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23 March 2006

Tony Coe, City Engineer
City of Lafayette
P.O. Box 1968
3675 Mount Diablo Boulevard, Suite 210
Lafayette, California 94549-1968

RE: Addendum 4 to Geotechnical Investigation Report
Proposed City Library
Mt. Diablo Boulevard at First Street
Lafayette, California

Dear Mr. Coe:

We are providing this addendum letter to clarify some of our previous recommendations regarding the design loads for permanent basement and shoring walls and drainage for permanent retaining walls, and to provide additional subgrade preparation recommendations for on-grade floor slabs for the staff building and exterior decking.

BACKGROUND

Geotechnical recommendations for the project were provided by Cal Engineering & Geology, Inc. in our report titled, *Foundation Exploration Report for Planned Lafayette City Library Mt. Diablo Boulevard and First Street Lafayette, California,* dated 21 May 2003. Additional geotechnical recommendations for the project were provided in our report titled, *Addendum Foundation Exploration Report New Lafayette City Library Mt. Diablo Boulevard and First Street Lafayette, California*, dated 15 September 2003. The addendum report incorporated the adjoining parcels (3488 and 3486 Golden Gate Way) to the southeast of the original property. On 25 January 2005 we provided an *Addendum 2 to the Geotechnical Investigation and Report* letter that detailed additional foundation recommendations for the new Lafayette City Library based upon the preliminary project plans prepared by Killefer and Flammang, Architects, dated 18 October 2004. Additional recommendations were provided in our report titled *Addendum 3 to Geotechnical Investigation Report*, dated 24 January 2006. Addendum report 3 provided additional geotechnical recommendations for building walls to be constructed near Seaborg Garden and the Chiller Facility.

CLARIFICATIONS

Design Loads for Basement Retaining Walls and Shoring

The design pressures for permanent retaining walls as noted in our 21 May 2003 report is an equivalent fluid pressure of 50 pounds per cubic foot for an unrestrained (active) condition and 80 pounds per cubic foot for a restrained condition. These loads as provided in the 21 May 2003 report have a triangular distribution and are applicable for cantilever retaining walls.

It is our understanding that it is likely that at least some of the permanent restrained retaining walls will be laterally braced by the floor and building structure and most of the temporary shoring will be laterally supported by rakers or tiebacks. As a result some of the retaining structures will not be cantilevered and the triangular load distribution is not applicable.

For the permanent retaining walls and shoring configurations where lateral bracing of the walls will occur, we recommend that a trapezoidal pressure of 50H (given in pounds per square foot for wall height, H, in feet) should be used to design the permanent laterally braced retaining walls. This value is unfactored, but accounts for seismic loads and vehicular surcharge. The uniform pressure of 50H noted should be applied uniformly over the central six-tenths of the wall and decreased to zero at the top and bottom of the wall. This lateral loading configuration is shown diagrammatically on Figure 1.

Passive earth pressure values for conventional footings supported in bedrock are noted on Page 9 of our 21 May 2003 report.

Deepened foundations (piles) may be used to support permanent retaining walls where bedrock is not anticipated at the library basement subgrade, such as along the west side of the library building. Alluvium is anticipated at the subgrade elevation along the west edge of the library basement level. Resistance to lateral loading for pile-supported retaining walls may be provided by bedrock and/or alluvium. Passive earth pressure values for the bedrock and alluvium are listed on page 10 of the 21 May 2003 report under the heading of *Lateral Design*.

Retaining Wall Drainage Options

Drainage recommendations for permanent retaining walls are listed in the *Retaining Wall* section on pages 11 and 12 of our 21 May 2003 report. These recommendations remain applicable to the project, except that the gradient of pipes may be reduced to 1 percent from 2 percent, if necessary. The attached Figures 2 and 3 provide generalized details of the alternatives discussed on pages 11 and 12 of the 21 May 2003 report.

It is planned to construct a permanent shoring wall along the north side of the structure where the mechanical room (chiller) and some stairs are to be located. This area is located directly adjacent to and below an existing retaining structure that supports the south edge of the parking lot on an

adjoining property. It is our understanding that the permanent shoring wall is planned as a continuous embedded reinforced concrete wall. The wall is to be installed segmentally in narrow hand-excavated slots so as not to undermine the piles supporting the existing retaining structure. The ground surface below the permanent shoring wall will then be trimmed to allow for the installation of rakers to temporarily brace the wall. Additional excavations will then be made to the stairway and basement subgrade elevation. Once the building walls and floor slabs below the permanent shoring wall are installed the lateral loading for the permanent shoring wall will be transferred into the building walls and the rakers removed.

The permanent shoring wall should be poured neat against the face of the beam. The plans for the offsite retaining structure indicates that drainage was to be provided by drain rock wrapped in filter fabric located behind the wood-lagged wall. Water would then weep through gaps between the wood lagging to the face of the slope below. We recommend that a provision should be made to allow for drainage that does weep through the wood lagging which forms the face of the existing retaining structure to reach the slope face to the east of the end of the permanent shoring wall.

If the gap between the existing retaining structure and the permanent shoring wall is to be filled to the top of the existing retaining structure it will be necessary to either design the permanent shoring wall for hydrostatic pressure over the upper 5 feet of the wall that adjoins the face of the existing retaining structure or to provide a drainage outlet for the existing retaining structure.

Drainage for the existing retaining structure and the new permanent shoring wall can be provided by installing sheets of geocomposite drain board on the face of the existing retaining structure and continue it down into the pits excavated for the permanent shoring wall. Drainage for the geocomposite can be transmitted through 4-inch diameter pipes that extend through the face of the permanent shoring wall at a convenient elevation and tied into the subdrain system for the building basement retaining walls.

If property line constraints do not provide sufficient space to use a conventional 4 inch diameter collection and outfall pipes at the base of the retaining wall, then it would be acceptable to use a geocomposite “flat pipe” and connectors as an alternative. Mirafi’s QuickDRAIN product and the appropriate connectors or equivalent are recommended. A detail for this alternative is provided as Figure 4.

SUBGRADE PREPARATION RECOMMENDATIONS

Main Library Building

The excavation for the basement level of the library will expose, bedrock, weathered bedrock and alluvium. These materials are considered to be suitable for support of the basement floor slab. It may be necessary to locally process some alluvium where it is found to be soft and/or saturated. This would involve removal of the upper 2 feet of alluvium and recompacting it and or mixing or replacing it with a select fill derived from excavations made into the bedrock.

Community Hall

The community hall will be supported on a pile-supported structural slab and so will not depend on the earth materials for slab support. No specific subgrade preparation measures are required for this area.

Staff Building

The floor elevation of the staff building to be located at the northeast corner of the property is proposed near the existing grade. The south edge of the structure will extend over the top of the basement wall of the library. The remainder of the structure will be supported by piles that extend onto bedrock so as to minimize the potential for differential settlement. The ground surface in this area is covered by a thin veneer of fill and soil (alluvium). The existing fill and the upper 2 feet of the soil/alluvium should be removed and recompacted to a minimum of 90 percent relative compaction to allow for support of the staff building floor slab on grade. The depth of removal below the existing grade is estimated to be about about 3 to 5 feet, increasing in depth to the south. Deeper removal is anticipated where existing trees are located and the root balls will need to be removed. Removals for the staff building floor slab should extend a minimum of 3 feet beyond the footprint of the building.

If a sloped temporary cut is made to install the basement wall that will extend below the south side of the staff building, then the portion of the staff building floor slab that extends over the area of the temporary cut should be designed as a structural slab. This is because even with well-compacted fill there will be a large variation in fill thickness that could lead to cracking of the floor slab.

Other Areas

Removal depths of 3 to 5 feet below the existing ground surface are anticipated for the subgrade improvement for the exterior decking between the staff building and the community hall and in the amphitheater area near the southwest corner of the property. Deeper removals in the amphitheater could occur if the existing storm drain is to be removed.

The importance of the removal of the existing fill and soft upper soil and alluvium is to provide a uniform base for support of the decking. The subgrade preparation can be performed at anytime, but it may be easier to prepare the grades following site clearing and demolition of the existing building. It should be realized that differential settlement will occur between decking supported on grade and decking located above subterranean portions of the building and structurally supported decking. Joints should be provided at locations where slabs with different support meet.

We trust this addendum provides you with the information required to proceed. If you have any questions, please call us at your convenience.

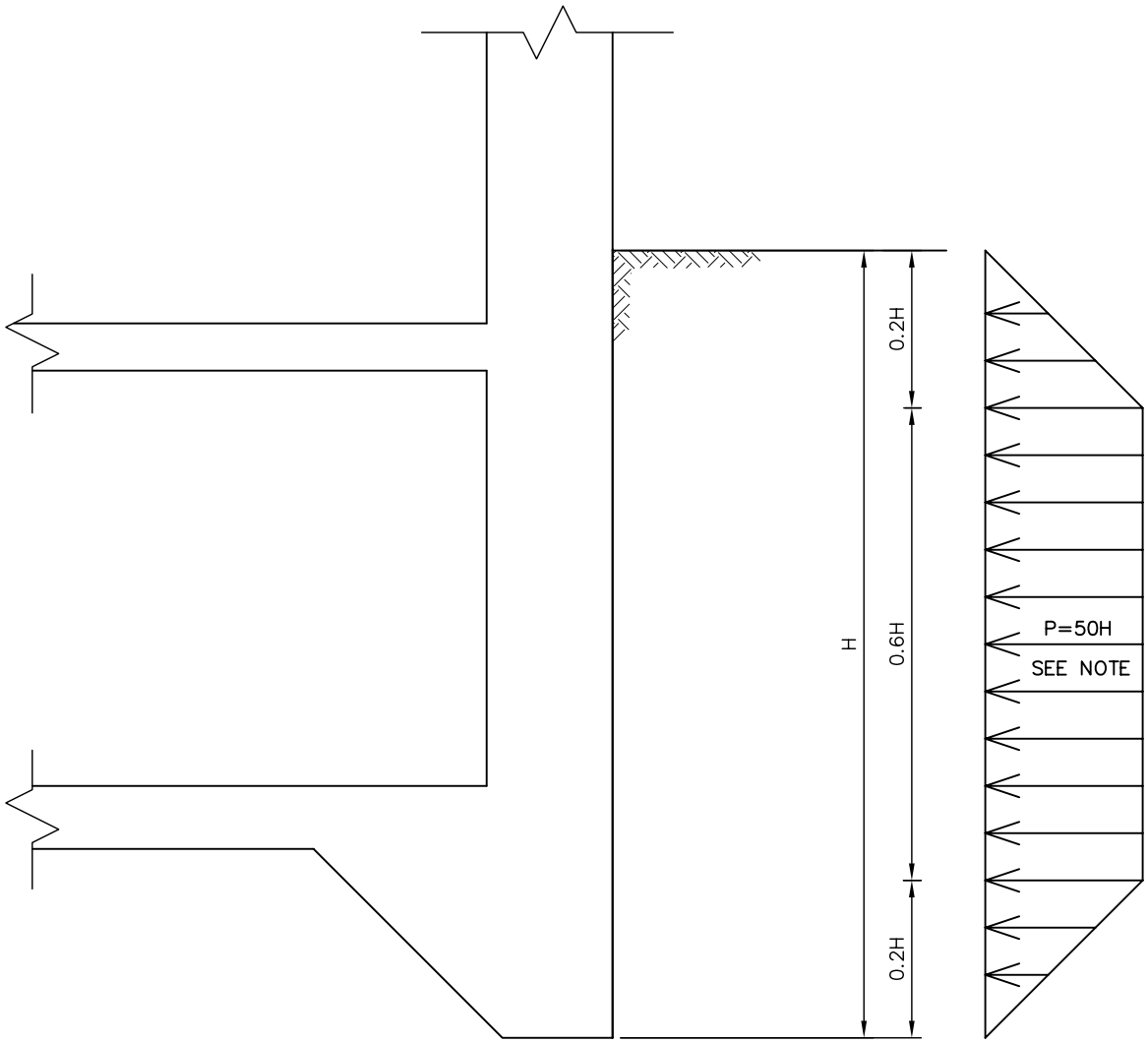
Yours truly,

CAL ENGINEERING & GEOLOGY, INC.

Phillip Gregory, P.E., G.E.
Principal Engineer

Stephen M. Watry, C.E.G., G.E.
Senior Geologist/Engineer

attachments: Figures 1 - 4



EARTH PRESSURE FOR LATERALLY SUPPORTED BASEMENT WALLS

NOT TO SCALE

NOTE:

P = EARTH PRESSURE IN POUNDS PER SQUARE FOOT
H = RETAINED HEIGHT IN FEET

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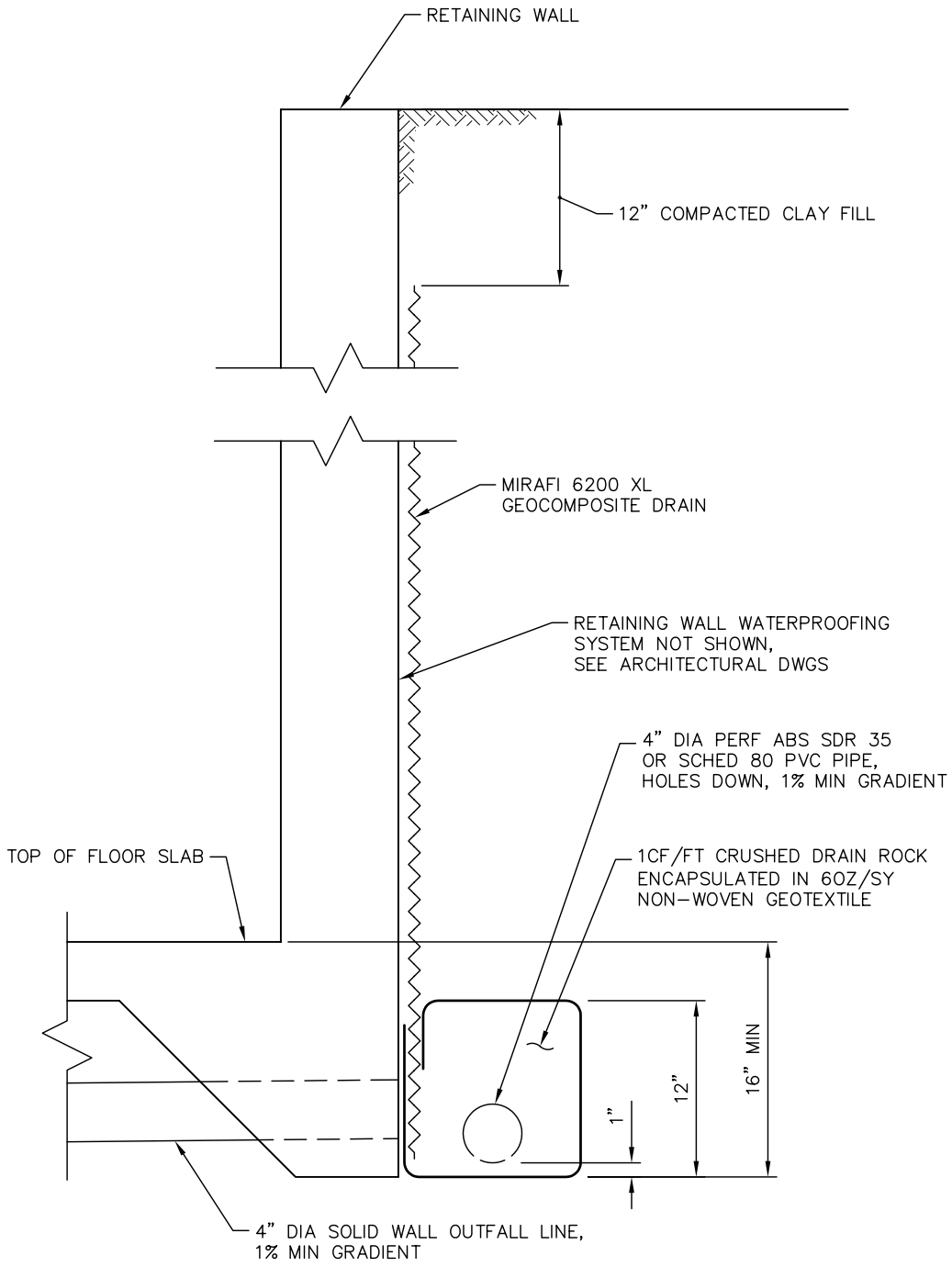
RETAINING WALL LOADING

PROJ NO. 030400	MARCH 2006	FIGURE 1



GEOCOMPOSITE WITH PLASTIC PIPE COLLECTOR

NOT TO SCALE

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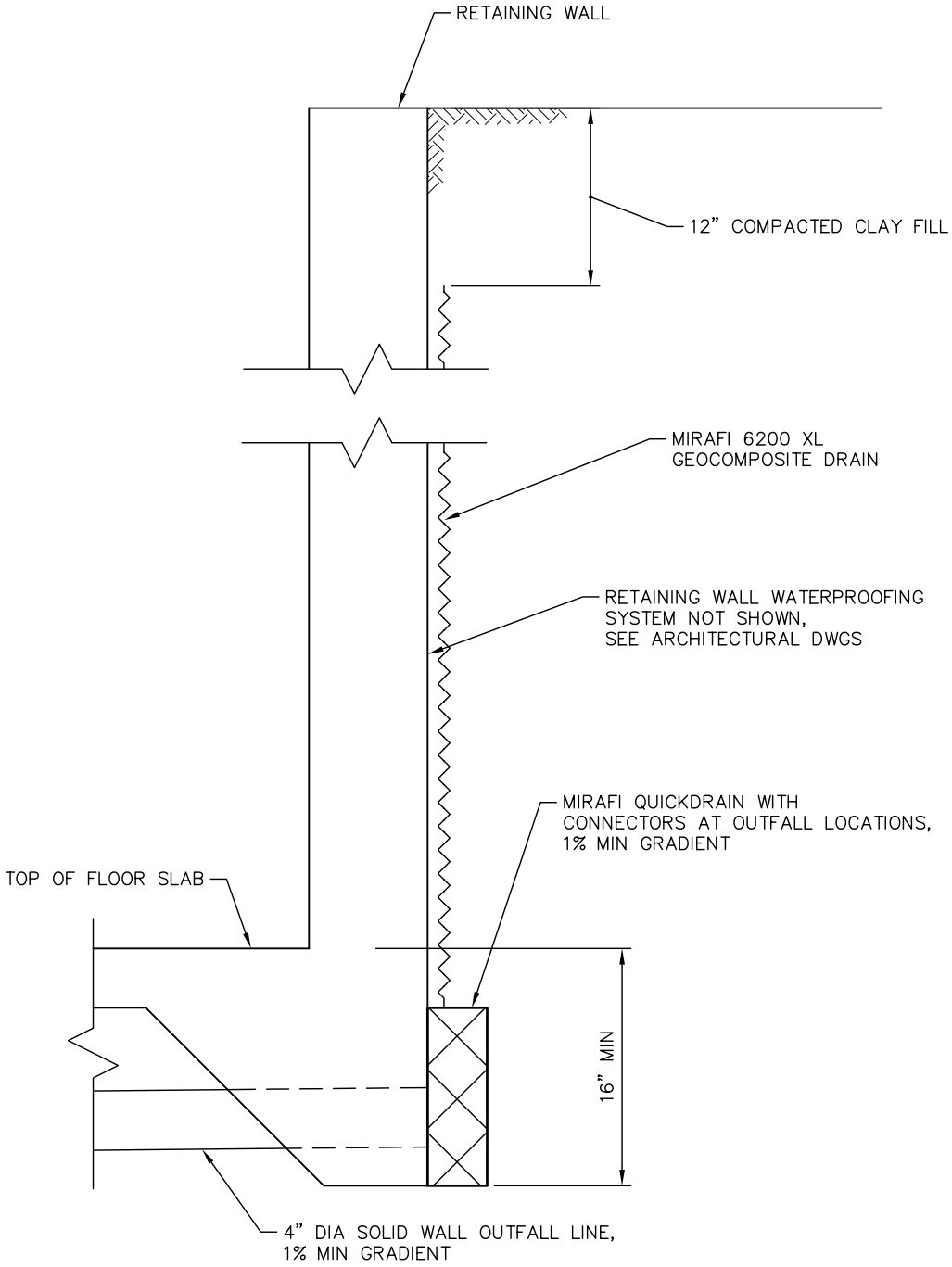
RETAINING WALL SUBDRAIN (1 OF 3)

PROJ NO. 030400	MARCH 2006	FIGURE 2



GEOCOMPOSITE WITH "FLAT PIPE" COLLECTOR

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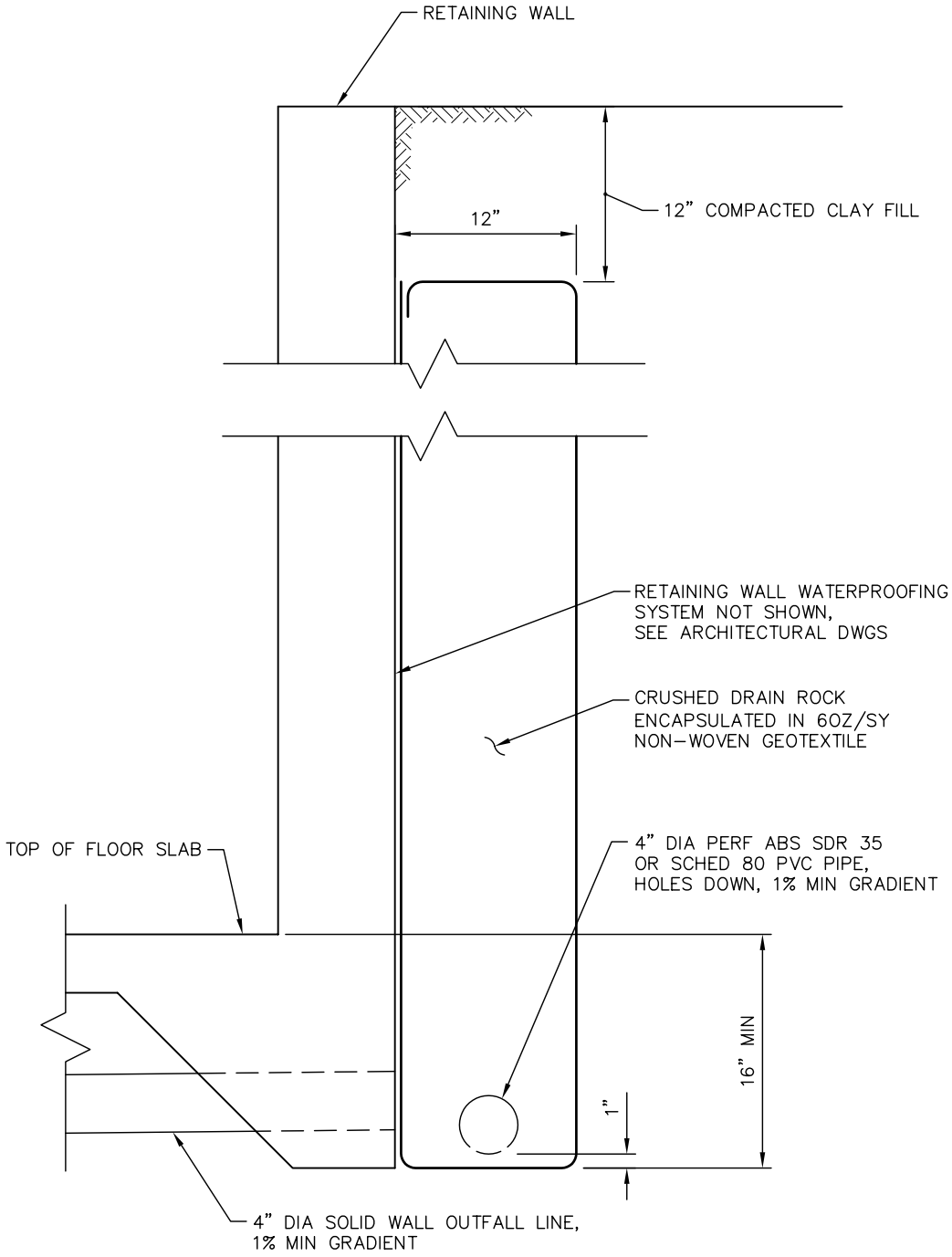
RETAINING WALL SUBDRAIN (2 OF 3)

PROJ NO. 030400	MARCH 2006	FIGURE 3



CRUSHED ROCK WITH PIPE COLLECTOR

NOT TO SCALE

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RETAINING WALL SUBDRAIN (3 OF 3)

PROJ NO. 030400	MARCH 2006	FIGURE 4