

Item No. 414S
Concrete Retaining Walls

414S.1 Description

This item shall govern reinforced Portland cement concrete precast or cast-in-place retaining walls constructed in conformity with the lines, grades and details indicated on the Drawings or as directed by the Engineer or designated representative.

When indicated on the drawings or directed by the Engineer or designated representative, this item shall also govern any requirements for pumping, bailing, drainage and/or protection of workers in trenches in compliance with Standard Specification Item No. 509S, "Excavation Safety Systems".

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses.

414S.2 Submittals

The submittal requirements of this specification item may include:

- A. Type of concrete
- B. Reinforcing steel type, size, area, lengths
- C. Joint sealants and fillers type, manufacturer, fact sheets and application recommendations.
- D. Curing compound: manufacturer, type compound material, batch number or symbol and appropriate fact sheets
- E. Filter fabric manufacturer, fact sheets and test results.
- F. Select Backfill source, gradation and test results.
- G. Type and manufacturer of waterstops

414S.3 Materials

A. Concrete

Cast-in-place Portland cement concrete shall conform to the requirements of a Class C Concrete, as specified in Standard Specification Item No. 403S, "Concrete For Structures". Precast Portland cement concrete shall conform to the requirements of Standard Specification Item No. 403S, "Concrete for Structures" but shall have a minimum 28 day compressive strength of 4500 psi (31027 kPa).

B. Reinforcing Steel

Reinforcing steel shall conform to Standard Specification Item No. 406S, "Reinforcing Steel".

C. Joint Sealants and Fillers

Prefomed Bituminous Fiber Material shall meet the requirements of ASTM D 1751. Joint sealant shall be a non-sag low-modulus silicone.

D. Membrane Curing Compound

Membrane curing compound shall conform to Standard Specification Item No. 409S, "Membrane Curing".

E. Filter Fabric

Filter fabric shall conform to Standard Specification Item No. 620S, "Filter Fabric".

F. Select Backfill

Select backfill shall conform to Standard Specification Item No. 210S, "Flexible Base".

G. Waterstops

Waterstops, if shown on the Drawings, shall conform to Standard Specification Item 416S, "Waterstops".

H. Pipe Underdrains

Pipe Underdrains, if shown on the Drawings, shall conform to Standard Specification Item 551, "Pipe Underdrains".

414S.4 Construction Methods

A. General

All excavation shall be done in accordance with Standard Specification Item No. 401S, "Structural Excavation and Backfill".

All forms and forming, placement of reinforcement, placement of Portland cement concrete, form removal, finishing and curing shall conform to Standard Specification Item No. 410S, "Concrete Structures". Cast-in-place Portland cement concrete retaining walls shall be constructed in one continuous vertical pour from the top of the footing to the top of the wall unless intermediate horizontal construction joints are shown on the Drawings.

The height of the retaining wall will be determined by established grades or as directed by the Engineer or designated representative but and shall be such that water will not be trapped or ponded on private or public property.

Reinforcement for the wall shall be as indicated on the Drawings. The Contractor shall provide dowel bars of the proper size, shape and spacing, as indicated on the drawings.

Devices to release the hydrostatic head shall be installed as indicated on the drawings.

All exposed corners and edges shall be filleted with triangular chamfer strips measuring 3/4 inch (19 mm) on each side. Exposed horizontal surfaces shall be level and flat, and exposed vertical surfaces shall be plumb and flat, unless indicated otherwise on the Drawings.

B. Vertical Control Joints

Unless indicated otherwise on the Drawings, vertical control joints shall be constructed in the retaining wall stem (the vertical portion of the wall) to create planes of weakness to control cracking. Horizontal wall reinforcement shall extend through the vertical control joints. These joints shall be constructed at abrupt

changes in wall height and at a spacing not to exceed 20 feet (6 meters) in wall sections of uniform. The joints shall be formed by placing triangular chamfer strips to create grooves in both faces of the wall to a depth of at least ten percent of the wall thickness. Control joints shall be sealed, on the backfilled side of the retaining wall, with a non-sag low-modulus silicone sealant, or, alternatively, the joint may be covered with a waterproofing material consisting of an 18-inch (450-mm) wide strip of self-adhering polyethylene having a rubberized asphalt mastic, as approved by the Engineer or designated representative.

C. Vertical Expansion Joints

Vertical expansion joints shall conform to the applicable section of Standard Specification Item 410S, "Concrete Structures". These joints shall be constructed at a spacing not to exceed 60 feet (15 meters), unless indicated otherwise on the Drawings. They shall extend the full height and width of the wall, including the wall footing, and shall consist of sleeved dowels and 1/2-inch (13 mm) thick preformed bituminous fiber material. The edges and corners of the joints shall be formed by triangular chamfer strips measuring 3/4 inch (19 mm) on each side. The concrete on the two sides of an expansion joint shall be placed in two separate pours unless approved otherwise by the Engineer or designated representative.

D. Construction Joints

Construction joints shall conform to the applicable section of Standard Specification Item 410S, "Concrete Structures". Wall reinforcement shall extend through the construction joint unless indicated otherwise on the Drawings,

E. Waterstops

Waterstops shall be provided in construction and expansion joints in retaining walls where water-tightness is essential to the function of the structure, as in detention, retention, or water quality ponds or flood walls.

414S.5 Measurement

Accepted cast in place or precast Portland cement concrete work as prescribed by this item will be measured by the cubic yard for reinforced concrete retaining wall, complete in place.

All concrete quantities will be based on the dimensions indicated on the drawings.

414S.6 Payment

The cast-in-place or precast Portland cement concrete work performed as prescribed by this item will be paid for at the unit bid price per cubic yard for "Concrete Retaining Wall". The unit bid price shall include full compensation for all excavation, forms, concrete, curing, finishing, backfilling, sloping that is not part of an excavation safety system covered by Item No. 509S, and for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Payment will be made under one of the following:

- Pay Item No. 414S-C:** Cast-in-place Portland Cement Concrete Retaining Wall, Including Reinforcement - Per Cubic Yard.
- Pay Item No. 414S-P:** Precast Concrete Retaining Wall - Per Cubic Yard.

End

SPECIFIC CROSS REFERENCE MATERIALS
Standard Specification Item 414S, "Concrete Retaining Walls"

City of Austin Standard Specification Items

Designation	Description
Item No. 210S	Flexible Base
Item No. 401S	Structural Excavation and Backfill
Item No. 403S	Concrete for Structures
Item No. 406S	Reinforcing Steel
Item No. 409S	Membrane Curing
Item No. 410S	Concrete Structures
Item No. 416S	Waterstops
Item No. 509S	Excavation Safety Systems
Item No. 551	Pipe Underdrains
Item No. 620S	Filter Fabric

American Society for Testing and Materials, ASTM

Designation	Description
ASTM D 1751	Preformed Expansion Joint Filler for Concrete Paving and Structural Construction

RELATED CROSS REFERENCE MATERIALS
Standard Specification Item 414S, "Concrete Retaining Walls"

City of Austin Standard Specification Items

Designation	Description
Item No. 404S	Pneumatically Placed Concrete
Item No. 405S	Concrete Admixtures
Item No. 408S	Concrete Joint Materials
Item No. 411S	Surface Finishes for Concrete

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

Designation	Description
Item No. 360	Concrete Pavement
Item No. 420	Concrete Structures
Item No. 421	Portland Cement Concrete
Item No. 427	Surface Finishes for Concrete
Item No. 431	Pneumatically Placed Concrete
Item No. 437	Concrete Admixtures
Item No. 520	Weighing and Measuring Equipment
Item No. 522	Portland Cement Concrete Plants
Item No. 524	Hydraulic Cement

Texas Department of Transportation: Departmental Material Specifications

Designation	Description
DMS 8900	Fly Ash