextile drainage fabric stating it conforms to the specification and that it is the same one appearing on the Approved List for Geotextile Drainage, and material certification for the prefabricated composite structural drain stating it conforms to the specification and that it is the same one appearing on the Approved List for PCSD.
9. Delivery tickets – Each delivery ticket shall identify the Suppliers name, Suppliers granular source number (GSN), date, NYSDOT contract number, stockpile number, and item number.

10. Aesthetic treatment approval for the chosen system.

11. Installation of the identification markers including positioning of the sign and burial of the marking tape.

MSES:

The Evidence of Acceptability outlined for MSWS also pertain to MSES. In addition, the reinforcing element (4.) associated with each approved wall system shall appear on the Department’s Approved List under wall system components.

REFERENCES – GRSS


REFERENCES – Proprietary Walls


Geotechnical Engineering Bureau website: https://www.dot.ny.gov/divisions/engineering/technical-services/geotechnical-engineering-bureau

MSES:
SECTION 554 – FILL TYPE RETAINING WALLS


Section 5: Retaining Walls in the Standard Specifications for Highway Bridges, Adopted by the American Associations of State Highway and Transportation Officials (AASHTO).