PLAN OF CONTROL
FOR
FALLON VILLAGE
GEOLOGIC HAZARD ABATEMENT DISTRICT
DUBLIN, CALIFORNIA

Submitted to:
Mr. Jeff Lawrence
Braddock & Logan Group
4155 Blackhawk Plaza Circle, Suite 201
Danville, CA 94526-4668

Prepared by:
ENGEO Incorporated

May 8, 2007
Latest Revision July 3, 2013

Project No:
4663.101.001

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Subject: Fallon Village
Dublin, California

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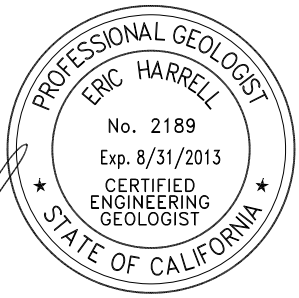
GEOLOGIC HAZARD ABATEMENT DISTRICT

Dear Mr. Lawrence:

The attached documents reflect revisions to the Fallon Village Plan of Control for the purpose of updating the Plan of Control to reflect funding of the onsite conservation easement by the Fallon Village Ranch Geologic Hazard Abatement District (GHAD).

Sincerely,

ENGEO Incorporated



Eric Harrell, CEG

Uri Eliahu, GE

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TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

1.0 AUTHORITY AND SCOPE

The Fallon Village Geologic Hazard Abatement District ("District") was formed under authority of the California Public Resources Code, Division 17, commencing with Section 26500. The boundaries of the District comprise a total of approximately 488 acres.

For the Fallon Village Project, Condition of Approval (COA) No. 76 requires the formation of a Geologic Hazard Abatement District ("GHAD"). To satisfy this requirement, the developer of Fallon Village is submitting this Plan of Control to allow the District to permanently monitor and maintain slopes, detention and water quality basins, storm drainage facilities and other improvements within the GHAD as described herein.

Development of a Plan of Control is a requirement for formation of a GHAD. Pursuant to Section 26509 of the California Public Resources Code, this Plan of Control was prepared by an Engineering Geologist certified pursuant to Section 7822 of the Business and Professions Code. As required by Section 26509, it describes potential geologic hazards within the proposed District boundaries and provides a plan for the prevention, mitigation, abatement, or control thereof.

As used in this Plan of Control, and as provided in Section 26507, "geologic hazard" means an actual or threatened landslide, land subsidence, soil erosion, earthquake, fault movement, or any other natural or unnatural movement of land or earth.

1.1 PROPERTY IDENTIFICATION

The proposed District boundary is shown in the District Boundary Map on Exhibit A, and further described in the District Boundary Description on Exhibit B.

2.0 BACKGROUND

2.1 Existing Site Conditions

The study area is approximately 488 acres and is located north of Highway 580 in Dublin. Prior to mass grading, site topography consisted of rolling, grass-covered hills generally increasing in elevation to the north. Site drainage is to the south, toward Arroyo Las Positas and the Livermore Valley. Prior to mass grading, most of the study area consisted of open, undeveloped land with local improvements related to agricultural or residential use. These improvements included barns, sheds, and dwellings, as well as roadways, driveways, and utilities.

2.2 Proposed Development

The site plan prepared by Mackay and Somps shows 1,043 single-family lots. In addition, the plans show a school site, a neighborhood park site, four bioretention cells (2.4, 0.23, 0.21 and 0.48 acres), roadways and a 4.6-acre neighborhood square site. A Preliminary Geotechnical

Exploration report was completed for the site by ENGEO dated February 23, 2003, and revised December 17, 2004. The ENGEO report titled Phase 1 - Corrective Grading Plans serves as a design-level geotechnical exploration report for the project.

It is our understanding that bulk grading on the site will occur in four phases. As shown on the MacKay and Somps Grading Plans, they will include Phases 1 and 2 Bulk grading and later each of these areas will be regraded to the final elevations necessary for the construction roadways, building pads and other site improvements. The preliminary proposed site grading includes preparation of level building pads and roadways. As planned, grading will involve cuts and fills up to about 70 feet thick. Also, cut slopes as high as 170 feet are planned and fill slopes up to about 80 feet high are planned.

2.3 Open Space

Project Open Space includes approximately 200 acres as shown in Open Space Plan with about 172.2 acres within a conservation easement (Figure 3). Title to the parcels comprising the open space will be conveyed to the GHAD approximately six years after the first residential building permit has been issued within the District. Since long-term maintenance and stability of the GHAD Property will protect the open space, which is an amenity that will benefit all of the current and future property owners, the funding for the GHAD's activities will be shared by all current and future property owners within the GHAD's boundaries. All such activities shall be consistent with this Plan of Control.

2.4 GHAD Responsibilities

The GHAD will mitigate, prevent, abate or repair landslide or erosion hazards that could directly affect property within the GHAD boundary, as necessary to implement this Plan of Control. The GHAD will also assume open-space management responsibilities that are required for the Fallon Village project because, as property owner of the open space, the GHAD is obligated to comply with the terms of a Habitat Mitigation and Management Plan approved by the United States Fish & Wildlife Service and the California Department of Fish and Wildlife. These responsibilities will include vegetation management, erosion control, vegetation removal (fire suppression), and selected other maintenance associated with open space. In addition, the responsibility of the GHAD includes maintenance, monitoring and repair of bioretention cells, vegetation control, armoring of channels and desilting of detention basins.

The GHAD's responsibilities will include, but may not be limited to, monitoring and maintenance for the following as appropriate.

- Four bioretention cells.
- Maintenance and repair of EVA and access roads.
- Erosion repairs.

- Revegetation and vegetation control, including fire break mowing, weeding and additional hydroseeding as deemed necessary.

- Sediment removal from concrete structures (applies only to open-space catch basins, field inlets, V-ditches and storm drain pipes).

- Slope stabilization (includes minor landsliding and debris bench clearing).

- Subdrain outfall maintenance.

- Open-space storm drain pipe and V-ditch replacement.

In addition, the GHAD will have maintenance, monitoring and repair responsibilities for slopes, which will include natural, reconstructed or partially reconstructed landslides as indicated within the referenced ENGEO reports and discussed in Section V.

3.0 GEOLOGY

3.1 Regional Geology and Geologic Maps

The site is located within the Coast Ranges geologic province of California, a series of northwest-trending ridges and valleys. Bedrock at the site is mapped as non-marine sedimentary rock of the Tassajara Formation (QTt) (Dibblee, 1980) or as the Livermore Gravels (Graymer et al., 1994) of Late Pliocene to Pleistocene age. The rocks in the site vicinity have been tightly folded such that the bedrock layers (bedding) are generally inclined at a steep angle from the horizontal. Crane (1996) mapped the axes of anticlinal and synclinal folds through the north end of the site.

The site is not located within a State of California Earthquake Fault Zone for active faults (CDMG, 1982). The nearest mapped active faults are the Calaveras fault located approximately 5 miles to the southwest and the Greenville fault located approximately 6 miles to the northeast. A more detailed discussion of the site geology is included as Appendix C of this Plan of Control.

4.0 SLOPE STABILITY CONSIDERATIONS DURING MASS GRADING

As shown on the Corrective Grading Plans for Fallon Village (May 2006), existing artificial fills within the graded area have been removed and, as required, replaced with subdrained engineered fills (Figure 1). In graded or repaired areas, the unsuitable materials, including alluvium, colluvium and/or landslide debris will be overexcavated to firm undisturbed materials below the unsuitable material as determined by the Geotechnical Engineer or Engineering Geologist at the time of grading. Surface and subsurface drains will be installed to collect the surface and subsurface waters which may have initially caused the instability. The configuration of each subdrainage system will be tailored to the individual area at the time of grading. The Geotechnical Engineer and/or Engineering Geologist will determine the location and depths of

subdrains at that time. The location and elevation of subdrains and outlets will be surveyed during construction. Each subexcavation will then be reconstructed to final grade by keying and benching below the landslide plane with compacted, drained engineered fill.

It is important to note that to preserve the natural topography, wildlife habitat and vegetation of the site, stabilization of landslide masses is currently planned only for landslides that directly threaten the proposed improvements. Slope instability in open-space parcels which does not have the potential to directly affect the GHAD-accepted homesites, roadways, habitat areas or other critical improvements will not be repaired, as provided in Section 6.0.

The cuts will be viewed by the project Geologist during grading to provide mitigation schemes for unsuspected slope conditions which could decrease the slope stability. Such conditions include unfavorable bedrock attitudes and seepage conditions. A geology map will be prepared by the project Geologist for use by the GHAD. We expect that the extents of buttressed slopes and associated subdrain systems will be identified on as-built plans following construction.

5.0 GEOLOGIC HAZARDS

Geologic hazards identified for the site in the geotechnical exploration reports include the following items.

- Slope instability
- Seismically induced ground shaking
- Expansive soils
- Compressible soils

These geologic hazards are not expected to be eliminated entirely by site grading. Slope instability is not unique to this project, but is of importance for hillside projects throughout the San Francisco Bay Area. Future stability of these areas depends on various factors, including any introduction of natural or artificial groundwater, future grading and earthquake ground shaking.

5.1 Slope Instability

During mapping for the site geotechnical exploration, areas of slope instability were identified throughout the planned development area and within the future open space areas. The geologic hazard map showing the location of each of the debris flows and landslides is included as Figure 2. The table below identifies each of the landslide areas within the development area and the proposed corrective measures. The “Current Designation” column shown on Table 5.1-1 is the landslide labeling used on the corrective grading plan. The “Previous Designation” column identifies the landslide labeling used in the Geotechnical Exploration Report. Potential District monitoring or maintenance activities for the specific areas listed in the table below are discussed in Section 8.0.

TABLE 5.1-1
Mapped Areas of Slope Instability and Proposed Corrective Measures

Bulk Grading				
LANDSLIDE		Location (Sheet) and Landslide Type	Proposed Corrective Measures	Unremediated Areas
Current Designation	Previous Designation			
L1	R25	G2, Earthflow	Remove and replace.	None
L2	Not Labeled	G2, Earthflow	Removal and replacement of landslide material within the limits of grading.	Landslide material may not be removed downslope of engineered fill slope.
L3	Not Labeled	G2, Earthflow	Removal and replacement of landslide material within the limits of grading.	Landslide material may not be removed downslope of engineered fill slope.
L4	R13	G1, Earthflow	Remove and replace.	None
L5	R14	G1, Earthflow	Remove and replace.	None
L6	R8	G1, Earthflow	Remove and replace.	None
L7	R7	G1, Earthflow	Removal and replacement of landslide material within the limits of the property.	Offsite landslide material will not be removed.
L7A	Not Labeled	G1, Deep seated	Buttress fill over lower portion of the landslide.	No removal of landslide material outside the civil limits of grading.
L7B	Not Labeled	G1, Deep seated	Buttress fill over lower portion of the landslide.	No removal of landslide material outside the civil limits of grading.
L8	R6	G1, Earthflow	Remove and replace.	None
L9	R12	G1, Earthflow	Remove and replace.	None
L10	R11	G1, Earthflow	Remove and replace.	None
L11	R10	G1, Earthflow	Remove and replace.	None
L12	R17	G1, Rotational slump	Excavation of landslide material within 20 feet of the pad grade.	Landslide material not removed below 20 feet below the pad grade.
Phase 2				
L12	R17	G1, Rotational slump	Within building pads excavation of landslide material within 10 feet of the pad grade.	Landslide material not removed below 10 feet below the pad grade within buildable lots.

Bulk Grading				
LANDSLIDE		Location (Sheet) and Landslide Type	Proposed Corrective Measures	Unremediated Areas
Current Designation	Previous Designation			
L13	R16	G1, Rotational slump	Within building pads, excavation of landslide material within 20 feet of the pad grade.	Landslide material not removed below 20 feet below the pad grade within buildable lots.
L14	R-15	G2, (Lots and a portion of Parcel "E"), Rotational Slump	Removal and replacement of landslide material within the limits of grading.	Landslide material may not be removed downslope of engineered fill slope.
L15	R-19	G2 (Lots and adjacent slope), Slump flow complex	Removal and replacement of landslide material within the limits of grading.	None
L16	R-26	G3, Earth flow	Remove and replace.	None
L16A	R-27	G3, Earthflow	Removal and replacement of landslide material within the limits of the property.	Offsite landslide material will not be removed.
L17	R-24	G2, Earth flow	Remove and replace.	None
L18	R-25	G2, Earth flow	Remove and replace.	None
L19	R-21	G2, Earth flow	Remove and replace.	None
L20	R-22	G2, Earth flow	Remove and replace.	None
L21	R-20	G2, Earth flow	Remove and replace.	None
L22	R28, R-29 and R-30	Lots 976-1004, Rotational Slump	Remove and replace.	None
L23	R-31	Lots 940-942, 961-965 and 1013-1017, Slump Flow Complex	Remove and replace.	None
L24	R-34	Lots 829-831, Earth flow	Remove and replace onsite landslide material.	Offsite portion of the landslide.

A number of landslides are located within the open space areas of the District and mitigation is not planned for these areas of slope instability since they do not have the potential to impact the site improvements as discussed in Section 6.0. Since no mitigation is shown on the Corrective Grading Plan, these landslides were not relabeled and retain the designation from the Geotechnical Exploration Report. These landslides are described below and shown on Figure 2.

TABLE 5.1-2
Mapped Areas of Slope Instability
Without Proposed Corrective Measures

Slide Designation	Type of Feature	Estimated Depth (feet)
R-1 to R-4	Earth flow	15
R-5	Slump flow complex	30
R-9	Earth flow	10
R-18	Slump flow complex	40
R-19	Slump flow	30
R-23	Earth flow	15
R-32 and R-33	Earth flow	10 to 15

In addition to the landslides listed above, other areas of slope instability or landsliding will likely be identified during the life of the development. Since earth stability is the District's prime geotechnical concern, this section describes several types of slope instability that may be within the District's area of responsibility, subject to Section 6.0 of this Plan of Control.

A landslide is defined as a mass of rock, soil and other debris that has been displaced downslope by sliding, flowing or falling. Landslides include cohesive block glides and disrupted slumps that have formed by displacement along a planar slip surface or rotation (displacement along a curved slip surface). Undercutting and erosion of hillside slopes trigger many slope failures.

Slope failures are also often triggered by increased pore water pressure due to the infiltration of rainwater. The resulting decrease of shear resistance (internal resistance to deformation by shearing) can cause the slope to move. The level of the groundwater table varies with the amount of rainfall for the area. If rainfall is higher than average during the winter season, the water table will be higher than average on a hillslope and groundwater pressures may become dangerously high. Under these conditions, hillside movement can be activated.

Areas of thicker soil cover on the hillslopes are known as colluvium (Qc). Colluvial deposits are typically the result of soil creep and may be in a weak, unconsolidated state, making them susceptible to landsliding if undercut. Colluvium is generally approximately ten to fifteen feet in thickness. Landslides and colluvial deposits located within open space areas are natural landforms that do not require mitigation except where they affect man-made improvements. Potential mitigation and repair measures for District areas near development are discussed in Section 8.0.

5.2 Seismically Induced Ground Shaking

As identified in the geotechnical report, an earthquake of moderate to high magnitude generated within the San Francisco Bay Region could cause considerable ground shaking at the site, similar

to that which has occurred in the past. Seismic slope stability has been considered in the ENGEO designed geotechnical corrective grading plan; however, seismically generated slope failures could occur in open-space areas outside the development limits.

5.3 Expansive Soils

Near-surface soil, colluvium and alluvium at the site could exhibit a moderate to critically high potential for expansion. These potentially expansive soils could impact the planned site development. Expansive soils shrink and swell as a result of moisture changes. This can cause heaving and cracking of slabs-on-grade, pavements and structures founded on shallow foundations. The potential for expansive soils has been identified in previous reports for the property. Shrink and swell of expansive soils on slopes is a portion of the mechanism of creep movement which can result in shallow slope instability.

5.4 Compressible Soils

Based on the geotechnical data, it appears that minor settlement of as much as a few inches could result from consolidation of alluvial and colluvial deposits beneath deep fills and from consolidation of deep fills due to their own weight. Based on the proposed grading settlements experienced by site improvements due to design fills are anticipated to be minor.

6.0 AREAS OF DISTRICT RESPONSIBILITY

6.1 Scope of Activities

The Fallon Village GHAD, as owner of the open space areas and basins within the site, will assume responsibilities that relate to its position as a GHAD and other duties of a responsible landowner. The GHAD is charged with responsibilities that relate to the prevention, mitigation, abatement, and control of geologic hazards. This includes, but is not limited to, the maintenance of facilities that enhance site stability such as drainage facilities and associated improvements. This may include the monitoring and maintenance of drainage facilities and associated resources which, if subject to improper care, could result in decreased slope stability, the prime concern of the GHAD.

In addition, the GHAD will be responsible for maintenance of designated trails planned within the open space area. Improper maintenance of the trail system could facilitate erosion, a prime concern for the GHAD. Funding for conservation activities are described in the Engineer's Report for the Fallon Village GHAD.

6.2 Prevention, Mitigation, Abatement and/or Control of Geologic Hazards

Subject to the following exceptions, the primary mission of the District shall be the prevention, mitigation, abatement and/or control of geologic hazards within its boundaries that have damaged, or that pose a significant threat of damage to site improvements within the developed

areas of the project. As used herein, the term "site improvements" means buildings and outbuildings, roads, sidewalks, improved paths, utilities, improved trails, swimming pools, tennis courts, gazebos, cabanas, geologic stabilization features or similar improvements.

6.3 Exceptions

The intent of this Plan of Control is not to require or to create the expectation that the District will take action to address every threatened or actual geologic hazard. The District may decline to prevent, mitigate, abate or control geologic hazards under the following circumstances:

6.3.1 Isolated or Remote Slope Instability

The District shall not have responsibility and may place a low priority on its responsibility to monitor, abate, mitigate or control slope instability that does not involve damage to or pose a significant threat to damage site improvements.

6.3.2 Single Property

The District will not prevent, mitigate, abate or control geologic hazards which are limited in area to a single parcel of property unless the geologic hazard has damaged, or poses a significant threat of damage, to site improvements located on other property within the District boundaries. This exclusion does not apply to geologic hazards existing on common area property owned by the HOA or within open space owned by the District.

6.4 Vertical Movement or Creep Due to Shrink Swell or Settlement

Vertical movement due to shrink-swell of expansive soils or settlement of fills is expected at the site as with many residential developments in the area. Damage to site improvements resulting from shrink swell or settlement of fills is not the responsibility of the GHAD.

6.5 Property Not Accepted

The GHAD shall not have responsibility to repair damage, which is situated on a parcel of real property, which the GHAD has not accepted in accordance with Section 7.0. The GHAD, however, may monitor, abate, mitigate or control slope instability on a parcel of real property which the GHAD has not accepted in accordance with Section 7.0, provided that the GHAD responsibility on such parcel shall be limited to the extent necessary to address damage or a significant threat to damage site improvements on a GHAD accepted parcel.

Not withstanding the above exceptions from District responsibility, the District may take any action necessary to prevent, mitigate, abate or control damage to property or site improvements for which, in the sole judgment of the District, the District would be legally responsible as a property owner.

6.5.1 Hazard(s) or Failure(s) Resulting From Negligence

The District may decline to prevent, mitigate, abate or control geologic hazards or failures if, in the sole judgment of the District Manager in consultation with geologic or geotechnical professionals as the manager deems necessary, such hazards occur as the result of negligence of a property owner and/or a property owner's contractors, agents or employees in developing, grading, constructing, or maintaining any work on the subject property.

6.6 District Funding or Reimbursement for Damaged or Destroyed Structures or Site Improvements

In the event a residence or any other private structure, site improvement or landscape feature is damaged or destroyed as a result of a geologic hazard, the District may fund or reimburse the property owner for the expenses necessary to repair or replace the damaged or destroyed structure, site improvement or landscaping. Unless otherwise authorized by the Board of Directors, the total dollar amount of the District funding or reimbursement paid to all property owners whose property is damaged by the geologic hazard may not exceed ten percent (10%) of the total costs incurred by the District in actually mitigating, abating or controlling the geologic hazard that causes the damage. In the event the geologic hazard damaged or destroyed a structure, site improvement or landscaping which violated any provisions of the City Building Code or City Code at the time of its installation or improvement, the District may decline to provide any funding, or reimbursement to the property owner for repair or replacement of the damaged structure, improvement or landscaping.

6.7 No Reimbursement of Expenses Incurred by Property Owners

The District will not be obligated to reimburse a property owner for expenses incurred for the prevention, mitigation, abatement, or control of a geologic hazard nor for reimbursement for damaged or destroyed structures or site improvements absent a written agreement between the property owner and the District to that effect, which agreement has been executed prior to the property owner incurring said expenses, and following an investigation conducted by the District.

6.8 Protected Wildlife Habitat

The GHAD will not prevent, mitigate, abate or control isolated geologic hazards which are limited to mitigation areas and/or protected wildlife habitat unless the geologic hazard has damaged, or poses a significant threat of damage, to site improvements located on property within the GHAD boundaries. The GHAD, as land owner, is responsible for conservation activities as described in the Fallon Village GHAD Engineer's Report.

7.0 FUNDING AND ACCEPTANCE OF RESPONSIBILITY BY THE DISTRICT

7.1 1. Activation of Assessment

Ultimately an annual assessment shall be levied on all annexed residential or nonresidential parcels with habitable building areas within the Fallon Village development. The assessment shall be levied by the GHAD on each individual parcel beginning the first fiscal year following issuance of a building permit for that parcel.

7.2 2. Responsibility for GHAD Activities

The party that, on the date each Final Map is recorded within the GHAD boundaries, owns the developable parcels shown on that Final Map, shall have the responsibility to perform all the activities of the GHAD on property within that Final Map. Such responsibility shall automatically transfer to the GHAD at 9:00 a.m. on the day exactly six years after the first residential building permit is issued by the City of Dublin provided that the items listed under item No. 3 in this section have been completed. This turn-over date may be extended at the sole discretion of the project developer provided that the assessments shall continue to be levied during the extension period and that notice of such extension is delivered to the GHAD Manager at least 30 days prior to the turn-over date. The petitioners for formation of the GHAD intend that the approximately six-year period between the levying of the GHAD assessment and the GHAD becoming responsible to perform activities on property within each Final Map will allow the District to accumulate reserve funds without incurring significant expenses.

7.3 3. Ownership of the Open Space

Ownership of the open space will pass from the owner/developers to the District on, or approximately on the date the District commences its activities and becomes responsible for oversight of the actual physical maintenance of the open space as provided in this section.

7.4 4. Process for Transferring Responsibility for GHAD Activities

After the Transfer Eligibility Date for parcel(s), the process for transferring responsibility for performing GHAD activities on such parcel(s) shall be as follows:

(a) In the calendar year of the Transfer Eligibility Date or in any subsequent year, at its discretion, the developer may apply to the GHAD ("Transfer Application") to transfer the responsibility for performing GHAD Activities for parcel(s) to the District.

(b) Within 45 days of receiving such notice, a representative of the GHAD shall verify that all the facilities for which the GHAD will have maintenance responsibility have been constructed and maintained according to the City-approved plans and specifications for

the individual improvements, and that such facilities are operational and in good working order.

(c) Within 15 days of such inspection, the GHAD will send the developer a list ("Punch list") of all of the items that need to be constructed, repaired or otherwise modified in order to comply with the City-approved plans and specifications.

(d) The developer will notify the GHAD when it has completed the items identified on the Punch list.

(e) Within 30 days of receipt of such notice, the GHAD shall verify that all Punch list items have been completed and notify the developer that the District accepts responsibility for performing all future GHAD Activities on the parcel(s).

As part of the transfer activities the developer of parcel(s) to be transferred will provide the GHAD, for its use, copies of the applicable geotechnical exploration reports, grading plans, corrective grading plans, improvement plans, field-verified geologic maps, as-built subdrain plans or other pertinent documents as requested by the GHAD.

8.0 GEOTECHNICAL TECHNIQUES FOR MITIGATION OF LANDSLIDE, SOIL CREEP AND EROSION HAZARDS

8.1 Landslide Mitigation for Existing Debris Flows and Landslides

For existing debris flows and landslide areas, the following mitigation measures have been proposed and shown on the corrective grading plans. General landslide mitigation measures are shown below.

TABLE 8.1-1
Selected District Mitigation and Monitoring Areas

Bulk Grading				
LANDSLIDE		Location and Landslide Type	Unremediated Areas	Potential District Maintenance or Monitoring Activities
Current Designation	Previous Designation			
L2	Not Labeled	G2, Earthflow	Landslide material may not be removed downslope of engineered fill slope.	Observation of this area during periodic site monitoring events. Higher potential for corrective work in future if remaining landslide debris experiences movement and impacts site improvements. See Section 8.0 for potential landslide mitigation techniques.
L3	Not Labeled	G2, Earthflow	Landslide material may not be removed downslope of engineered fill slope.	Observation of this area during periodic site monitoring events. Higher potential for corrective work in future if remaining landslide debris experiences movement and impacts site improvements. See Section 8.0 for potential landslide mitigation techniques.
L7	R7	G1, Earthflow	Offsite landslide material will not be removed.	Observation of this area during periodic site monitoring events. Higher potential for corrective work in future if remaining landslide debris experiences movement and impacts site improvements. See Section 8.0 for potential landslide mitigation techniques.
L7A	Not Labeled	G1, Deep seated	No removal of landslide material outside the civil limits of grading.	In the event that Landslide L7A experiences movement, drainage in the swale at the toe of the planned fill slope could be partially blocked. To avoid ponding of water and the associated problems, it may be necessary to implement measures to facilitate storm drainage in this area. We anticipate that this type of operation would become the responsibility of the proposed Geologic Hazard Abatement District (GHAD).

Bulk Grading				
LANDSLIDE		Location and Landslide Type	Unremediated Areas	Potential District Maintenance or Monitoring Activities
Current Designation	Previous Designation			
L7B	Not Labeled	G1, Deep seated	No removal of landslide material outside the civil limits of grading.	Observation of this area during periodic site monitoring events. Higher potential for corrective work in future if remaining landslide debris experiences movement and impacts site improvements. See Section 8.0 for potential landslide mitigation techniques.
L14	R-15	G2, (Lots and a portion of Parcel "E"), Rotational Slump	Landslide material may not be removed downslope of engineered fill slope.	Observation of this area during periodic site monitoring events. Higher potential for corrective work in future if remaining landslide debris experiences movement and impacts site improvements. See Section 8.0 for potential landslide mitigation techniques.
L16A	R-27	G3, Earthflow	Offsite landslide material will not be removed.	
L24	R-34	Lots 829-831, Earth flow	Offsite portion of the landslide.	

8.2 General Landslide Mitigation

The techniques the District may employ to prevent, mitigate or abate landsliding or adverse erosion damage might include, but are not necessarily limited to:

- Removal of the unstable earth mass.
- Stabilization (either partial or total) of the landslide by removal and replacement with compacted drained fill.
- Construction of structures to retain or divert landslide material or sediment.
- Construction of erosion control devices such as gabions, rip rap, geotextiles, or lined ditches.
- Placement of drained engineered buttress fill.
- Placement of subsurface drainage devices (e.g. underdrains, or horizontal drilled drains).

- Slope correction (e.g. gradient change, biotechnical stabilization, and slope trimming or contouring).

- Construction of additional surface ditches and/or detention basins, silt fences, sediment traps, or backfill or erosion channels.

Potential landslide and erosion hazards can often best be mitigated by controlling soil saturation and water runoff and by maintaining the surface and subsurface drainage system. Maintenance shall be provided for lined surface drainage ditches and drainage terraces including debris catchment structures or drop inlets.

The impact of soil creep on site improvements is usually best mitigated by designing structures to resist the forces applied by the creeping soil, since soil creep movement on slopes is typically caused by conditions which are difficult to control on a larger scale, such as the wetting and drying of clays, the growth of roots, burrowing animals and by the downslope movement of saturated ground. Monitoring activities may include observation of saturated ground conditions and burrowing animal populations, which may be controlled by additional drainage or the removal of burrowing animals.

9.0 BIOTECHNICAL RECOMMENDATIONS FOR PREVENTION AND MITIGATION OF EXISTING OR POTENTIAL EROSION HAZARDS

Fill slopes within the boundaries of the District are expected to be erodible as will cut slopes in bedrock; therefore, the maintenance of vegetative cover is especially important. Vegetation provides a protective role on soil and exposed rock. It absorbs the impact of raindrops, reduces the velocity of runoff and retards erosion.

In many instances, adequate erosion protection for slopes can be accomplished with carefully selected and placed biological elements (plants) without the use of structures (e.g. brush layering and willow waddling).

In other areas, biotechnical slope protection may involve the use of mechanical elements or structures in combination with biological elements to provide erosion control and help prevent small-scale slope failures. Locally, crib walls, welded-wire walls, gabion walls, rock walls, riprap and reinforced earth walls used in combination with carefully selected and planted vegetation can provide high quality slope protection. The vegetation may be planted on the slope above a low retaining structure or toe wall, or the interstices of the structure can be planted.

10.0 PRIORITY FOR DISTRICT FUNDED REPAIRS

Emergency response and scheduled repair expenditures are to be prioritized by the General Manager, utilizing its discretion, based upon available funds, a prudent reserve and the approved operating budget.

Should available funds not be sufficient to undertake all of the identified remedial and preventive stabilization measures; the expenditures shall be prioritized as follows in descending order of priority:

A. The prevention, mitigation, abatement or control of geologic hazards that have either damaged or pose a significant threat of damage to residences, critical underground utilities or paved streets.

B. The prevention, mitigation, abatement or control of geologic hazards that have either damaged or pose a significant threat of damage to private or community recreation facilities (e.g. pools, spas, etc.).

C. The prevention, mitigation, abatement or control of geologic hazards that have either damaged or pose a significant threat of damage limited to loss of landscaping or other similar non-essential amenities.

D. The prevention, mitigation, abatement or control of geologic hazards existing entirely on open-space property and which have neither damaged nor pose a significant threat of damage to any site improvements.

11.0 MAINTENANCE AND MONITORING SCHEDULE

Geologic features and District-maintained facilities should be inspected on a regular basis. Budget permitting, inspections should be scheduled to occur a minimum of two times per year in normal years and three or more times per year in years of heavy rainfall. The inspections should be scheduled to take place in October, prior to the first significant rainfall; mid-winter as necessary during heavy rainfall years; and in early April at the end of the rainy season. The frequency of the inspections should be increased in years of higher than average rainfall intensity and/or recurrence.

- A District Engineer and/or Geologist should inspect the lined surface of concrete-lined drainage ditches within the District boundaries on a regular schedule. If possible, inspections should be scheduled twice each year, budget permitting. One inspection should be in the fall prior to the onset of winter rains. The inspector should check for sedimentation, cracking or shifting of the concrete-lined ditches. Repairs and maintenance should be performed on a regular schedule. Excess silt or sediment in ditches should be removed and cracked or broken ditches should be patched or repaired as required before the beginning of the next rainy season.

- Several types of debris catchment structures are planned. Repairs and maintenance should be performed on a regular schedule. Excess debris should be removed to allow the structures to maintain adequate catchment area.

- Subsurface drain outlets and horizontal drilled drain outlets, if any, should be inspected on a regular schedule. Water flowing from these outlets should be measured and recorded during each inspection. If possible, inspections should be scheduled twice each year, preferably in the fall and spring. Any suspicious interruption in flow should signal a need to unplug or clean by flushing the affected drain.

- If installed, piezometers used to measure groundwater levels, or other instruments such as inclinometers and tiltmeters, should be monitored on a regular schedule.

- Settlement monitoring devices, if any, should be monitored on a regular schedule. In the event of anomalous readings or excessive settlement, the monitoring frequency should be increased.

- Inlets, outfalls or trash racks, if used, must be kept free of debris and spillways maintained. Attention should be given to plantings or other obstructions, which may interfere with access, by power equipment.

- The bioretention facilities should be monitored and maintenance in accordance with the Operations and Maintenance Manual for Bioretention Facilities Tract 7586 at Fallon Village. A copy of this manual is provided in Appendix B.

The District should review its inspection schedule annually and assess the effectiveness of its preventive maintenance program on a regular basis. District staff should prepare an annual report to the Board of Directors with recommendations for maintenance and/or repair projects. Consultants, if necessary, may be retained to undertake the needed studies. The District Engineer and/or Engineering Geologist retained by the District shall prepare an annual inspection report for presentation to the District Board of Directors.

12.0 OPEN SPACE OWNERSHIP AND MANAGEMENT

Ownership, funding sources and maintenance responsibilities shall be as shown on following table. Parcels labels listed on the table below in quotation marks are those from the vesting tentative map.

TABLE 12.0-1
Fallon Village
Long-Term Ownership and Management Matrix

Facility/Function	Maintenance Entity	Funding	Tentative Acceptance Date Or Minimum Initial Monitoring Term	Ownership
I. Development Area				
A. Residential Lots	Private	Private	2013	Private
B. Bioretention Cells (Parcels J, JJ, "EE" and "FF")				
1. Water Quality Facilities	GHAD	GHAD	2013	GHAD
2. Retaining Walls and Slopes	GHAD	GHAD	2013	GHAD
3. Landscaping	HOA	HOA		GHAD
C. Semi Public Parcel E	Braddock and Logan	Braddock and Logan		Braddock and Logan
D. Parcel KK	HOA	HOA		HOA
E. Park (Parcel "E)	City of Dublin	City of Dublin		City of Dublin
F. Park (Parcel O)	City of Dublin	City of Dublin		City of Dublin
G. School Site (Parcel F-1)	Dublin Unified School District	Dublin Unified School District		Dublin Unified School District
H. Parkways, Tree Planting Easements and Sidewalks	HOA	HOA		City of Dublin
I. Multi-Use Trails and Collector Medians	HOA	HOA		City of Dublin
J. Parcel B and "II"	GHAD	GHAD		Braddock and Logan (City of Dublin)
II. Open Space				
K. Parcels A, C, D, E-1, K, P, "B", "C", "D" and "GG" including conservation easement funding starting in FY 2013/2014	GHAD	GHAD	2013	GHAD
L. Mitigation Pond (0.83 Acres)	Land Trust	Endowment		GHAD

13.0 RIGHT-OF-ENTRY

District officers, employees, consultants, contractors, agents, and representatives shall have the right to enter upon all lands within the District boundary, as shown on Exhibit B, for the purpose of performing the activities described in the Fallon Village Plan of Control. Such activities include, but are not limited to: (1) the inspection, maintenance and monitoring of site improvements including sedimentation basins, maintenance roads, deflection walls, drainage ditches, storm drains, outfalls and pipelines; (2) the monitoring, maintenance and repair of slopes, including repaired or partially repaired landslides; and (3) the management of erosion and geologic hazards within the open space areas shown on Exhibit A. Should the District need to access private residential lots to fulfill its duties under the Plan of Control, the District shall provide the affected landowner and/or resident with 72 hours advanced notice, unless in the reasonable judgment of the District, an emergency situation exists which makes immediate access necessary to protect the public health and safety, in which case no advanced notice is required, but the District shall inform the landowner and/or resident as soon as reasonably possible.

The foregoing right-of-entry shall be recorded in the chain of title for all residential parcels and common area lots, and it shall be included in all Covenants, Conditions and Restrictions (CC&Rs) and homebuyer disclosure statements prepared for parcels within the District boundary.

REFERENCES

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Crane, R., 1996, Geologic Map of the Livermore 7.5-Minute Quadrangle.

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ENGEO, Phase 1 – Corrective Grading Plans, Fallon Village, Dublin, California, March 14, 2006, Project No. 4663.1.009.01.

ENGEO, Preliminary Geotechnical Exploration, East Dublin Properties, Dublin, California, February 23, 2003, Revised December 17, 2004, Project No. 4663.1.004.01.

ENGEO, Geotechnical Corrective Grading Plan, Fallon Village, Dublin, California, May 2006, Project No. 4663.1.009.01.

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Graymer, R. W., Jones, D. L. and Brabb, E. E., 1994, Preliminary Geologic Map Emphasizing Bedrock Formations in Alameda County, California: OFR 96-252.

MacKay and Somps, Tentative Map, Fallon Village, Dublin, California, December 5, 2005.

MacKay and Somps, Phase 1 Bulk Grading Plan, Tract 7586 - Fallon Village, Dublin, California, Project No. 19319-1 June 2006.

Nilsen, T. H., 1975, Preliminary Photointerpretation Map of Landslide and Other Surficial Deposits of the Livermore 7½' Quadrangle, Contra Costa County, California, USGS 75-277-26.

APPENDIX A

Exhibits and Figures

Exhibit A	District Boundary Map
Exhibit B	District Boundary Description
Figure 1	Geotechnical Corrective Grading Plan
Figure 2	Geologic Map
Figure 3	Open Space and Improvements Ownership/Maintenance Plan

APPENDIX A

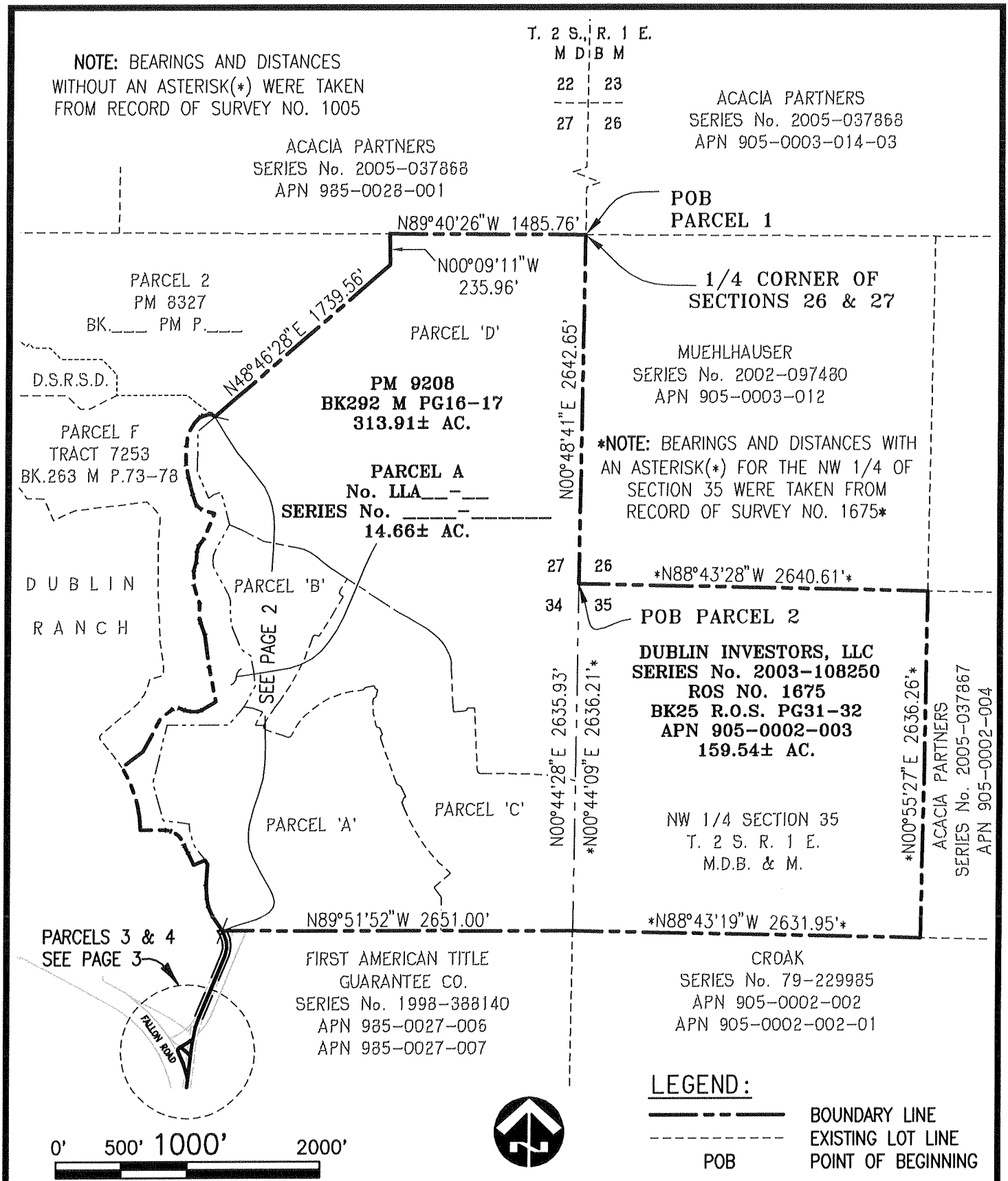

EXHIBIT "A" PAGE 1 OF 3

LIMITS OF FALLON VILLAGE GHAD

SEE EXHIBIT B FOR DESCTIPTION

CITY OF DUBLIN COUNTY OF ALAMEDA CALIFORNIA

MACKAY & SOMPS
CIVIL ENGINEERING•LAND PLANNING•LAND SURVEYING
Pleasanton, CA (925) - 225-0690

DRAWN	DATE	SCALE	JOB NO.
AMB	03-21-07	1"=1000'	19149-10

3-23-2007 16:41:06 mmcclellan P:\19149\legals\GHAD-legals-overall\PLATEXHIBIT.dwg

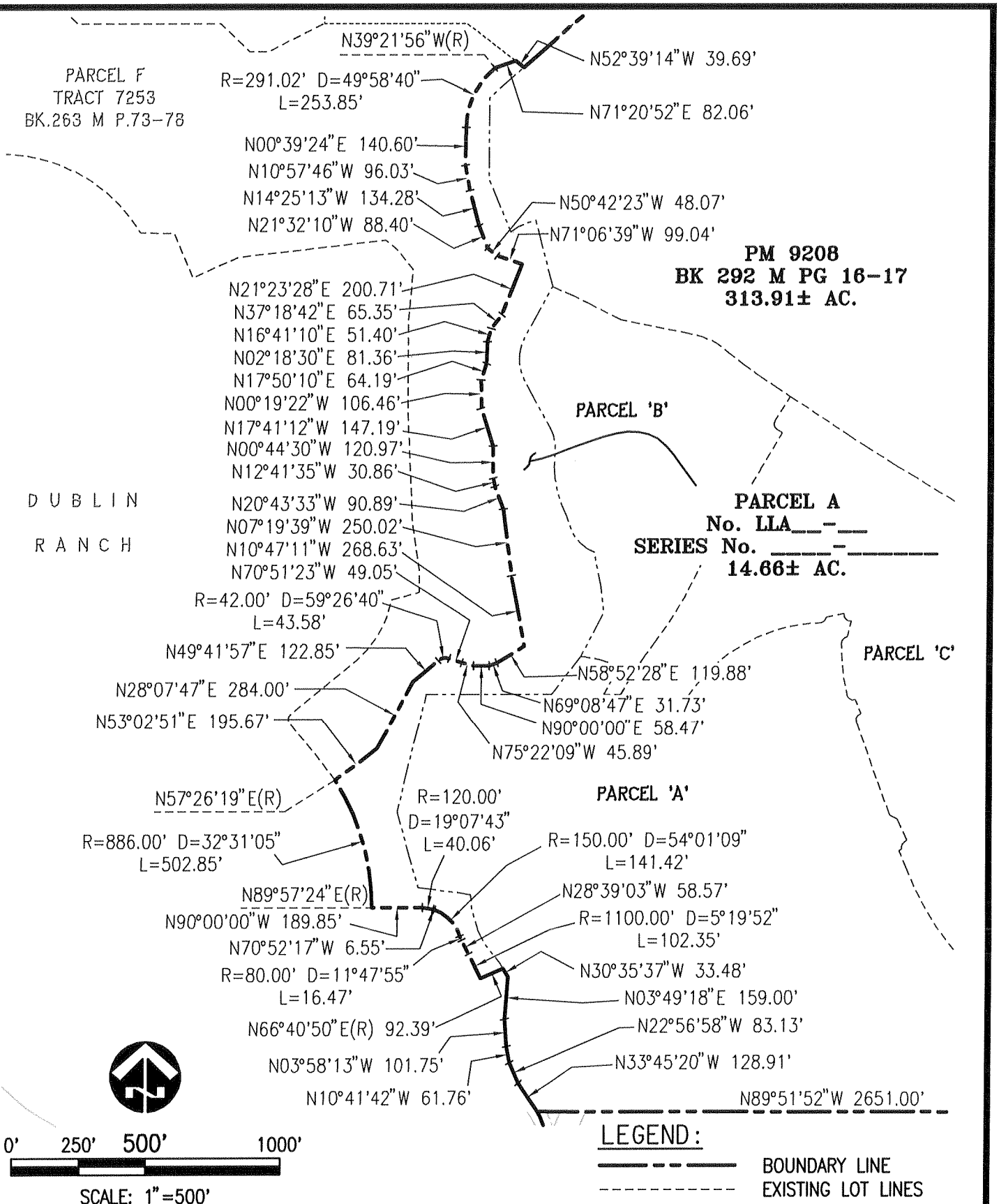

EXHIBIT "A"

LIMITS OF FALLON VILLAGE GHAD

SEE EXHIBIT B FOR DESCTIPTION

CITY OF DUBLIN COUNTY OF ALAMEDA CALIFORNIA

MACKAY & SOMPS
CIVIL ENGINEERING•LAND PLANNING•LAND SURVEYING
Pleasanton, CA (925) - 225-0690

DRAWN	DATE	SCALE	JOB NO.
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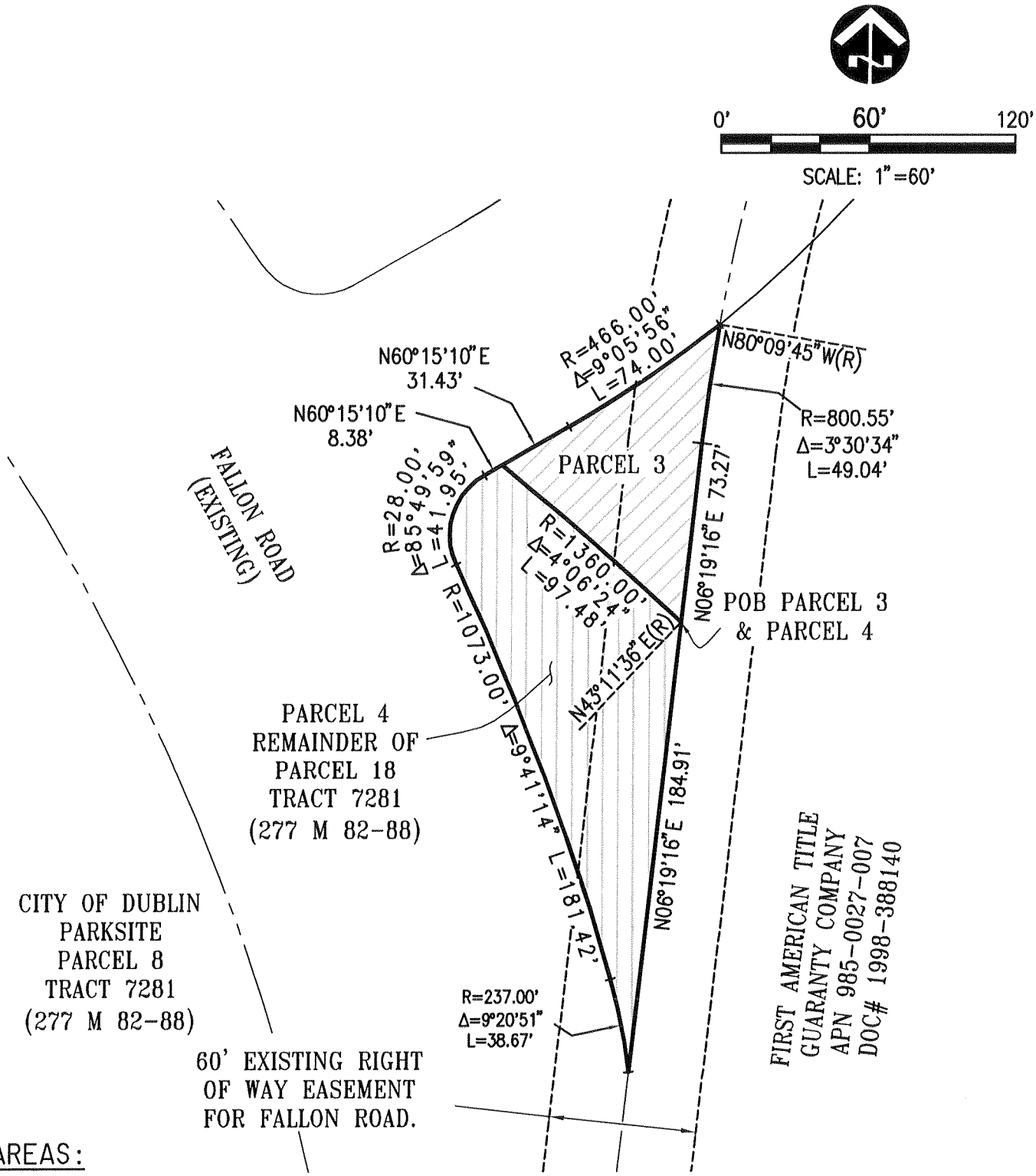

AREAS:

PARCEL 3=4,645± SF.
PARCEL 4=10,082± SF.

LEGEND:

POB POINT OF BEGINNING

EXHIBIT "A"

PAGE 3 OF 3

LIMITS OF FALLON VILLAGE GHAD

SEE EXHIBIT B FOR DESCTIPTION

CITY OF DUBLIN, COUNTY OF ALAMEDA, CALIFORNIA

MACKAY & SOMPS
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Pleasanton, CA (925) - 225-0690

DRAWN	DATE	SCALE	JOB NO.
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3-23-2007 16:48:21 mmcclellan P:\19149\legals\GHAD-legals-overall\GHADPARCELS1&2.dwg

EXHIBIT B

BOUNDARY OF THE DISTRICT AREA
(PROPERTY DESCRIPTION)

ALL THAT CERTAIN REAL PROPERTY SITUATED IN CITY OF DUBLIN, COUNTY OF ALAMEDA, STATE OF CALIFORNIA, BEING ALL OF THE NORTHWEST QUARTER OF SECTION 35 AS DESCRIBED IN SERIES No. 2003-108250, ALAMEDA COUNTY RECORDS, AS WELL AS A PORTION OF THE SOUTH HALF OF SECTION 27 AND A PORTION OF THE NORTH HALF OF SECTION 34, TOWNSHIP 2 SOUTH, RANGE 1 EAST, MOUNT DIABLO BASE AND MERIDIAN, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

PARCEL 1

BEGINNING AT THE COMMON QUARTER CORNER OF SECTIONS 26 AND 27 AS SHOWN ON PARCEL MAP 9208, RECORDED IN BOOK 292 OF MAPS PAGES 16-17, ALAMEDA COUNTY RECORDS; THENCE ALONG THE SECTION LINE OF SECTIONS 26 AND 27, SAID SECTION LINE BEING ALSO THE WESTERLY LINE OF THE MUEHLHAUSER TRUST, SERIES No. 2002-097480, ALAMEDA COUNTY RECORDS, SOUTH 00°48'41" WEST 2,642.65 FEET, TO THE COMMON SECTION CORNER OF SECTIONS 26, 27, 34, AND 35;

THENCE ALONG THE COMMON SECTION LINE OF SECTIONS 34 AND 35, SAID SECTION LINE BEING ALSO THE WESTERLY LINE OF DUBLIN INVESTORS, LLC, SERIES No. 2003-108250, ALAMEDA COUNTY RECORDS, SOUTH 00°44'28" WEST 2,635.93 FEET, TO THE COMMON QUARTER CORNER OF SECTIONS 34 AND 35;

THENCE ALONG THE EAST-WEST QUARTER SECTION LINE ENTERING SECTION 34, SAID EAST-WEST QUARTER SECTION LINE BEING ALSO THE NORTHERLY LINE OF FIRST AMERICAN TITLE GUARANTEE CO., SERIES No. 1998-388140, ALAMEDA COUNTY RECORDS, NORTH 89°51'52" WEST 2,651.00 FEET;

THENCE LEAVING SAID EAST-WEST QUARTER SECTION LINE ALONG THE WESTERLY LINES OF PARCEL "A" OF SAID PARCEL MAP 9208, THE FOLLOWING SIX (6) COURSES:

1) NORTH 33°45'20" WEST 128.91 FEET;

2) NORTH 22°56'58" WEST 83.13 FEET;

3) NORTH 10°41'42" WEST 61.76 FEET;

4) NORTH 03°58'13" WEST 101.75 FEET;

5) NORTH 03°49'18" EAST 159.00 FEET;

6) NORTH 30°35'37" WEST 33.48 FEET;

THENCE LEAVING SAID WESTERLY LINE OF PARCEL "A" ALONG THE WESTERLY LINE OF PARCEL "A", PER No. LLA____-____SERIES No. ____-_____, ALAMEDA COUNTY RECORDS THE FOLLOWING THIRTY-NINE (39) COURSES:

1) SOUTH 66°40'50" WEST 92.39 FEET TO A NON-TANGENT CURVE;

2) THENCE ALONG SAID NON-TANGENT CURVE TO THE LEFT, FROM WHICH THE RADIUS POINT BEARS SOUTH 66°40'50" WEST, HAVING A RADIUS OF 1,100.00 FEET; THROUGH A CENTRAL ANGLE OF 05°19'52", FOR AN ARC DISTANCE OF 102.35 FEET;

3) NORTH 28°39'03" WEST 58.57 FEET TO A POINT OF CURVATURE;

4) THENCE ALONG A TANGENT CURVE TO THE RIGHT HAVING A RADIUS OF 80.00 FEET, THROUGH A CENTRAL ANGLE OF 11°47'55", FOR AN ARC DISTANCE OF 16.47 FEET; TO A POINT OF REVERSE CURVATURE;

5) THENCE ALONG SAID REVERSE CURVE TO THE LEFT HAVING A RADIUS OF 150.00 FEET, THROUGH A CENTRAL ANGLE OF 54°01'09", FOR AN ARC DISTANCE OF 141.42 FEET;

6) NORTH 70°52'17" WEST 6.55 FEET TO A POINT OF CURVATURE;

7) THENCE ALONG A TANGENT CURVE TO THE LEFT HAVING A RADIUS OF 120.00 FEET, THROUGH A CENTRAL ANGLE OF 19°07'43", FOR AN ARC DISTANCE OF 40.06 FEET;

8) NORTH 90°00'00" WEST 189.85 FEET TO A NON-TANGENT CURVE;

9) THENCE ALONG SAID NON-TANGENT CURVE TO THE LEFT, FROM WHICH THE RADIUS POINT BEARS SOUTH 89°57'24" WEST, HAVING A RADIUS OF 886.00 FEET; THROUGH A CENTRAL ANGLE OF 32°31'05", FOR AN ARC DISTANCE OF 502.85 FEET;

10) NORTH 53°02'51" EAST 195.67 FEET;

11) NORTH 28°07'47" EAST 284.00 FEET;

12) NORTH 49°41'57" EAST 122.85 FEET; TO A POINT OF CURVATURE;

13) THENCE ALONG A TANGENT CURVE TO THE RIGHT HAVING A RADIUS OF 42.00 FEET, THROUGH A CENTRAL ANGLE OF 59°26'40", FOR AN ARC DISTANCE OF 43.58 FEET;

14) SOUTH 70°51'23" EAST 49.05 FEET;

15) SOUTH 75°22'09" EAST 45.89 FEET;

16) NORTH 90°00'00" EAST 58.47 FEET;

17) NORTH 69°08'47" EAST 31.73 FEET;

18) NORTH 58°52'28" EAST 119.88 FEET;

19) NORTH 10°47'11" WEST 268.63 FEET;

20) NORTH 07°19'39" WEST 250.02 FEET;

21) NORTH 20°43'33" WEST 90.89 FEET;

22) NORTH 12°41'35" WEST 30.86 FEET;

23) NORTH 00°44'30" WEST 120.97 FEET;

24) NORTH 17°41'12" WEST 147.19 FEET;

25) NORTH 00°19'22" WEST 106.46 FEET;

26) NORTH 17°50'10" EAST 64.19 FEET;

27) NORTH 02°18'30" EAST 81.36 FEET;

28) NORTH 16°41'10" EAST 51.40 FEET;

29) NORTH 37°18'42" EAST 65.35 FEET;

30) NORTH 21°23'28" EAST 200.71 FEET;

31) NORTH 71°06'39" WEST 99.04 FEET;

32) NORTH 50°42'23" WEST 48.07 FEET;

33) NORTH 21°32'10" WEST 88.40 FEET;

34) NORTH 14°25'13" WEST 134.28 FEET;

35) NORTH 10°57'46" WEST 96.03 FEET;

36) NORTH 00°39'24" EAST 140.60 FEET TO A POINT OF CURVATURE;

37) THENCE ALONG A TANGENT CURVE TO THE RIGHT HAVING A RADIUS OF 291.02 FEET, THROUGH A CENTRAL ANGLE OF 49°58'40", FOR AN ARC DISTANCE OF 253.85 FEET;

38) NORTH 71°20'52" EAST 82.06 FEET;

39) SOUTH 52°39'14" EAST 39.69 FEET; TO THE WESTERLY LINE OF PARCEL "D" OF SAID PARCEL MAP 9208;

THENCE ALONG SAID WESTERLY LINE OF PARCEL "D" THE FOLLOWING TWO (2) COURSES:

1) NORTH 48°46'28" EAST 1,739.56 FEET;

2) NORTH 00°09'11" WEST 235.96 FEET TO A POINT ON THE QUARTER SECTION LINE OF SECTION 27, SAID SECTION LINE BEING ALSO THE SOUTHERLY LINE OF ACACIA PARTNERS, SERIES No. 2005-037868, ALAMEDA COUNTY RECORDS, AND THE NORTHERLY LINE OF SAID PARCEL "D";

THENCE ALONG SAID QUARTER SECTION LINE SOUTH 89°40'26" EAST 1,485.76 FEET; TO THE **POINT OF BEGINNING**.

CONTAINING 328.57 ACRES, MORE OR LESS.

PARCEL 2

BEGINNING AT THE COMMON CORNER OF SECTIONS 26, 27, 34, AND 35 THENCE ALONG THE SECTION LINE OF SECTIONS 26 AND 35, SAID SECTION LINE ALSO BEING THE SOUTHERLY LINE OF THE MUEHLHAUSER TRUST, RECORDED IN SERIES No. 2002-097480, ALAMEDA COUNTY RECORDS, SOUTH 88°43'28" EAST 2640.61 FEET TO THE NORTH QUARTER CORNER OF SECTION 35;

THENCE ALONG THE NORTH-SOUTH QUARTER SECTION LINE OF SECTION 35, SAID QUARTER SECTION LINE BEING ALSO THE WESTERLY LINE OF ACACIA PARTNERS, RECORDED IN SERIES No. 2005-037867, ALAMEDA COUNTY RECORDS, SOUTH 00°55'27" WEST 2636.26 FEET TO THE CENTER QUARTER CORNER OF SECTION 35;

THENCE ALONG THE EAST-WEST QUARTER SECTION LINE OF SECTION 35, SAID QUARTER SECTION LINE BEING ALSO THE NORTHERLY LINE OF CROAK, RECORDED IN SERIES No. 79-229985,ALAMEDA COUNTY RECORDS; NORTH 88°43'19" WEST 2631.95 FEET TO THE WEST QUARTER CORNER OF SECTION AND 35;

THENCE ALONG THE COMMON SECTION LINE OF SECTIONS 34 AND 35, BEING ALSO THE EASTERLY LINE OF PARCELS "C" AND "D" OF PARCEL MAP 9208, BOOK 292 OF MAPS PAGES 16-17, ALAMEDA COUNTY RECORDS; NORTH 00°44'09" EAST 2636.21 FEET TO THE **POINT OF BEGINNING**.

BEARINGS, DISTANCES AND AREA CALCULATION ARE BASED ON RECORD OF SURVEY No. 1675, BOOK 25 RECORD OF SURVEYS PAGES 31-32 ALAMEDA COUNTY RECORDS.

CONTAINING 159.54 ACRES, MORE OR LESS.

PARCEL 3

ALL THAT CERTAIN REAL PROPERTY SITUATED IN THE CITY OF DUBLIN, COUNTY OF ALAMEDA, STATE OF CALIFORNIA, BEING A PORTION OF FALLON ROAD AS SHOWN ON TRACT MAP 7281, FILED SEPTEMBER 3, 2004 IN BOOK 277 OF MAPS PAGES 82-88, AND TRACT MAP 7142 FILED AUGUST 21, 2001 IN BOOK 261 OF MAPS PAGES 5-10, ALAMEDA COUNTY RECORDS, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF PARCEL 18 AS SHOWN ON SAID TRACT MAP 7281, THENCE ALONG THE NORTHERLY LINE OF SAID PARCEL 18, COINCIDENT WITH THE SOUTHERLY LINE OF FALLON ROAD, ALONG A CURVE TO THE LEFT WITH A RADIUS OF 1360.00 FEET, FROM WHICH THE RADIUS POINT BEARS SOUTH 43°11'36" WEST, THROUGH A CENTRAL ANGLE OF 04°06'24", FOR AN ARC DISTANCE OF 97.48 FEET;

THENCE LEAVING SAID NORTHERLY LINE, AND ENTERING SAID FALLON ROAD, THE FOLLOWING 4 COURSES:

1) NORTH 60°15'10" EAST 31.43 FEET;

2) ALONG A TANGENT CURVE TO THE LEFT WITH A RADIUS OF 466.00 FEET, THROUGH A CENTRAL ANGLE OF 09°05'56" FOR AN ARC DISTANCE OF 74.00 FEET TO THE CENTERLINE OF OLD FALLON ROAD, A 60 FOOT RIGHT OF WAY;

3) THENCE ALONG SAID CENTERLINE ALONG A NON TANGENT CURVE TO THE LEFT WITH A RADIUS OF 800.55 FEET, FROM WHICH THE RADIUS POINT BEARS SOUTH 80°09'45" EAST, THROUGH A CENTRAL ANGLE OF 03°30'34", FOR AN ARC DISTANCE OF 49.04 FEET;

4) THENCE SOUTH 06°19'16" WEST 73.27 FEET TO THE **POINT OF BEGINNING**.

CONTAINING 4,645 SQUARE FEET MORE OR LESS.

PARCEL 4

ALL THAT CERTAIN REAL PROPERTY SITUATED IN CITY OF DUBLIN, COUNTY OF ALAMEDA, STATE OF CALIFORNIA, BEING PARCEL 18 AS SHOWN ON TRACT MAP 7281, RECORDED IN BOOK 277 OF MAPS PAGES 82-88, ALAMEDA COUNTY RECORDS, EXCEPTING FROM SAID PARCEL 18 THAT PORTION CONVEYED TO THE CITY OF DUBLIN AS DESCRIBED

IN SERIES No. _____, ALAMEDA COUNTY RECORDS, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF PARCEL 18 AS SHOWN ON SAID TRACT MAP 7281, THENCE ALONG THE NORTHERLY LINE OF SAID PARCEL 18, COINCIDENT WITH THE SOUTHERLY LINE OF FALLON ROAD, ALONG A CURVE TO THE LEFT WITH A RADIUS OF 1360.00 FEET, FROM WHICH THE RADIUS POINT BEARS SOUTH 43°11'36" WEST, THROUGH A CENTRAL ANGLE OF 04°06'24", FOR AN ARC DISTANCE OF 97.48 FEET, TO THE EASTERLY LINE OF THE PORTION CONVEYED TO THE CITY OF DUBLIN IN SERIES No. ____-_____, ALAMEDA COUNTY RECORDS;

THENCE LEAVING SAID NORTHERLY LINE AND ALONG SAID EASTERLY LINE THE FOLLOWING FOUR (4) COURSES:

1) SOUTH 60°15'10" WEST 8.38 FEET; TO A TANGENT CURVE;

2) ALONG SAID TANGENT CURVE TO THE LEFT HAVING A RADIUS OF 28.00 FEET, THROUGH A CENTRAL ANGLE OF 85°49'59"; FOR AN ARC DISTANCE OF 41.95 FEET; TO A POINT OF REVERSE CURVATURE;

3) ALONG SAID REVERSE CURVE TO THE RIGHT HAVING A RADIUS OF 1,073.00 FEET, THROUGH A CENTRAL ANGLE OF 09°41'14", FOR AN ARC DISTANCE OF 181.42 FEET; TO A POINT OF COMPOUND CURVATURE;

4) ALONG SAID COMPOUND CURVE TO THE RIGHT HAVING A RADIUS OF 237.00 FEET, THROUGH A CENTRAL ANGLE OF 09°20'51", FOR AN ARC DISTANCE OF 38.67 FEET, TO THE EASTERLY LINE OF SAID PARCEL 18;

THENCE ALONG SAID EASTERLY LINE NORTH 06°19'16" EAST 184.91 FEET, TO THE **POINT OF BEGINNING.**

CONTAINING 10,082 SQUARE FEET, MORE OR LESS

SEE EXHIBIT A FOR DISTRICT BOUNDARY MAP

END OF DESCRIPTION.

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CIVIL ENGINEERING • LAND PLANNING • LAND SURVEYING
5142 Franklin Drive Suite B, Pleasanton, CA. 94588-3355
(925) 225-0690

EXPLANATION

- Qaf FILL
- Qal ALLUVIUM
- Qc COLLUVIUM
- QTt TASSAJARA FORMATION
- B-4-05 APPROXIMATE LOCATION OF BORING (ENGEO, 2005)*
- B-15 APPROXIMATE LOCATION OF BORING (ENGEO, 2002)*
- C-3 APPROXIMATE LOCATION OF CORED TEST BORING (ENGEO, 2002)*
- B-3 APPROXIMATE LOCATION OF BORING (ENGEO, 2000)*
- C-5 APPROXIMATE LOCATION OF CORED TEST BORING (ENGEO, 2000)*
- TP-108-05 APPROXIMATE LOCATION OF TEST PIT (ENGEO, 2005)*
- TP-2 APPROXIMATE LOCATION OF TEST PIT (ENGEO, 2000)*
- BEDDING TREND FROM AERIAL PHOTOGRAPHY
- 55 STRIKE AND DIP OF BEDDING
- 45 STRIKE AND DIP OF SHEAR PLANE
- ANTICLINE
- SYNCLINE
- BLIND THRUST FAULT MAPPED BY CRANE
- FAULT
- GEOLOGIC CONTACT

- SHALLOW EARTHFLOW/DEBRIS FLOW (5'-15' THICK)
- MODERATELY DEEP EARTHFLOW/ROTATIONAL SLUMP (15'-30' THICK)
- DEEP-SEATED ROTATIONAL BEDROCK SLUMP (30'-60' THICK)
- PROPERTY BOUNDARY

* ADJACENT NUMBER INDICATES DEPTH TO BEDROCK

- K24 PROPOSED KEYWAY
- PROPOSED GEOGRID REINFORCEMENT
- PROPOSED KEYWAY SUBDRAIN
- PROPOSED SWALE SUBDRAIN
- L21 PROPOSED LANDSLIDE DEBRIS REMOVAL
- SUBDRAIN DISCHARGE
- SUBDRAIN RISER
- C1 PROPOSED COLLUVIUM REMOVAL
- RECOMMENDED FILL MONITORING POINT
- POSSIBLE SLOPE REBUILD AREA TO MITIGATE ADVERSE BEDDING
- INV 713' PROPOSED SUBDRAIN INVERT WITH APPROXIMATE ELEVATION

- C CUT LOT, OVEREXCAVATE 3 FEET
- T TRANSITION LOT, OVEREXCAVATE CUT PORTION 3 FEET
- 563 DIFFERENTIAL FILL LOT, OVEREXCAVATE LOT TO ELEVATION NOTED

SUBDRAIN PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH ONE OF THE FOLLOWING REQUIREMENTS:

DESIGN DEPTHS LESS THAN 30 FEET
- PERFORATED ABS SOLID WALL SDR 35 (ASTM D-2751)
- PERFORATED PVC SOLID WALL SDR 35 (ASTM D-3034)
- PERFORATED PVC A-2000 (ASTM F949)
- PERFORATED CORRUGATED HDPE DOUBLE-WALL (AASHTO M-252 OR M-294, CALTRANS TYPE S, 50 PSI MINIMUM STIFFNESS)

DESIGN DEPTHS LESS THAN 50 FEET
- PERFORATED PVC SDR 23.5 SOLID WALL (ASTM D-3034)
- PERFORATED SCH. 40 PVC SOLID WALL (ASTM-1785)
- PERFORATED ABS SDR 23.5 SOLID WALL (ASTM D-2751)
- PERFORATED ABS DWV/SCH. 40 (ASTM D-2661 AND D-1527)
- PERFORATED CORRUGATED HDPE DOUBLE-WALL (AASHTO M-252 OR M-294, CALTRANS TYPE S, 70 PSI MINIMUM STIFFNESS)

DESIGN DEPTHS LESS THAN 70 FEET
- PERFORATED ABS SOLID WALL SDR 15.3 (ASTM D-2751)
- PERFORATED SCH. 80 PVC (ASTM D-1785)
- PERFORATED CORRUGATED ALUMINUM (ASTM B-745)

N

0 FEET 200
0 METERS 100

DISCHARGE TO EXISTING STORM DRAIN PIPE INVERT 605'

DISCHARGE TO EXISTING STORM DRAIN PIPE INV. 690'

KEYWAY TO BE FILLED WITH SILTSTONE-DERIVED MATERIAL

KEYWAY TO BE FILLED WITH SILTSTONE-DERIVED MATERIAL

BASE MAP SOURCE: MACKAY & SOMPS

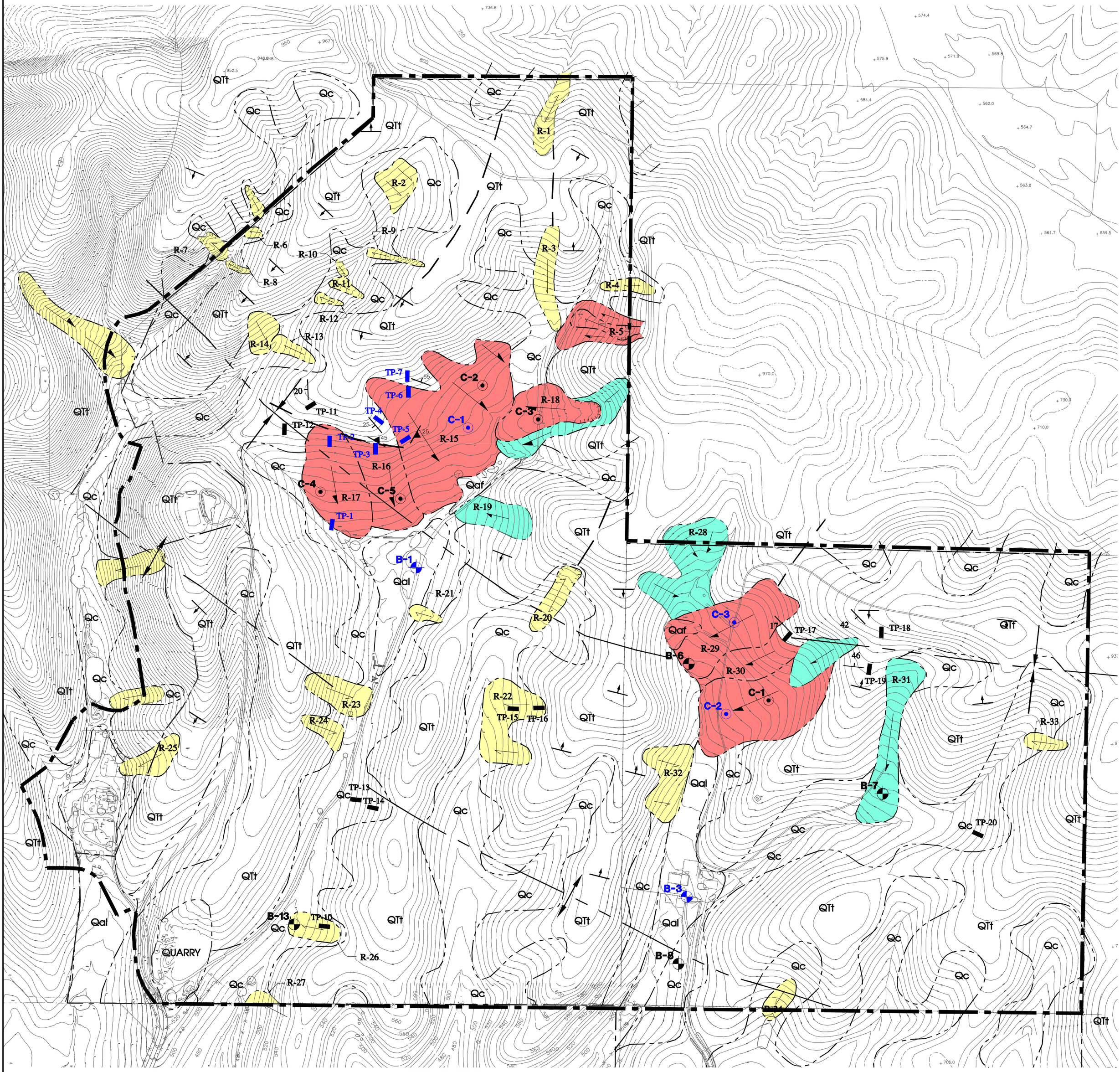
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

CORRECTIVE GRADING PLAN
FALLON VILLAGE GHAD
DUBLIN, CALIFORNIA

PROJECT NO.:	4663.1.010.01
DATE:	MAY 2007
DRAWN BY: PC	CHECKED BY: EH

FIGURE NO. 1

ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION

- Qaf — FILL
- Qal — ALLUVIUM
- Qc — COLLUVIUM
- QTt — TASSAJARA FORMATION
- B-15 — APPROXIMATE LOCATION OF BORING (ENGEO, 2002)
- C-3 — APPROXIMATE LOCATION OF CORED TEST BORING (ENGEO, 2002)
- B-3 — APPROXIMATE LOCATION OF BORING (ENGEO, 2000)
- C-3 — APPROXIMATE LOCATION OF CORED TEST BORING (ENGEO, 2000)
- TP-6 — APPROXIMATE LOCATION OF TEST PIT
- TP-2 — APPROXIMATE LOCATION OF TEST PIT (ENGEO, 2000)
- BEDDING TREND FROM AERIAL PHOTOGRAPHY
- 55 — STRIKE AND DIP OF BEDDING
- 45 — STRIKE AND DIP OF SHEER PLANE
- ANTICLINE
- SYNCLINE
- FAULT
- SHALLOW EARTHFLOW/DEBRIS FLOW (5'-15' THICK)
- MODERATELY DEEP EARTHFLOW/ROTATIONAL SLUMP (15'-30' THICK)
- DEEP-SEATED ROTATIONAL BEDROCK SLUMP (30'-60' THICK)
- R-34 — LANDSLIDE DESIGNATION
- PROPERTY BOUNDARY

N

0 FEET 400
0 METERS 200

BASE MAP SOURCE: ENGEO, INC., GEOTECHNICAL EXPLORATION REPORT, EAST DUBLIN PROPERTIES FEBRUARY 2003

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

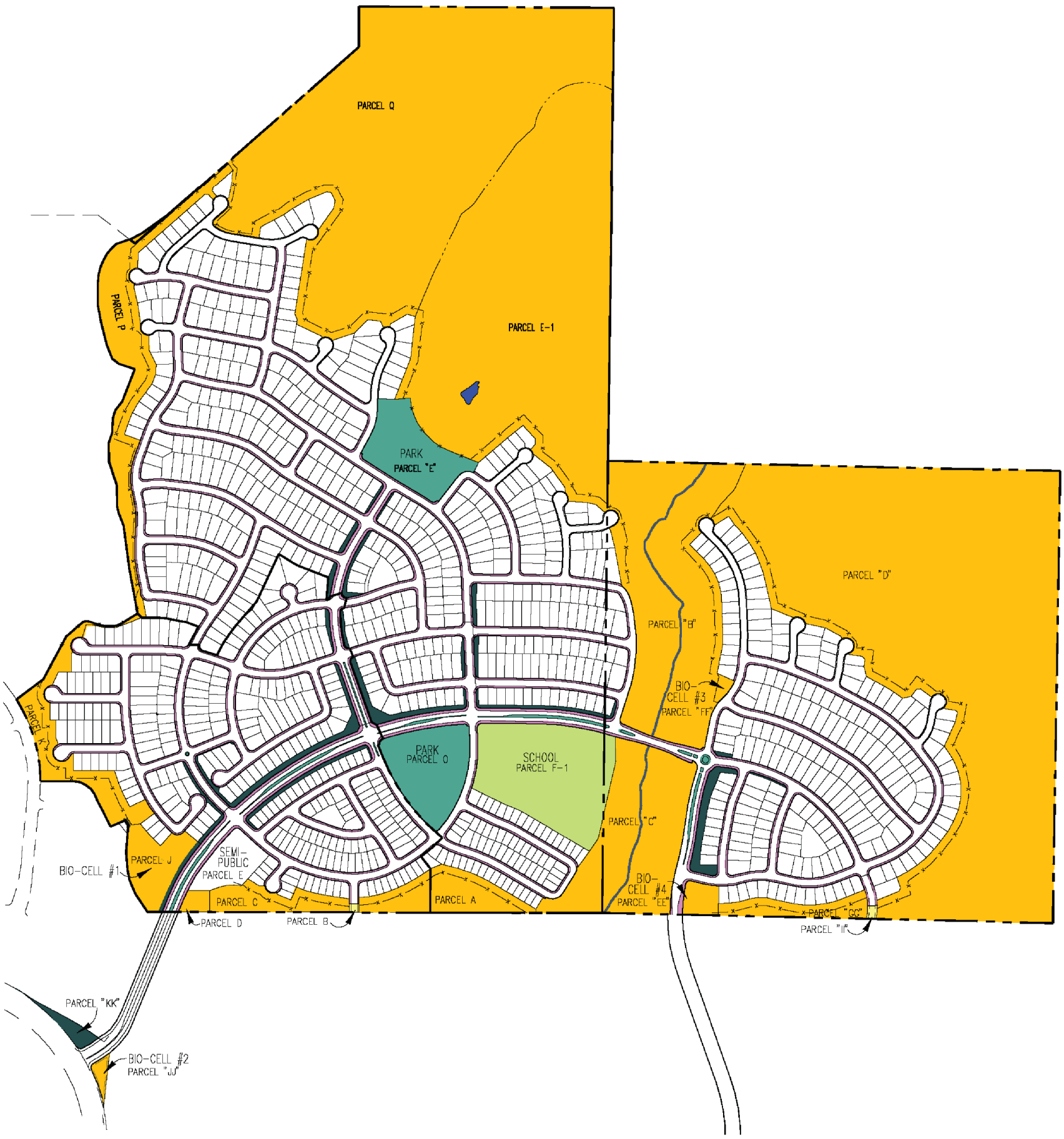
GEOLOGIC MAP
FALLON VILLAGE GHAD
DUBLIN, CALIFORNIA

PROJECT NO.: 4663.1.010.01
DATE: MAY 2007
DRAWN BY: SRP CHECKED BY: EH

FIGURE NO. 2

G:\Drafting\DRAFTING2_Dwg\4663\010\GHAD\4663101001-2-GHAD-CGeologicMap-0507.dwg 5-30-07 07:27:58 AM

ORIGINAL FIGURE PRINTED IN COLOR



LEGEND:

PARCEL "X" PARCEL NAMES IN QUOTES CORRESPOND TO TENTATIVE MAP 7586 PARCEL NAMES.

PARCEL X PARCEL NAMES WITHOUT QUOTES CORRESPOND TO FINAL MAP PARCELS (PER FM 7853, 7854, AND 7855).

—x—x— FIRE / OPEN SPACE FENCING TO BE MAINTAINED BY GEOLOGIC HAZARDS ABATEMENT DISTRICT.

LANDS AND IMPROVEMENTS TO BE OWNED BY CITY OF DUBLIN WITH MASTER HOMEOWNERS ASSOCIATION MAINTAINING PARKWAY STRIP LANDSCAPING AND TREE PLANTING AND HOMEOWNER OR MASTER HOMEOWNERS ASSOCIATION MAINTAINING SIDEWALK.

LANDS AND IMPROVEMENTS TO BE OWNED AND MAINTAINED BY THE CITY OF DUBLIN (PARKS AND COLLECTOR MEDIANS). COLLECTOR MEDIANS TO BE MAINTAINED VIA THE CITY OF DUBLIN LANDSCAPE MAINTENANCE ASSESSMENT DISTRICT 99-1.

LAND AND IMPROVEMENTS TO BE OWNED AND MAINTAINED BY DUBLIN UNIFIED SCHOOL DISTRICT (DUSD).

LANDS AND IMPROVEMENTS TO BE OWNED AND MAINTAINED BY MASTER HOMEOWNERS ASSOCIATION, WITH EXCEPTION OF PUBLIC UTILITIES.

(0.83± AC.) LANDS TO BE OWNED BY GEOLOGIC HAZARDS ABATEMENT DISTRICT, AND MAINTAINED BY A LAND TRUST. CULVERT FOR CORRIDOR CROSSING WILL BE OWNED AND MAINTAINED BY THE CITY OF DUBLIN.

(226.7± AC.) LANDS AND IMPROVEMENTS TO BE OWNED AND MAINTAINED BY A GEOLOGIC HAZARDS ABATEMENT DISTRICT.

(0.16± AC.) LANDS TO BE OWNED BY BRADDOCK AND LOGAN AND LANDS/IMPROVEMENTS MAINTAINED BY GEOLOGIC HAZARDS ABATEMENT DISTRICT AND DEDICATED TO THE CITY IN THE FUTURE FOR CITY OWNERSHIP AND MAINTENANCE FOR PUBLIC ROADS.

N

0 FEET 700
0 METERS 350

BASE MAP SOURCE: MACKAY & SOMPS

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

OPEN SPACE AND IMPROVEMENTS OWNERSHIP / MAINTENANCE PLAN
FALLON VILLAGE GHAD
DUBLIN, CALIFORNIA

PROJECT NO.: 4663.1.010.01	FIGURE NO. 3
DATE: MAY 2007	
DRAWN BY: SRP	CHECKED BY: EH

ORIGINAL FIGURE PRINTED IN COLOR

APPENDIX B

Operation and Maintenance Manual for Bioretention Facilities
Tract 7586 at Fallon Village, Alameda County, California
ENGEO Project No. 4663.1.006.04
December 5, 2006, Revised February 8, 2007

APPENDIX B

OPERATIONS AND MAINTENANCE MANUAL FOR BIORETENTION FACILITIES

TRACT 7586 AT FALLON VILLAGE

ALAMEDA COUNTY, CALIFORNIA

PREPARED FOR

BRADDOCK & LOGAN SERVICES, INC.

DANVILLE, CALIFORNIA

PREPARED BY

ENGEO INCORPORATED

PROJECT NO. 4663.1.006.04

DECEMBER 5, 2006
REVISED FEBRUARY 8, 2007

OPERATIONS AND MAINTENANCE MANUAL FOR BIORETENTION FACILITIES

TRACT 7586 AT FALLON VILLAGE

ALAMEDA COUNTY
CALIFORNIA

TABLE OF CONTENTS

1.0 INTRODUCTION

As part of State requirements for obtaining a Clean Water Act Section 401 Water Quality Certification and addressing Alameda County requirements for meeting the NPDES Municipal Stormwater Permit, several bioretention facilities have been designed for implementation at Tract 7586 of Fallon Village (the Project). The goal of this document is to provide the reader with an understanding of how the facilities are designed to operate and to describe a maintenance program that should provide for optimum function of the facilities. This document is required to meet Condition of Approval No. 9 as stated in the Water Quality Certification for the Fallon Village Project from the San Francisco Regional Water Quality Control Board (RWQCB), dated August 7, 2006. It is anticipated that the facilities will not require extensive maintenance; however, routine monitoring and minor maintenance is necessary since the facilities are part of the Project's storm drain system.

1.1 General Policy and Goals

This draft Operations and Maintenance Manual (OMM) is based on the requirements of both the County National Pollution Discharge Elimination System (NPDES) permit, and the RWQCB Water Quality Certification Condition No. 9.

The subject water quality facilities should be maintained with a focus on providing the services needed to accomplish drainage and water quality goals, performance standards and priorities as outlined in this document and in the project Stormwater Management Plan (ENGEO, February 23, 2006). The objectives of this OMM are intended to support NPDES elements and long-term best management practices (BMPs), as well as Project Conditions of Approval by maintaining safe, effective and high-quality water treatment facilities.

The goals for maintenance and monitoring of water quality treatment facilities at the Project are:

- Maintain the bioretention facilities as all-season water quality facilities.
- Preserve the structural integrity and intended capacity of these facilities.
- Monitor these facilities for public safety and proper functioning.
- Prepare maintenance and monitoring reports for these facilities.
- Provide for any repair work associated with maintenance of these facilities.

This OMM provides a structured monitoring and maintenance program including a plan regarding the frequency of monitoring, maintenance triggers and corrective measures. Drainage facility maintenance is an integral part of the process to provide proper function, promote public health and safety, and protect the development improvements from erosion and other natural processes. This document can function as a manual for the Project as it is presently proposed. It may be necessary to amend portions of this document to accommodate land use changes or unforeseen conditions. Modifications must be consistent with the goals and intentions of both the resource and public agencies.

2.0 FACILITY DESCRIPTIONS

2.1 Bioretention Facilities

This Project is located in Alameda County (Figure 1), and includes four water quality features labeled Bioretention Cell No. 1 through Bioretention Cell No. 4 as shown on Figure 2 (also see Improvement Plans). The bioretention facilities require periodic monitoring and maintenance to keep the outlet and inlet structures free of blockage, to remove litter and debris, to ensure proper filtering and drainage, and to maintain the facilities for aesthetics. Facility maintenance should include vegetation pruning, inlet and outlet cleaning and observation of the structural components for structural integrity. The facilities are designed to remain free draining. If standing water is found for an extended period of time (defined as greater than two hours) within any of the facilities during any monitoring event, the facility and/or piping leaving the facility may not be functioning properly. In this case, maintenance may be required so that the facility in question remains self-draining within the time frame noted.

The bioretention facilities have been designed for water quality purposes only. These facilities are not intended to be used as a park, playground, recreational area or parking area. The bioretention cells should not be walked or driven on, except when necessary for maintenance reasons. Because the facilities are designed to pond water a depth of six inches, access should also be restricted due to safety reasons. Signs and/or fencing at the perimeter of the bioretention facilities should be installed to prohibit homeowners and/or pedestrians from walking on the bioretention facilities. For example, a sign may read "This bioretention area has been constructed for water quality purposes. For your safety and for the protection of water quality in this neighborhood, please stay out of this area."

3.0 FACILITY OPERATIONS AND MAINTENANCE

Facility function for urban pollutant filtering should be maintained; for this reason, vegetation is planned in the facilities to aid in biological and chemical reactions. Plants are important for proper functioning, but should not be allowed to become so extensive that their root systems clog the subdrains. Pruning, removal and replacement with smaller specimens, as well as normal plant care are anticipated only to the extent that they do not hinder infiltration of water. The bioretention facilities are designed with a veneer of organic material such as well-drained mulch. The consistency of this medium should not be altered during maintenance unless specifically reviewed and accepted by ENGEO.

Pesticides and herbicides should generally not be used within the facilities as the chemicals would add significantly to the pollutant load and might cause adverse changes in the biotic mix necessary for proper facility function. Pesticide use should be limited and only applied if absolutely necessary for mosquito control, with input from Alameda County Mosquito Abatement District, applicable resource agencies, and in conformance with all applicable rules and regulations.

The following general maintenance activities are considered appropriate for the stormwater quality bioretention elements at Tract 7586 of Fallon Village and will be discussed in more detail in following sections:

1. Landscape Maintenance - The bioretention facilities will require landscape maintenance to control vegetation growth and improve appearance. Maintenance should limit the vegetation height, allow for a neat appearance and provide for adequate surface flow capacity. Maintenance should be in keeping with generally acceptable landscape maintenance practices.

2. Plant Replacement - All plant replacement materials should be able to tolerate saturated soil conditions for the length of time anticipated in the design storm event (one hour), as well as other anticipated runoff constituents. The bioretention facilities should be planted with vegetation having low water, fertilizer and pesticide requirements. Please refer to the planting palette listed on the Planting Plans for recommended plant types.

3. Debris Control - Litter and debris blocking the bioretention cell filter media could contribute to flooding and should be removed. Regular debris removal should be undertaken. This includes removal of woody vegetation blocking the flow path, removal of debris blocking facility outlets and inlets and removal of general litter from all facilities.

4. Drainage Monitoring – Because the bioretention cells are designed as filters, it is important that the facilities are draining at appropriate rates, and are not experiencing over-saturation or excessive ponding. Drainage monitoring should be used to record long-term changes in the system and highlight any needed maintenance to either surface or subdrainage, including the riser pipes.

5. Filter Medium Monitoring - Replacement of the sand or other media within bioretention cells should not be necessary as part of maintenance activities unless evidence of excessive saturation or ponding is noted during repeated monitoring and the integrity of the discharge piping has been established as functional. The design life of the filter system is generally greater than 50 years (CELSOC, November 2004). Filter medium replacement in such cases would improve aesthetics or repair systems damaged by high pollutant loads or excessive pesticide/herbicide accumulation. The original percentage of native soil in the sandy medium (specified on the Improvement Plans) should be repeated in any new medium placed in the facilities unless specifically approved by ENGEO.

6. Access Road Monitoring – Access roads should be monitored and maintained in a condition suitable for access vehicle travel. Maintenance should include reapplication of gravel or other surfacing as necessary to provide access for service vehicles.

As currently planned, the above maintenance will be undertaken by the project Geologic Hazard Abatement District (GHAD). The GHAD will maintain and manage the bioretention facilities' water quality and drainage aspects and related drainage facilities as soon as construction has been completed. The GHAD will provide landscape contracting, maintenance and litter control within common areas, including the bioretention facilities.

3.1 Landscape Maintenance/Plant Replacement

Vegetation should be planted and allowed to become established in the facilities; however, any planting should be irrigated by low-flow drip emitters only. Plant establishment is important because many of the chemical and biological processes that remove pollutants from the system are enhanced by plant growth. Landscape maintenance should include applicable pruning, light feeding, drip irrigation maintenance and annual mulch replacement.

A 2-inch veneer of organic planting medium such as mulch should be reapplied annually. The consistency of this medium should not be altered from that indicated on the Improvement Plans during landscape maintenance unless specifically reviewed and accepted by the Soil Engineer. The mulch layer is important to the bioretention facilities and serves an important function for metals and bacteria removal. The new layer of mulch can be applied over the older layer from the previous year.

As stated previously, the use of pesticides and herbicides should not be used excessively within the bioretention facilities as the chemicals would add significantly to the pollutant load treated in the facilities and might cause adverse changes in the biotic mix necessary for proper facilities function.

Stones and hardscape used in landscaping must not be continuous over the surface of the bioretention facilities, but can be incorporated into the landscaping plan with prior approval from ENGEO Incorporated or the Project Engineer. In no case should any portion of the bioretention cell be paved or have any surfacing applied. Access roadways within the facilities are acceptable as long as the road base is freely draining and has an appropriate bearing capacity.

All plant replacement materials should be able to tolerate saturated soil conditions for up to approximately one hour and additionally should have low water, fertilizer and pesticide requirements. A suggested plant palette is shown on the Planting Plans. Plants can be pruned and lightly fed, as well as serviced with drip irrigation as long as the irrigation system is maintained in a proper working condition. Irrigation systems should not be allowed to leak or malfunction such that excess water is allowed to enter the water quality facilities. An observation of continuous flow in the outfall pipes could be an indication of irrigation system malfunction or overwatering and should be followed up with a system check for proper function.

In summary, the maintenance and monitoring procedures for landscape maintenance and plant replacement should include:

- Pruning, mowing, and light feeding as applicable.
- Checking for proper irrigation system function.
- Annual mulching.
- Observation of stressed or dead vegetation.
- Scheduling for replacement of stressed or dead vegetation.

3.2 Debris Control

Maintenance should include routine removal of litter and debris. This removal is anticipated as part of a routine maintenance program and can be incorporated into the landscape maintenance plan. Maintenance may include trash pick-up and removal, raking and removal of leaves/litter, etc.

3.3 Drainage and Filter Medium Monitoring and Maintenance

The facilities are designed with diversion structures (weir boxes) so that higher flow events will by-pass the facilities and remain in the project storm drain system. If standing water or soggy,

saturated soil medium is noted during monitoring, it may be an indication of subdrain or outfall clogging and both the subdrain and outfall should be checked for integrity and proper function. The bioretention inflows, inlet and outfalls must be maintained in working condition, free of obstruction and freely draining.

The bioretention facilities should be monitored for proper function and public safety. Of particular importance is maintaining the ability of the facilities to filter stormwater without clogging or becoming saturated. The facilities are designed to filter the 85th percentile runoff event (approximately the first 1 inch of rainfall runoff) and must function as water quality treatment facilities even if used additionally for aesthetic uses. To this end, the facilities must not be capped with clayey soils, paved or parked on for extended time or covered. Additionally, the bioretention facilities should not be used as recreational areas, and should not be walked or driven on except for maintenance reasons.

It is anticipated that the rock aprons for energy dissipation located where water enters the bioretention cells may need periodic maintenance and replacement if there is sediment buildup in this location. The purpose of the rock aprons is to slow the water entering the bioretention cell, and also to trap suspended sediments in the rock prior to the water flowing onto the surface of the bioretention cell. Therefore, sediment buildup is expected on the rock apron and on the filter fabric beneath the rock. If sediment buildup has accumulated on the rock apron such that it appears that the rocks are not trapping sediment/debris or the void spaces between rocks are filled with sediment/debris, this is a trigger for replacement of the rock apron. To replace the rock apron, the filter fabric and rock should be removed and the filter fabric replaced with fresh material equal to that specified on the Improvement Plans. The rock can be reused if not coated with clayey soil.

The surface of the facilities at the inflow locations must be regularly cleared of any excess clayey sediment and leafy material to enable proper flow characteristics. If sediment, leafy material or other debris is accumulating such that it has created a continuous cover over any portion of the bioretention cell, this should trigger the need to remove the buildup. Failure to do so can create the potential for inefficient functioning.

The surface drainage and filter medium function should be monitored at least three times yearly, in May, August and November, with additional monitoring within two working days after significant storm events (i.e. 1 inch or more of rainfall in a 24-hour period) to evaluate the function of the bioretention facilities. A weather forecasting website such as www.accuweather.com can be used to track rainfall amounts. Although the number of major storm events varies from year to year, a rain event of 1 inch or more in a 24-hour period occurs on average roughly 3.5 times per year, but could be as many as twelve or more times per year. The results of the monitoring will be included in June, September and December monitoring reports. Inflow and outflow structures and subdrain cleanouts should additionally be checked for proper function and condition and repaired or replaced as necessary.

As stated above, filter medium functioning should be observed three times yearly and additionally after major storm events. Observations that may indicate filter medium malfunction include but are not limited to excessive ponding, saturation and/or plant mortality. Excessive ponding or saturation should be defined as saturation or ponding of water for more than two consecutive hours. If excess ponding/saturation is observed, it should first be checked that the subdrain system is functioning properly. The subdrain should be evaluated for proper functioning by periodically checking the outfall to note if water is freely draining from the bioretention cell. If it is determined that the subdrain is not clogged or broken, this would warrant the need to replace all or a portion of the filter medium. It is expected that if malfunction of filter medium were to occur, it would most likely occur in the areas where water

immediately enters the bioretention cell, i.e. in the vicinity of the rock aprons. If filter medium is to be replaced, ENGEO should be consulted to confirm the locations of replacement and for observation of replacement activities. The entire depth of the filter medium should be replaced to the depth of the subdrain.

In summary, the maintenance and monitoring procedures for the surface, subsurface and medium drainage should include:

- Observing inflow, inlet, spillway and outfall locations for function.
- Checking for soggy or saturated soil medium.
- Repairing broken or blocked piping.
- Replacing the inlet rock apron filter fabric as needed if sediment build-up is visible.
- Observation of the filter medium for any bare patches or rills on the surface on the bioretention facilities.
- Observations of the berms surrounding the bioretention cells for any bare patches, rills or slumping.

3.4 Access Road Monitoring

Access roads should be checked annually to determine if the access road is suitable for vehicle access to the bioretention cell. If needed, an application of gravel or other surfacing should be applied to the access road. The access road should be checked for erosion, rills or other problems that may affect the integrity of the access road.

4.0 MONITORING AND MAINTENANCE SCHEDULE

The following schedule for monitoring and maintenance is recommended. The schedule may be modified as needed when conditions change in order to fulfill the overall facility maintenance goals. Monitoring visits can be performed on the following schedule:

ITEM	SCHEDULE	MAINTENANCE/REPAIR
1. Landscape Maintenance		
1.a. Pruning and light feeding	Monthly	Check plant height and health, and prune plants over three feet in height. If needed, plant replacement should be able to tolerate saturated soils, and should have low water, fertilizer and pesticide requirements. Please refer to planting palette specified on the Improvement Plans.
1.b. Check for proper irrigation system function	Monthly	Repair irrigation system as needed.
1.c. Reapply Mulch	Yearly	Apply 2-inch mulch layer yearly. Can be applied over previous layers.
2. Debris Control		
2.a. Routine removal of litter and debris	Monthly	Remove debris/litter as necessary.
3. Drainage and Filter Medium Monitoring and Maintenance		
3.a. Check for standing water or soggy, saturated soil medium.	Three times yearly (May, August and November) and additionally within two working days after storm events with rainfall exceeding 1 inch in 24 hours.	Replace filter medium as necessary.
3.b. Surface of facility at inflow locations should be cleared of excess clayey sediment, leaves or other debris.	Three times yearly (May, August and November) and additionally within two working days after storm events with rainfall exceeding 1 inch in 24 hours.	Remove debris as necessary.

ITEM	SCHEDULE	MAINTENANCE/REPAIR
3.c. Check for sediment buildup at rock apron inlet protection.	Yearly	Remove filter fabric and rock. Clean rock, replace filter fabric as needed.
3.d. Check inflow and outflow structures for clogging, and check subdrain cleanouts.	Three times yearly (May, August and November) and additionally within two working days after storm events with rainfall exceeding 1 inch in 24 hours.	Clean/repair as necessary. Repair any broken or blocked piping.
4. Access Road Monitoring		
4.a. Check that access road is suitable for vehicle access	Yearly	Reapply gravel or other surfacing as necessary.

BIORETENTION FACILITY MONITORING PROGRAM
MONITORING REPORT FORM

Please refer to the improvement plans included in the project Operations and Maintenance Manual for bioretention cell locations.

This monitoring report form is being completed for:
□ Bioretention Cell #1 □ Bioretention Cell #2 □ Bioretention Cell #3 □ Bioretention Cell #4

A separate monitoring form should be completed for each bioretention facility.

Reason for inspection:
□ Scheduled inspection (in May, August or November)
□ Inspection after major rain event (greater than one inch in 24 hours)

Inspector Name: _____

Company: _____

Date of Inspection: _____

Date of Last Inspection: _____

Plant Health (check during every inspection):

Do plants appear to be in generally good health? □ Yes □ No

Are plants over three feet in height (excluding trees)? □ Yes □ No

Does it appear that the top layer of mulch needs to be replaced? □ Yes □ No

Describe Conditions: _____
_____
_____
_____

Corrective Actions (if needed): _____
_____
_____
_____

Irrigation System Functioning (check during every inspection):

Does irrigation system appear to be functioning properly? □ Yes □ No

Describe Conditions: _____
_____
_____
_____

Corrective Actions (if needed): _____
_____
_____
_____

Drainage and Filter Medium Monitoring (check in May, August and November, and additionally after large storm events):

Is standing water or soggy, saturated soil present in the bioretention cell? □ Yes □ No

Is there a build-up of excess clayey sediment, leaves or other debris at the surface of facility at inflow locations? □ Yes □ No

Is there a sediment build-up at the locations of rock apron inlet protection? □ Yes □ No

Are any of the inflow or outflow structures clogged with sediment/debris? □ Yes □ No

Is water draining freely from the subdrain system? □ Yes □ No

Describe Conditions: _____
_____
_____
_____

Corrective Actions (if needed): _____
_____
_____
_____

Access Road Monitoring (check once per year):

Is access road is suitable for vehicle access? □ Yes □ No

Describe Conditions: _____
_____
_____
_____

Corrective Actions (if needed): _____
_____
_____
_____

Other (check during every inspection):

Is litter/garbage present within the bioretention cells? □ Yes □ No

Describe Conditions: _____
_____
_____
_____

Corrective Actions (if needed): _____
_____
_____
_____

SELECTED REFERENCES

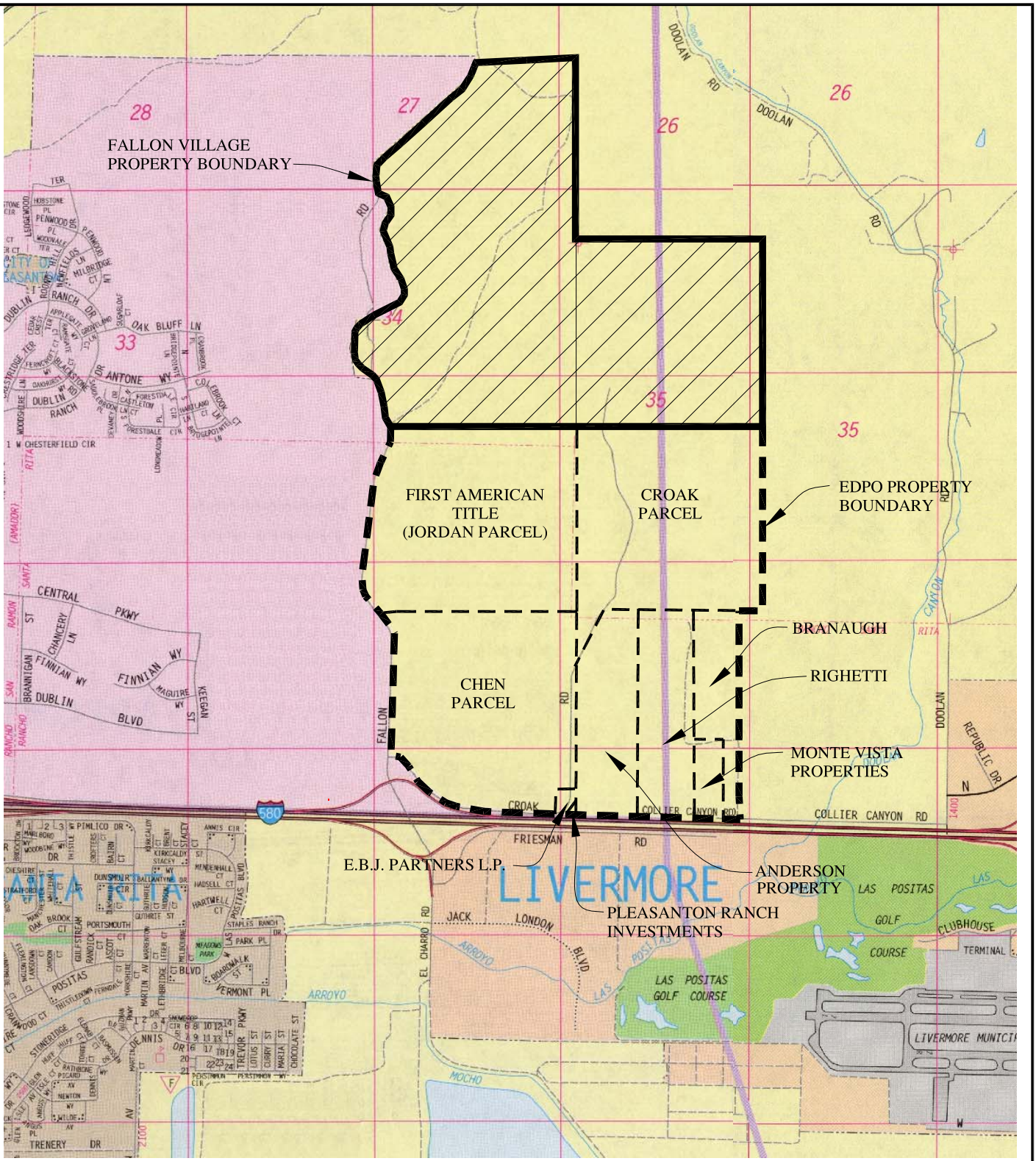
1. Bedient, Philip and Huber, Wayne; Hydrology and Floodplain Analysis, Third Edition; Prentice-Hall, Inc., © 2002.

2. CELSOC, November 29, 2004, Low Impact Development Workshop by Larry S. Coffman.

3. Contra Costa Clean Water Program, Stormwater C.3 Guidebook, Third Edition, dated October 2006.

4. ENGEO Inc.; Stormwater Quality and Hydrograph Management Plan, Tract 7586 at Fallon Village, Alameda, California; February 23, 2006; Project No. 4663.1.006.01.

LIST OF FIGURES



BASE MAP SOURCE: THOMAS BROTHERS

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

VICINITY MAP

FALLON VILLAGE O&M MANUAL FOR BIORETENTION

DUBLIN, CALIFORNIA

PROJECT NO.: 4663.1.006.04	FIGURE NO. 1
DATE: OCTOBER 2006	
DRAWN BY: DLB	CHECKED BY: JB

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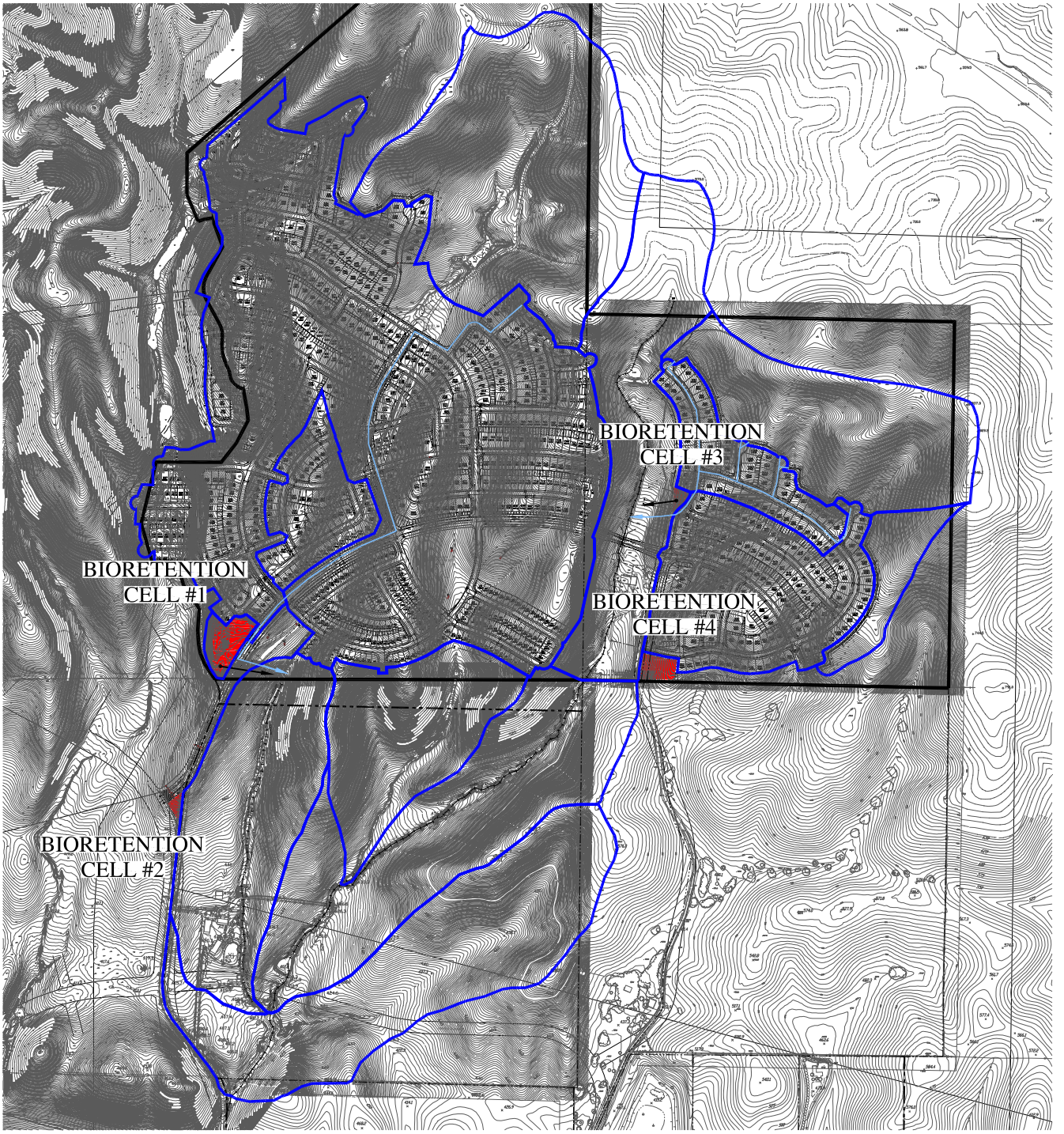

EXPLANATION

- APPROXIMATE LOCATION OF PROPOSED OPEN SPACE STORM DRAIN TO CREEK
- FALLON VILLAGE PROJECT BOUNDARY
- WATERSHED BOUNDARY (MACKAY AND SOMPS, DECEMBER 2003)
- APPROXIMATE BIORETENTION CELL LOCATION

N

BASE MAP SOURCE: UNKNOWN

NO SCALE

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SITE PLAN

FALLON VILLAGE O&M MANUAL FOR BIORETENTION

DUBLIN, CALIFORNIA

PROJECT NO.: 4663.1.006.04	FIGURE NO. 2
DATE: OCTOBER 2006	
DRAWN BY: KA	CHECKED BY: JB

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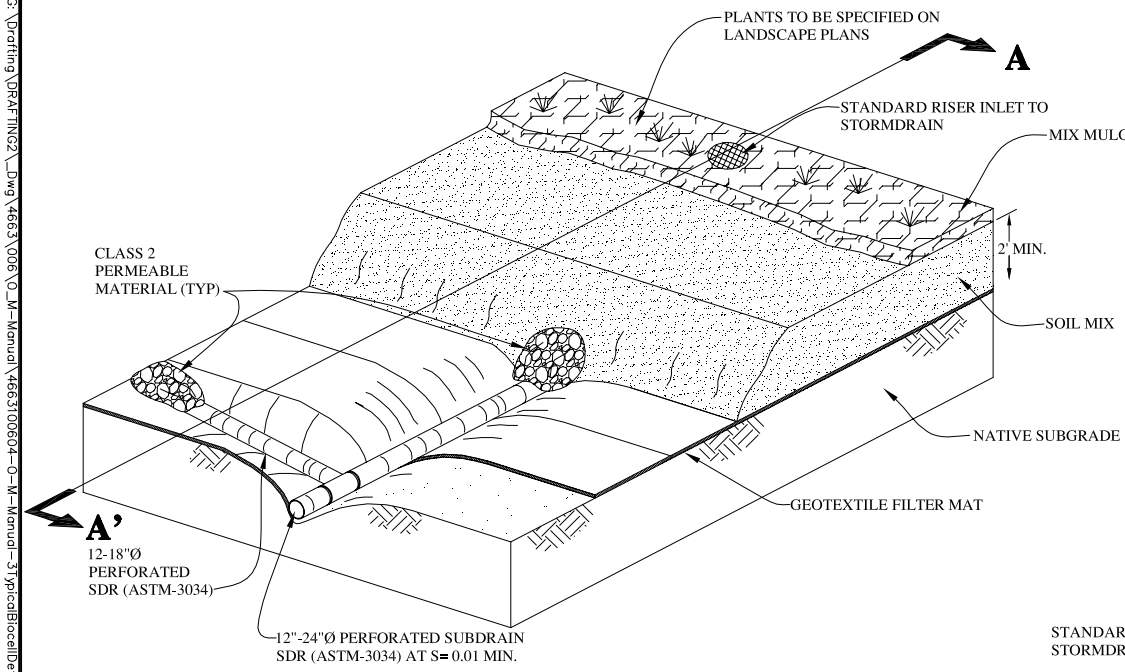
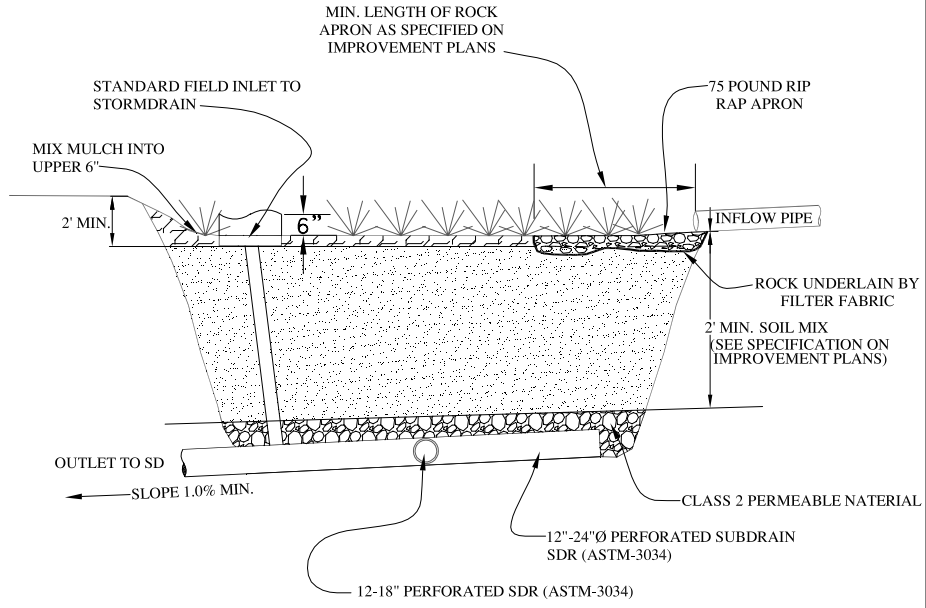
ORIGINAL FIGURE PRINTED IN COLOR



BIORETENTION CELL TYPICAL DETAIL



SECTION

NO SCALE

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

TYPICAL BIORETENTION CELL DETAIL

FALLON VILLAGE O&M MANUAL FOR BIORETENTION

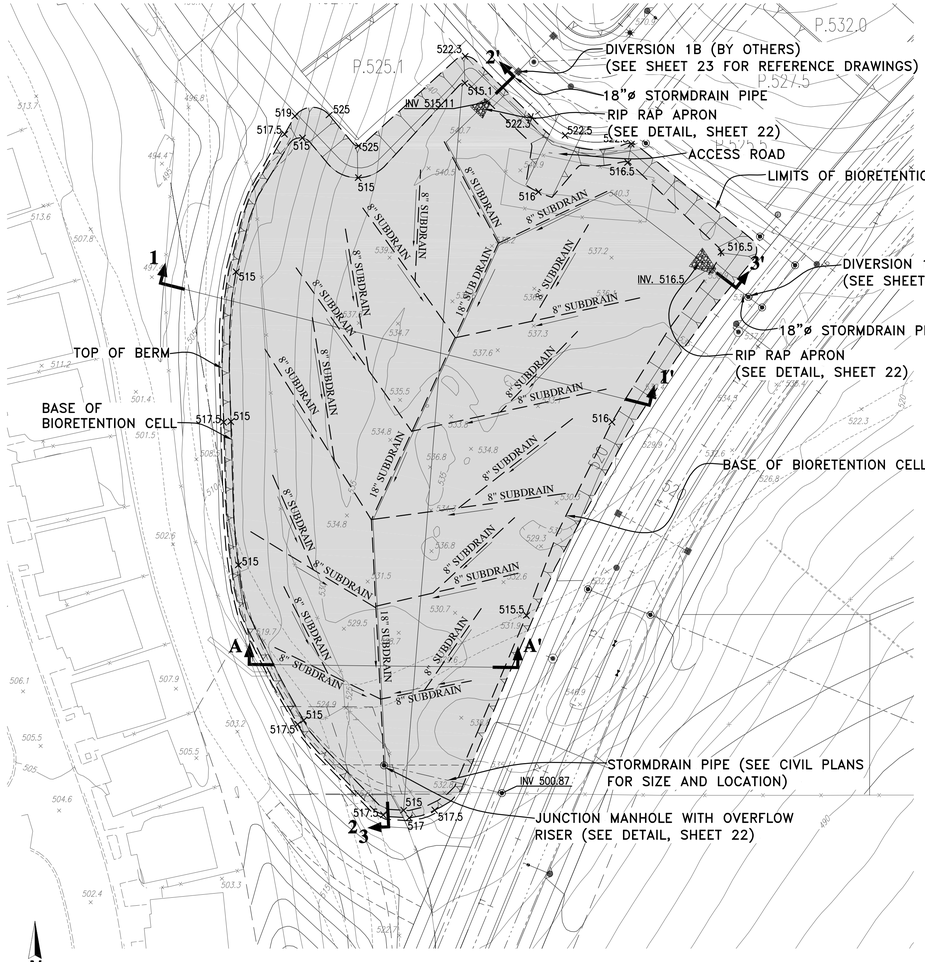
DUBLIN, CALIFORNIA

PROJECT NO.: 4663.1.006.04		FIGURE NO. 3
DATE: OCTOBER 2006		
DRAWN BY: KA	CHECKED BY: JB	

ENGEO
INCORPORATED

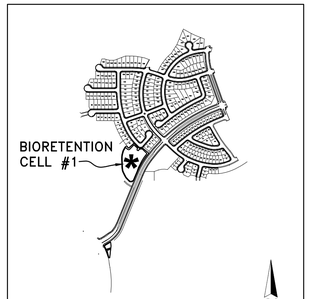
IMPROVEMENT PLANS FOR BIORETENTION CELLS NO. 1 – NO. 4

4663.1.006.04
December 5, 2006
Revised February 8, 2007



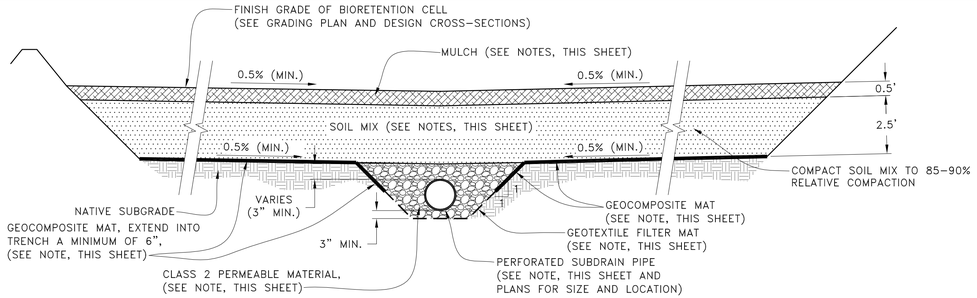
GRADING PLAN - BIORETENTION CELL #1

SCALE: 1" = 50'



LOCATION MAP

NO SCALE



BIORETENTION CELL TYPICAL SECTION A-A'

NO SCALE

BIORETENTION CELL NOTES:

SOIL MIX:
SHALL BE 50% IMPORTED SAND, 20–30% MULCH/COMPOST, AND 20–30% TOPSOIL WITH LESS THAN 5% CLAY. MAXIMUM CONTENT OF FINES SHOULD NOT EXCEED 25%. SOIL MIX MAY BE PRODUCED WITH ON–SITE SOILS OR WITH IMPORTED SOILS TO ACHIEVE THE NOTED MIXTURE SPECIFICATION. ANY NATIVE SOIL MATERIALS USED SHALL HAVE THE FOLLOWING SPECIFICATIONS: MATERIALS TO BE USED SHALL BE FREE FROM ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES, AND OF SUCH QUALITY THAT IT WILL DRAIN THOROUGHLY WITHOUT EXCESSIVE VOIDS. EXCAVATED ON–SITE MATERIAL WILL BE CONSIDERED SUITABLE IF IT CONTAINS NO MORE THAN THREE PERCENT ORGANIC MATTER, IS FREE OF DEBRIS AND OTHER DELETERIOUS SUBSTANCES AND CONFORMS TO THE REQUIREMENTS SPECIFIED ABOVE. ROCKS SHALL BE REMOVED FROM ANY FILL MATERIAL TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER.

MULCH:
SHALL BE DOUBLE–GRIND CEDAR BARK OR APPROVED EQUAL, AVAILABLE AT SUN–UP FOREST PRODUCTS, INC., 3301 BUSINESS DRIVE, SACRAMENTO, CA 95820, 1 (800) 222 2551.
EXECUTION: INCORPORATE 2" LAYER OF MULCH INTO TOP 6" LAYER OF SOIL MIX. INCORPORATE WITH ROTOTILLER TO A HOMOGENOUS BLEND. SMOOTH OUT FINISH SURFACE PRIOR TO PLANTING.

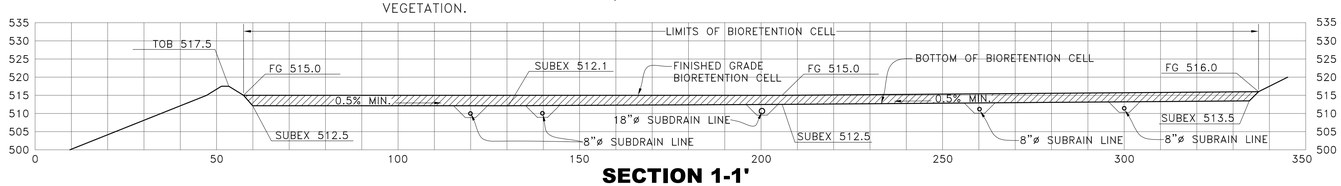
CLASS 2 PERMEABLE MATERIAL:
AS DESCRIBED IN HEADING B UNDER SECTION 2.05, PART 2–PRODUCTS IN THE GEOTECHNICAL GUIDE CONTRACT SPECIFICATIONS PREPARED BY ENGEO.

GEOTEXTILE FILTER MAT:
SHALL BE SKAPS GEONET TN–270 OR APPROVED EQUIVALENT.

GEOCOMPOSITE MAT:
SHALL BE SKAPS GEOCOMPOSITE TN–220 WITH 6 OZ. FABRIC OR APPROVED EQUIVALENT.

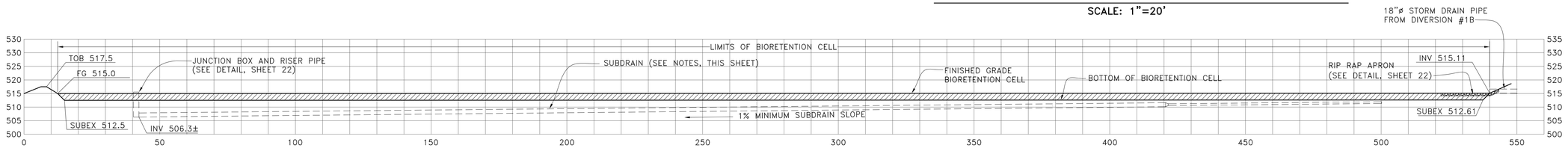
PERFORATED SUBDRAIN:
PERFORATED SUBDRAIN SHALL BE PERFORATED PVC SOLID WALL SDR 35 (ASTM D–3034). PLACE PERFORATIONS DOWN. ALL PIPE JOINTS SHALL BE GLUED, PER MANUFACTURER'S SPECIFICATIONS. PERFORATED PIPE SHALL HAVE A MINIMUM OF THREE 3/4" DIAMETER HOLES, EQUALLY SPACED ALONG THE CIRCUMFERENCE OF THE PIPE AND NOT LESS THAN THREE HOLES PER LINEAR FOOT OF PIPE. SUBDRAIN SHOULD BE PLACED AT A 1% SLOPE MINIMUM.

SOIL MIX TESTING AND REPORTING:
COLLECT THREE SAMPLES OF FILTER MIX. CONFIRM THAT ORGANIC CONTENT IS 20%–30% OF FILTER MEDIA BY VOLUME (ASTM D2974). CONFIRM THAT PERCENT PASSING #200 SIEVE (ASTM D422–63) DOES NOT EXCEED 25%. CONFIRM USING HYDROMETER TEST (ASTM D422–63) THAT CLAY CONTENT DOES NOT EXCEED 5%. A REPORT SHALL BE SUBMITTED TO THE RWQCB (REGIONAL WATER QUALITY CONTROL BOARD) WITH LABORATORY TESTING RESULTS PRIOR TO PLACEMENT OF THE TOP LAYER OF MULCH AND VEGETATION.



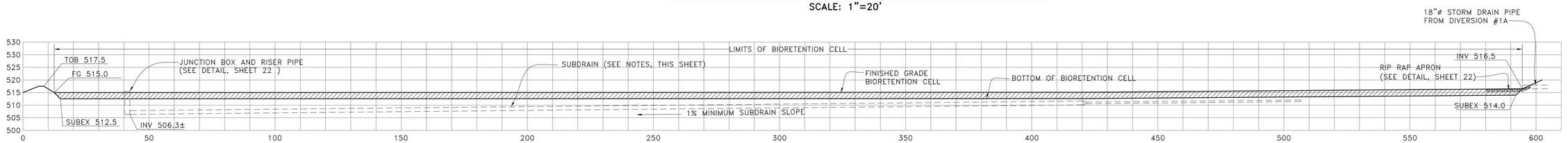
SECTION 1-1'

SCALE: 1"=20'



SECTION 2-2'

SCALE: 1"=20'



SECTION 3-3'

SCALE: 1"=20'

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971
2010 CROW CANYON PLACE
SUITE 280
SAN RAMON, CALIFORNIA 94583
(925) 866-9000
FAX (925) 866-0199
SAN RAMON - SAN JOSE - SAN FRANCISCO - ROSEVILLE - TRACY - VACAVILLE - VALLEJO

GRADING AND SUBDRAIN PLAN
BIORETENTION CELL #1
FALLON VILLAGE
DUBLIN, CALIFORNIA

DESIGNED BY: KA
DRAWN BY: PC
CHECKED BY: JB
DATE: DECEMBER 2006
SCALE: AS SHOWN

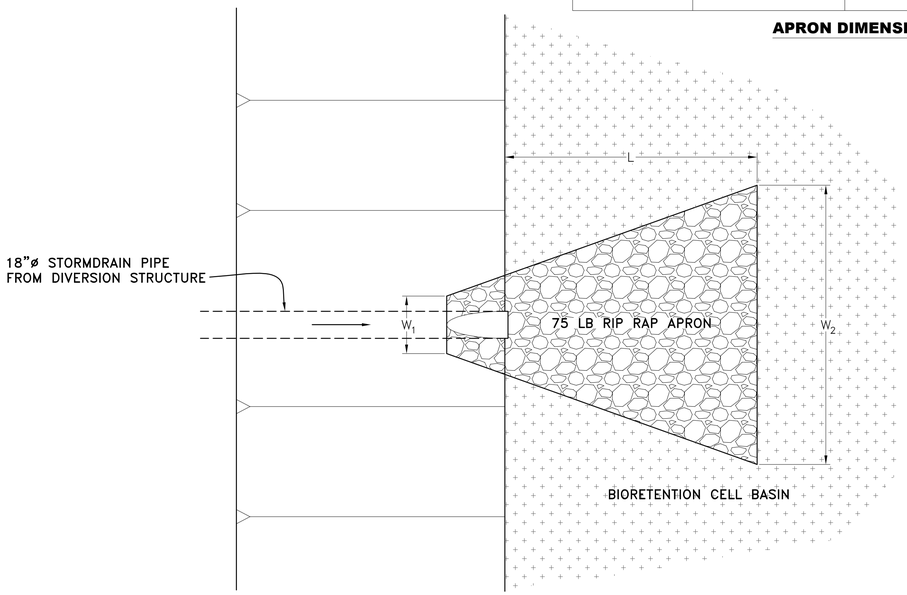
REV.	DATE	DESCRIPTION	BY
1	02/07/07	REVISIONS DATED FEBRUARY 2007	KA

SHEET NUMBER
22
OF 24 SHEETS

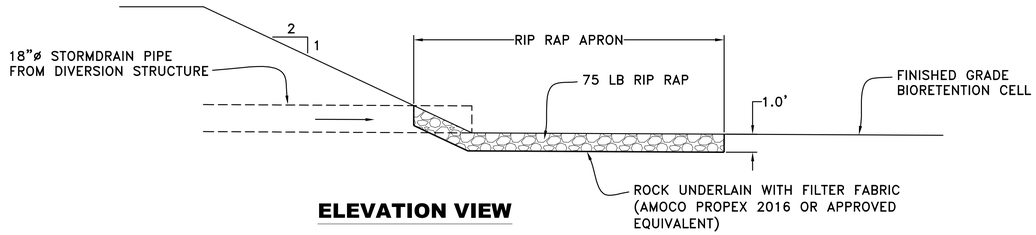
PROJECT NO.
4663.1.006.04

DIVERSION	APRON LENGTH (L)	MINIMUM APRON WIDTH (W_1)	MAXIMUM APRON WIDTH (W_2)
1A	14'	4.5'	19.5'
1B	10'	4.5'	15.5'

APRON DIMENSION TABLE



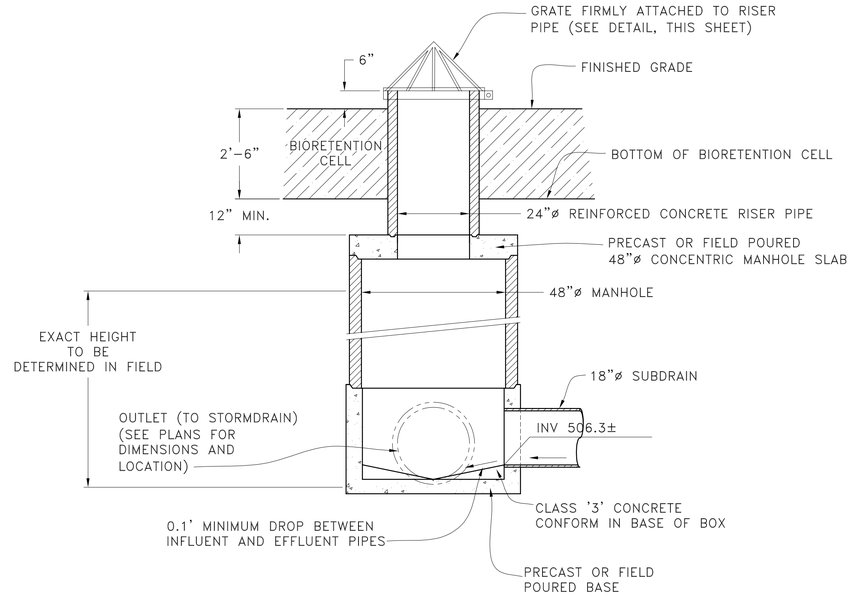
PLAN VIEW



ELEVATION VIEW

RIP RAP APRON

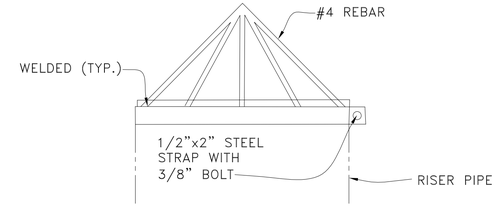
NO SCALE



ELEVATION VIEW
SECTION A-A'

JUNCTION BOX

NO SCALE



TRASH RACK GRATE ASSEMBLE DETAIL

NO SCALE

2010 CROW CANYON PLACE
SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-9000
FAX (925) 866-0199
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971
SAN RAMON - SAN JOSE - SAN FRANCISCO - ROSEVILLE - TRACY - VACAVILLE - VALLEJO

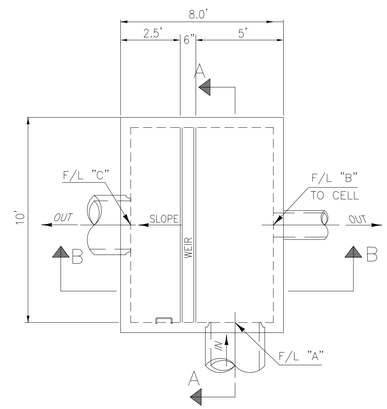
DETAILS
BIORETENTION CELL #1
FALLON VILLAGE
DUBLIN, CALIFORNIA

DESIGNED BY: KA
DRAWN BY: PC
CHECKED BY: JB
DATE: DECEMBER 2006
SCALE: AS SHOWN

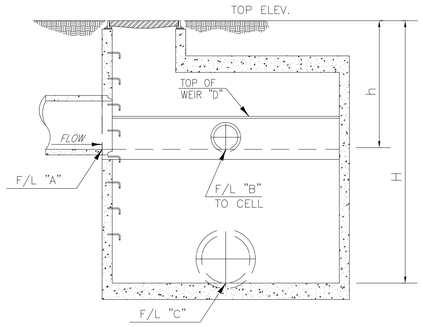
REV.	DATE	DESCRIPTION	BY
'			

SHEET NUMBER
23
OF **24** SHEETS

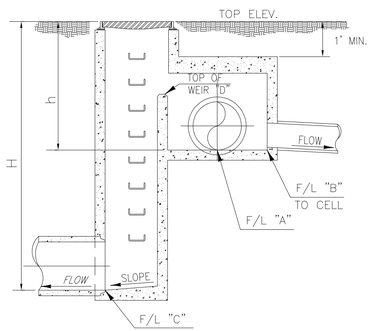
PROJECT NO.
4663.1.006.04



PLAN-DIVERSION STRUCTURE
NTS

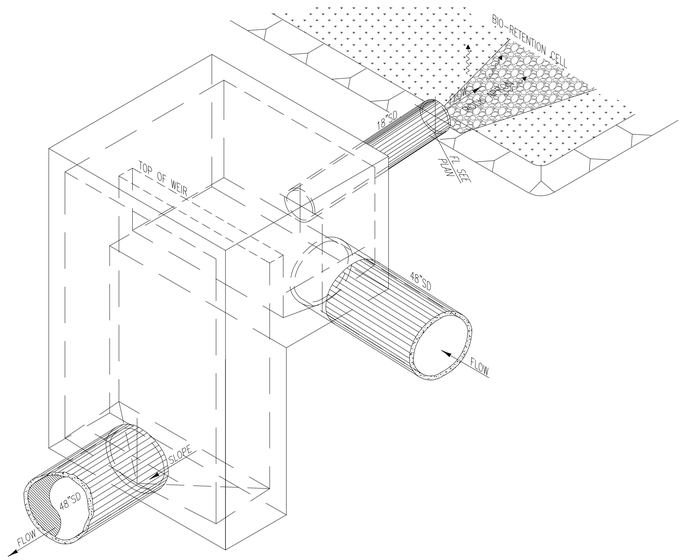


SECTION A-A
NTS



SECTION B-B
NTS

NOTE: SEE STORM DRAIN DIVERSION STRUCTURAL PLANS BY OTHERS FOR STRUCTURAL DETAILS



ISOMETRIC VIEW-DIVERSION STRUCTURE
NTS

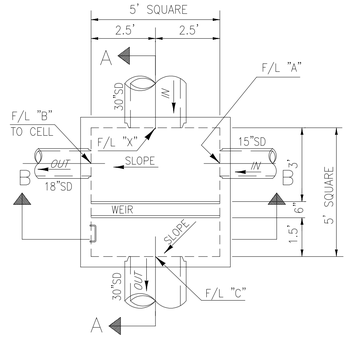
DIVERSION STRUCTURE DESIGN DIMENSIONS									
DIV. STRUCTURE NO.	F/L "A" ELEV.	F/L "B" ELEV.	F/L "C" ELEV.	TOP WEIR "D" ELEV.	WEIR HT.	WEIR LENGTH	OUTLET PIPE TO CELL (DIA.)	"h"	"H"
1A	516.76	516.76	512.76	520.95	4.19'	10.0'	18"	8.19'	12.19'
1B	515.26	515.26	515.26	517.38	2.12'	5.0'	18"	N/A	6.99'

NOTE: N/A IN TABLE ABOVE MEANS THAT A DROP OUTLET IS NOT NEEDED FOR THESE DIVERSION STRUCTURES.

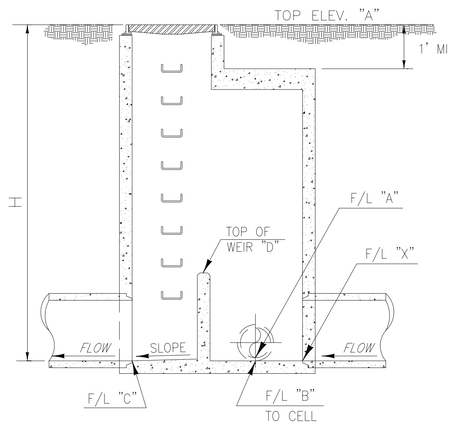
NOTE:
THESE PLANS ARE FOR REFERENCE ONLY. SEE STRUCTURAL AND CIVIL PLANS FOR CONSTRUCTION DETAILS.

BIORETENTION CELL #1 - DIVERSION STRUCTURE #1A

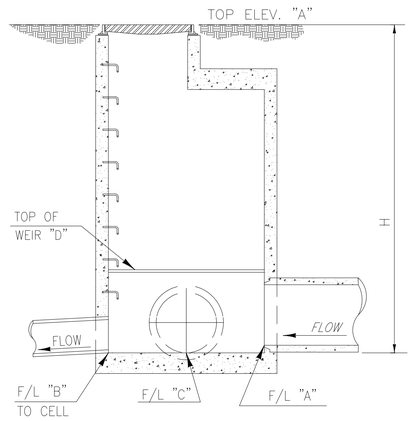
NO SCALE



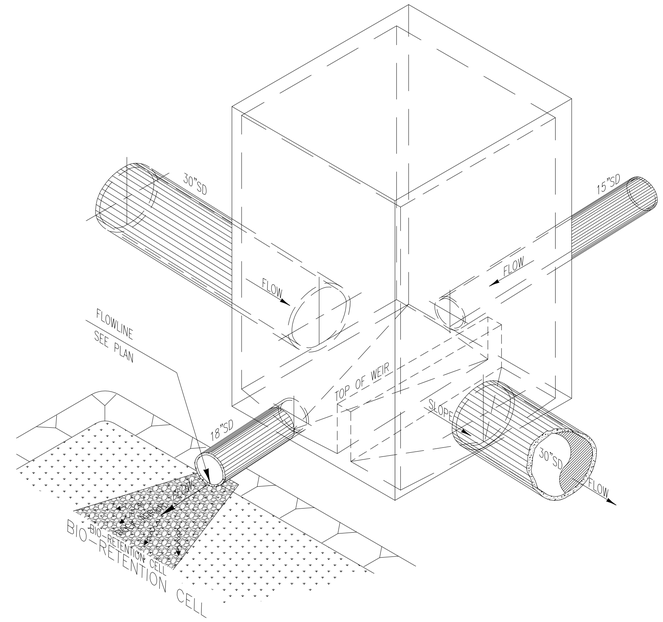
PLAN VIEW
NTS



SECTION A-A
NTS



SECTION B-B
NTS



ISOMETRIC VIEW
NTS

BIORETENTION CELL #1 - DIVERSION STRUCTURE #1B

NO SCALE

ENGEO INCORPORATED
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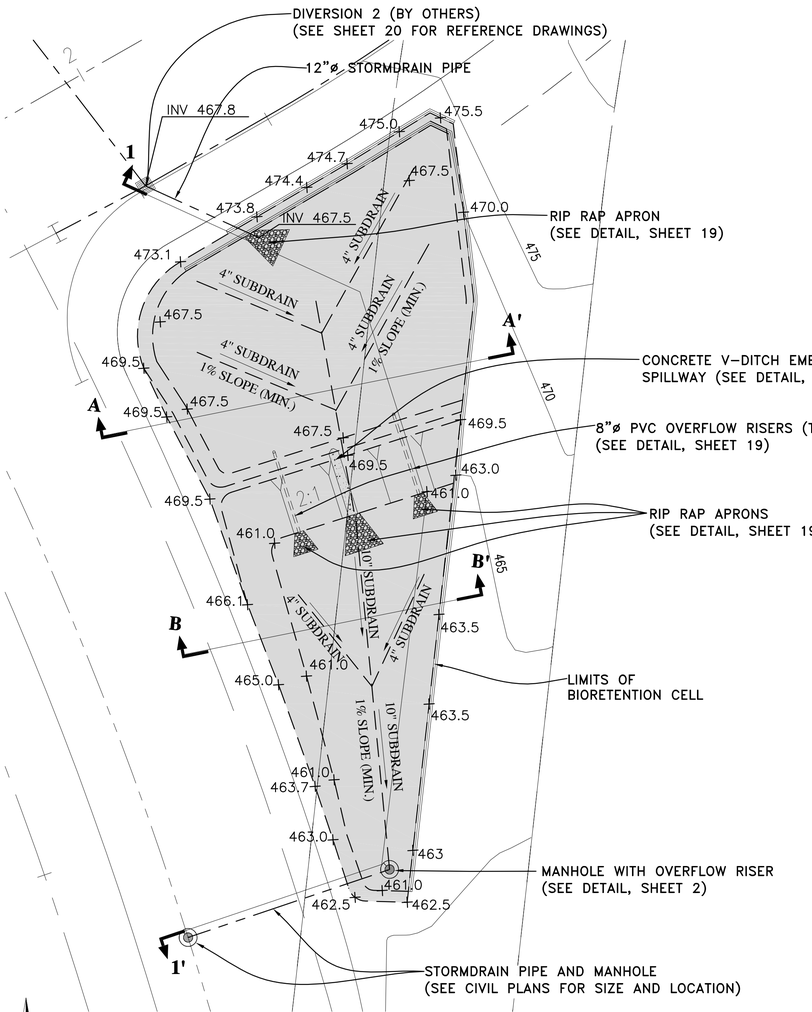
2010 CROW CANYON PLACE
SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-9000
FAX (925) 866-0199
SAN RAMON - SAN JOSE - SAN FRANCISCO - ROSEVILLE - TRACY - VACAVILLE - VALLEJO

DETAILS
BIORETENTION CELL #1
FALLON VILLAGE
DUBLIN, CALIFORNIA

DESIGNED BY: AC
DRAWN BY: —
CHECKED BY:
DATE: DECEMBER 2006
SCALE: AS SHOWN

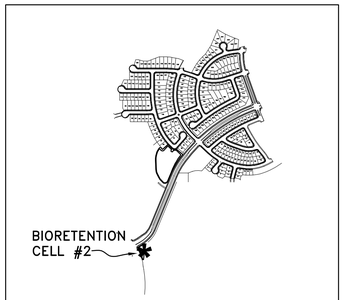
REV.	DATE	DESCRIPTION	BY

SHEET NUMBER
24
OF 24 SHEETS
PROJECT NO.
4663.1.006.04



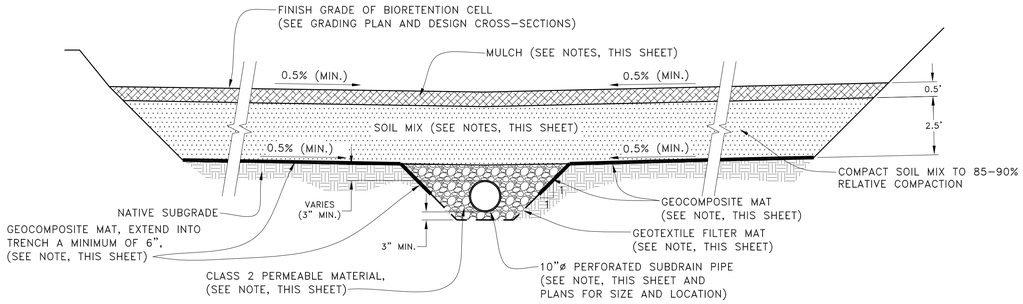
GRADING PLAN - BIORETENTION CELL #2

SCALE: 1" = 20'



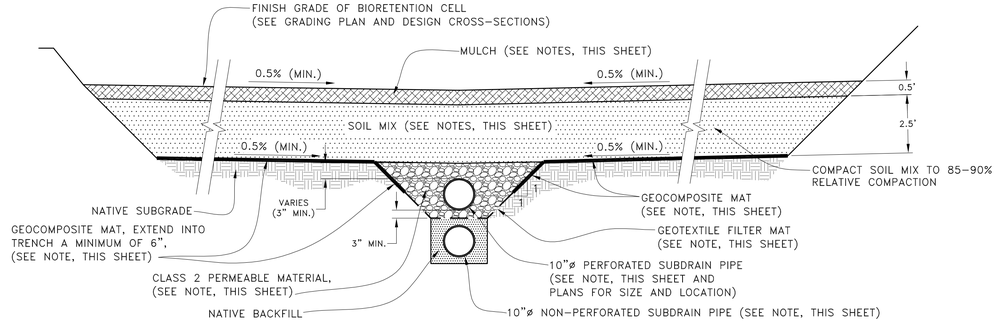
LOCATION MAP

NO SCALE



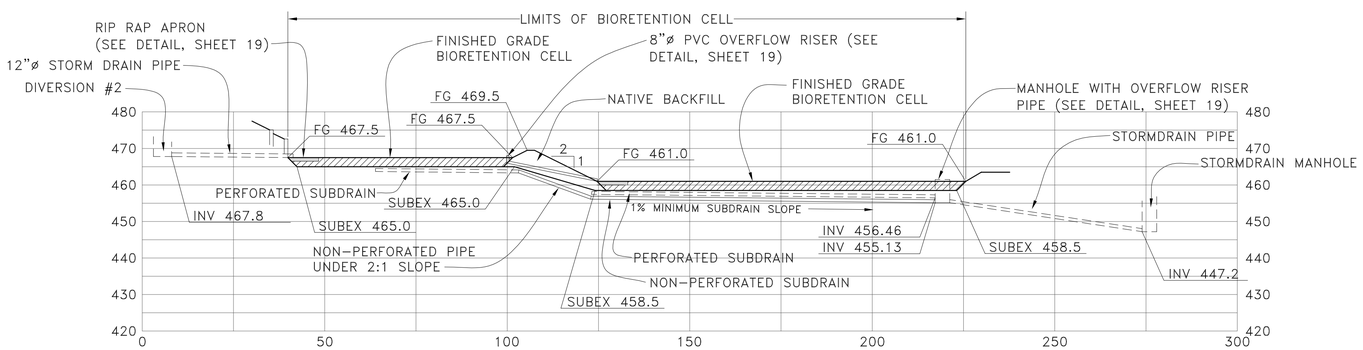
BIORETENTION CELL
TYPICAL SECTION A-A'

NO SCALE



BIORETENTION CELL
TYPICAL SECTION B-B'

NO SCALE



SECTION 1-1'

SCALE: 1"=20'

BIORETENTION CELL NOTES:

SOIL MIX:
SHALL BE 50% IMPORTED SAND, 20-30% MULCH/COMPOST, AND 20-30% TOPSOIL WITH LESS THAN 5% CLAY. MAXIMUM CONTENT OF FINES SHOULD NOT EXCEED 25%. SOIL MIX MAY BE PRODUCED WITH ON-SITE SOILS OR WITH IMPORTED SOILS TO ACHIEVE THE NOTED MIXTURE SPECIFICATION. ANY NATIVE SOIL MATERIALS USED SHALL HAVE THE FOLLOWING SPECIFICATIONS: MATERIALS TO BE USED SHALL BE FREE FROM ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES, AND OF SUCH QUALITY THAT IT WILL DRAIN THOROUGHLY WITHOUT EXCESSIVE VOIDS. EXCAVATED ON-SITE MATERIAL WILL BE CONSIDERED SUITABLE IF IT CONTAINS NO MORE THAN THREE PERCENT ORGANIC MATTER, IS FREE OF DEBRIS AND OTHER DELETERIOUS SUBSTANCES AND CONFORMS TO THE REQUIREMENTS SPECIFIED ABOVE. ROCKS SHALL BE REMOVED FROM ANY FILL MATERIAL TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER.

MULCH:
SHALL BE DOUBLE-GRIND CEDAR BARK OR APPROVED EQUAL, AVAILABLE AT SUN-UP FOREST PRODUCTS, INC., 3301 BUSINESS DRIVE, SACRAMENTO, CA 95820, 1 (800) 222 2551. EXECUTION: INCORPORATE 2" LAYER OF MULCH INTO TOP 6" LAYER OF SOIL MIX. INCORPORATE WITH ROTOTILLER TO A HOMOGENOUS BLEND. SMOOTH OUT FINISH SURFACE PRIOR TO PLANTING.

CLASS 2 PERMEABLE MATERIAL:
AS DESCRIBED IN HEADING B UNDER SECTION 2.05, PART 2-PRODUCTS IN THE GEOTECHNICAL GUIDE CONTRACT SPECIFICATIONS PREPARED BY ENGEO.

GEOTEXTILE FILTER MAT:
SHALL BE SKAPS GEONET TN-270 OR APPROVED EQUAL.

GEOCOMPOSITE MAT:
SHALL BE SKAPS GEOCOMPOSITE TN-220 WITH 6 OZ. FABRIC OR APPROVED EQUIVALENT.

PERFORATED SUBDRAIN:
PERFORATED SUBDRAIN SHALL BE PERFORATED PVC SOLID WALL SDR 35 (ASTM D-3034). PLACE PERFORATIONS DOWN. ALL PIPE JOINTS SHALL BE GLUED, PER MANUFACTURER'S SPECIFICATIONS. PERFORATED PIPE SHALL HAVE A MINIMUM OF THREE 3/4" DIAMETER HOLES, EQUALLY SPACED ALONG THE CIRCUMFERENCE OF THE PIPE AND NOT LESS THAN THREE HOLES PER LINEAR FOOT OF PIPE. SUBDRAIN SHOULD BE AT A 1% MINIMUM SLOPE.

NON-PERFORATED SUBDRAIN PIPE:
NON-PERFORATED SUBDRAIN SHALL BE PERFORATED PVC SOLID WALL SDR 35 (ASTM D-3034). ALL PIPE JOINTS SHALL BE GLUED, PER MANUFACTURER'S SPECIFICATIONS. SUBDRAIN SHOULD BE AT A 1% MINIMUM SLOPE.

SOIL MIX TESTING AND REPORTING:
COLLECT ONE SAMPLE OF FILTER MIX. CONFIRM THAT ORGANIC CONTENT IS 20%-30% OF FILTER MEDIA BY WEIGHT (ASTM D2974). CONFIRM THAT PERCENT PASSING #200 SIEVE (ASTM D422-63) DOES NOT EXCEED 25%. CONFIRM USING HYDROMETER TEST (ASTM D422-63) THAT CLAY CONTENT DOES NOT EXCEED 5%. A REPORT SHALL BE SUBMITTED TO THE RWQCB (REGIONAL WATER QUALITY CONTROL BOARD) WITH LABORATORY TESTING RESULTS PRIOR TO PLACEMENT OF THE TOP LAYER OF MULCH AND VEGETATION.

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971
2010 CROW CANYON PLACE
SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-9000
FAX (888) 279-2698
SAN RAMON · SAN JOSE · SAN FRANCISCO · ROCKLIN · RIPON · MARE ISLAND/VALLEJO · RENO

GRADING AND SUBDRAIN PLAN
BIORETENTION CELL #2
FALLON VILLAGE
DUBLIN, CALIFORNIA

DESIGNED BY: KA
DRAWN BY: PC
CHECKED BY: JB
DATE: DECEMBER 2006
SCALE:

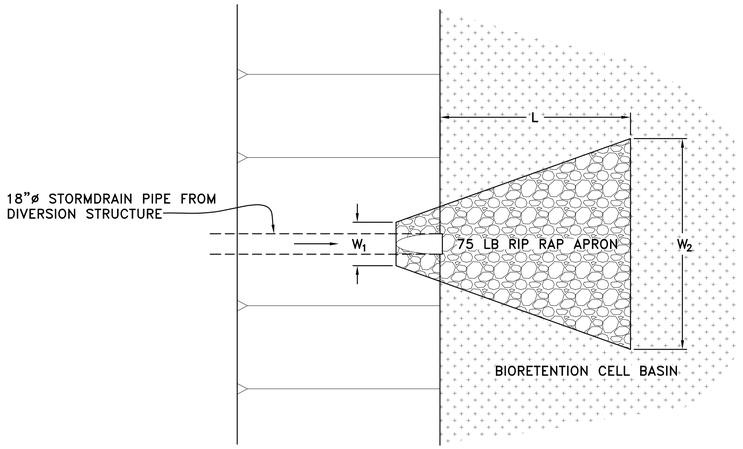
REV.	DATE	DESCRIPTION	BY
1	02/07/07	REVISION DATED FEBRUARY 2007	KA

SHEET NUMBER
19
OF 24 SHEETS

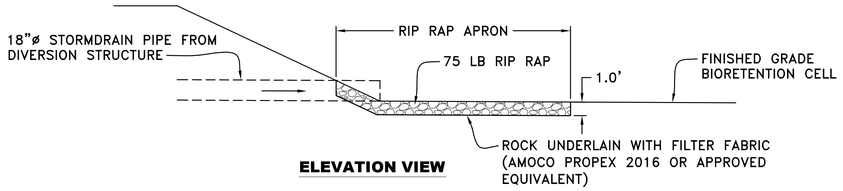
PROJECT NO.
4663.1.006.04

APRON DIMENSION TABLE

LOCATION	APRON LENGTH (L)	MAXIMUM APRON WIDTH (W)	MINIMUM APRON WIDTH (W)
DIVERSION STRUCTURE	10'	11'	3'
PVC PIPE FROM OVERFLOW RISER	6'	7'	2.5'
V-DITCH (TYP OF 2)	10'	11'	3.5'



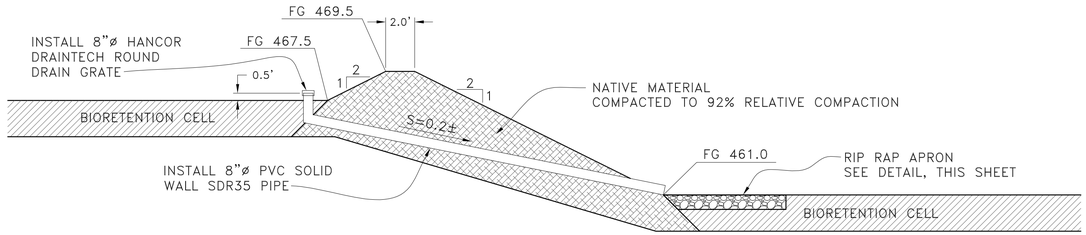
PLAN VIEW



ELEVATION VIEW

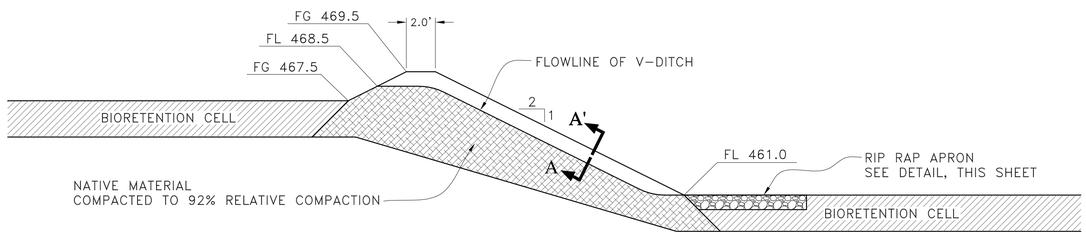
RIP RAP APRON

NO SCALE



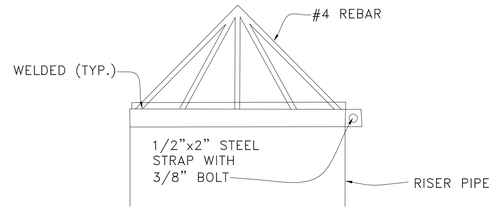
OVERFLOW RISER DETAIL

NO SCALE



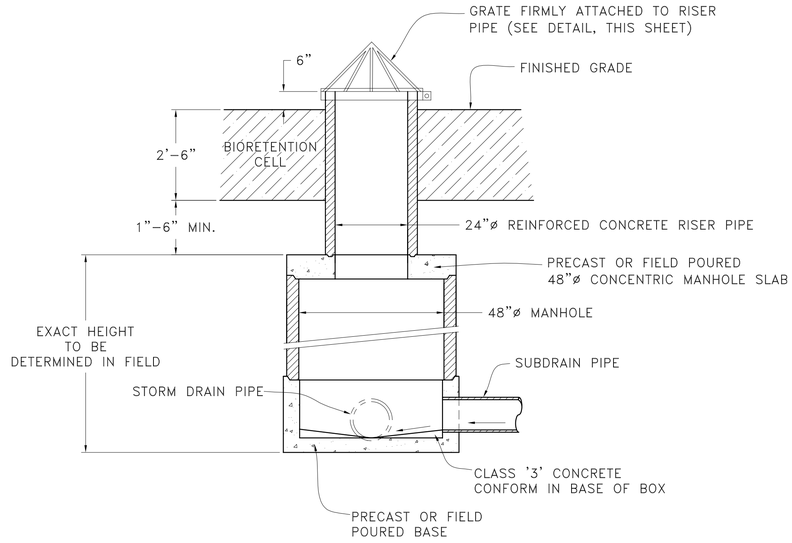
CONCRETE V-DITCH EMERGENCY SPILLWAY DETAIL

NO SCALE



TRASH RACK GRATE ASSEMBLY DETAIL

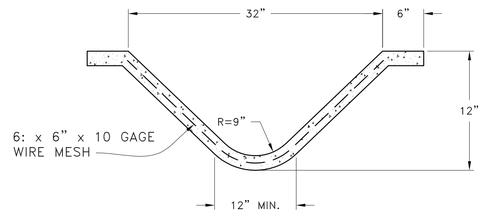
NO SCALE



ELEVATION VIEW

JUNCTION BOX

NO SCALE



SECTION A-A'

CONCRETE V-DITCH DETAIL

NO SCALE

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971
2010 CROW CANYON PLACE SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-0200
FAX (888) 279-2698
SAN RAMON - SAN JOSE - SAN FRANCISCO - ROCKLIN - RIPON - MARE ISLAND/VALLEJO - RENO

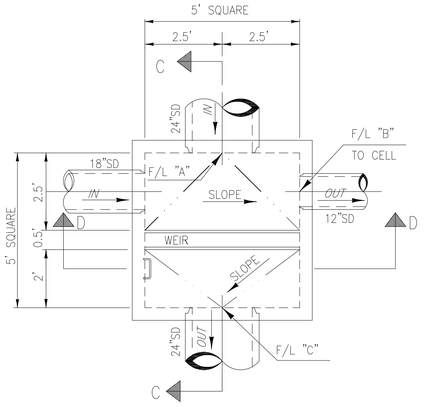
DETAILS
BIORETENTION CELL 2
FALLON VILLAGE
DUBLIN, CALIFORNIA

DESIGNED BY: KA
DRAWN BY: PC
CHECKED BY: JB
DATE: DECEMBER 2006
SCALE: AS SHOWN

REV.	DATE	DESCRIPTION	BY

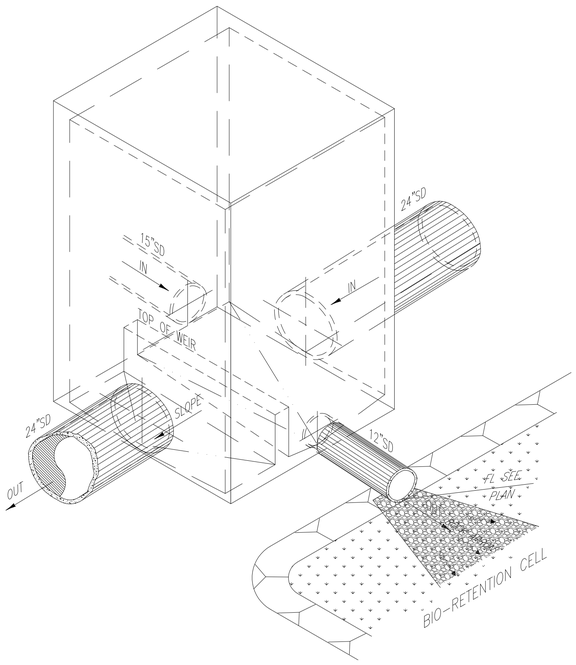
SHEET NUMBER
20
OF 24 SHEETS

PROJECT NO.
4663.1.006.04



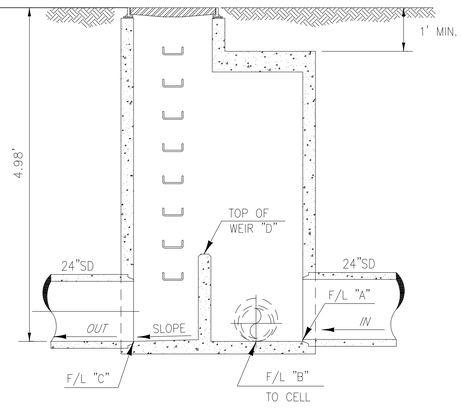
ISOMETRIC VIEW
N.T.S.

PLAN VIEW
N.T.S.



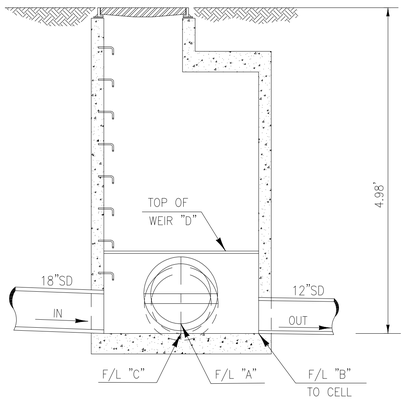
ISOMETRIC VIEW
N.T.S.

NOTE:
THESE PLANS ARE FOR REFERENCE ONLY.
SEE STRUCTURAL AND CIVIL PLANS FOR CONSTRUCTION DETAILS.



NOTE: SEE STORM DRAIN DIVERSION STRUCTURAL PLANS BY OTHERS FOR STRUCTURAL DETAILS

SECTION C-C
N.T.S.



SECTION D-D
N.T.S.

BIORETENTION CELL #2 - DIVERSION STRUCTURE #2
NO SCALE

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971
2010 CROW CANYON PLACE SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-9000
FAX (888) 279-2698
SAN RAMON - SAN JOSE - SAN FRANCISCO - ROCKLIN - RIPON - MARE ISLAND/VALLEJO - RENO

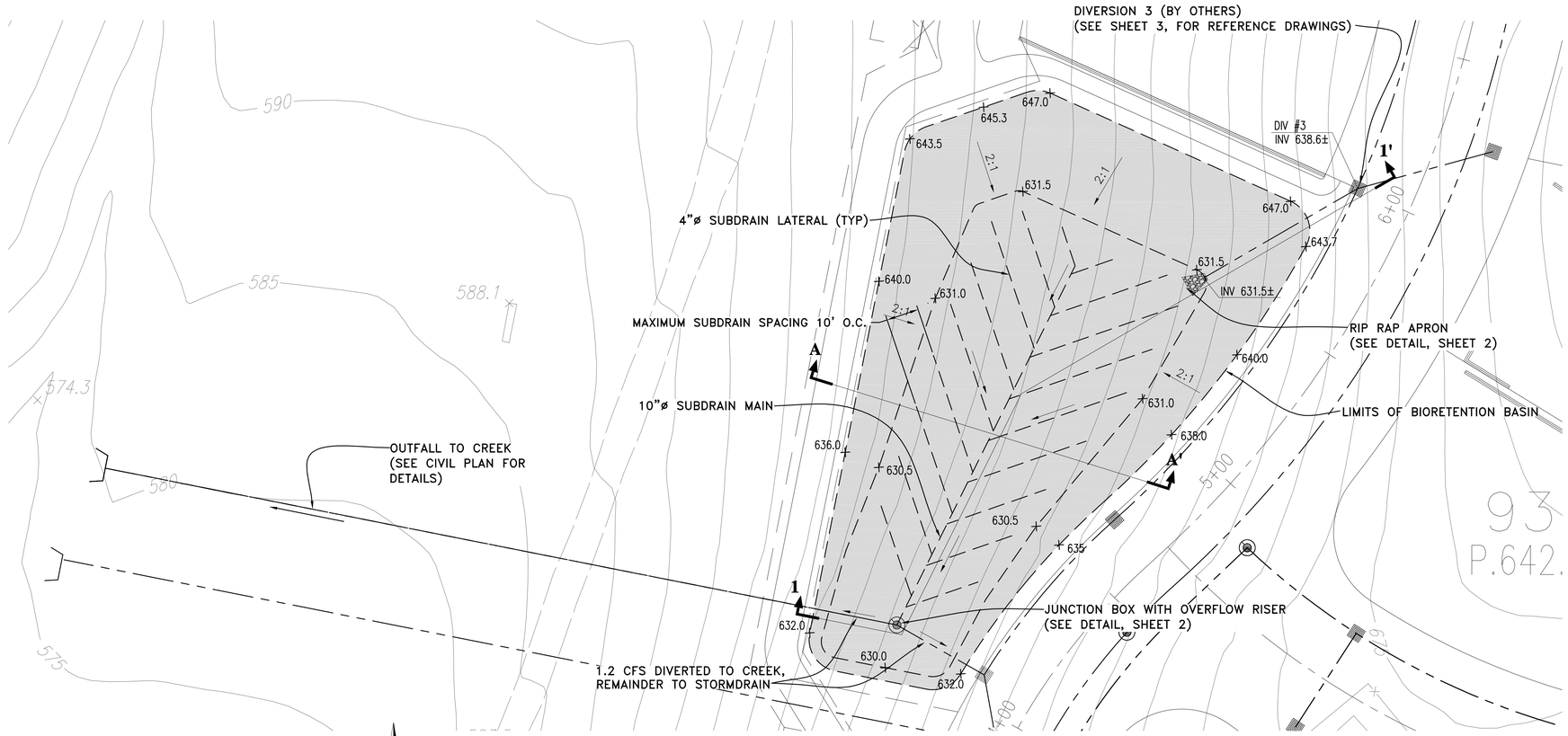
DIVERSION STRUCTURE DETAILS
BIORETENTION CELL 2
FALLON VILLAGE
DUBLIN, CALIFORNIA

DESIGNED BY: AC
DRAWN BY: --
CHECKED BY:
DATE: DECEMBER 2006
SCALE: NO SCALE

REV.	DATE	DESCRIPTION	BY
-			

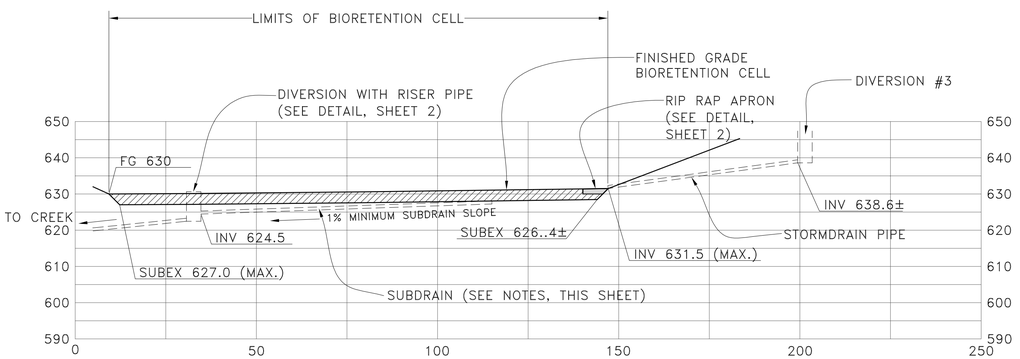
SHEET NUMBER
21
OF 24 SHEETS

PROJECT NO.
4663.1.006.04



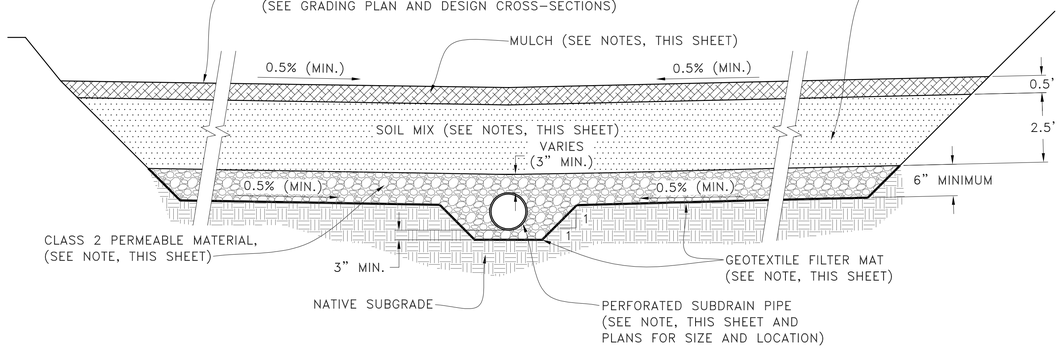
GRADING PLAN - BIORETENTION CELL #3

SCALE: 1" = 20'



SECTION 1-1'

SCALE: 1"=20'



BIORETENTION CELL
TYPICAL SECTION A-A'

NO SCALE

BIORETENTION CELL NOTES:

SOIL MIX:
SHALL BE 50% IMPORTED SAND, 20–30% MULCH/COMPOST, AND 20–30% TOPSOIL WITH LESS THAN 5% CLAY. MAXIMUM CONTENT OF FINES SHOULD NOT EXCEED 25%. SOIL MIX MAY BE PRODUCED WITH ON–SITE SOILS OR WITH IMPORTED SOILS TO ACHIEVE THE NOTED MIXTURE SPECIFICATION. ANY NATIVE SOIL MATERIALS USED SHALL HAVE THE FOLLOWING SPECIFICATIONS: MATERIALS TO BE USED SHALL BE FREE FROM ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES, AND OF SUCH QUALITY THAT IT WILL DRAIN THOROUGHLY WITHOUT EXCESSIVE VOIDS. EXCAVATED ON–SITE MATERIAL WILL BE CONSIDERED SUITABLE IF IT CONTAINS NO MORE THAN THREE PERCENT ORGANIC MATTER, IS FREE OF DEBRIS AND OTHER DELETERIOUS SUBSTANCES AND CONFORMS TO THE REQUIREMENTS SPECIFIED ABOVE. ROCKS SHALL BE REMOVED FROM ANY FILL MATERIAL TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER.

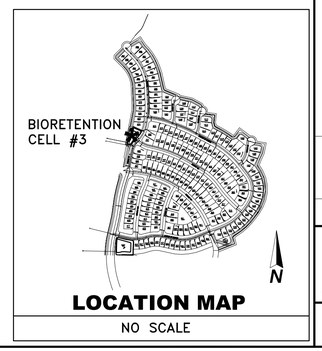
MULCH:
SHALL BE DOUBLE–GRIND CEDAR BARK OR APPROVED EQUAL, AVAILABLE AT SUN–UP FOREST PRODUCTS, INC., 3301 BUSINESS DRIVE, SACRAMENTO, CA 95820, 1 (800) 222 2551.
EXECUTION: INCORPORATE 2" LAYER OF MULCH INTO TOP 6" LAYER OF SOIL MIX. INCORPORATE WITH ROTOTILLER TO A HOMOGENOUS BLEND. SMOOTH OUT FINISH SURFACE PRIOR TO PLANTING.

CLASS 2 PERMEABLE MATERIAL:
AS DESCRIBED IN HEADING B UNDER SECTION 2.05, PART 2–PRODUCTS IN THE GEOTECHNICAL GUIDE CONTRACT SPECIFICATIONS PREPARED BY ENGEO.

GEOTEXTILE FILTER MAT:
SHALL BE SKAPS TN–270 OR APPROVED EQUAL.

PERFORATED SUBDRAIN:
PERFORATED SUBDRAIN SHALL BE PERFORATED PVC SOLID WALL SDR 35 (ASTM D–3034). PLACE PERFORATIONS DOWN. ALL PIPE JOINTS SHALL BE GLUED, PER MANUFACTURER'S SPECIFICATIONS. PERFORATED PIPE SHALL HAVE A MINIMUM OF THREE 3/4" DIAMETER HOLES, EQUALLY SPACED ALONG THE CIRCUMFERENCE OF THE PIPE AND NOT LESS THAN THREE HOLES PER LINEAR FOOT OF PIPE. SUBDRAIN SHOULD BE PLACED AT A 1% SLOPE MINIMUM.

SOIL MIX TESTING AND REPORTING:
COLLECT ONE SAMPLE OF FILTER MIX. CONFIRM THAT ORGANIC CONTENT IS 20–30% OF FILTER MEDIA BY VOLUME (ASTM D2974). CONFIRM THAT PERCENT PASSING #200 SIEVE (ASTM D422–63) DOES NOT EXCEED 25%. CONFIRM USING HYDROMETER TEST (ASTM D422–63) THAT CLAY CONTENT DOES NOT EXCEED 5%. A REPORT SHALL BE SUBMITTED TO THE RWQCB (REGIONAL WATER QUALITY CONTROL BOARD) WITH LABORATORY TESTING RESULTS PRIOR TO PLACEMENT OF THE TOP LAYER OF MULCH AND VEGETATION.



LOCATION MAP

NO SCALE

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971
2010 CROW CANYON PLACE
SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-0000
FAX (888) 279-2698
SAN RAMON · SAN JOSE · SAN FRANCISCO · ROCKLIN · RIPON · MARE ISLAND/VALLEJO · RENO

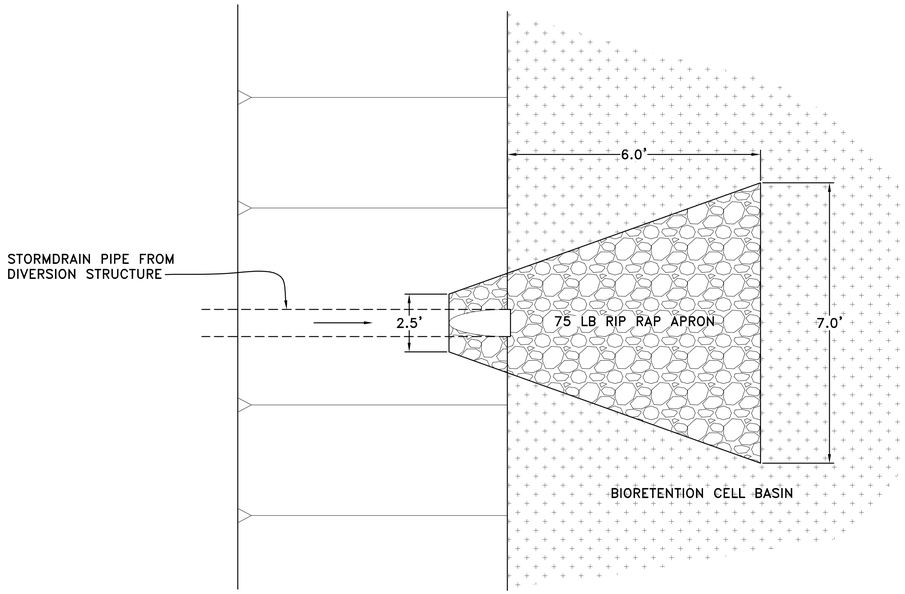
GRADING AND SUBDRAIN PLAN
BIORETENTION CELL #3
FALLON VILLAGE
DUBLIN, CALIFORNIA

DESIGNED BY: KA
DRAWN BY: PC
CHECKED BY: JB
DATE: DECEMBER 2006
SCALE:

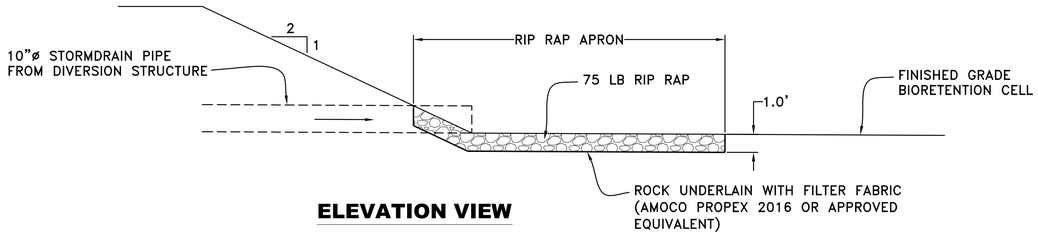
REV.	DATE	DESCRIPTION	BY
1	02-07-07	REVISION DATED FEBRUARY 2007	KSA

SHEET NUMBER
1
OF 3 SHEETS

PROJECT NO.
4663.1.006.04



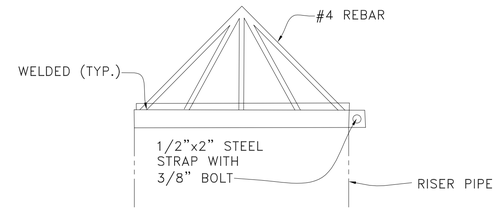
PLAN VIEW



ELEVATION VIEW

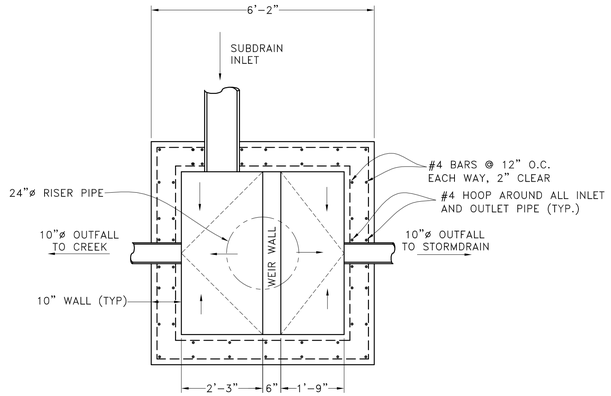
RIP RAP APRON

NO SCALE

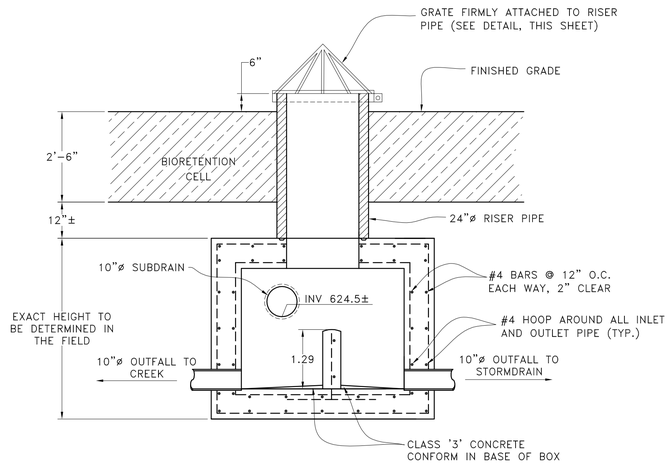


TRASH RACK GRATE ASSEMBLY DETAIL

NO SCALE



SECTIONAL PLAN VIEW



SECTIONAL ELEVATION VIEW

JUNCTION BOX / OVERFLOW PIPE

NO SCALE

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971
2010 CROW CANYON PLACE
SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-9000
FAX (888) 279-2698
SAN RAMON · SAN JOSE · SAN FRANCISCO · ROCKLIN · RIPON · MARE ISLAND/VALLEJO · RENO

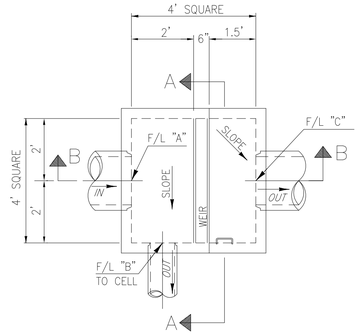
DETAILS
BIORETENTION CELL #3
FALLON VILLAGE
DUBLIN, CALIFORNIA

DESIGNED BY: KA
DRAWN BY: PC
CHECKED BY: JB
DATE: DECEMBER 2006
SCALE: AS SHOWN

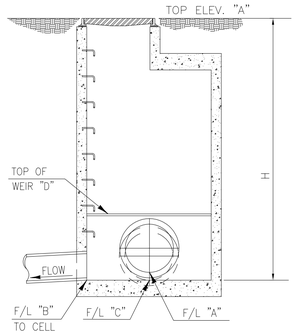
REV.	DATE	DESCRIPTION	BY

SHEET NUMBER
2
OF 3 SHEETS

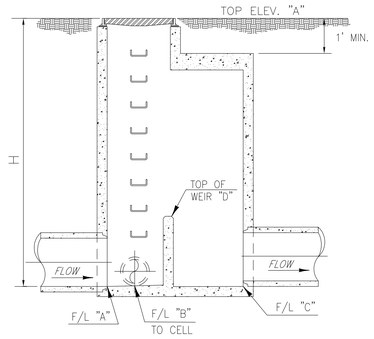
PROJECT NO.
4663.1.006.04



PLAN-DIVERSION STRUCTURE
NTS



SECTION A-A
NTS

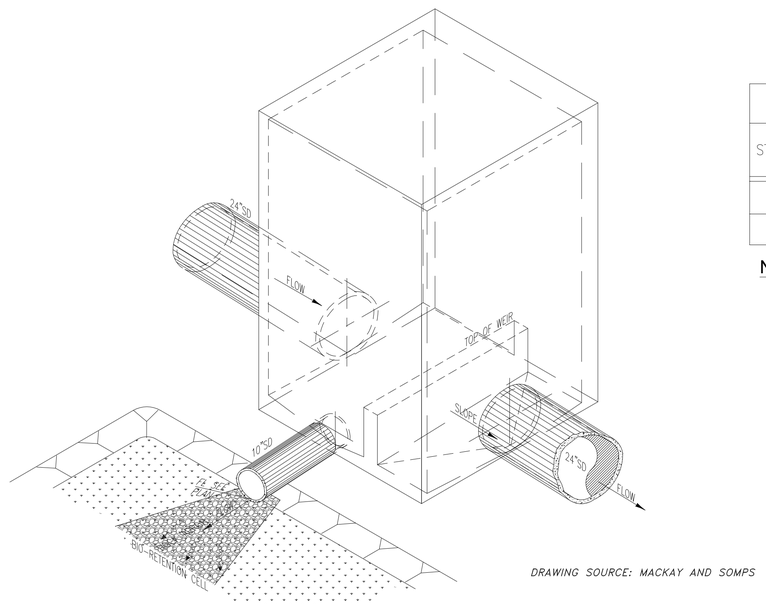


SECTION B-B
NTS

NOTE: SEE STORM DRAIN DIVERSION STRUCTURAL PLANS BY OTHERS FOR STRUCTURAL DETAILS

DRAWING SOURCE: MACKAY AND SOMPS

NOTE:
THESE PLANS ARE FOR REFERENCE ONLY.
SEE STRUCTURAL AND CIVIL PLANS FOR CONSTRUCTION DETAILS.



DRAWING SOURCE: MACKAY AND SOMPS

BIORETENTION CELL #3 - DIVERSION STRUCTURE #3
NO SCALE

DIVERSION STRUCTURE DESIGN DIMENSIONS									
DIV. STRUCTURE NO.	F/L "A" ELEV.	F/L "B" ELEV.	F/L "C" ELEV.	TOP WEIR "D" ELEV.	WEIR HT.	WEIR LENGTH	OUTLET PIPE TO CELL (DIA.)	"h"	"H"
3	638.60	638.60	638.60	640.04	1.44'	4.0'	10"	N/A	6.08'

NOTE: N/A IN TABLE ABOVE MEANS THAT A DROP OUTLET IS NOT NEEDED FOR THESE DIVERSION STRUCTURES.

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971
2010 CROW CANYON PLACE
SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-9000
FAX (888) 279-2698
SAN RAMON · SAN JOSE · SAN FRANCISCO · ROCKLIN · RIPON · MARE ISLAND/VALLEJO · RENO

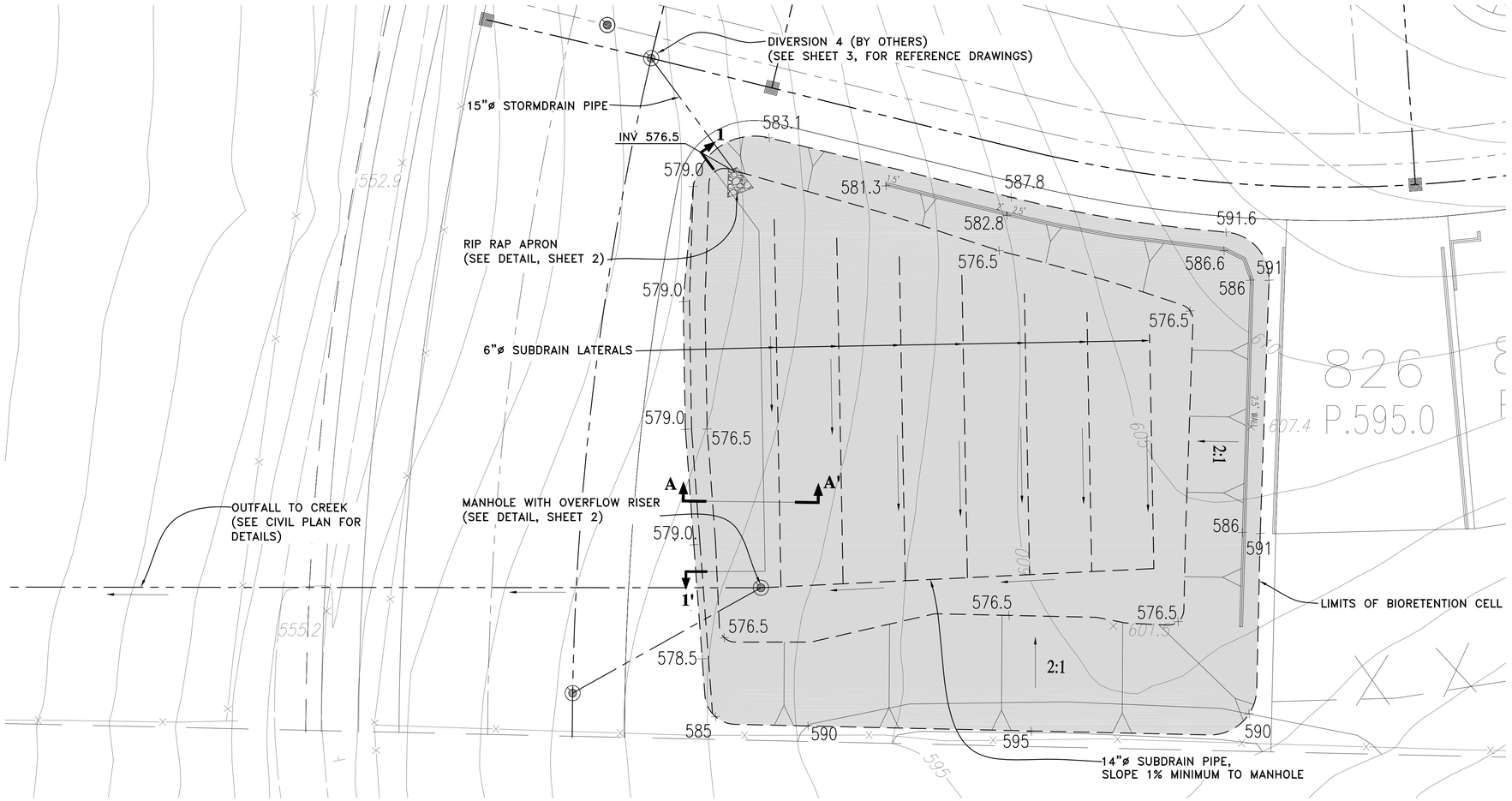
DIVERSION STRUCTURE DETAILS
BIORETENTION CELL #3
FALLON VILLAGE
DUBLIN, CALIFORNIA

DESIGNED BY: AC
DRAWN BY: --
CHECKED BY:
DATE: DECEMBER 2006
SCALE: NO SCALE

REV.	DATE	DESCRIPTION	BY
-			

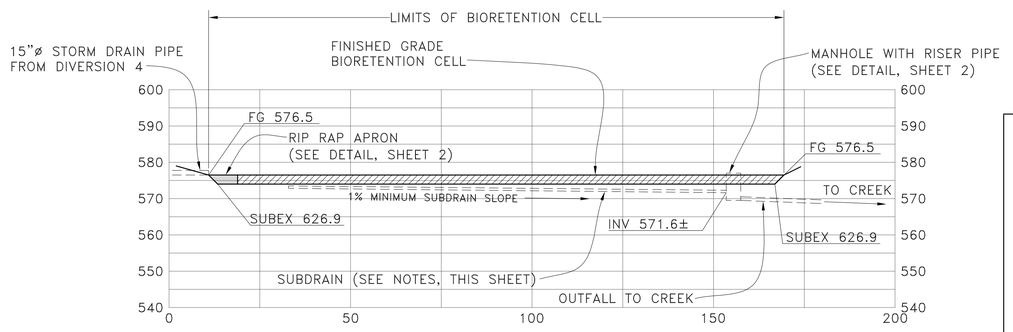
SHEET NUMBER
3
OF 3 SHEETS

PROJECT NO.
4663.1.006.04



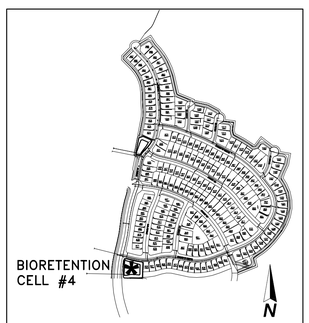
GRADING PLAN - BIORETENTION CELL #4

SCALE: 1" = 20'



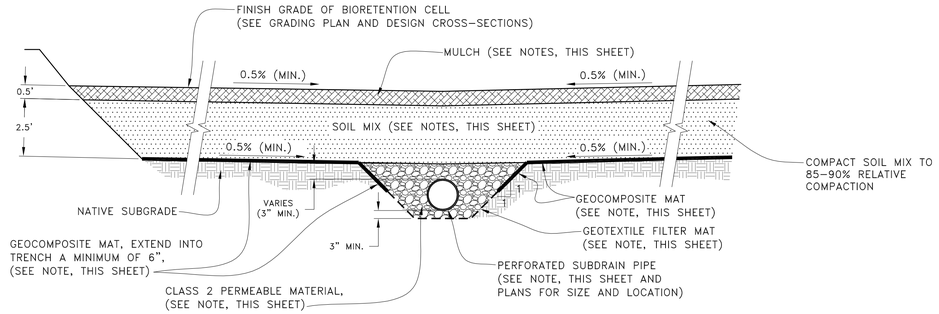
SECTION 1-1'

SCALE: 1"=20'



LOCATION MAP

NO SCALE



BIORETENTION CELL TYPICAL SECTION A-A'

NO SCALE

BIORETENTION CELL NOTES:

SOIL MIX:
SHALL BE 50% IMPORTED SAND, 20–30% MULCH/COMPOST, AND 20–30% TOPSOIL WITH LESS THAN 5% CLAY. MAXIMUM CONTENT OF FINES SHOULD NOT EXCEED 25%. SOIL MIX MAY BE PRODUCED WITH ON–SITE SOILS OR WITH IMPORTED SOILS TO ACHIEVE THE NOTED MIXTURE SPECIFICATION. ANY NATIVE SOIL MATERIALS USED SHALL HAVE THE FOLLOWING SPECIFICATIONS: MATERIALS TO BE USED SHALL BE FREE FROM ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES, AND OF SUCH QUALITY THAT IT WILL DRAIN THOROUGHLY WITHOUT EXCESSIVE VOIDS. EXCAVATED ON–SITE MATERIAL WILL BE CONSIDERED SUITABLE IF IT CONTAINS NO MORE THAN THREE PERCENT ORGANIC MATTER, IS FREE OF DEBRIS AND OTHER DELETERIOUS SUBSTANCES AND CONFORMS TO THE REQUIREMENTS SPECIFIED ABOVE. ROCKS SHALL BE REMOVED FROM ANY FILL MATERIAL TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER.

MULCH:
SHALL BE DOUBLE–GRIND CEDAR BARK OR APPROVED EQUAL, AVAILABLE AT SUN–UP FOREST PRODUCTS, INC., 3301 BUSINESS DRIVE, SACRAMENTO, CA 95820, 1 (800) 222 2551.
EXECUTION: INCORPORATE 2" LAYER OF MULCH INTO TOP 6" LAYER OF SOIL MIX. INCORPORATE WITH ROTOTILLER TO A HOMOGENOUS BLEND. SMOOTH OUT FINISH SURFACE PRIOR TO PLANTING.

CLASS 2 PERMEABLE MATERIAL:
AS DESCRIBED IN HEADING B UNDER SECTION 2.05, PART 2–PRODUCTS IN THE GEOTECHNICAL GUIDE CONTRACT SPECIFICATIONS PREPARED BY ENGEO.

GEOTEXTILE FILTER MAT:
SHALL BE SKAPS GEONET TN–270 OR APPROVED EQUAL.

GEOCOMPOSITE MAT:
SHALL BE SKAPS GEOCOMPOSITE TN–220 WITH 6 OZ. FABRIC OR APPROVED EQUIVALENT.

PERFORATED SUBDRAIN:
PERFORATED SUBDRAIN SHALL BE PERFORATED PVC SOLID WALL SDR 35 (ASTM D–3034). PLACE PERFORATIONS DOWN. ALL PIPE JOINTS SHALL BE GLUED, PER MANUFACTURER'S SPECIFICATIONS. PERFORATED PIPE SHALL HAVE A MINIMUM OF THREE 3/4" DIAMETER HOLES, EQUALLY SPACED ALONG THE CIRCUMFERENCE OF THE PIPE AND NOT LESS THAN THREE HOLES PER LINEAR FOOT OF PIPE. SUBDRAIN SHOULD BE PLACED BE PLACED AT A 1% MINIMUM SLOPE.
IL MIX TESTING AND REPORTING:
COLLECT ONE SAMPLE OF FILTER MIX. CONFIRM THAT ORGANIC CONTENT IS 20–30% OF FILTER MEDIA BY VOLUME (ASTM D2974). CONFIRM THAT PERCENT PASSING #200 SIEVE (ASTM D422–63) DOES NOT EXCEED 25%. CONFIRM USING HYDROMETER TEST (ASTM D422–63) THAT CLAY CONTENT DOES NOT EXCEED 5%. A REPORT SHALL BE SUBMITTED TO THE RWQCB (REGIONAL WATER QUALITY CONTROL BOARD) WITH LABORATORY TESTING RESULTS PRIOR TO PLACEMENT OF THE TOP LAYER OF MULCH AND VEGETATION.

2010 CROW CANYON PLACE
SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-0000
FAX (888) 279-2698
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971
SAN RAMON · SAN JOSE · SAN FRANCISCO · ROCKLIN · RIPON · MARE ISLAND/VALLEJO · RENO

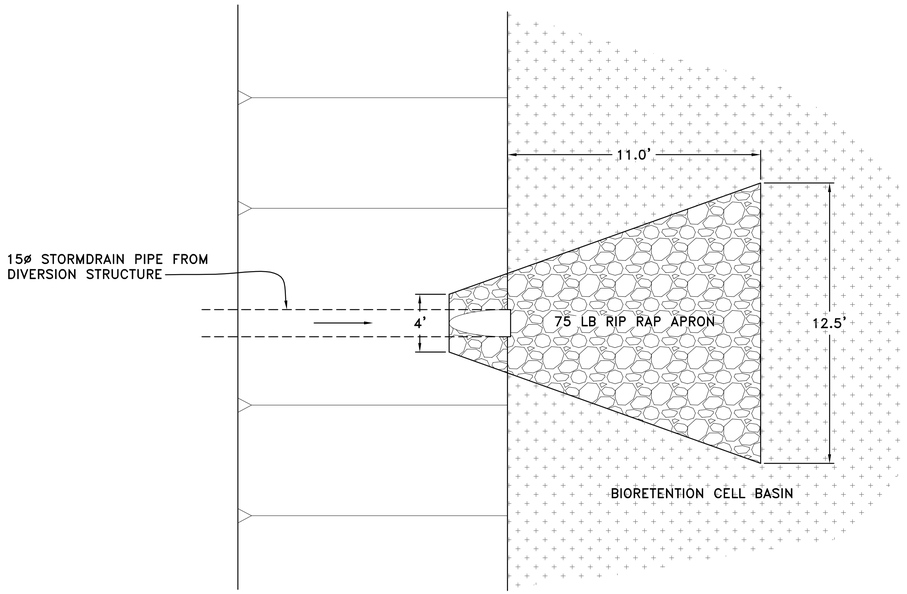
GRADING AND SUBDRAIN PLAN
BIORETENTION CELL #4
FALLON VILLAGE
DUBLIN, CALIFORNIA

DESIGNED BY: KA
DRAWN BY: PC
CHECKED BY: JB
DATE: DECEMBER 2006
SCALE:

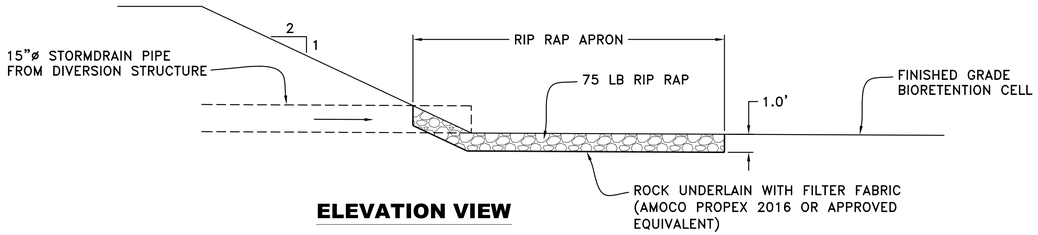
REV.	DATE	DESCRIPTION	BY
1	02-07-07	REVISION DATED FEBRUARY 2007	KA

SHEET NUMBER
1
OF 3 SHEETS

PROJECT NO.
4663.1.006.04



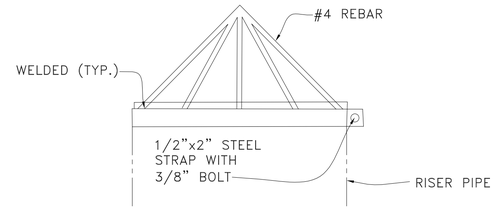
PLAN VIEW



ELEVATION VIEW

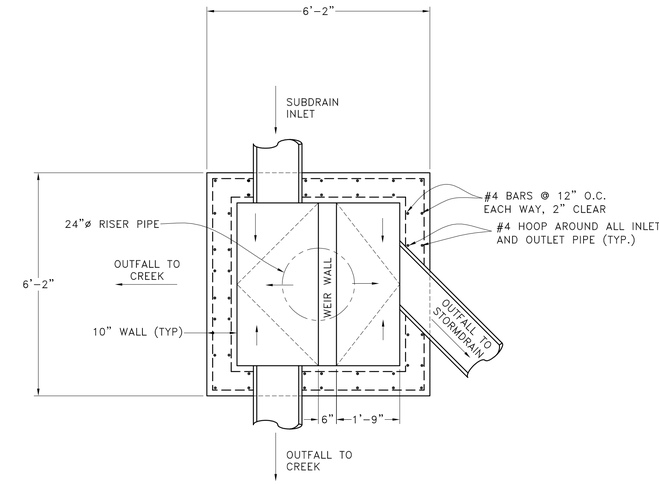
RIP RAP APRON

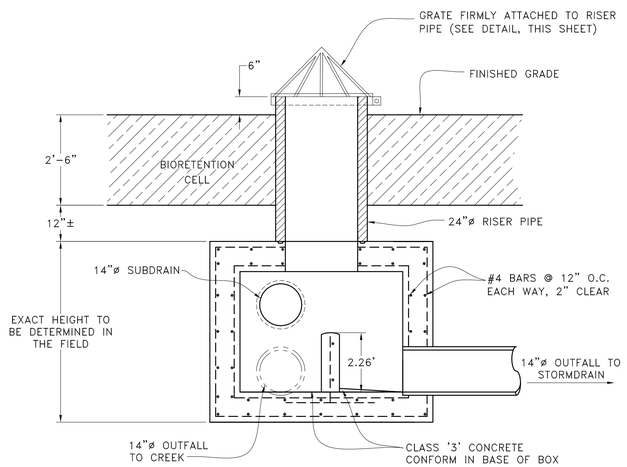
NO SCALE



TRASH RACK GRATE ASSEMBLY DETAIL

NO SCALE





JUNCTION BOX / OVERFLOW RISER

NO SCALE

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971
2010 CROW CANYON PLACE
SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-9000
FAX (888) 279-2698
SAN RAMON - SAN JOSE - SAN FRANCISCO - ROCKLIN - RIPON - MARE ISLAND/VALLEJO - RENO

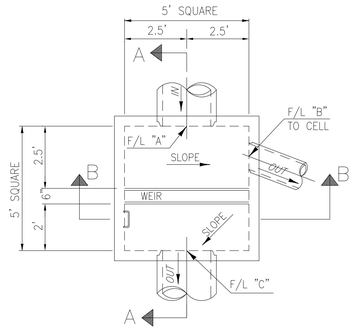
DETAILS
BIORETENTION CELL #4
FALLON VILLAGE
DUBLIN, CALIFORNIA

DESIGNED BY:	KA
DRAWN BY:	PC
CHECKED BY:	JB
DATE:	DECEMBER 2006
SCALE:	AS SHOWN

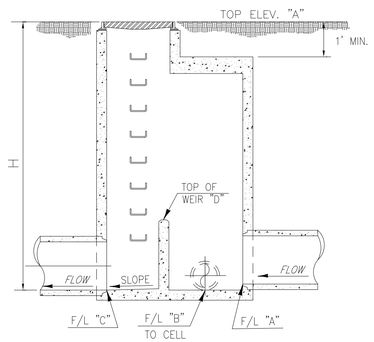
REV.	DATE	DESCRIPTION	BY
-			

SHEET NUMBER
2
OF 3 SHEETS

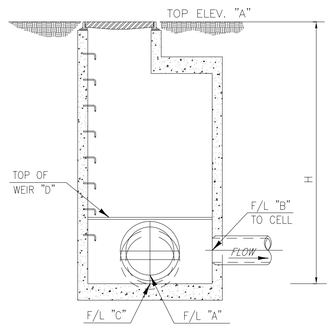
PROJECT NO.
4663.1.006.04



PLAN-DIVERSION STRUCTURE
NTS



SECTION A-A
NTS



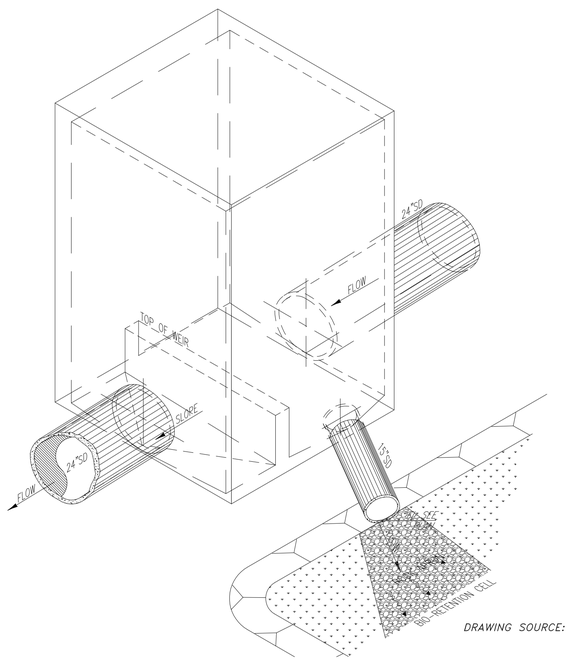
SECTION B-B
NTS

DIVERSION STRUCTURE DESIGN DIMENSIONS									
DIV. STRUCTURE NO.	F/L "A" ELEV.	F/L "B" ELEV.	F/L "C" ELEV.	TOP WEIR "D" ELEV.	WEIR HT.	WEIR LENGTH	OUTLET PIPE TO CELL (DIA.)	"h"	"H"
4	577.00	577.00	577.00	578.88	1.88'	5.0'	15"	N/A	5.00'

NOTE: N/A IN TABLE ABOVE MEANS THAT A DROP OUTLET IS NOT NEEDED FOR THESE DIVERSION STRUCTURES.

NOTE: SEE STORM DRAIN DIVERSION STRUCTURAL PLANS BY OTHERS FOR STRUCTURAL DETAILS

DRAWING SOURCE: MACKAY AND SOMPS



DRAWING SOURCE: MACKAY AND SOMPS

NOTE:
THESE PLANS ARE FOR REFERENCE ONLY.
SEE STRUCTURAL AND CIVIL PLANS FOR CONSTRUCTION DETAILS.

BIORETENTION CELL #4 - DIVERSION STRUCTURE #4

NO SCALE

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971
2010 CROW CANYON PLACE
SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-9000
FAX (888) 279-2698
SAN RAMON - SAN JOSE - SAN FRANCISCO - ROCKLIN - RIPON - MARE ISLAND/VALLEJO - RENO

DIVERSION STRUCTURE DETAILS

BIORETENTION CELL #4
FALLON VILLAGE
DUBLIN, CALIFORNIA

DESIGNED BY: AJC
DRAWN BY: --
CHECKED BY:
DATE: DECEMBER 2006
SCALE: NO SCALE

REV.	DATE	DESCRIPTION	BY
.			

SHEET NUMBER
3
OF 3 SHEETS

PROJECT NO.
4663.1.006.04

APPENDIX C

Fallon Village Site Geology

APPENDIX C

Site Geology

The geologic units mapped on the site include bedrock and surficial deposits consisting of artificial fill, alluvium, colluvium and landslides that are described below. The geologic units described below are adapted from reports completed by ENGEO Incorporated for the site.

Geologic Units

Artificial Fill. Artificial fill encountered on the site is associated with some of the roadways and other areas in the project including a quarry area. The fill materials were described as a mixture of clay and rock fragments.

Surficial Soils. The surface of the site is typically mantled with 3 to 4 feet of dark gray-brown clay derived from weathering of the underlying parent material consisting of weak bedrock or alluvium. The gradational contact at the base of the desiccated surficial soil layer typically exhibited a zone of discontinuous slickensided shear planes that we interpret to be the result of seasonal shrinking and swelling of the clay soil. The above-described features are typical of highly expansive clay soils. Plasticity Index (PI) from 30 to 51 were reported from samples of the surficial soil, indicating that the surface soils should be considered very highly plastic and critically expansive.

Colluvium. Mantling the bedrock and filling swales of the site are colluvial deposits. These sediments are derived from weathering of the underlying bedrock and consist mostly of a silty clay matrix with sand and rock fragments. In general, the deposits of colluvium in site swales should be expected to range from 5 to 25 feet thick. Laboratory testing indicates that the colluvium is overconsolidated and moderately compressible.

Where colluvium is located on sloping ground, it may be characteristically unstable. Within swales, the colluvial deposits tend to be relatively thicker and may be subject to flow or slip downslope.

Landslides. Landslide deposits consist of masses of unconsolidated material and/or bedrock that have moved downslope by sliding, falling, or flowing. Landslides ranging in size from very small to relatively large occur along the northern edge of the site. The landslides include soil slips, earth flows, debris slides, areas of shallow slumps and gullying, large predominantly rotational slumps, and translational slides.

Alluvium. Alluvium underlies the wider portions of valley floors on the subject property. Alluvial soils in the site vicinity typically consist of very stiff silty clay with minor amounts of interbedded gravelly clay. On the southwest portion of the property alluvium may be as much as 100 feet in depth. Laboratory testing indicates that the site alluvium is overconsolidated and relatively non-compressible.

Bedrock. Bedrock at and north of the site was identified during subsurface explorations during site studies as weak clayey siltstone and claystone, with relatively minor amounts of interbedded friable sandstone. Bedrock was described in the boring and exploratory test pit logs as having shearing is interpreted to be the result of the regional folding of the bedrock formations. In general, bedding was described as striking to the north-northwest. The fine-grained rocks including claystone and clayey siltstone should be considered highly to very highly plastic and critically expansive.

Groundwater

At the time of subsurface work, groundwater was encountered between 14 to 40 feet below the ground surface in the exploratory boring where it was encountered. Fluctuations in groundwater levels may occur seasonally and over a period of years because of precipitation, changes in drainage patterns, irrigation and other factors. Future irrigation may cause an overall rise in groundwater levels.

Seismic Sources

No active faults are known to pass through the property, according to published geologic maps (Dibblee, 1980; Crane, 1995; Graymer, et al. 1994). The nearest State-of-California-zoned, active[1] faults are the Calaveras fault located approximately 5 miles to the southwest and the Greenville fault located about 6 miles northeast of the site.

A "blind" thrust fault has been mapped traversing the southern portion of the property by Dibblee (1980), Crane, (1995) and Graymer, et al., (1996), at the northern edge of the Livermore Valley. This mapped thrust fault is not considered active by the State of California or by local geotechnical consultants. While the probability of ground rupture is considered low, as described in the ENGEO Geotechnical Reports, there is a high probability that the site and any improvements will be subject to strong ground shaking during the lifetime of the project.

[1] An active fault is defined by the State Mining and Geology Board as one that has had surface displacement within Holocene time (about the last 10,000 years) (Hart, 1994). The State of California has prepared maps designating zones for special studies that contain these active earthquake faults.