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Creating Ways to Bridge the Gap

The Progress Quarry Development project in Beaverton, Oregon was a large scale project that needed some complex structural solutions. When the original natural stone concepts were abandoned due to design problems and extremely high costs, the owners chose the Allan Block Ashlar Blend pattern because of the natural cut stone look and the engineering behind it. This commercial site in a residential setting consisted of more than 30 Allan Block® retaining walls varying in height with some exceeding 25 ft. (7.6 m). The main walls of the project form both sides of two land bridges with large culverts running underneath.

Design

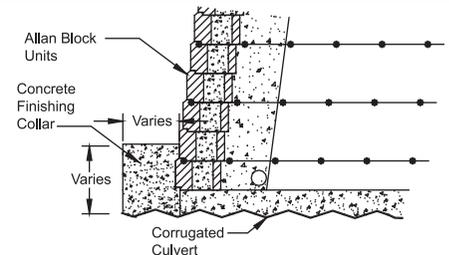
The two land bridges posed the most design challenges for ABHT Structural Engineers. Besides the corrugated steel culverts, the bridges are designed using back-to-back Allan Block walls with AASHTO requirements. When designing back-to-back walls it is important to not use the same geogrid layer from wall to wall. The grid layers must overlap at the center, between the walls. This allows for the natural elongation of each independent grid layer while placing and compacting the infill soils. ABHT designed the top wall courses as a masonry application where the cores of the Allan Block were cast solid with a cantilevered concrete footing. This allowed for the creation of a geogrid free utility trench under the side-walks on each side of the bridge.



Construction

The construction of the Progress Quarry bridges needed to be well coordinated between the engineers, builders and survey team. With the corrugated steel culverts in place, the surveying team spent many hours laying out the placement of the walls and accounting for the block setback to maintain roadway width.

During actual wall construction, the culverts were expected to flex as the land bridges were built around them. The builder and the survey team worked together as each block course needed to be placed and compacted simultaneously around the culverts. This insured that each would flex exactly the same, allowing the block courses to match when the wall reached the top



of the culverts. The culverts were finished by casting concrete finishing collars on each to lock the Allan Block and culvert lips in place. Allan Block Courtyard Posts and ornamental metal railings were used to complete the top of the walls.

Visit allanblock.com for the complete project profile.

Manufacturer:

Central Oregon Brick & Block, Prineville, OR

Engineers

Randall Toma, ABHT Structural Engineers

Product Used:

AB® Collection with an AB Ashlar Blend™ Pattern and AB Courtyard Posts

Planning for Success

Standard AB Patterns

Allan Block has a variety of pre-set patterns available for your wall projects.

1 Course Pattern Section



2 Course Pattern Section



3 Course Pattern Section



- Geogrid design to dictate pattern spacing
- For curved walls, it is recommended to use the 1 or 2 course pattern
- See Allan Block's Landscape Walls Guide or AB Commercial Retaining Wall Manual for a complete discussion on patterns or visit allanblock.com.



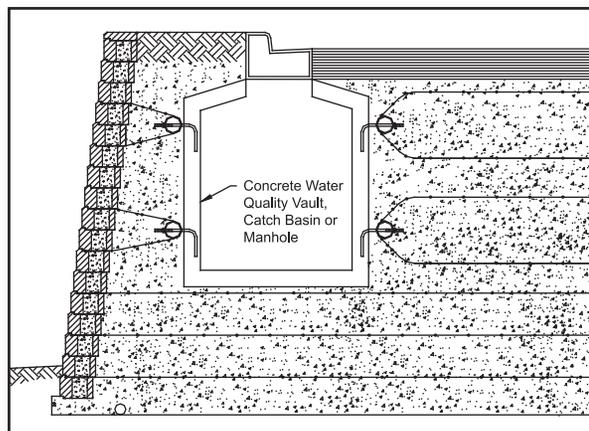
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Ensuring your project is successful will require proper planning on the front end, and the cover story at Progress Quarry was no different. Although everything cannot be accounted for, you can start with the **site geometry** and identify all physical features surrounding the proposed wall location and note key elevations, lot lines, utilities, structures, slopes, setback, surcharges etc. Other basics that were covering at Progress Quarry include:

- **Soils** – Foundation soils located at the site were poor and with most of the walls having their footings located in wetland areas, a majority of the walls were designed as water applications with oversized granular footings to maintain adequate bearing capacity.

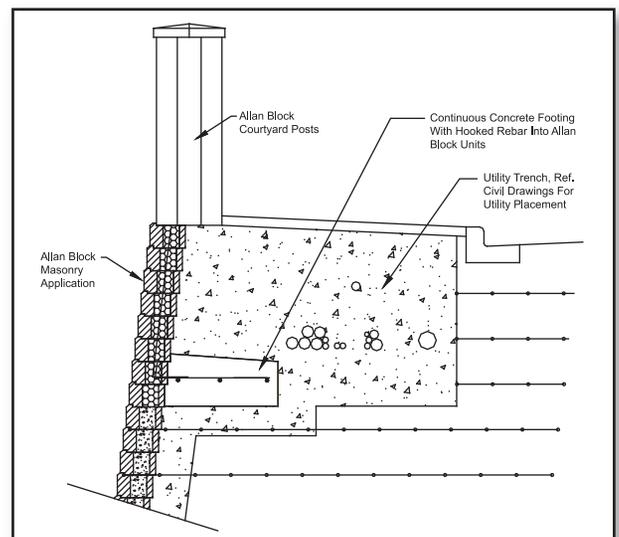


- **Water Management** – Large culverts were installed through the walls to ensure continual surface drainage within the identified drainage channel. Manholes and storm drains located behind the walls within the geogrid reinforced zone needed to be considered as well. These drains were too large to simply place the geogrid reinforcement through the soil in the typical fashion so an alternative design was used. AASHTO required that the geogrid be fastened to all the manholes and storm drains. By connecting the layers of geogrid to the sides of the manholes the reinforced soil structure was maintained.



- **Utilities** - Another challenge during the design phase was managing the locations of the many private utilities required for the residential development. Locating them within the geogrid reinforced zone was not an option since future maintenance of the structural integrity of the Allan Block walls were required.

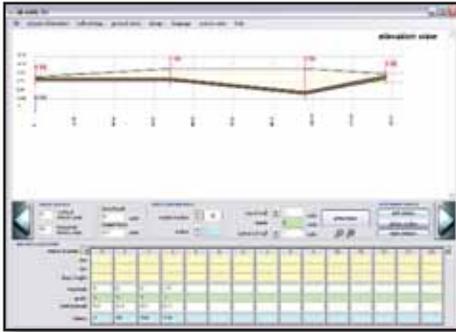
To solve this challenge, a utility trench was designed and located behind the wall to house the numerous private utility lines. The geogrid layout was modified to work around the trench, but still provided the structural requirements for the Allan Block wall.



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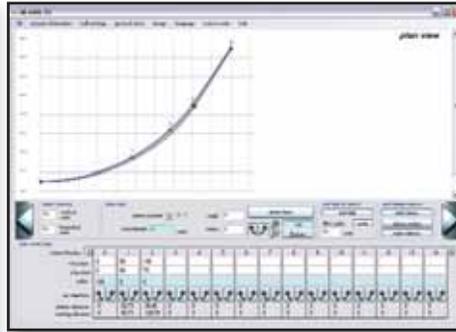
AB Walls 10 Has Been Released!

The highly anticipated AB Walls 10 has recently been released. Please contact your local Allan Block Sales Representative to schedule an appointment to receive your copy of this comprehensive segmental retaining wall design software.



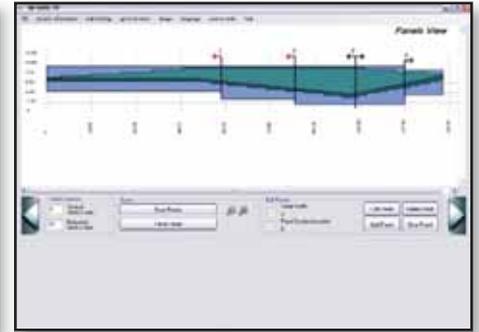
Elevation View:

- Full retaining wall elevations drawn by entering elevations and stations in a spreadsheet-like form.
- Slopes above the wall can be drawn on the elevation to streamline the cross section design process.
- Easily add or modify stations or elevations when design conditions change.



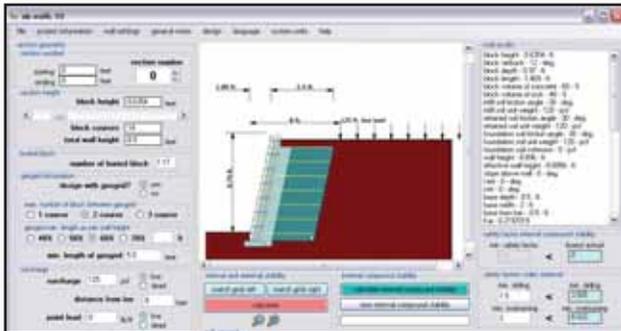
Plan View:

- The plan view can be used to see the true retaining wall footprint on your site including the wall's setback and geogrid length. This is critical in the planning and design phases of construction.
- An existing plan can be imported into AB Walls 10 to provide an accurate wall layout.



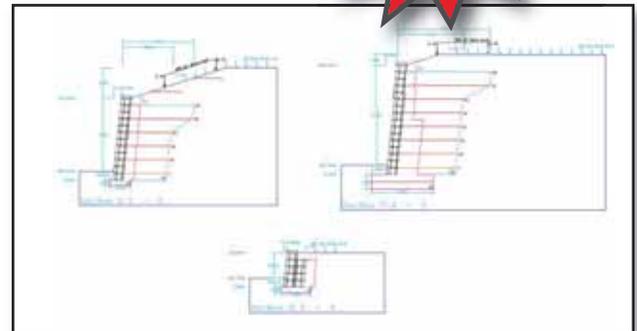
Wall Panels:

- Like previous versions of AB Walls, the retaining wall elevation is divided into multiple wall panels, each of which has a cross section assigned to it.



Cross Sections:

- Geogrid Lengths, Surcharges & Point Loads can all be customized to give an accurate representation of your site.
- Slopes above the wall entered from the elevation or assigned to each cross section independently.
- Static & Seismic Design
 - ◆ External Stability - with automated suggestion of design parameters
 - ◆ Internal Stability - with easily modified geogrid parameters
 - ◆ Internal Compound Stability (ICS)
- Additional gravity wall options available for each cross section.



.DXF Output:

- With the click of a button, output your design to a .DXF file that is compatible with most software. It is layered and to scale, ready to be incorporated into your construction documents.
 - ◆ Elevation
 - ◆ Plan
 - ◆ Cross Sections
 - ◆ General Notes
 - ◆ Cross Section Notes

Call your local AB Sales Rep today to start using the best and easiest retaining wall design software currently available.

Visit allanblock.com for more information.

Allan Block Technical Newsletter - 1st Qtr 2010

Inside this issue:

Project Profile

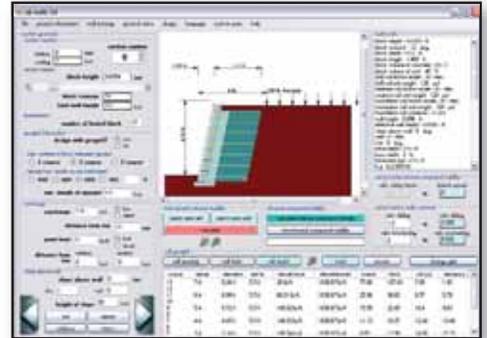
Commercial and Bridge Project,
Progress Quarry Development, Beaverton, OR

Planning Your Way to a Successful Project

New Design Software Released:

Allan Block is Proud to Release AB Walls 10

Designing with Allan Block Patterns



Visit allanblock.com for more information.

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