LondonBoulder™
Where Strength Meets Style

CASE STUDY

RETAINING WALL: PARKING LOT

NISSAN ABELOFF

Project:
Ableoff Nissan
Stroudsburg, PA

Product:
LondonBoulder

Wall Design Engineer:
Civil Solutions Group
Minneapolis MN

Site/Wall Contractor:
E. F. Possinger & Sons
Stoudsburg, PA

Manufacturer:
Bethlehem Precast
Bethlehem, PA

Construction Manager:
Nu Cor Management, Inc.
Pen Argyl, PA

Wall Dimensions:
High from 2' to 32'
4,200 sq ft

The Challenge:
The Abeloff Nissan Dealership entrance was located atop a mix of solid rock and native soils. The change in grade from this roadway to the finished grades surrounding the dealership building varied from a low elevation of 1.5' to 31.5' at its maximum height.

The solid rock layer located behind the lower portion of the wall made excavation for normal geogrid reinforcement prohibitively expensive.

The Solution:
The first wall system proposed for this site was a competing "Big Block" system using geogrid reinforcement. This concept was not feasible due to the retained rock embankment and the excavation costs required to install the geogrid reinforcement. Consequently, a smaller block (SRW) system was proposed using a concrete and anchoring system. It was at this point that Civil Solutions Group (CSG) was contacted by Bethlehem Precast to review the project and look for a more economically feasible solution.

After a comprehensive assessment of the site conditions and parameters, Civil Solutions devised a hybrid resolution to meet this challenge. The LondonBoulder Retaining Wall System was at the core of this resolution. It consisted of a concrete reinforced wall base installed in conjunction with a gravity wall application on the upper half of the retained face. To facilitate this unique hybrid solution, a concrete leveling pad was poured at a 6 degree angle to achieve the required batter for the gravity wall design. The lower half of the wall was then backfilled with lean concrete to solidify the base. This was accomplished by placing the concrete in 4.5' maximum lifts and reinforcing each lift with rebar.

These concrete lifts were then anchored at both ends - on the back using rebar to anchor into the shale rock face embankment, and in the front using rebar hooks which connected perpendicularly to rebar laying along the bottom of the keyway in each LondonBoulder unit. An epoxy grout was added to the rebar extending into the shale rock face to provide the wall with the long term stability required to resist natural destabilizing forces. Finally, the various sizes of the LondonBoulder units provided the mass needed in order to make the gravity wall design work as efficiently as possible.

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CASE STUDY

RETAINING WALL: ROADWAY & WATERWAY

Product
Route 263 Floor Repair
Witehouse Station, NJ

Product:
LondonBoulder

Wall Design Engineer:
Civil Solutions Group
Minneapolis MN

Site/Wall Contractor:
H.C. Constructors
Witehouse Station, NJ

Manufacturer:
Bethlehem Precast, Inc.
Bethlehem, PA

Wall Contractor:
H.C. Constructors
Witehouse Station, NJ

Wall Dimensions:
Varying heights
1,524 sq ft

The Challenge:
With the trout fishing season fast approaching and Route 623 in need of significant flood repair, the local municipality began searching for a long-lasting, aesthetically pleasing, efficiently built retaining wall system - one that could keep Route 623 from crumbling back into the stream during future high-water events.

With a limited budget and an even more limited time frame, Hazen, New Jersey's Route 623 Flood Repair project went out for bid.

The Solution:
Early considerations were given to a competing product whose design called for roughly 40 steel manta ray anchors to be placed beneath the road surface. With a price tag of around $40,000 all by themselves, these anchors became a prohibitively expensive alternative.

Using a little ingenuity, Bethlehem Precast teamed up with Civil Solutions Group to design a LondonBoulder Retaining Wall that could eliminate the need for the expensive anchors, allowing them to maintain the attractive natural aesthetics of the streambed while saving significant money and installation time.

To accomplish this, the LondonBoulder keyway was lined with a 1" X 1" X 9" long shim to create a permanent one-inch setback. This setback amount was just enough to provide the stability needed to remove the anchors from the design, but not so much that it would reduce valuable space at the top of the wall already occupied by the paved road. Built in tight quarters with cars passing by just above the worksite, only 17 workdays were needed to complete this relatively complicated 1,524 square foot retaining wall.

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CASE STUDY

RETAINING WALL: PARKING LOT

Product:
LondonBoulder

Wall Design Engineer:
Vickery Engineer & Consulting

Wall Contractor:
Breitbach Construction Co

Civil Engineer:
Anderson-Johnson Associates Inc.

Manufacturer:
JME Companies
Monticello, MN

Construction Manager:
Breitbach Construction Co.

Wall Dimensions:
11,340 sq ft
Height: 22 ft

Saint John's UNIVERSITY

Project Details

- Maximized the use of gravity / unreinforced areas to save trees
- Design used a combination of gravity and reinforced walls
- Wall design incorporated inside 90° corners
- Maximum wall heights of 22 ft.

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CASE STUDY

RETAINING WALL: ROADWAY

Project:
County Highway 38
Burnsville, MN

Product:
LondonBoulder

Wall Design Engineer:
Civil Design Professionals

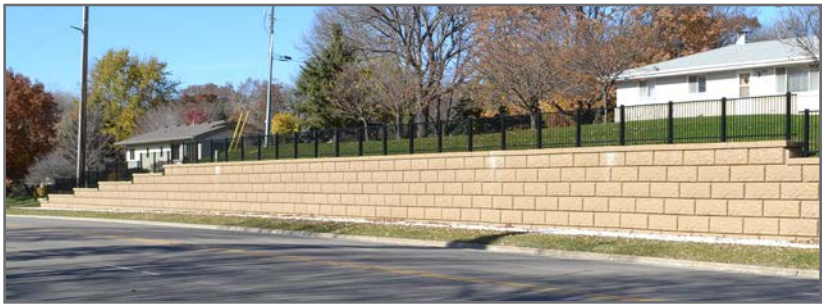
Wall Contractor:
Rosti Construction

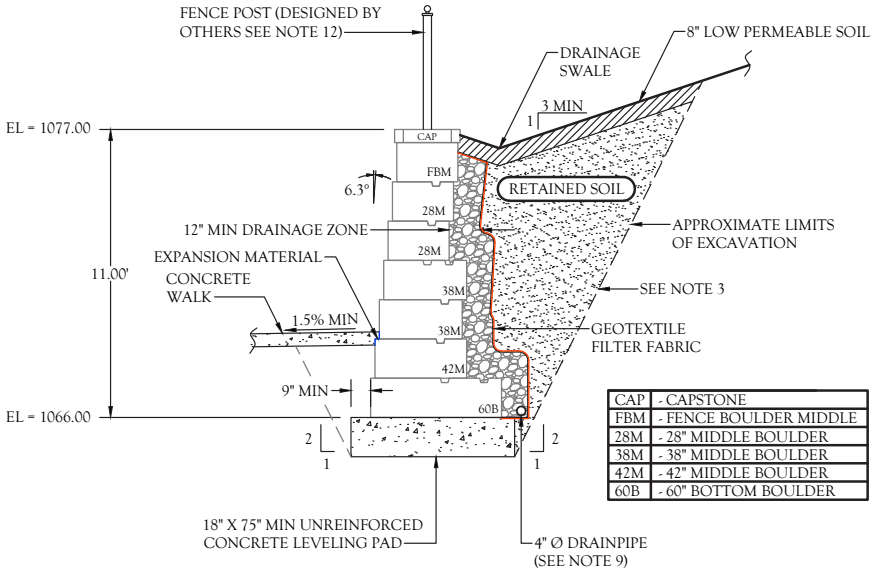
Civil Engineer:
Bolton & Menk

Manufacturer:
JME Companies
Monticello, MN

Construction Manager:
Rosti Construction

Wall Dimensions:
2,270 sq ft
Height: 11 ft





Project Details

- MNDOT Project
- Gravity wall / unreinforced
- Wall built along county road / highway
- Design utilized a 6" cap and fence on top of the wall

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CASE STUDY

RETAINING WALL: ROADWAY

Project:
Arbor Lakes Business Park, Maple Grove, MN

Product:
LondonBoulder

Wall Design Engineer:
Vickery Engineer & Construction

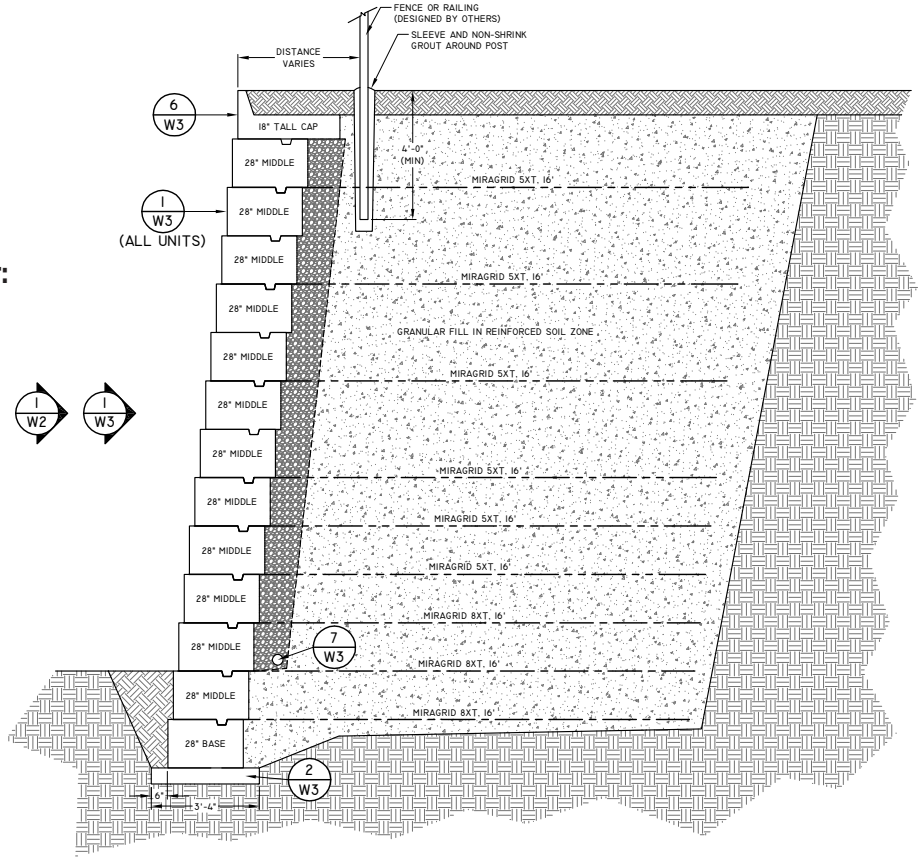
Wall Contractor:
Cedar Ridge Landscaping

Civil Engineer:
Stantec

Manufacturer:
JME Companies
Monticello, MN

Construction Manager:
C. S. Mc Crossan
Maple Grove, MN

Wall Dimensions:
3,651 sq ft
Height: 22 1/2 ft



Project Details

- City of Maple Grove project
- Reinforced wall
- Next to roadway
- Wall created space for a tunnel system to be built
- Wall height exceeds 22 ft

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CASE STUDY

RETAINING WALL: PARKING LOT

Project:
Beacon Bluffs
St. Paul, MN

Product:
LondonBoulder

Wall Design Engineer:
Gray Engineering, LLC

Wall Contractor:
Precision
Hardscapes, Inc

Civil Engineer:
Solution Blue

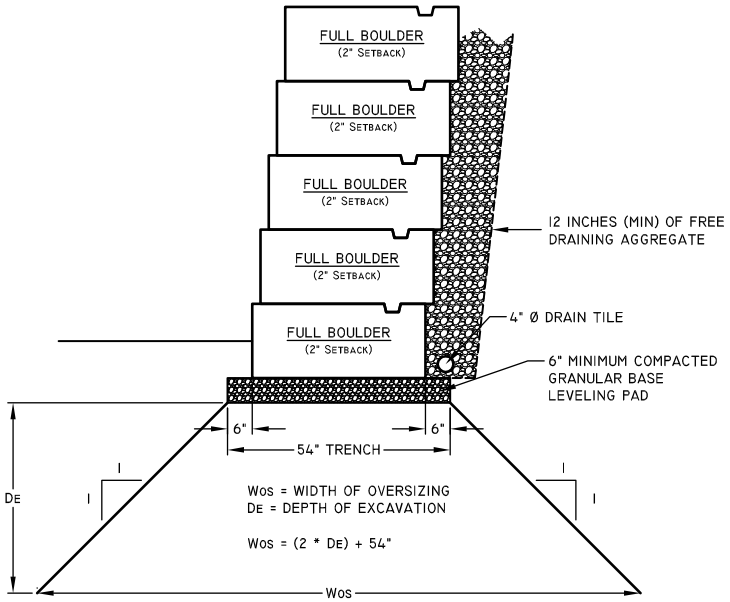
Manufacturer:
JME Companies
Monticello, MN

Construction Manager:
Opus Design

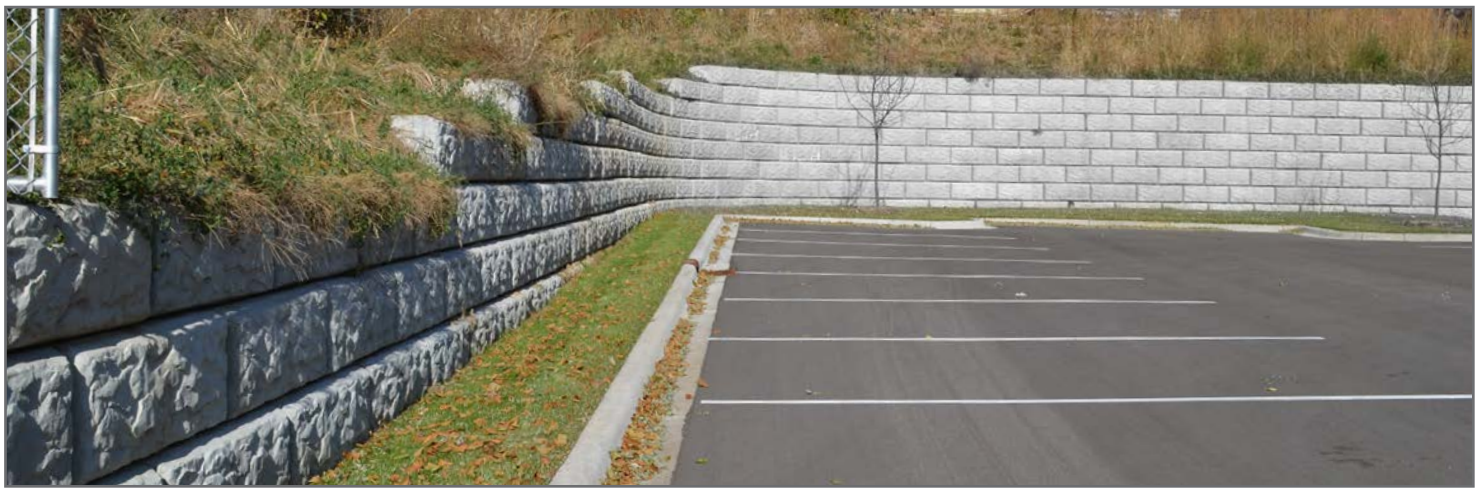
Wall Dimensions:
2,130 sq ft
Height: 13 1/2 ft

Project Details

- Tight space
- Cut hill block to fit building space
- 10 ft between building and front of wall
- No space for reinforcement
- 15 ft From back of wall to property line
- Gravity / unreinforced design allowed this plan to be a good solution



3
W2
LONDONBOULDER - 2-INCH SETBACK
1:1 EXCAVATION OVERSIZING - GRAVITY WALL
(NOT TO SCALE)



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CASE STUDY

RETAINING WALL: PARKING LOT & ROADWAY

Project:
Cherrywood Point Complex
Minnetonka, MN

Product:
LondonBoulder

Wall Design Engineer:
Civil Design Professionals

Wall Contractor:
Cedar Ridge Landscaping

Civil Engineer:
Solution Blue

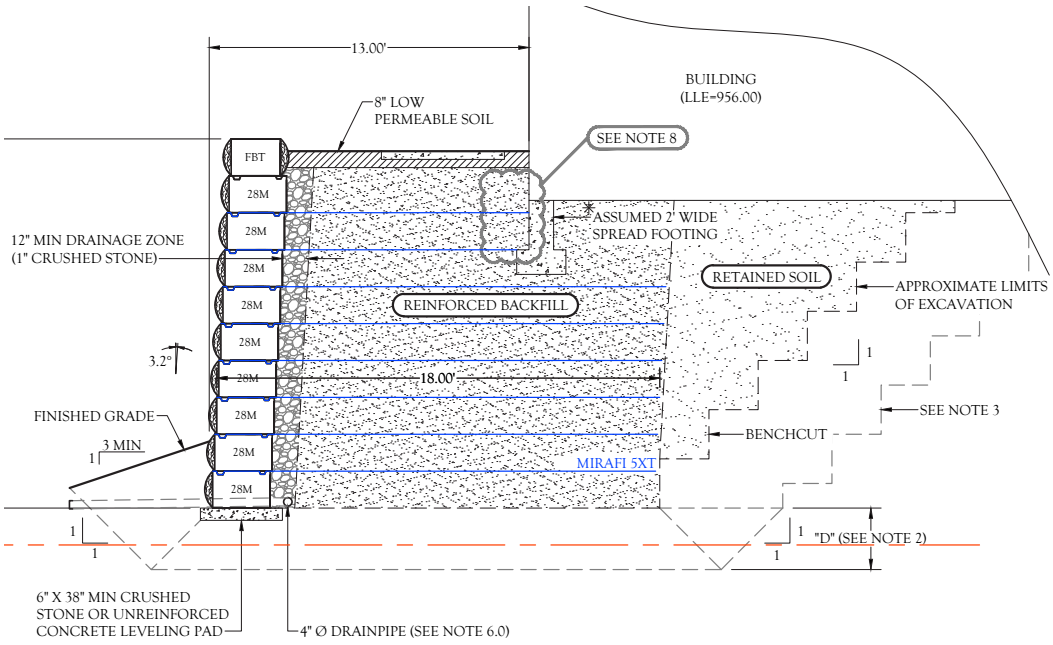
Manufacturer:
JME Companies
Monticello, MN

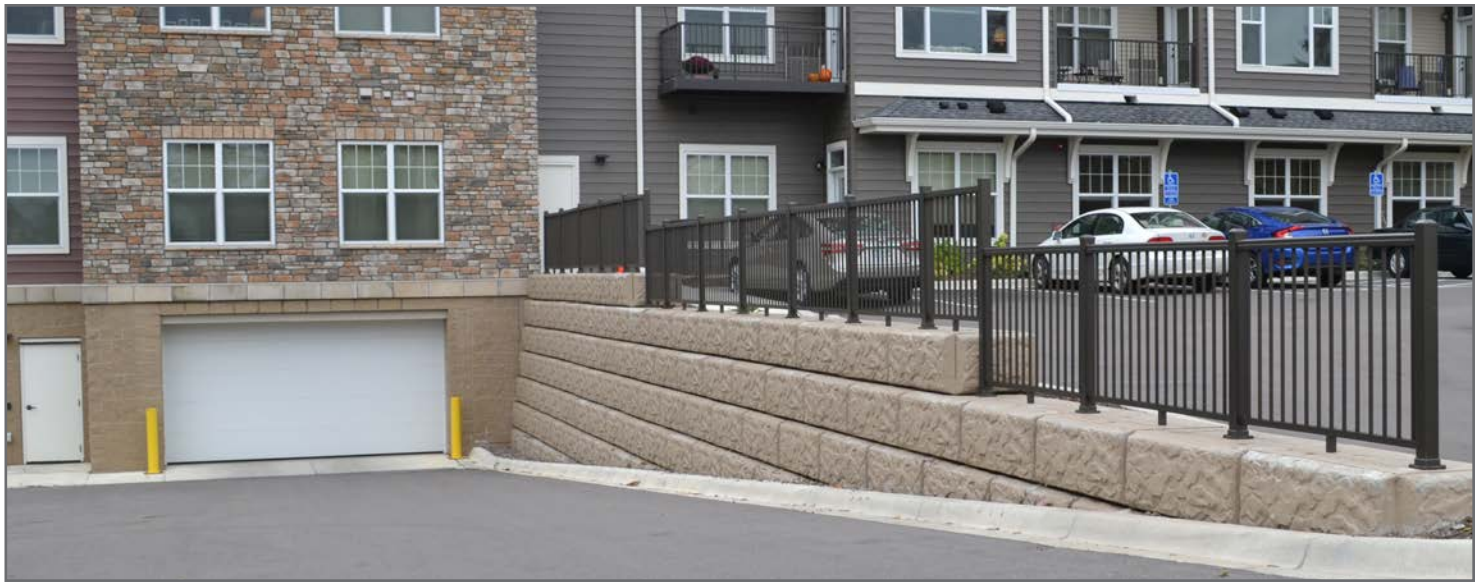
Construction Manager:
Weis Builders, Inc.

Wall Dimensions:
3,279 sq ft

Project Details

- 3 walls on site
- Both reinforced and gravity walls used in this design
- 2 sided block were utilize on the top course of the design
- Fence built on top of the wall (see below)





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CASE STUDY

RETAINING WALL: ROADWAY

Project:
Dale Road & Pioneer Drive, Woodbury, MN

Product:
LondonBoulder

Wall Design Engineer:
Civil Design Professionals

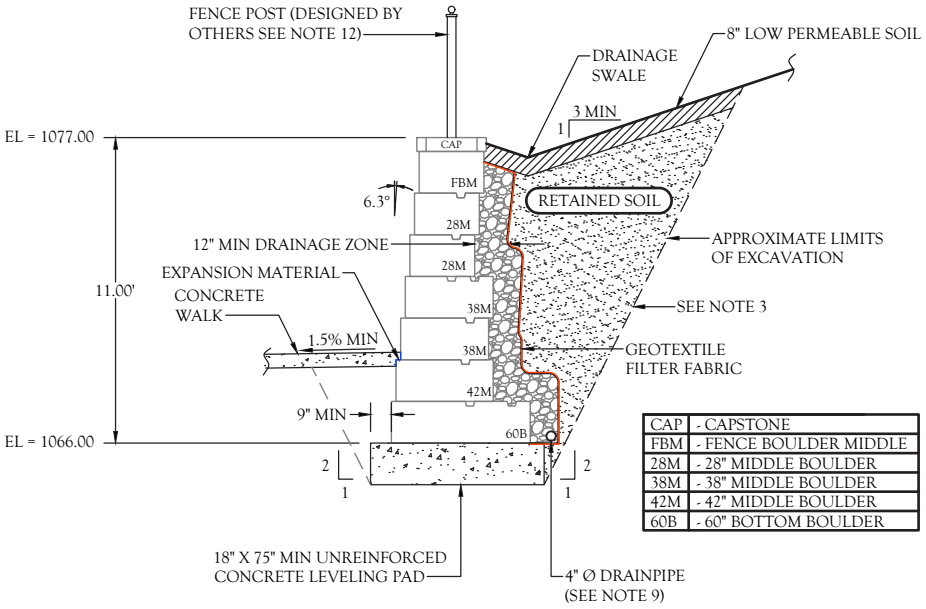
Wall Contractor:
Rosti Construction

Civil Engineer:
WSB & Associates

Manufacturer:
JME Companies
Monticello, MN

Construction Manager:
Hardrives

Wall Dimensions:
4,148 sq ft



Project Details

- Roundabout and street project
- MNDOT project
- Gravity wall / unreinforced
- Fieldstone face texture
- 11 ft wall heights

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CASE STUDY

RETAINING WALL: PARKING LOT

Project:
Eagan Maintenance Facility Eagan, MN

Product:
LondonBoulder

Wall Design Engineer:
Civil Design Professionals

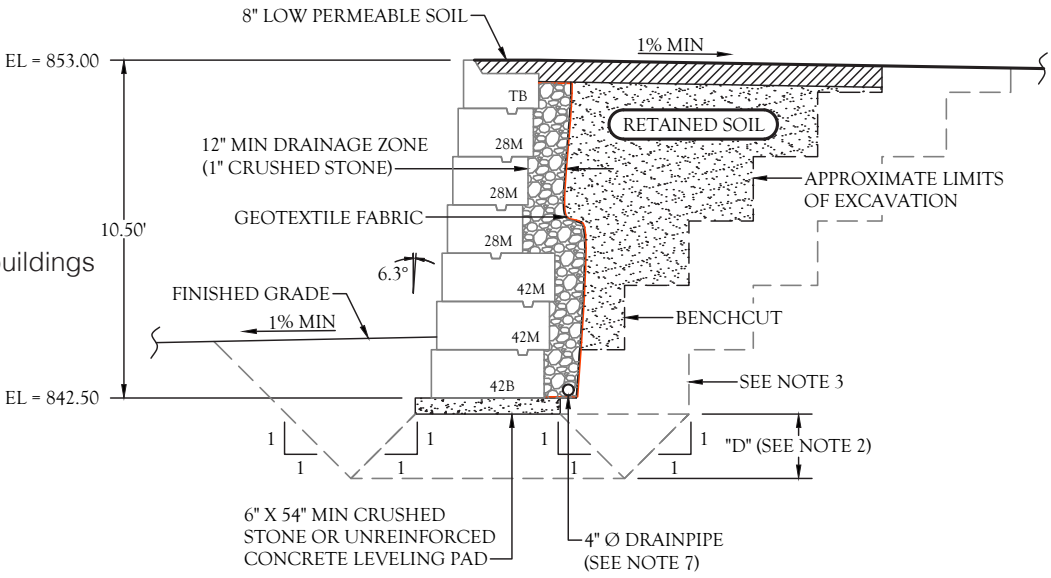
Wall Contractor:
Precision Hardscapes, Inc.

Civil Engineer:
Larson Engineering

Manufacturer:
JME Companies
Monticello, MN

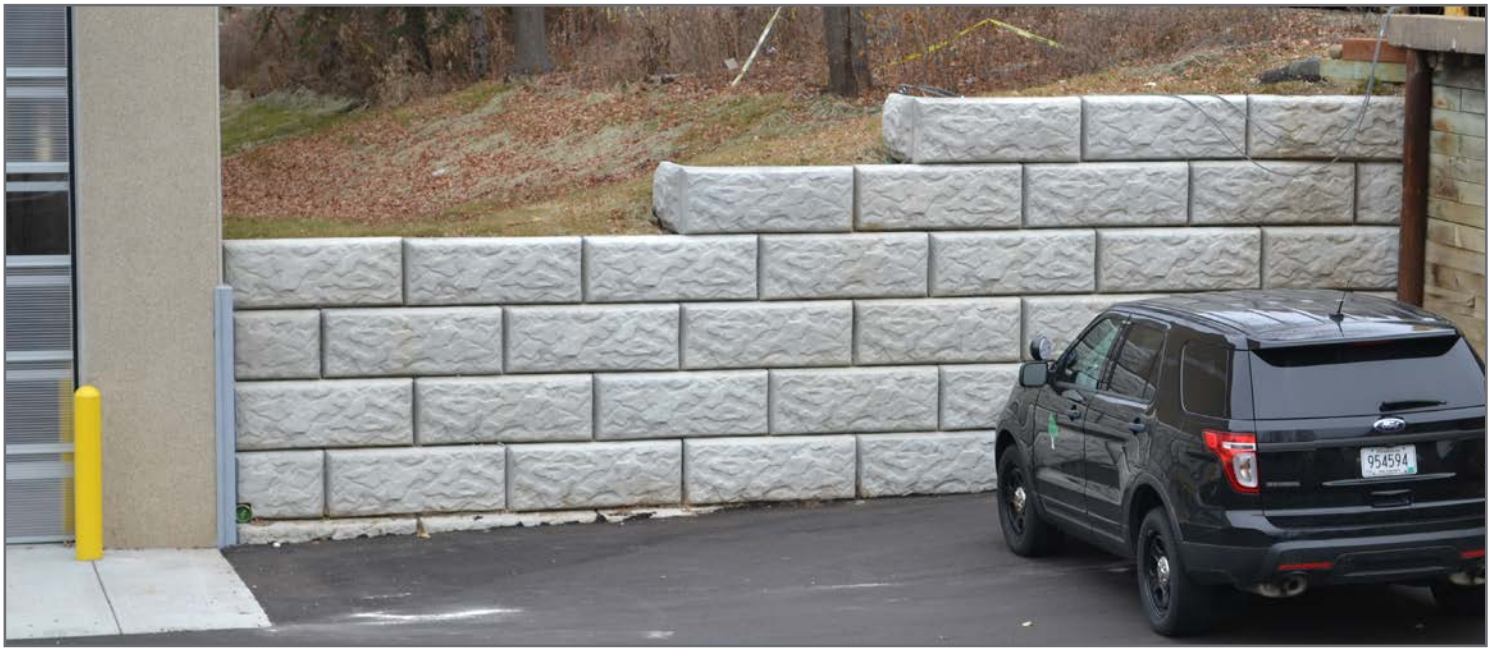
Construction Manager:
Ebert Construction

Wall Dimensions:
Height: 10 1/2 ft



Project Details

- Retaining wall built between two buildings
- City of Eagan project
- Gravity wall
- Helped increase parking area
- 10 ½ ft wall heights



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CASE STUDY

RETAINING WALL: INCREASE USABLE SPACE

Project:
Fernbrook Fields
Maple Grove, MN

Product:
LondonBoulder

Wall Design Engineer:
Civil Design Professionals

Wall Contractor:
Blackstone Contractors

Civil Engineer:
Stantec

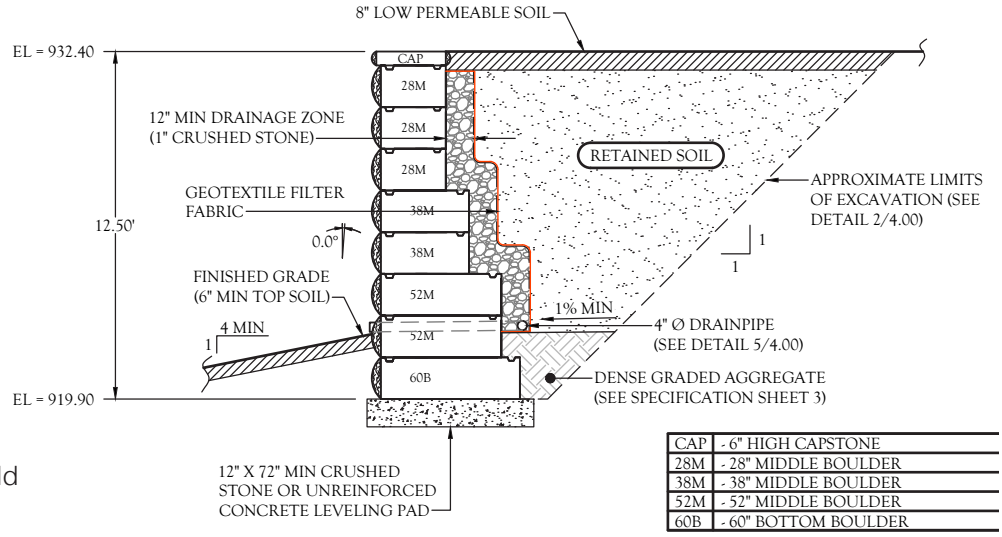
Manufacturer:
JME Companies
Monticello, MN

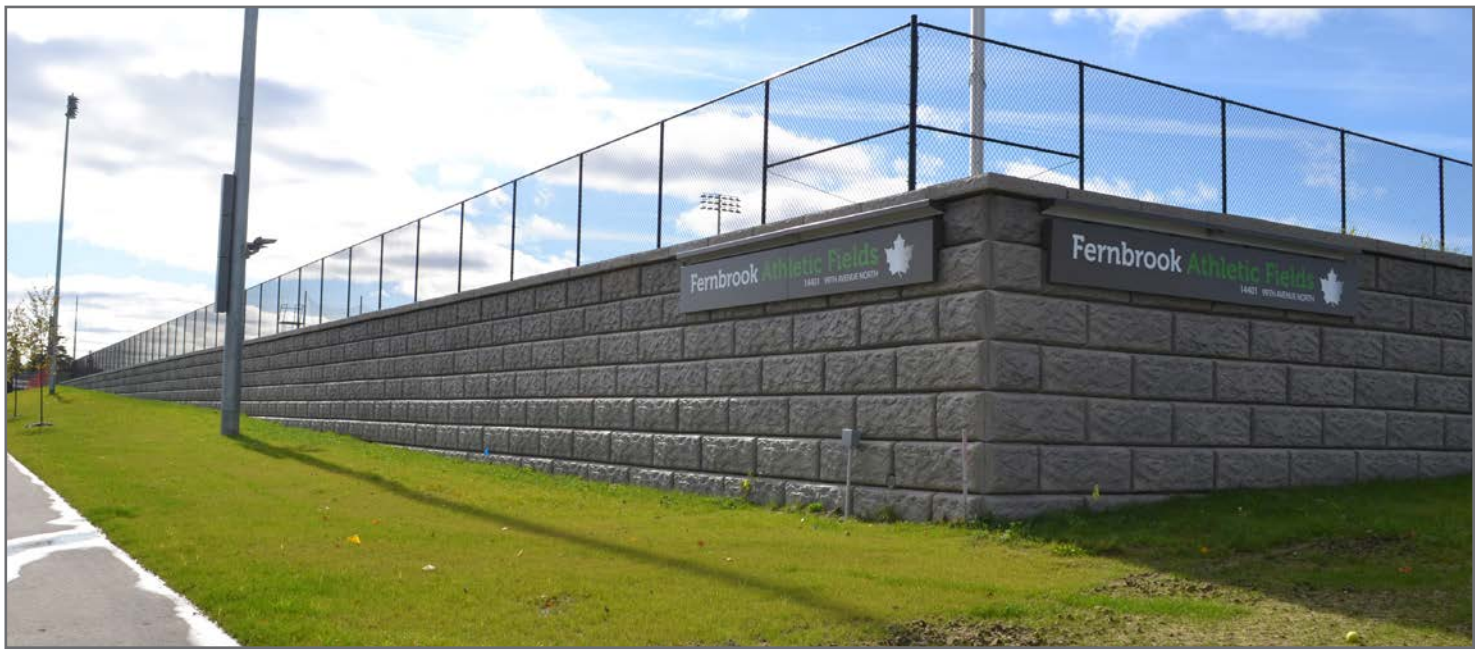
Construction Manager:
RJM Construction

Wall Dimensions:
7,156 sq ft
14 ft Tall

Project Details

- City of Maple Grove project
- Gravity wall / unreinforced
- Next to roadway
- Some areas up to 14 ft tall
- Walls helped increase the space to build additional fields





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CASE STUDY

RETAINING WALL: ROADWAY

Project:
Hamm's Brewery
Fire Lane Extension
St. Paul, MN

Product:
LondonBoulder

Wall Design Engineer:
Civil Design
Professionals

Wall Contractor:
Precision
Hardscapes, Inc

Civil Engineer:
Larson Engineering, Inc

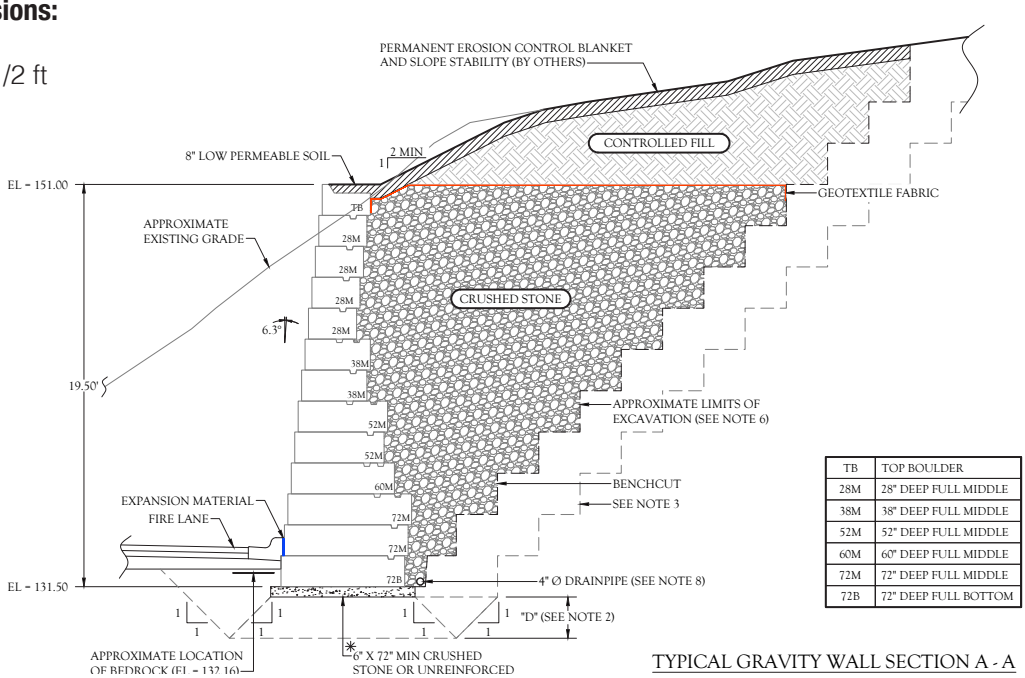
Manufacturer:
JME Companies
Monticello, MN

Construction Manager:
Meyer Contracting

Wall Dimensions:
1,659 sq ft
Height: 19 1/2 ft

Project Details

- Roadway
- Gravity wall / unreinforced
- 19 ½ ft tall with no geogrid
- 5 different sized LondonBoulder blocks utilized in the design



TB	TOP BOULDER
28M	28" DEEP FULL MIDDLE
38M	38" DEEP FULL MIDDLE
52M	52" DEEP FULL MIDDLE
60M	60" DEEP FULL MIDDLE
72M	72" DEEP FULL MIDDLE
72B	72" DEEP FULL BOTTOM

TYPICAL GRAVITY WALL SECTION A - A

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CASE STUDY

RETAINING WALL: PARKING LOT

Project:
LondonBoulder
Walmart Sartel, MN

Product:
LondonBoulder

Wall Design Engineer:
Vickery Engineering & Consulting

Wall Contractor:
Helmin Landscaping

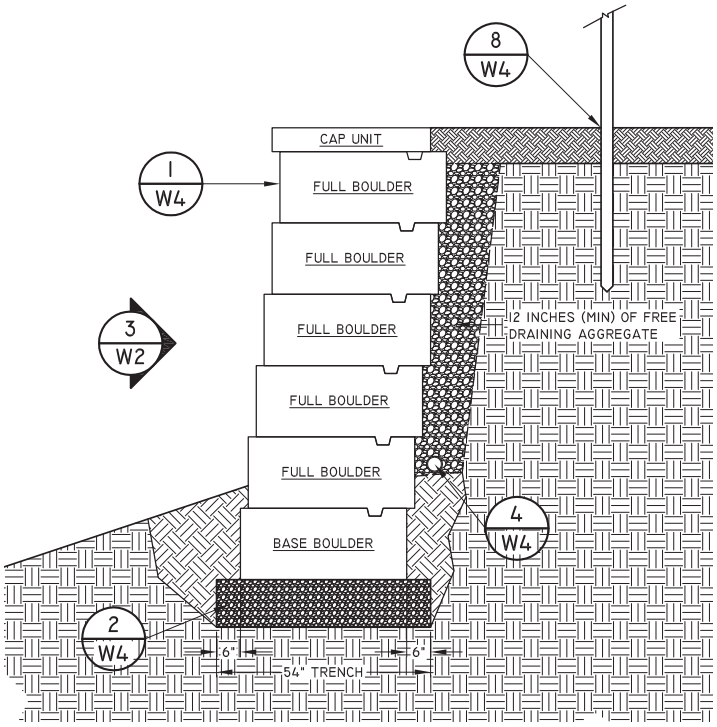
Civil Engineer:
McCombs Frank Roos Associates/Sambatek

Site Engineer:
Gale-Tec Engineering, Inc

Manufacturer:
JME Companies
Monticello, MN

Construction Manager:
Breitbach Construction

Wall Dimensions:
6,456 sq ft
Height: 9 ft



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CASE STUDY

RETAINING WALL: PARKING LOT

Project:
Riverview Medical Center, Waconia, MN

Product:
LondonBoulder

Wall Design Engineer:
Civil Design Professionals

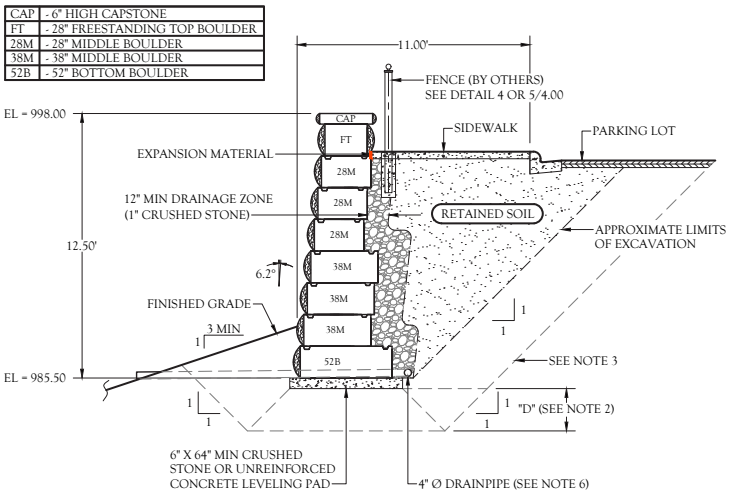
Wall Contractor:
JL Theis

Civil Engineer:
Larson Engineering, Inc

Manufacturer:
JME Companies
Monticello, MN

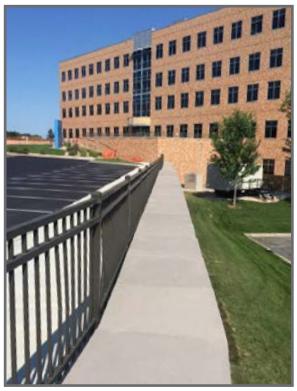
Construction Manager:
Ridgeview Medical

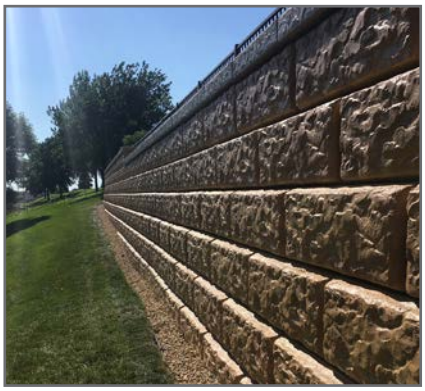
Wall Dimensions:
1,808 sq ft
Height: 12 1/2 ft



Project Details

- Wall heights exceed 12 ft tall
- Fence/Double sided units use on top course
- Gravity walls / unreinforced
- 6" cap units used on top with fence behind





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Where Strength Meets Style

CASE STUDY

FREE STANDING WALL: CURVED

Project:
Coachman Ridge Apartments

Product:
LondonBoulder LB28 Blocks

Wall Design Engineer:
Vickery Engineering & Consulting, Minnetonka, MN

Wall Contractor:
Great Northern Landscaping, Elk River MN

Manufacturer:
JME Companies Monticello, MN

Construction Manager:
Ridgeview Medical

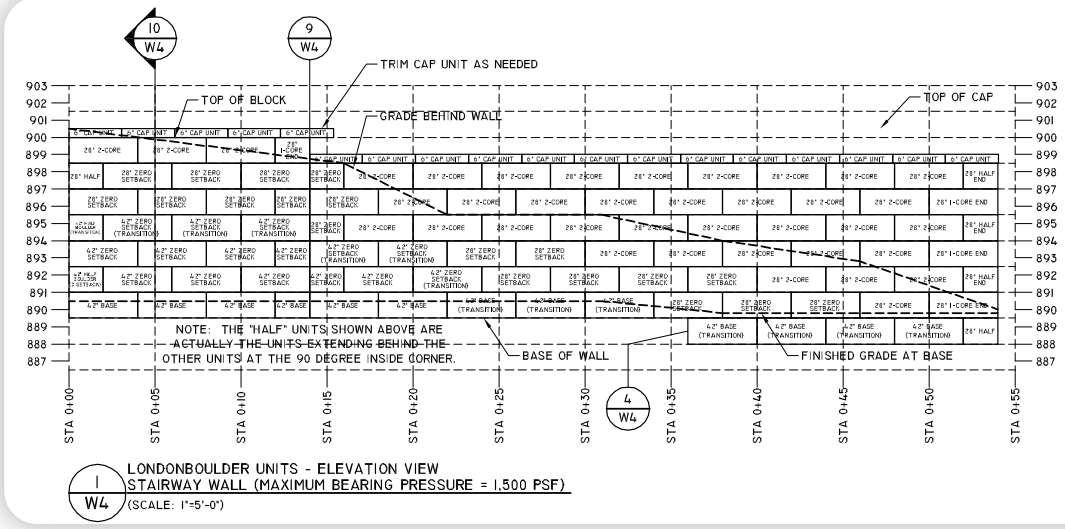
Wall Dimensions:
9 ft tall x 70 ft long

The Challenge:

Owner wanted a curved free standing wall to wrap around with the stairs.

The Solution:

The LondonBoulder cored LB28 Block. It's the only big block on the market that could be cut on the ends to provide a radius big block 2 sided wall.



LEGEND

X / WX - DETAIL NUMBER / SHEET NUMBER

X / WX - INDICATES LOCATION OF SECTION CUT

9 / W4 - INDICATES APPROXIMATE LOCATION OF 90-DEGREE INSIDE CORNER

NOTES

1) CAP UNITS WILL NEED TO BE TRIMMED TO FIT THE WALL. SEE DETAIL 6 ON SHEET W4 FOR ADDITIONAL INFORMATION ON CAPPING.

2) THE FREE-STANDING PORTION OF THE WALL NEEDS TO BE CORE-FILLED WITH DRAINAGE AGGREGATE FOR THE ENTIRE FREE-STANDING PORTION AND THE BLOCK BELOW. A #5 REBAR SHOULD BE PLACED CONTINUOUSLY IN EACH CORE. EACH UNIT IN THE FREE-STANDING PORTION OF THE WALL SHOULD BE ADHERED TO THE BLOCK BELOW WITH THE CAP ADHESIVE (4 CONTINUOUS BEADS, MINIMUM).

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CASE STUDY

RETAINING WALL: WATERWAY / CURVED

Project:
Chemung County Run Off Project

Site Contractor:
Chemung County Soil & Water

Product:
London Boulder w/ Field Stone Face

Manufacturer:
Zeiser Wilbert Vault
Elmira NY

The Challenge:

In this particular residential area the residents had long had a run off spillway moving through many of their backyards. This run off took all the water from the above hillside and redirected it toward the Chemung County River. The old wall was built with rip rap and over many years the surrounding soils began to erode and many of the lawns started to slide into the run off bed. Jimmie Joe Carl and Mark Watts approached us to inquire about replacing the wall using our London Boulder system.

They really like the natural stone look and how you could build multiple radius points with this system. They spent a few weeks excavating the old rip rap out and replacing it with two courses of full block stone and one course of the sod cap block.

The surrounding neighbors really loved the end result and were very pleased to see that they had their backyards restored to what they knew it to be in years past.

Zeiser Wilbert VAULT, INC.
CONCRETE PRODUCTS

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CASE STUDY

RETAINING WALL: PARKING LOT & ROADWAY

Product:
LondonBoulder

Wall Design Engineer:
Civil Design Professionals

Site/Wall Contractor:
Precision Hardscapes, Inc

Civil Engineer:
Kleinfelder

Manufacturer:
JME Companies
Monticello, MN

Construction Manager:
Jackson Dean Construction

Wall Dimensions:
37,743 sq ft

The Challenge:

- The project was back up against the DOT right-of-way and there were some tight limits of excavation
- There was a stringent specification with some large live loads
- The site was built on an old wetland with poor soils

The Solution:

A system that could switch easily from reinforced to gravity where needed for space constraints. Additionally, a system that can meet the durability requirements of the specification and be flexible enough for some potential movement due to the wetlands even with the soil correction.

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CASE STUDY 1 OF 2

RETAINING WALL: PARKING LOT & ROADWAY

Project:
Commercial Retail

Product:
LondonBoulder LB42 Blocks and LondonBoulder LB28 Blocks

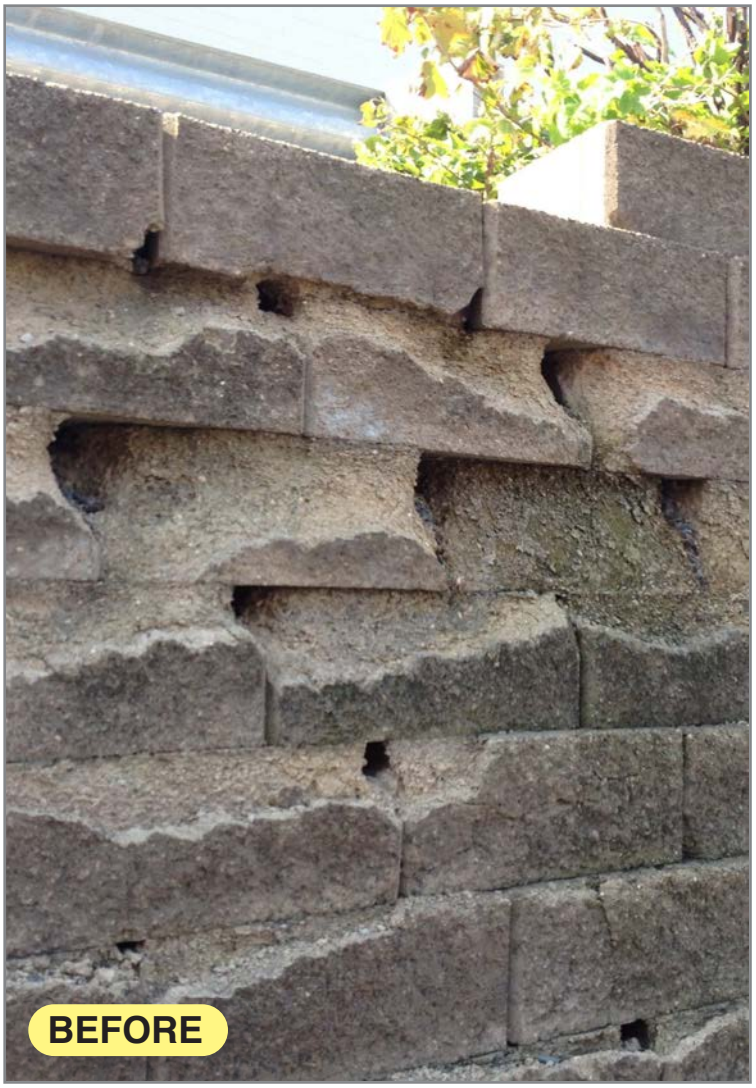
Wall Design Engineer:
Vickery Engineering & Consulting
Minnetonka, MN

Wall Contractor:
Supreme Lawn & Landscaping, Waite Park, MN

Manufacturer:
JME Companies
Monticello, MN

Supplier:
Quarry Creek Nursery,
St. Cloud, MN

Wall Dimensions:
8 ft tall x 180 ft long



The Challenge:

Salt used on the roadway above the wall ended up washing into the area behind the wall and subsequently exited through the face of the wall.

Small segmental retaining wall blocks cannot withstand the freeze/thaw cycles that salt creates.

LondonBoulder™
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CASE STUDY 2 OF 2

RETAINING WALL: PARKING LOT & ROADWAY

Project:
Commercial Retail

Product:
LondonBoulder LB42 Blocks and LondonBoulder LB28 Blocks

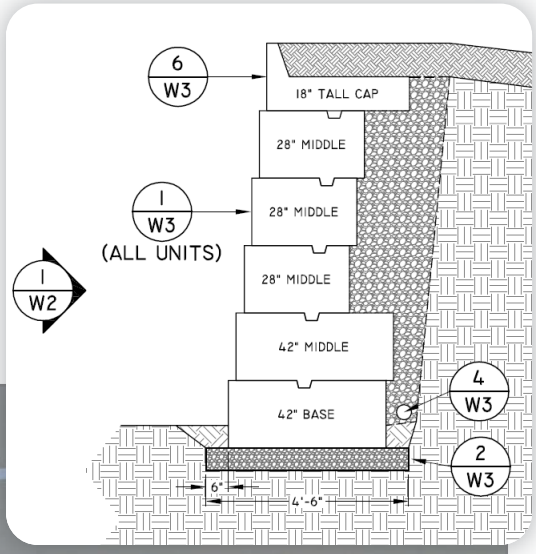
Wall Design Engineer:
Vickery Engineering & Consulting
Minnetonka, MN

Wall Contractor:
Supreme Lawn & Landscaping, Waite Park, MN

Manufacturer:
JME Companies
Monticello, MN

Supplier:
Quarry Creek Nursery,
St. Cloud, MN

Wall Dimensions:
8 ft tall x 180 ft long



The Solution:

LondonBoulder Big Blocks are a wet cast produced retaining wall block. The mix design in the production of LondonBoulder Big Blocks includes an air entraining agent. This air entraining agent creates bubbles in the concrete. These bubbles reduce surface tension between water and solids in the mix which gives the LondonBoulder Big Blocks durability to withstand the freeze/thaw cycle that salt creates.

Also, because the original small block wall was built before the road, the geogrid that was required for a small block wall of this height was laid out under the current road. Vickery Engineering used a wall design using LondonBoulder Big Block that required no geogrid reinforcement so that the roadway above the wall remained undisturbed for construction.

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CASE STUDY 1 OF 2

RETAINING WALL: INCREASED PROPERTY

Project:
Auto Rec Bodyworks

Product:
LondonBoulder

Wall Design Engineer:
Civil Design Professionals

Site/Wall Contractor:
Diversified Foundations

Manufacturer:
JME Companies
Monticello, MN

Wall Dimensions:
16.5 ft Wall:

The Challenge:

With the property constraints, there was minimal room to excavate behind the wall to use any geogrid reinforcments.

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CASE STUDY 2 OF 2

RETAINING WALL: INCREASED PROPERTY

Project:
Auto Rec Bodyworks

Product:
LondonBoulder

Wall Design Engineer:
Civil Design Professionals

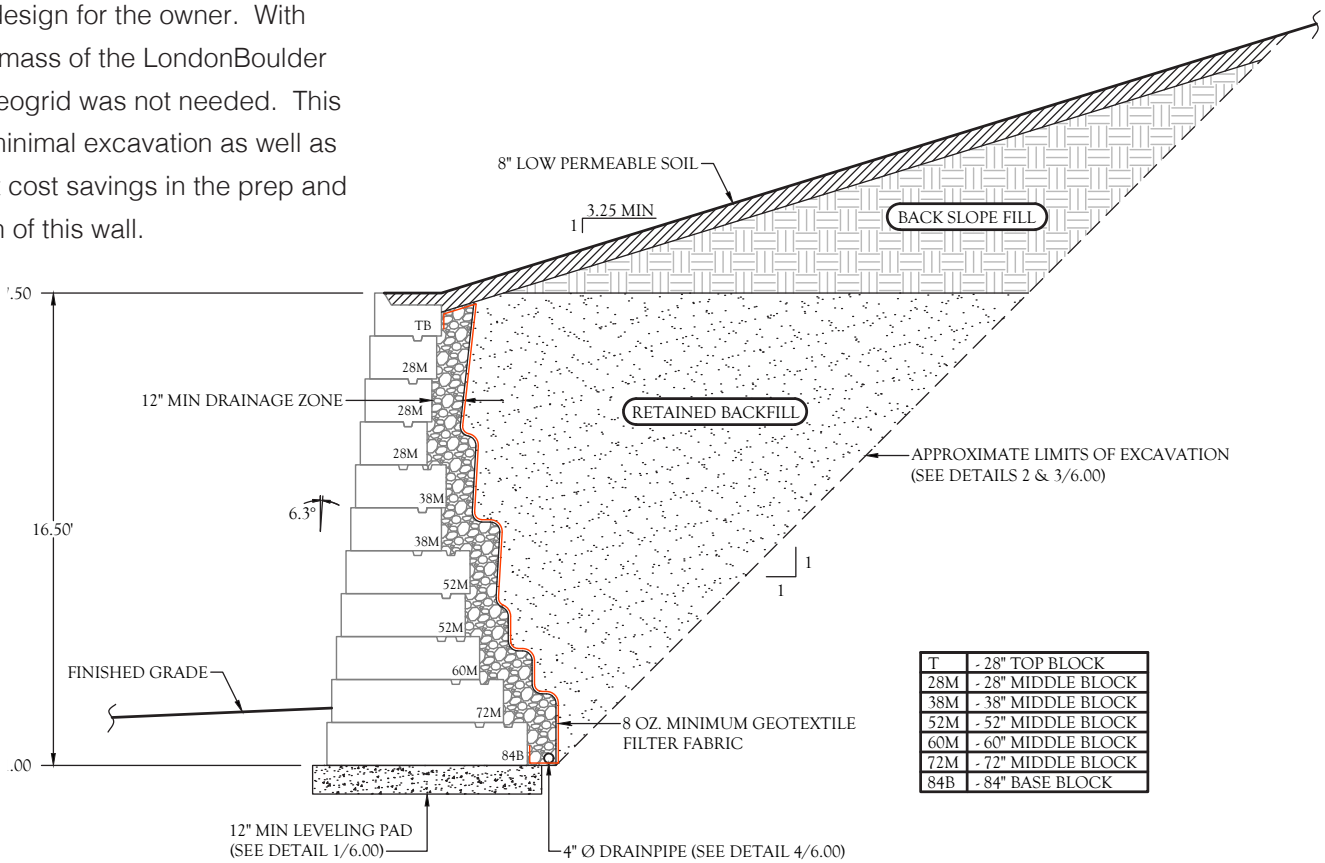
Site/Wall Contractor:
Diversified Foundations

Manufacturer:
JME Companies
Monticello, MN

Wall Dimensions:
16.5 ft Wall:

The Solution:

Using the LondonBoulder system! This project combined the 6 different block sizes to create the most cost effective design for the owner. With the sheer mass of the LondonBoulder system, geogrid was not needed. This enabled minimal excavation as well as significant cost savings in the prep and installation of this wall.



T	- 28" TOP BLOCK
28M	- 28" MIDDLE BLOCK
38M	- 38" MIDDLE BLOCK
52M	- 52" MIDDLE BLOCK
60M	- 60" MIDDLE BLOCK
72M	- 72" MIDDLE BLOCK
84B	- 84" BASE BLOCK

TYPICAL WALL SECTION A - A
(WALL 1 SECTION SHOWN AT STA 125')