

## **PART 1 - GENERAL**

### **1.1 WORK INCLUDED**

- .1 This Section specifies requirements for supplying and installing segmental retaining walls as indicated on the Project Documents. Although the Specifications and Design indicate a cast-in-place retaining wall, pre-cast retaining structures are also acceptable for this project.

### **1.2 REFERENCE STANDARDS**

- .1 ASTM C1372-09, Standard Specifications for Dry Cast Segmental Retaining Wall Units.
- .2 ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12400 ft-lbs/ft<sup>3</sup> or 600 kN m/m<sup>3</sup>).
- .3 National Concrete Masonry Association (NCMA) Design Manual for Segmental Walls, Second Edition.
- .4 ASTM C 260-01, Standard Specification for Air-Entraining Admixtures for Concrete.
- .5 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1/A23.2-2009, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard practices for Concrete.
  - .2 CSA-A23.3-04, Design of Concrete Structures.
  - .3 CSA-A23.4-09, Precast Concrete - Materials and Construction.
  - .4 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3304 and A3005). Includes update No.1(2009).
    - .1 CSA-A3001-03, Cementitious Materials for Use in Concrete.
  - .5 Precast/Prestressed Concrete Institute:
    - .1 PCI-MNL-116, Manual for Quality Control for Plants and Production of Structural Precast Concrete Products, 4th Edition.

### **1.3 PROTECTION**

- .1 Prevent damage to buildings, landscaping, fences, adjacent property and all other items designated to remain.

### **1.4 DELIVERY AND STORAGE**

- .1 Check materials upon delivery to assure proper material have been received and are in good condition.
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- .2 Prevent excessive mud, wet cement, and like material from coming in contact with the materials.
- .3 Protect materials from damage and deterioration from excessive moisture, temperature changes, contaminants, breaking, chipping or other causes. Do not incorporate damaged materials into the project. Promptly remove damaged units from the site.

### **1.5 ALLOWABLE TOLERANCES**

- .1 Finish top of wall surfaces to within 25mm of specified elevations and locations, and within a tolerance of 12mm for both top and face surfaces when measured under a 3 m long straightedge.

### **1.6 SHOP DRAWINGS**

- .1 Provide stamped engineered shop drawings in accordance with Section 01 10 00. Include the engineered design for the fence connection to the segmental retaining wall.

## **PART 2 - PRODUCTS**

### **2.1 SEGMENTAL WALL UNITS**

- .1 All walls to be produced by a licensed manufacturer.
  - .2 Block wall units shall have minimum 2.2 day compressive strength in accordance with ASTM C1372 for the climate in which it is intended to be constructed.
  - .3 Exterior dimensions of blocks to be uniform and consistent. Maximum dimensional deviations shall be 1%, not including textured face.
  - .4 Fill contained within the units may be considered 80% effective weight.
  - .5 Maximum width (face to back) deviation including textured face, shall be 25mm.
  - .6 Exterior face texture and colour to be indicated in the Project Documents or as selected by Departmental Representative. Other surfaces to be smooth form type.
  - .7 Segmental wall must meet a minimum CL-625 truck load condition. Wall with genset load to be designed once exact genset model is selected.
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- .8 Acceptable products are as follows:
  - .1 Redi-Rock
  - .2 Allan Block
  - .3 Pisa 2

## **2.2 GEOTEXTILE FILTER**

- .1 As per specification section 31 32 19.01 and as required by manufacturer.

## **2.3 GEOGRID REINFORCEMENT**

- .1 As per manufacturer's requirements.

## **2.4 INFILL SOIL**

- .1 Infill material shall be site excavated soils or imported materials as approved by the Geotechnical Engineer unless otherwise specified in the Project Documents. Unsuitable soils for backfill (heavy clays or organic soils) shall not be used in the reinforced soil mass. Typically clay soils with high plasticity will not be acceptable, unless specifically addressed by the Geotechnical Engineer.
- .2 The infill soil used must meet or exceed the designed friction angle and description noted on the design cross-section, and must be free of debris.
- .3 Where additional fill is required, submit samples and specifications to the Engineer for approval.

## **PART 3 - EXECUTION**

### **3.1 SOIL PREPARATION**

- .1 Complete excavation in accordance with Project Documents.
  - .2 Ensure actual foundation soil strength meets or exceeds assumed design strength.
  - .3 Remove and replace soil not meeting the required strength with acceptable material. Compact to a minimum 98% Standard Proctor Density in accordance with ASTM D698.
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### **3.2 BASE**

- .1 Place base materials as shown in the Project Documents. Top of base shall allow bottom wall units to be buried to the proper depths according to wall heights and Project Documents.
- .2 Compact base to 95% of Standard Proctor Density as per ASTM D698. Construct base to ensure proper wall embedment and the final elevations indicated. Well-graded sand can be used to smooth the top 13mm on the base of the material.
- .3 Base material shall be a 100mm minimum depth for walls under 1.2m and a 150mm minimum depth for walls over 1.2m or as specified in Project Documents.

### **3.3 UNIT INSTALLATION**

- .1 Segmental retaining wall is to be designed in accordance with recommendations of the NCMA Design Manual for Segmental Retaining Walls, Latest Edition.
  - .2 The first course of wall units shall be placed on the prepared base as specified in Project Documents. Check units for level and alignment.
  - .3 Ensure units are in full contact with the base. Proper care shall be taken to develop straight lines and smooth curves on base course as per wall layout.
  - .4 Fill and compact all cavities in and around the base row with wall rock approved by the Engineer. Backfill in front and back of the base row. Check again for level and alignment. Sweep excess granular material from the top of the level of blocks prior to placing next row of blocks.
  - .5 Install next course of wall units on top of base row. Position blocks as specified in Project Documents and backfill in 300mm uniform depths and compact to 95% of Standard Proctor density, in accordance with ASTM D698, behind the consolidation.
  - .6 Consolidation zone: 1m behind the wall or as indicated in Project Documents. Compaction is accomplished with hand operated compactor until the entire consolidation zone is compacted. Final compaction requirements to be determined by Geotechnical Engineer.
  - .7 Lay each subsequent row of blocks in a like manner as stated above. Repeat procedure to the extent of wall height.
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### **3.4 PROTECTION**

- .1 Protect and maintain work of this Section including accessories, until acceptance of project work.

### **3.5 ADJUSTMENT AND CLEANING**

- .1 Replace units that are defective. Immediately remove from site defective and damaged materials. Replace, repair, re-finish, according to Departmental Representative's approval.