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SOIL ENGINEERS
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98/160

PLAN OF CONTROL
FALLON CROSSING GHAD
TASSAJARA ROAD
DUBLIN, CALIFORNIA

FOR
STANDARD PACIFIC HOMES
May 25, 2011

Job No. 3058.000

BERLOGAR ^{10/8/60}
STEVENS &
ASSOCIATES

Via Hand Delivery

May 25, 2011
Job No. 3058.000

Mr. Aaron Ross-Swain
Standard Pacific Homes
3825 Hopyard Road, Suite 275
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Subject: Plan of Control
Fallon Crossing GHAD
Tassajara Road
Dublin, California

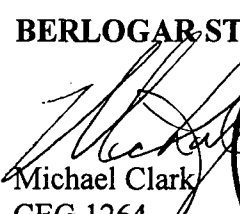
Dear Mr. Ross-Swain:

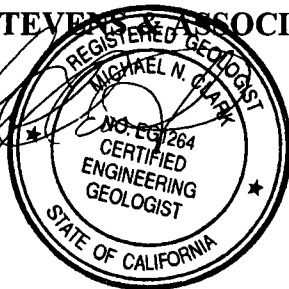
We are pleased to present herein Volume 1 of the Plan of Control for the Fallon Crossing Geologic Hazard Abatement District (GHAD) in Dublin, California. Volume 2 will include record drawings and as-built documents to be created at the completion of site development. This Plan of Control has been prepared to satisfy Condition of Approval #26 for the Fallon Crossing residential development and in accordance with California Public Resources Code, Division 17, sections 26500 et seq.

Should you have any questions regarding this document, please do not hesitate to contact us.

Respectfully submitted,

BERLOGAR STEVENS & ASSOCIATES


Michael Clark
CEG 1264



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Ruggeri-Jensen-Azar & Associates (1)
Attention: Mr. Mark Falgout

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Frank Berlogar
GE 142



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Plate 1 – Vicinity Map

Plate 2 – Pre-Development Geologic Map

Plate 3 – Remedial Grading Plan

Exhibit A – Open Space Ownership and Maintenance Responsibilities Exhibit

Exhibit B – Legal Descriptions of GHAD Boundaries and Maintenance Easement

Exhibit C – Plats of GHAD Boundaries and Maintenance Easement

Exhibit D – Deed Restriction Exhibit

Appendix A – Detention/Water Quality Basin Operations and Maintenance Manual

Appendix B – Fire Hazard Mitigation and Defensible Space Vegetation Management Plan

Appendix C – Riparian Mitigation & Monitoring Plan

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GLOSSARY OF TERMS

Board of Directors – The governing body of the Geologic Hazard Abatement District. For the Fallon Crossing GHAD, the initial Board of Directors is the Dublin City Council.

Fallon Crossing Site or The Site – The roughly 68-acre parcel of land including both the development area of Tract 7617 and the undeveloped open space. Refer to Plate 1.

Geologic Hazard Abatement District (GHAD) – A district formed under California Public Resources Code 26500-26601 that is intended to handle long-term abatement and control of real property threatened by earth movement.

Geologic Hazard – An actual or threatened landslide, land subsidence, soil erosion, earthquake, fault movement, or any other natural or unnatural movement of land or earth.

GHAD Boundaries – The limits of GHAD responsibilities as shown on Exhibit A.

GHAD Maintenance Area – The area of GHAD maintenance responsibilities including Parcels A and H as well as the maintenance easement as shown on Exhibit A.

GHAD Maintained Facilities – Facilities to be maintained by the GHAD, including concrete V ditches, drainage facilities, subdrain outfalls, ponds and basins.

GHAD Ownership Areas – The areas that the GHAD will have ownership over shown as Parcels A and H on Exhibit A.

Preserve – For the purposes of this document the preserve includes those areas within the Open Space parcel "Parcel A" and the Riparian Corridor located within Parcel H, except for the areas referred to as Water Quality and Detention Basin.

GHAD Manager – The person in charge of overseeing GHAD related activities including budgeting, evaluation of assessments, contracting maintenance work, contracting technical consultant, and reporting to the Board of Directors.

Plan of Control – A report prepared by an engineering geologist certified pursuant to Section 7822 of the Business and Professional Code or a firm of engineering geologists which describes in detail a geologic hazard, its location and the area affected thereby, and a plan for the prevention, mitigation, abatement, or control thereof.

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TRACT 7617 – FALLON CROSSING PLAN OF CONTROL

I. AUTHORITY AND SCOPE

Formation of the Fallon Crossing Geologic Hazard Abatement District (GHAD) is proposed under authority of the California Public Resources Code, Division 17, sections 26500 et seq.

As required by Public Resources Code section 26509, an engineering geologist certified pursuant to section 7822 of the Business and Professions Code has prepared this Plan of Control which describes the potential geologic hazards within the Fallon Crossing GHAD boundaries. It also provides a plan for the prevention, mitigation, abatement, and control thereof. As used in this Plan of Control and as provided in Public Resources Code 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.

II. PROPERTY IDENTIFICATION

The GHAD boundaries, shown in Exhibits B and C to this Plan of Control, include 47 acres of land within the Fallon Crossing site (The Site). Exhibit A is a plan entitled Open Space Ownership and Maintenance Responsibilities Exhibit, Tract 7617 – Fallon Crossing, prepared by Ruggeri-Jensen-Azar (RJA), dated October 2007. The plan shows the areas of the site that will be owned and maintained by the GHAD and a 0.22-acre maintenance easement between the Fallon Crossing development and the adjacent Silvera Ranch development. The GHAD will have maintenance responsibilities over, but will not own the easement. The legal descriptions and Plats of the land within the Fallon Crossing GHAD are contained in Exhibits B and C, respectively.

III. BACKGROUND

PERMITTING

Construction for Fallon Crossings will be carried out under permits issued by the City of Dublin, California Department of Fish and Game, National Fish and Wildlife Service, United States Army Corps of Engineers, and the Regional Water Quality Control Board. Certain conditions of these permits may survive construction and may apply to ongoing GHAD management activities.

GENERAL SITE LOCATION AND EXISTING CONDITIONS

The site is an irregularly shaped parcel including about 68 acres of land located on the northeast side of Tassajara Road, about 2¼ miles north of Interstate Highway 580. Tassajara Road and Moller Creek, a tributary of Tassajara Creek, border the western and northwestern limits of the

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site. Moller Creek flows to the south-southwest into a culvert crossing under Tassajara Road. Grading for the Silvera Ranch residential development has been performed on the south and southwest sides of the site. Open land borders the remainder of the site to the north and east. The site location is shown on the Vicinity Map, Plate 1.

When this Plan of Control was prepared, the site was vacant and used for cattle grazing. A pond (labeled as "Lower Pond" on Exhibit A) is located adjacent to Moller Creek in the northwest corner of the site. Another intermittent pond (labeled as "Upper Pond" on Exhibit A) was created by a man-made artificial fill berm placed in a drainage swale, upslope of the development. Additionally, there is an existing conservation easement at the site that includes the "Lower Pond" and a 200-foot wide radius around the pond.

A ridge roughly 200 feet high trends east-west and dominates the northern portion of the site. This ridge slopes down to the development area at gradients as steep as about 2 horizontal to 1 vertical (2H:1V) near the top, but generally slopes between 2½H:1V to 3H:1V or less steep as shown on the Pre-Development Geologic Map, Plate 2. A shallow drainage course drains westerly along the toe of the ridge and into Moller Creek. A man-made berm is located across the drainage in the northeast portion of the site to form the "Upper Pond" about 450 feet east of the development area. Two smaller west-east trending ridge spurs separated by a small drainage swale extend into the southern portion of the site from the east. The ridge spurs are between about 80 to 100 feet high with side slopes as steep as 2½H:1V along the northern slope of the northern spur and 3H:1V or less steep elsewhere. The spurs slope down to a relatively level plane east of Moller Creek. The plane ranges from about 100 to 300 feet wide.

Site topography ranges in elevation from 450 feet above mean sea level in Moller Creek in the southwestern portion of the site near Tassajara Road to about 705 feet on the top of the northern ridge. On-site vegetation consists of seasonal grasses on the slopes and in the valleys, and dense bushes and trees concentrated near the tributary creek. The site generally drains to the west.

PROPOSED SITE DEVELOPMENT

The Fallon Crossing residential development is shown on the project grading plans prepared by RJA, dated May 2, 2008. The grading plans show that the site will be developed into 106 single-family residences. Grading will be limited to about the western half of the site and extending beyond the property line into partially graded ground within the adjacent Silvera Ranch development to the southeast and tying into an existing engineered fill slope of the Silvera Ranch development to the south. The roadways will include a main loop road that will connect to Tassajara Road on the southwest side of the development and loop around the development in a clockwise direction to connect to Cydonia Road to the southeast. Three cul-de-sacs will extend to the southeast from the western stretch of the loop. Site grading will steepen the lower portion of the slope in the eastern portion of the development. The spur ridges in the southern portion of the site will be modified by a combination of cuts and engineered fills. A water quality pond and two detention basins are planned next to Moller Creek. We understand that future development of adjacent properties (Moller Ranch) will include rerouting Moller Creek to the south into a culvert to pass beneath Tassajara Road. The design of the creek realignment and culvert should be provided to the Fallon Crossing GHAD for review and acceptance.

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OPEN SPACE

Exhibit A of this Plan of Control shows the area of Fallon Crossing GHAD ownership as Parcels A and H collectively referred to as the Open Space. Parcel A is located upslope of the development area on the north and northeast sides. Parcel A consists mainly of undeveloped open space and is bound by the Fallon Crossing and Silvera Ranch developments to the south, Parcel H to the west, and open graze land to the north and east. Parcel H is located in the northwest portion of the Fallon Crossing GHAD-owned open space and is located along Moller Creek that is northwest of the development area. The GHAD will maintain a 15-foot wide maintenance easement that is owned by the TR 7450 Home Owners Association (HOA). The maintenance easement is located in open space between the southeast side of the Fallon Crossing development and the upslope Silvera Ranch development. The maintenance easement will be transferred to the GHAD upon the turnover of Parcel A & H to the GHAD pursuant to Section VI of this document.

Parcels B, C, D, E, F, and G are HOA owned and maintained properties. Parcel B is a linear park located between the development area and Parcel H. There is a 15-foot wide access easement at the south end of Parcel B. Parcel C is a landscaped area along Tassajara Road. Parcel D is an open space located in the interior of the development area. Parcel D will consist of a northwest-facing slope that is planned to be an irrigated vineyard. Parcel E is a neighborhood park located at the eastern edge of the development area. There is a 15-foot-wide access easement through this parcel. Parcels F and G are landscaped areas.

Open space within the Fallon Crossing GHAD boundaries (Parcels A and H and the maintenance easement) shall be managed under the terms of the agreements between the developer and City of Dublin, this Plan of Control and any subsequent updates or amendments, the existing conservation easement that was recorded on the property in 2001 to satisfy biological mitigation measures, and the Fallon Crossing Riparian Mitigation and Monitoring Plan. A deed restriction will be recorded over Parcel A and a portion of Parcel H (excluding the detention basin and water quality pond) for the benefit of preserving the natural habitat; Exhibit D depicts the area covered by the deed restriction. The Deed Restriction will enable to the GHAD to conduct GHAD activities to protect the habitat area in an appropriate manner without interaction with the regulatory agencies.

Within the areas owned and maintained by the GHAD (parcel A and H), the GHAD's responsibilities *may* consist of, but are not limited to, the following:

- Open Space maintenance
- Slope stabilization (landslides and erosion hazards)
- Creek bank stabilization, when needed
- Maintenance of the detention and water quality ponds including but not limited to thinning/removal of vegetation and sediment
- Subdrain outfall inspection and maintenance
- Concrete lined V ditch maintenance, and repair or replacement
- Sediment removal (from concrete structures)

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- GHAD monitoring program
- Contracting technical consultants
- Geotechnical instrument monitoring (if installed in the future)
- Equipment maintenance and operation in GHAD-maintained areas
- Upper and Lower Pond repairs and rehabilitation (as discussed in Appendix B)
- Vegetation control including revegetation and fire break mowing (as discussed in Appendix C)

RIPARIAN ENHANCEMENT

As a part of the permitting process with the Regional Water Quality Control Board (RWQCB) and California Department of Fish and Game (CDFG), a small portion of Parcel H within the existing conservation easement (depicted in Exhibit D) will benefit from riparian enhancement. The general purpose of the proposed mitigation is to enhance and expand the width of the existing riparian corridor along Moller Creek and provide species access to the creek from an existing stock pond known to contain CRLF. The 0.17 acres (150-foot by 50-foot section of Moller Creek) of riparian habitat enhancement/restoration work will consist of tree/shrub planting and the installation of temporary irrigation. Because this is a permit requirement, there will be maintenance and monitoring requirements associated with this enhancement work. For years 1 through 10, the maintenance and monitoring activities and expenses will be the responsibility of Standard Pacific Homes. Upon acknowledgement from the Agencies that the mitigation has reached its success criteria, management responsibilities which consist of reduced maintenance and monitoring will be turned over to the GHAD. These additional management activities that the GHAD will inherit will be incorporated into the GHAD's Engineers Estimate to generate funds to cover these additional activities. For details regarding the riparian enhancement work and for all maintenance and monitoring requirements, reference the Mitigation and Monitoring Plan incorporated herein as Appendix C and Section XII of this document

IV. SITE GEOLOGY

REGIONAL GEOLOGY AND SEISMICITY

The site is located within the Coast Ranges geomorphic province of California. The Coast Ranges province is characterized by a series of northwest trending, folded and faulted mountain ranges and valleys. In this part of the province, sedimentary bedrock units have been mapped as the Tassajara Formation by Dibblee (1980) and Crane (1988). Graymer et al, (1996) and Barlock (1988) include these rocks as part of the Livermore Gravels. These materials were deposited during the Pliocene to Pleistocene epochs of geologic time (approximately 0.01 to 5.3 million years before present). The low-lying area at the site includes a Pleistocene alluvial terrace that has been incised by Moller Creek that crosses the northern portion of the site.

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The region has been folded and faulted during the past few million years due to oblique strike-slip relative motions between the Pacific Plate and North American Plate. The site does not lie within an earthquake fault zone for active faults as defined by the State of California (Bryant and Hart, 2007; Davis 1982). Major active faults in the region that influence the seismicity of the site include, but are not limited to, the Greenville fault located about 7 miles to the northeast, and the Calaveras, Hayward and San Andreas faults located about 4, 11 and 30 miles to the southwest, respectively. The projected surface interception of the (blind) Mount Diablo Thrust fault is located about 2,000 feet south of the site.

SITE GEOLOGIC UNITS

Artificial Fill

Existing Non-engineered Fills. There are two areas of non-engineered fill present at the site, as shown by the symbol "Qaf" on the Pre-Development Geologic Map. The non-engineered fills consist of a stockpile in the northeastern portion of the planned development area and a berm forming the dam of the "Upper Pond". The existing stockpile of non-engineered fill located within the development area will be removed during mass grading of the site. The non-engineered fill berm at the "Upper Pond" is planned to remain.

Off-Site Existing Engineered Fill. Grading for the Silvera Ranch development has altered the ground surface of the adjacent property to the south. Engeo Incorporated prepared two reports in 2005 and 2006 that documented the results of Engeo's observation and testing services during grading of the adjacent Silvera Ranch residential development. The Engeo reports discuss the location of landslide remediation, subdrain installation, and engineered fill placement. As a result of the Silvera Ranch grading, engineered fill has been placed against the southern limit and upslope of the southeastern limit of the site. These fills are outside the GHAD-maintained open space area and it is not expected that these off-site fills will require attention by the Fallon Crossing GHAD.

Future Engineered Fill. To grade for the planned residential development at the site, the swale areas are to be filled and spur ridges truncated by cuts. Engineered fill at the site will be constructed up to about 38 feet thick and will be placed on a properly prepared and geotechnically approved base.

The geotechnical reports prepared by Berlogar Geotechnical Consultants (BGC) in 2001 and 2003 include the recommendation that an engineering geologist map future cut slopes for the Fallon Crossing project during construction. Based on such observations, there is the potential that the engineering geologist will recommend reconstructing selected portions of cut slopes with engineered fill. The limits of such future slope rebuilds cannot be predicted at the time of preparation of this Plan of Control; therefore, the project Remedial Grading Plan is provided as Plate 3. It is anticipated that the engineering geologist will document such locations of slope rebuilds, if any, during construction. It is anticipated such construction-record documents will be available to professionals assisting the Fallon Crossing GHAD.

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Residual Soils and Colluvial Deposits

Residual soils, derived by in-place weathering of the underlying parent bedrock, are located along ridgelines and spur ridges. The residual soils at the site consist of dark gray and dark gray-brown silty clay (CL-CH). Typically the thickness of residual soils ranges from about 2 to 4 feet. The residual soils have a moderate to high plasticity and are considered highly expansive (BGC, 2003). Colluvial deposits, generated by the downslope creeping of residual soils and/or their transportation by erosion, are located near the toes of slopes, in swales and near the upstream end of valleys. Areas underlain by deposits of colluvium are delineated by the map symbol "Qc" on the Pre-Development Geologic Map. The colluvial deposits at the site consist of yellow-brown to dark brown silty clay (CH), have a high plasticity and are considered highly expansive (BGC, 2003). Desiccation cracks up to about 3 inches wide and about 2 to 3 feet deep have been observed at the site in the summer months demonstrating the expansive nature of these residual and colluvial soils.

Alluvial Deposits

Alluvium is material that has been transported and deposited by flowing water. Alluvial deposits were noted within and adjacent to Mollar Creek and its tributaries. The alluvial soils at the site generally consist of stiff to very stiff sandy clay and silty clay (CL-CH), medium stiff to stiff clayey silt (ML), medium dense sandy silt (ML), clayey sand (SC) and silty sand (SM) (BGC, 2003). The alluvial deposits are delineated by the symbols "Qoa" (older alluvium) and "Qal" on the Pre-Development Geologic Map. The clayey portion of the alluvial soils have moderate to high plasticity and are considered highly expansive (BGC, 2003).

Landslide Deposits

A landslide is a mass of rock and/or soil that has, because of the force of gravity, broken free from intact earth along some discrete surface and has moved downslope. Landslides have a variety of shapes, sizes, modes of movement, and material properties. They can consist of debris flows, earth flows, rotational slumps, or rock glides; there are also other less common types. The landslides at the Fallon Crossing site appear to be a combination of soil slips, slumps and earthflows. Regional landslide maps prepared by the California Division of Mines and Geology (Majmudar, 1991) and the U.S. Geological Survey (Nilsen, 1973 and 1975) show several suspected landslides within the site boundaries. The project's geotechnical reports (BGC, 2001 and 2003) have identified two landslides, designated as Landslides A and B that impact the development area. These two landslides will be completely removed and replaced with engineered fill during site grading as shown on the Remedial Grading Plan for the site. There are additional suspected landslide deposits elsewhere on the site, but these are well outside (north and east) of the development area. The landslides identified at the site are delineated by the map symbol "Qls" along with their letter designation (A through H) on the Pre-Development Geologic Map.

Bedrock

Bedrock units of the Plio-Pleistocene aged (roughly 0.01 to 5.3 million years before present) Tassajara Formation underlie the site. In general, the Tassajara formation includes layers of sandstone, siltstone, claystone and conglomerate. These rocks are generally moderately to

highly weathered, friable, and moderately to highly fractured. Commonly, the claystone beds and some of the clayey siltstone beds are moderately to highly expansive. The areas underlain by the Tassajara formation near the ground surface are delineated by the symbol "QTt" on the Pre-Development Geologic Map.

V. GEOLOGIC HAZARDS

Geologic hazards identified at the site consist of potential slope instability, soil creep, erosion and sedimentation, seismic (earthquake) ground shaking, creek bank erosion, shrink and swell of expansive earth materials, compressible soils and dispersive soils. The grading for the planned development is not expected to entirely eliminate the geologic hazards from the site. The geotechnical reports prepared by BGC (2001 and 2003) have identified the geologic hazards that impact the planned development. The Remedial Grading Plan shows the planned treatment of the geologic hazards and other geotechnical factors identified within the development area that pose a direct impact to planned lots and site improvements. It is anticipated that field-verified geologic mapping will be undertaken during site grading operations. The record documents showing subdrain locations and outfall elevations, bedrock structure, springs (if encountered), and landslide/unstable soil areas limits and repairs shall be provided to the Fallon Crossing GHAD when available as Volume 2 of this Plan of Control. A brief description of the geologic hazards within the Fallon Crossing GHAD boundaries is included below.

SLOPE INSTABILITY

Slope instability is common in the San Francisco Bay Area and is not unique to the site. In general, the stabilization of landslide masses and unsuitable materials on the slopes of the GHAD ownership and maintenance area will be performed during site grading only for slopes that could directly threaten improvements within the development area. It is considered neither practical nor desirable to remove all landslide deposits and/or unstable soil areas from the surrounding hillsides during site grading. In addition to areas of slope instability identified during geotechnical explorations, geologic reconnaissance performed before site development, and geologic observations made during site grading, areas of slope instability and/or landsliding could become apparent during the life of the development. Since earth instability is the GHAD's primary geotechnical concern, this section describes several types of slope instability that are the GHAD's responsibility. See also Section VIII below under the heading Geotechnical Techniques for Mitigating Landslide and Erosion Hazards.

Landslides located within open space are natural landforms that typically do not require mitigation. Where they do merit mitigation, it is where they could affect man-made improvements. GHAD maintenance will be important to provide and maintain adequate protection for the site improvements. See Section XII below under the heading *Maintenance and Monitoring Schedule*.

Rainwater and artificial watering can raise pore pressures between earth particles and reduce the frictional forces holding the earth material together. Thus, water tends to reduce the strength of the earth material. For this reason, slope stability is lower and landslides occur more frequently in the winter, which is the rainy season in California. Intensive tunneling by burrowing animals can provide pathways for surface water to permeate into the ground, sometimes leading to

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saturation of slopes and soil slips. Seismic ground shaking imposes forces on a slope that lowers slope stability and may increase landslide movements.

The following table lists the areas of slope instability, their impacts to site improvements and the potential GHAD maintenance responsibilities.

SLOPE INSTABILITY AND GHAD MAINTENANCE TABLE		
Location	Potential Impact to Site Improvements	Potential GHAD Maintenance Responsibilities
Slopes above development area	If instabilities develop in the future, they could threaten homes and site improvements	Slope monitoring required. Future instabilities, should they develop, would likely require removal of the unstable mass and replacement with engineered fill. Mitigation to be determined by technical consultant and based on site-specific characteristics.
Slopes located in Open Space and not within development area	Potential to block drainage.	Slope monitoring required. Impact to be evaluated by technical consultants
Landslides A and B	None after site development.	Monitor reconstructed slopes.
Landslide C	Potential to block drainage.	Monitoring required. Future landslide movement may require removal of soil and/or slope re-contouring
Landslides D, E and F	Future landslide movement could block the flow of water resulting in increased erosion and sedimentation in the "Upper Pond".	Slope monitoring required. Removal of materials at the toe may be needed to allow for drainage. Technical consultants to determine extent of removal so that remaining upslope mass is not destabilized.
Landslides G and H	None	Future landslide movement not expected to result in GHAD maintenance. Future grading of the off-site portions of these landslides shall be reviewed by the GHAD for potential impacts to the Fallon Crossing GHAD.

SOIL CREEP

Soil creep is the gradual, diffuse downslope movement of surficial soil under the influence of gravity. Soil creep differs from landsliding in that creep does not involve a separation of earth material across any distinct surface. Creep moves at a speed imperceptible to the eye, on the order of a few inches per decade. Typically creep occurs in colluvial soil, though it can also occur in engineered fill, alluvium, and bedrock.

Soil creep has been observed at the site in the areas shown on the Pre-Development Geologic Map and is generally outside the area of site improvements. The potential GHAD maintenance responsibilities of soil creep to the Fallon Crossing GHAD are low.

EROSION AND SEDIMENTATION

Erosion is the movement of soil particles down a slope or channel by the flow of running water as sheetwash or rivulets. The soil particles are suspended or otherwise entrained in the water, as shown by the water's turbidity or cloudiness. Water usually does not flow in just a sheetwash mode for long and soon begins forming rivulets. Rills, which are tiny gullies, and then gullies are the result of concentrated water flow that remove soil on a slope. Where the slope gradient decreases or the water otherwise meets a barrier, the water slows and the soil particles settle out. The deposition of these soil particles is termed sedimentation. Vegetation can slow erosion, which will in turn reduce sedimentation. Conversely, a lack of vegetation can speed erosion and lead to down-gradient sedimentation. Slope height and concentration of water, natural or artificial, are also factors that contribute to erosion and sedimentation. Sedimentation could impact drainage facilities and the ponds and basins at the site. Sediment removal and erosion control will be needed.

SEISMIC GROUND SHAKING

Future earthquakes of moderate to high magnitude are expected to occur in the region during the design life of the development. Strong ground shaking is expected to occur at the site as a result. To mitigate the shaking effects, structures will be designed under current building code requirements and using sound engineering judgment. Slope stability is also lowered under seismic-shaking conditions.

CREEK BANK INSTABILITY AND EROSION

The channel of Moller Creek crosses the northern portion of the proposed GHAD boundary. The creek banks may be locally over-steepened and be susceptible to instability and erosion. Observation of creek bank conditions, as outlined in Section XII under the heading Monitoring and Maintenance Schedule, will be performed by the Fallon Crossing GHAD periodically.

SHRINK/SWELL OF EXPANSIVE EARTH

Residual soils, colluvium, clayey alluvial soils, engineered fill, and some bedrock layers at the site could have a potential to shrink and swell with changes in moisture content. Such movements potentially would cause heaving and cracking of slabs-on-grade, pavements, and structures founded on shallow foundations. It is anticipated that design and remedial grading under engineering control and the use of structural slab foundations will mitigate the potential for shrink and swell and reduce the potential hazard to low.

COMPRESSIBLE SOILS

Colluvial deposits and alluvial soils are types of material that could be potentially compressible. Compression potentially would cause lowering and cracking of slabs-on-grade, pavements, and structures founded on shallow foundations, and sags in gravity controlled utility pipelines (storm and sewer). It is anticipated that some settlement of the thicker engineered fills will occur with site development but that those settlements will be within tolerable limits of the site improvements. It is anticipated that design and remedial grading under engineering control will mitigate the potential for soil compression and reduce the potential hazard to low.

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DISPERSIVE SOILS

The northwest portion of the site located adjacent to Moller Creek appears to be underlain by dispersive soils. The soils may contain dispersed clay particles that go into suspension in flowing water (both surface and subsurface) and potentially contain soluble salt minerals. As a result, the areas underlain by the dispersive soils are highly erodible and sometimes form sinkholes. It is anticipated that design and remedial grading under engineering control will reduce the hazard of dispersive soils at the site to low.

VI. FUNDING AND ACCEPTANCE OF RESPONSIBILITY BY GHAD

PROPERTY OWNER ASSESSMENTS

The Fallon Crossing GHAD is funded in perpetuity by assessments that are paid by the residences. Subject to applicable law, an annual assessment must be promptly implemented on all residential parcels in the GHAD boundaries. The assessment will be levied by the Fallon Crossing GHAD on each individual residential parcel beginning the first fiscal year after the City issues a building permit for that parcel. Annual assessments will be based on the projected costs that are incurred from the implementation of the geotechnical scope outlined in this document. The actual assessments will be calculated in the Engineers Report that will be developed subsequent to the approval of this document by the City Council.

TRANSFER OF RESPONSIBILITY TO THE DISTRICT

The party that, on the date that the City records the Final Map within the boundaries of the Fallon Crossing GHAD, owns the developable parcels shown on that Final Map has the responsibility to perform all the activities of the Fallon Crossing GHAD on property within that Final Map. Such responsibility shall automatically transfer to the Fallon Crossing GHAD at 9:00 a.m. on the day exactly three years after the first residential building permit is issued by the City. This transfer date may be extended at the sole discretion of the project developer provided that the assessments continue to be levied during the extension period and that notice of such extension is delivered to the GHAD manager at least 30 days before the transfer date. The petitioners for formation of the Fallon Crossing GHAD intend that the approximately three-year period between the levying of the GHAD assessment and the Fallon Crossing GHAD becoming responsible to perform activities on property within the Final Map will allow the District to accumulate reserve funds without incurring significant expenses. Such reserve funds are needed to address periodic major events that cannot be funded from annual revenues.

VII. AREAS OF GHAD RESPONSIBILITY

PREVENTION, MITIGATION, ABATEMENT AND/OR CONTROL OF GEOLOGIC HAZARDS

Subject to the following exceptions, the primary mission of the Fallon Crossing GHAD 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

development areas of the site. As used herein, the term "site improvements" means buildings and outbuildings, roads, sidewalks, paths, utilities, improved trails, swimming pools, tennis courts, gazebos, cabanas, basins, geologic stabilization features, drainage features, or similar improvements. The exclusions and limitations set forth herein do not apply to geologic hazards existing on open-space property owned by any homeowner's associations except for the maintenance easement from the upslope Silvera Ranch development, since these areas are not part of the responsibility of the Fallon Crossing GHAD.

The secondary mission of the Fallon Crossing GHAD is to maintain the biological values of the open space by adhering to the conditions and restrictions set forth in the Resource Management Plan and the deed restriction.

EXCEPTIONS

The Fallon Crossing GHAD is not responsible for open space tasks that will be provided by the City of Dublin or the homeowners association as set forth in Exhibit A or in any future memoranda or agreements. The Fallon Crossing GHAD's role is limited to overseeing and supervising the City's general physical maintenance of the open-space areas as may be required to prevent, mitigate, control, or abate erosion, sedimentation, and potential landslide hazards.

The Fallon Crossing GHAD may decline to prevent, mitigate, abate, or control geologic hazards under the following circumstances:

Isolated or Remote Slope Instability

The Fallon Crossing GHAD will not have responsibility or may place a low priority on its responsibility to monitor, abate, mitigate, or control slope instability that does not involve damage, or pose a significant threat of damage, to site improvements, including residences.

Single Property

The Fallon Crossing GHAD will not prevent, mitigate, abate, or control geologic hazards that 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 GHAD boundaries. The GHAD maintenance area (Parcels A and H on Exhibit A) shall not be considered a "single parcel of property" for the purpose of this limitation, regardless of whether it may actually comprise a single legal parcel.

Geologic Hazard That Requires Expenditure in Amount Exceeding the Value of the Threatened or Damaged Improvement

The Fallon Crossing GHAD will not prevent, mitigate, abate, or control a geologic hazard where, in the GHAD manager's sole discretion, the anticipated expenditure required to be funded by the Fallon Crossing GHAD to prevent, mitigate, abate, or control the geologic hazard will exceed the value of the structure(s) and site improvement(s) threatened with damage or loss.

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GHAD 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 Fallon Crossing GHAD may fund or reimburse the property owner for the expenses necessary to repair or replace the damaged or destroyed structure, site improvements, or landscaping, with the exceptions noted above. Unless otherwise authorized by the board of directors, the dollar amount of the Fallon Crossing GHAD funding or reimbursement may not exceed ten percent (10%) of the costs incurred by the Fallon Crossing GHAD in preventing, mitigating, abating, or controlling the geologic hazard causing the damage. In the event the geologic hazard damaged or destroyed a structure, site improvement or landscaping that violated any provision of the City of Dublin Building Code or City of Dublin Municipal Code applicable at the time of its installation or improvement, the Fallon Crossing GHAD may decline to provide any funding or reimbursement to the property owner for repair or replacement of the damaged structure, improvement, or landscaping.

Earthquake Insurance

The Fallon Crossing GHAD is not intended to serve or provide "in-lieu" earthquake insurance for private property owners. Obtaining the adequate level of earthquake insurance is the sole responsibility of the individual property owners within the Fallon Crossing development.

No Reimbursement without Written Agreement

The Fallon Crossing GHAD will not be obligated to reimburse a property owner for expenses incurred by the property owner for the prevention, mitigation, abatement, or control of a geologic hazard absent a written agreement between the property owner and the Fallon Crossing GHAD to that effect, executed before the property owner incurs said expenses, and following an investigation conducted by the Fallon Crossing GHAD.

Property Not Located Within GHAD Boundaries

Except as herein provided, the Fallon Crossing GHAD shall not prevent, mitigate, abate, or control geologic hazards located on property that is not located within the GHAD boundaries. In the event, however, that all or any portion of a geologic hazard existing on property located outside the GHAD boundaries has damaged or poses a significant risk of damage or site or other physical improvements located on property within the GHAD boundaries, the Fallon Crossing GHAD may prevent, mitigate, abate, or control the geologic hazard.

Any work conducted on property located outside of the GHAD boundaries shall be strictly limited to that necessary to prevent, mitigate, or control the damage, or threat of damage, to property located within the boundaries of the Fallon Crossing GHAD. Should the Fallon Crossing GHAD be required to respond to a geologic hazard outside the GHAD boundaries, the Fallon Crossing GHAD may take such actions as may be appropriate to recover costs incurred as a result of preventing, mitigating, abating, or controlling such geologic hazards from the responsible party, if any.

Protected Habitat under Deed Restriction

Geologic Hazards that occur within the Open Space that do not damage or threaten improvements, homes, or biological features (including the upper and lower stock ponds), will not be mitigated for.

GEOLOGIC HAZARDS IN OPEN SPACE AND MAINTENANCE OF OPEN SPACE AREAS

The Fallon Crossing GHAD may prevent, mitigate, abate, or control the geologic hazards in open space areas and other unimproved areas within the GHAD boundaries if the geologic hazards have damaged or have the potential to damage site improvements located on properties within the GHAD boundaries or result in a major adverse biological impact if not corrected or rehabilitated. All such prevention, mitigation, abatement, and control shall be done in a manner consistent with the Detention/Water Quality Basin Operations and Maintenance Manual and the Resource Management Plan. Due to the sensitive biological nature of the open space within the Fallon Crossing GHAD ownership and maintenance areas, procedures for mitigating geologic hazards are set forth in the Detention/Water Quality Basin Operations Manual and Resource Management Plan are provided in Appendices A and B hereto. No management activities can be performed within the deed restricted areas which result in the loss of habitat or impacts to any special-status species without required agency permits.

The Fallon Crossing GHAD will be responsible for slope stabilization, including major landslide events that meet the criteria for repair listed above for the potential to impact site improvements. This also includes repair of minor landslides and debris flows which have the potential to affect both the upper and lower ponds.

The Fallon Crossing GHAD is also authorized to monitor erosion and sedimentation in open space areas that affect developed lots and/or improvements. In addition, the Fallon Crossing GHAD is authorized to repair erosion gullies, etc. in open space areas if they pose an immediate threat to improvements, or wildlife habitat. Repair activities conducted within the Preserve will be coordinated with the California Department of Fish and Game and/or US Fish and Wildlife Service.

The Fallon Crossing GHAD is responsible for sediment and debris removal from concrete V ditches and open space catch basins. The Fallon Crossing GHAD is further authorized to maintain surface and subsurface drainage facilities and improvements located in the GHAD maintenance area, either by ownership or easement, including, but not necessarily limited to, concrete V ditches, storm drain inlets and outlets in open space and drainage corridors and subdrain outlets. Occasionally, portions of V ditches may require repair or replacement due to cracking caused by expansive soils, and this will be the responsibility of the Fallon Crossing GHAD.

The GHAD's creek channel maintenance responsibilities are limited to repairing substantial bank failures that directly damage or threaten actual site improvements (buildings, roads, utilities, trails, basins, etc.). Landslides that block the flow of water resulting in flooding of the site improvements may require immediate treatment. Downstream sedimentation resulting from creek bank erosion is considered a natural geologic process and is not the responsibility of the Fallon Crossing GHAD. Drainage channel improvement projects armoring channels with rock

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or other materials may be undertaken by the Fallon Crossing GHAD as required. Creek repairs will be required to obtain agency authorizations prior to undertaking such activity.

The Fallon Crossing GHAD is responsible for routine clearing of the firebreak and general maintenance of Parcels A and H (other than geologic hazard abatement). The Fire Hazard Mitigation and Defensible Space Vegetation Management Plan discusses the procedures for firebreak mowing and is included herein as Appendix C. The Fallon Crossing GHAD should review such activities for their potential to damage or interfere with the operation of any GHAD-maintained improvements, to cause an increase in erosion and/or sedimentation, or in any manner aggravate or increase the potential of a landslide.

Equipment maintenance and operations includes items of equipment related to geotechnical stabilization within the open space areas could include items such as sump pumps.

GHAD operations will include monitoring of geotechnical instruments (e.g., piezometers, inclinometers, settlement monuments, etc., if any) within the GHAD boundaries, including open space area as required.

The Fallon Crossing GHAD may review and has the right to approve or disapprove physical construction, maintenance, or repair activities proposed within the GHAD maintenance area that, at the discretion of the GHAD manager, could increase erosion or sedimentation or otherwise impact or affect the geologic stability of the area. Furthermore, no management activities can be performed within the deed restricted areas which result in the loss of habitat or impacts to any special-status species without required agency permits. Should the Fallon Crossing GHAD be required to perform maintenance activities that are the responsibilities of others, the Fallon Crossing GHAD shall take such actions against the responsible party as may be required to recover costs incurred as a result of such activities.

VIII. GEOTECHNICAL TECHNIQUES FOR MITIGATING LANDSLIDE AND EROSION HAZARDS

Techniques the Fallon Crossing GHAD may employ to prevent, mitigate, or abate landslide or adverse erosion damage include, but are not limited to, the following:

1. Agency authorization, if applicable.
2. Removal of the unstable earth mass.
3. Stabilization by either partial or total removal of the landslide, and safely stockpiling of material near the excavation and replacement with engineered fill provided with subdrainage.
4. Construction of structures to retain or divert landslide material or sediment.
5. Construction of erosion-control devices or materials such as gabions, rip-rap, geotextiles, or lined ditches.
6. Placement of drained engineered buttress fills.
7. Placement of subsurface drainage devices, e.g., subdrains or horizontal drilled drains.

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8. Slope correction such as gradient change, biotechnical stabilization, and slope trimming or contouring.
9. Construction of additional surface ditches and/or detention basins, silt fences, sediment traps, or backfill of erosion channels.
10. Re-vegetation of slopes by planting or hydro-seeding.

Potential landslide and erosion hazards can best be mitigated by controlling soil saturation and water runoff and by maintaining surface and subsurface drainage systems. The Fallon Crossing GHAD should use techniques to mitigate individual events of slope instability or erosion that are based on the recommendations of licensed professional technical consultants contracted by the Fallon Crossing GHAD. Maintenance shall be provided for lined surface drainage ditches and benches and drop inlets.

IX. BIOTECHNICAL RECOMMENDATIONS FOR PREVENTING AND MITIGATING EXISTING OR POTENTIAL EROSION HAZARDS

Fill and cut slopes within the GHAD boundaries are expected to be erodible. Therefore, the maintenance of vegetative cover is especially important. Vegetation provides a protective function on soil and exposed rock. Vegetation absorbs the impacts of raindrops, reduces 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 wadding).

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, rip-rap, 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.

X. PRIORITY FOR GHAD-FUNDED REPAIRS

Emergency response and scheduled repair expenditures are to be prioritized by the GHAD manager, at his or her discretion, based on 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:

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

2. The prevention, mitigation, abatement, or control of geologic hazards that have either damaged or pose a significant threat of damage to community buildings.
3. 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., park structures, pools, spas, tennis courts, etc.).
4. The prevention, mitigation, abatement, or control of geologic hazards that have either damaged or pose a significant threat of damage to loss of landscaping or other similar nonessential amenities.
5. The prevention, mitigation, abatement, or control of geologic hazards located entirely on open-space property and which have neither damaged nor pose a significant threat of damage to any site improvements.
6. As part of the standard GHAD budgeting practices, funds shall be allocated annually for the purpose of routine maintenance and management over the detention and water quality basins to ensure that they are operating as designed.

In performing any of the duties described above, the Fallon Crossing GHAD may seek reimbursements from public and private entities including, but not limited to, FEMA, City and County agencies, insurance companies, etc.

XI. RESERVE FUNDS

Based on the Engineers Report as well as subsequent Engineers Reports, the GHAD manager will evaluate the appropriate amount of funds to be reserved for emergency and long-term capital replacement projects that have costs in excess of the annual maintenance and repair budget. The reserve funds may be evaluated annually based on the most recent costs of GHAD projects at the site.

XII. MAINTENANCE AND MONITORING SCHEDULE

Geologic features and GHAD-maintained facilities shall be inspected on a regular basis and as necessary. Inspections shall be scheduled to occur a minimum of three times per year in normal years and four or more times per year in years of heavy rainfall as determined by the GHAD manager. The inspections shall be scheduled to take place prior to the middle of October before the first significant rainfall, midwinter as appropriate during heavy rainfall years, and in April at about the end of the rainy season. The operations and maintenance of the basins shall be conducted pursuant to Operations and Maintenance Manual (Exhibit D, Appendix A). The frequency of the inspections shall be increased in years of higher-than-average rainfall intensity and/or occurrence. The following table summarizes the inspection schedule recommended herein.

ITEM	SUGGESTED TIMING OF INSPECTIONS		
	Fall	Winter	Spring
Site Slopes	Annual for first 5 years post development		Annual
Creek Banks	Annual	After significant rainfall events	Annual
Basins	Annual	After significant rainfall events	
Upper Pond			Annual
Concrete Structures	Annual	After significant rainfall events	
Drainage Facilities	Annual	After significant rainfall events	

The Fallon Crossing GHAD shall review its inspection schedule annually and assess the effectiveness of its preventive maintenance program on a regular basis. GHAD staff shall prepare an annual report to the board of directors with recommendations for maintenance and/or repair projects. If necessary, consultants will be retained to undertake the needed studies. The district geotechnical engineer and/or engineering geologist retained by the Fallon Crossing GHAD shall prepare an annual inspection report for presentation to the GHAD board of directors.

Slopes. Site slopes shall be observed during scheduled site visits by a State of California certified geotechnical engineer (GE) or certified engineering geologist (CEG) for indications of slope instability, seeps, or unusual erosion. The schedule shall be two times per year for the first five years post-development and annually thereafter or as determined by the GHAD manager.

Creek Banks. A GE or CEG shall inspect the banks of the tributary creek on a regular schedule. The inspections would check for indications of potential instability and significant erosion. The inspections shall be performed prior to winter and during or shortly following significant rainfall events budget permitting.

Upper Pond. The GHAD Manager shall inspect the pond annually. The inspections would check for indications of potential instability, significant erosion, sediment deposition, vegetation accumulation, signs of trespass and human disturbance. The pond shall undergo sediment removal once every fifteen years or on an as needed basis as determined by the GHAD manager.

Basins. A GE or CEG shall inspect the detention and water quality basins for over vegetation or sedimentation that would decrease the geotechnical functions intended. Maintenance may include thinning of vegetation and sediment removal. If maintenance is required, such methods shall adhere to the Detention/Water Quality Basin Operations and Maintenance Manual in Appendix A. The operations and maintenance of the basins shall be conducted pursuant to Operations and Maintenance Manual (Exhibit D, Appendix A).

Concrete Structures. A GE or CEG shall inspect the surfaces of concrete-lined drainage ditches within the GHAD boundaries on a regular schedule. Inspections will be scheduled twice each year. One inspection should be in the fall before the onset of winter rains. The professional 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 shall be removed and cracked or broken ditches should be patched or repaired as required before the beginning of the next rainy season.

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Drainage facilities. Culverts, storm drain 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 that could interfere with access by mechanized equipment.

Subsurface drain outlets shall be inspected on a regular schedule. Water flowing from these outlets should be measured and documented during each inspection. Inspections shall be scheduled twice each year, preferably in the fall and spring. Suspicious interruption of flow should signal a need to unplug or clean by flushing the affected drain.

It is anticipated the project professionals observing the installation of subsurface drains and geotechnical instrumentation (if any) will document their locations and provide such documents to the Fallon Crossing GHAD for use in their maintenance and monitoring tasks.

Instrumentation. Although no geotechnical instrumentation, such as piezometers, inclinometer casings, and settlement monitoring devices, are planned in the Fallon Crossing development, they could be installed depending on future recommendations made by project professionals. If installed, the Fallon Crossing GHAD shall monitor such instruments on a regular schedule.

BIOLOGICAL RESPONSIBILITY TABLE

Fallon Crossing – Parcel's A & H										
Area	Parcel	Annual Monitoring / Inspection Requirement	Acceptable Monitoring Methods	Annual Maintenance Activities	Acceptable Maintenance Methods	Pre-Construction Survey Requirement	Agency Notification	Permit Requirement	Annual Report Requirement	Additional Information
Stock Pond	Identified as Upper pond; located w/in Parcel A	NA	NA	Assumed to occur once every 15 years. Or on an as-needed basis.	TBD	None	Yes	Yes	NO	The GHAD must apply for the appropriate agency permits prior to conducting the sediment removal from the pond.
Detention Basin	Basin Area	Yes - Quarterly. Inspect outlet structures, access road, basin banks, fencing. Quarterly Monitoring Report template can be found in the O&M Manual attached hereto as an exhibit.	Visual Inspection	Annual maintenance <i>may</i> include clearing/maintenance of Inlet and Outlet Structures, access road repairs, basin embankment repairs, fencing repairs, desilting of basins, and mosquito abatement. See O&M Manual for more detail.	Hand labor & wheelbarrows within the basin, mechanized equipment positioned from the maintenance rd.	Yes	No	No - However, maintenance must be conducted in accordance with the Operations and Maintenance Manual prepared by RJA, attached hereto as an exhibit.	No	All Maintenance activities to remove vegetation and/or sediment shall be performed between August 1 and September 30.
Riparian Corridor	Portion of Parcel H; within existing conservation Easement	Yes; Quarterly for years 1-3, with reduced levels for years 4 and on. Detailed breakdown of maintenance and monitoring obligations can be found in the MMP (Appendix C).	Visual Inspection	Vandalism inspections, weed control, plant and irrigation maintenance, litter removal, and erosion control maintenance.	Hand labor	No	No	No	Yes	

XIII. LIMITATIONS

The conclusions and recommendations presented in this document are based on information provided to us regarding the proposed improvements and other aspects of site development, the results of the geotechnical investigations at the site, available published regional geologic data and professional judgment. This document has been prepared in accordance with current standards of the engineering geology profession. No warranty is expressed or implied.

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338/60

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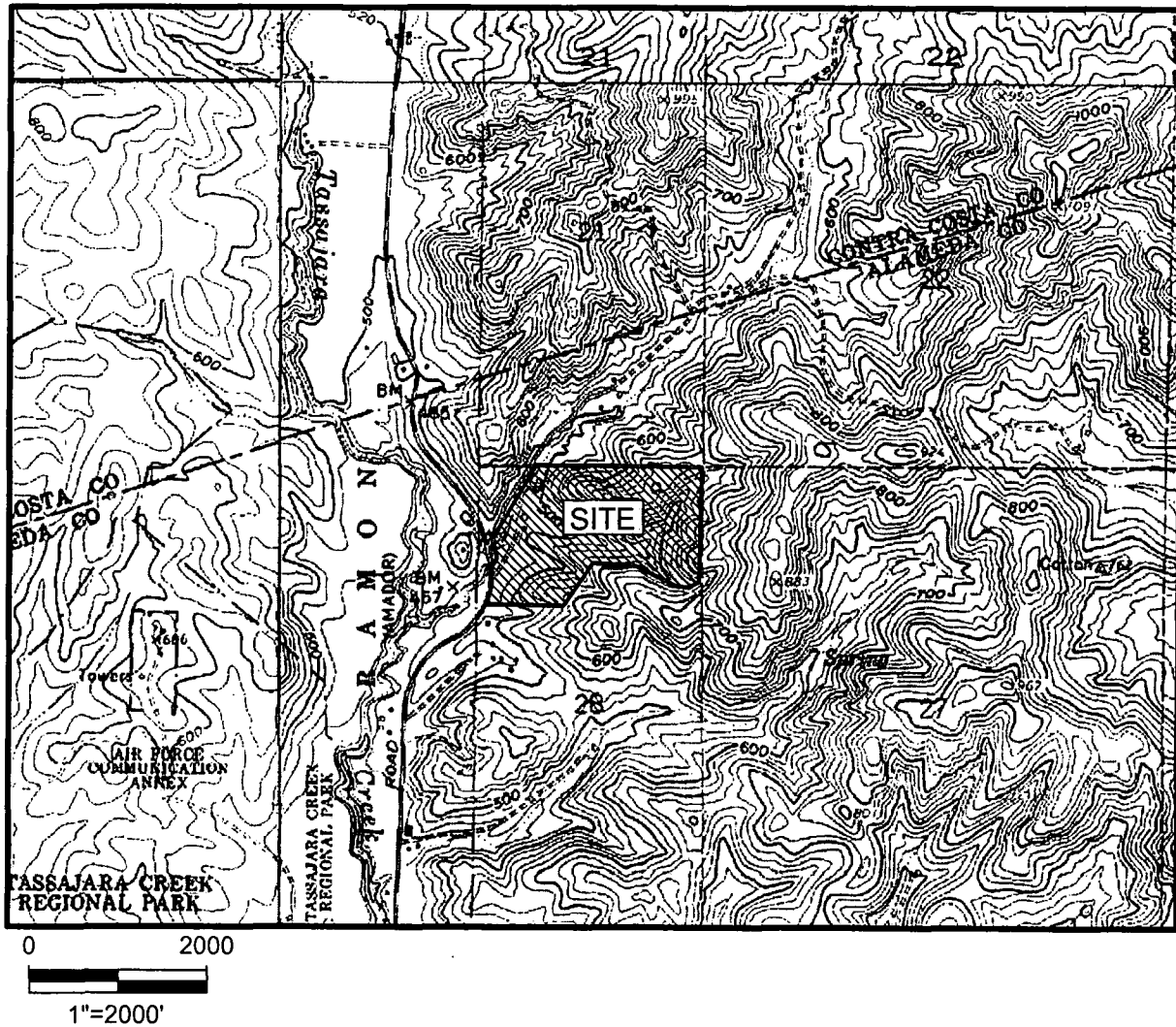
348/160

Ruggeri-Jensen-Azar; May 2, 2008; Grading Plans Tract 7617 – Fallon Crossing, City of Dublin, Alameda County, California.

State of California; February 27, 2008; Seismic hazard zones, Livermore Quadrangle, Preliminary Map: California Geological Survey.

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JOB NUMBER: 3058.000 DATE: 6-18-08 BY: CC



VICINITY MAP
 FALLON CROSSING
 TASSAJARA ROAD
 DUBLIN, CALIFORNIA
 FOR
 STANDARD PACIFIC HOMES



EXPLANATION

---	PROPERTY LINE
- - -	GEOLOGIC CONTACT
- - -	DIMENSIONS WHERE APPROXIMATE
- - -	QUERIED WHERE UNCERTAIN
---	ARTIFICIAL FILL
---	ENGINEERED FILL
---	COLLUVIUM
---	ALLUVIUM
---	CLAYEY ALLUVIUM
---	LANDSLIDE DEPOSIT
---	TASAJARA FORMATION
---	STRIKE AND DIP OF BEDDING
---	LANDSLIDE DESIGNATION
---	LANDSLIDE DEPOSIT
---	LANDSLIDE SCARP
---	SOIL CREEP
---	ENGINEERED GALLY

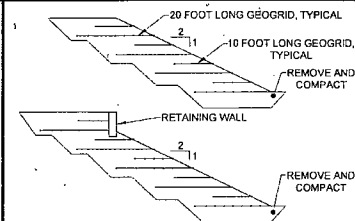
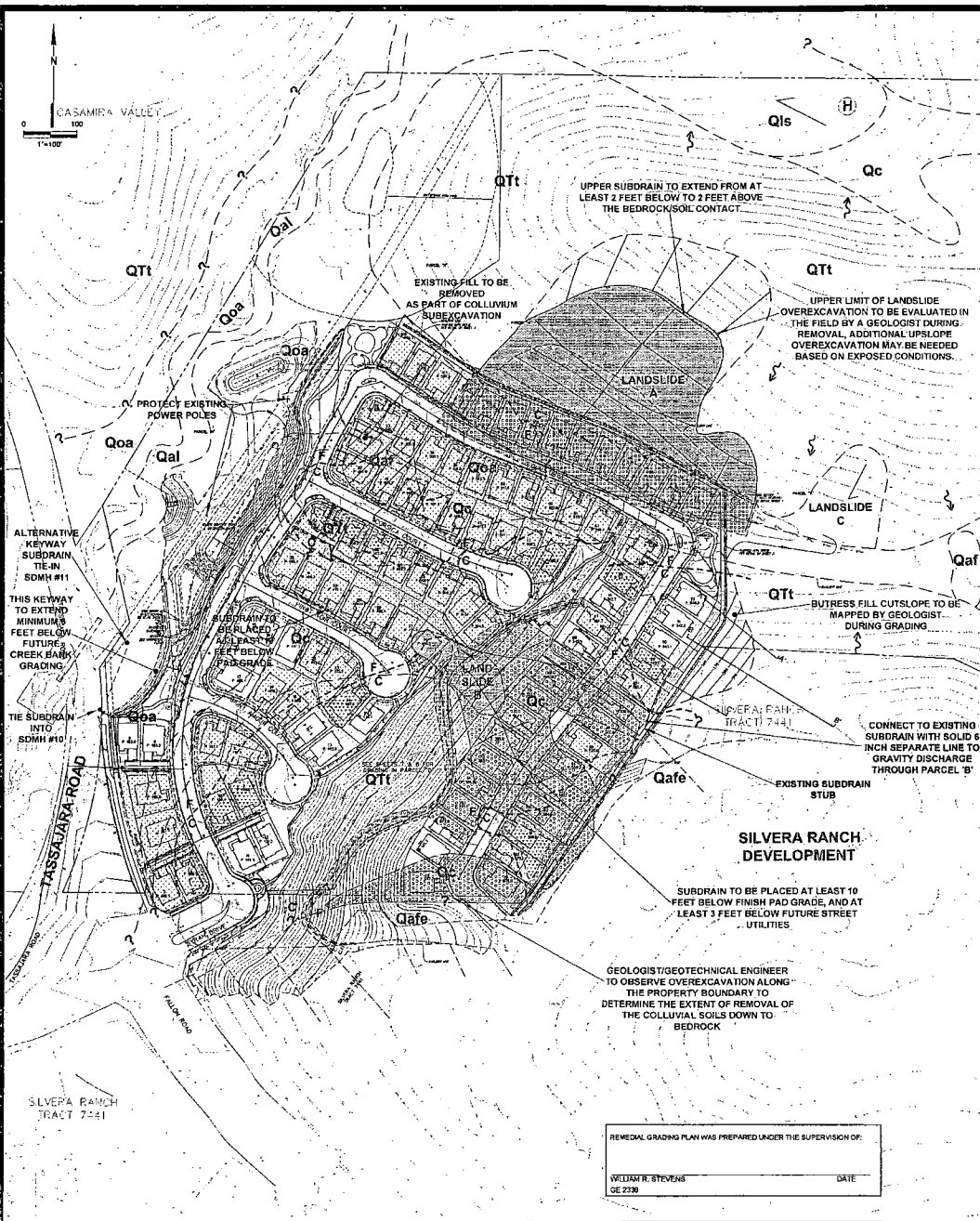
NOT E. ACQUIRED FROM DEC. 2003

36 of 160 PRE-DEVELOPMENT GEOLOGIC MAP FALLON CROSSING DUBLIN, CALIFORNIA

STANDARD PRACTICES
BRIEFING Geotechnical Consultants
for the use of the map

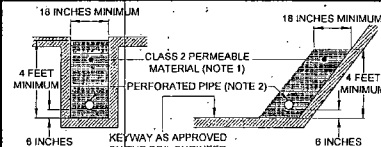


DATE PROVIDED BY: AUGUST 2004 AND ASSOCIATES, RECEIVED VIA EMAIL DATED 02/14/08



NOTE:
1. 10 AND 20 FOOT GEOGRID SPACED 5 FEET VERTICALLY, START AT BOTTOM WITH 20 FOOT LENGTH, THEN ALTERNATE LENGTHS.

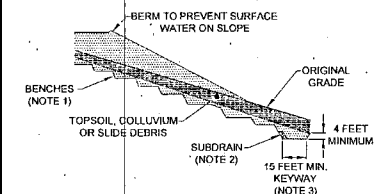
GEOGRID REINFORCED SLOPES DETAIL



NOTES:

1. CLASS 2 PERMEABLE MATERIAL, SECTION 88 - 1.025, STATE OF CALIFORNIA STANDARD SPECIFICATIONS, JULY, 2008 EDITION.
2. PERFORATED PIPE PLACED PERFORATIONS DOWN. PVC PIPE WITH A MINIMUM DIAMETER OF SIX (6) INCHES, CONFORMING TO ASTM D-3034 SDR 35, FOR DEPTHS LESS THAN 30 FEET, AND SDR 23.5 FOR DEPTHS GREATER THAN 30 FEET.

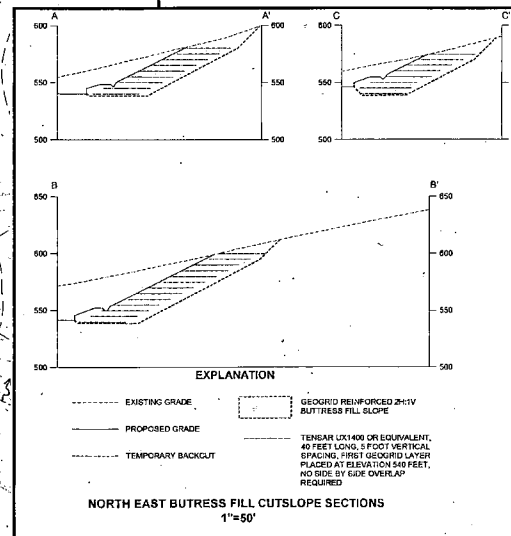
TYPICAL SUBDRAIN DETAIL



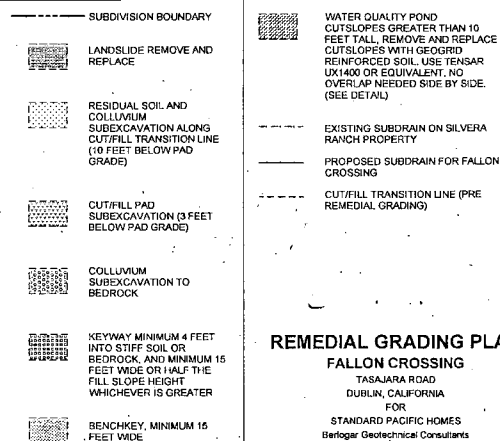
NOTES:

1. WHERE NATURAL GRADE IS STEEPER THAN 7:1, BENCH INTO STIFF SOIL OR BEDROCK AS DETERMINED BY SOIL ENGINEER.
2. SUBDRAIN SHOULD DISCHARGE VIA A CLOSED PIPE TO STORM DRAIN OR SUITABLE NATURAL DRAINAGE; SEE TYPICAL SUBDRAIN DETAILS.
3. KEYWAY SHOULD EXTEND AT LEAST 4 FEET INTO STIFF SOIL OR BEDROCK AS DETERMINED BY THE SOIL ENGINEER. KEYWAY WIDTH SHOULD BE A MINIMUM OF 15 FEET OR 1/2 OF THE FILL SLOPE HEIGHT, WHICHEVER IS GREATER.

FILL SLOPE DETAIL



70N



SUBDRAIN AS-BUILTS:
SUBDRAIN LOCATIONS AND OUTFALLS TO BE SURVEYED IN THE
FIELD DURING CONSTRUCTION

SELECT FILL REQUIREMENTS:
SELECT FILL REFERS TO SOILS BLENDED WITH BEDROCK CUT AT
RATIO OF 1 PART SOIL TO 3 PARTS BEDROCK.

SELECT FILL REQUIRED FOR KEYWAYS AND MSE RETAINING WALL BACKFILL

REMEDIAL GRADING PLAN WAS PREPARED UNDER THE SUPERVISION OF:

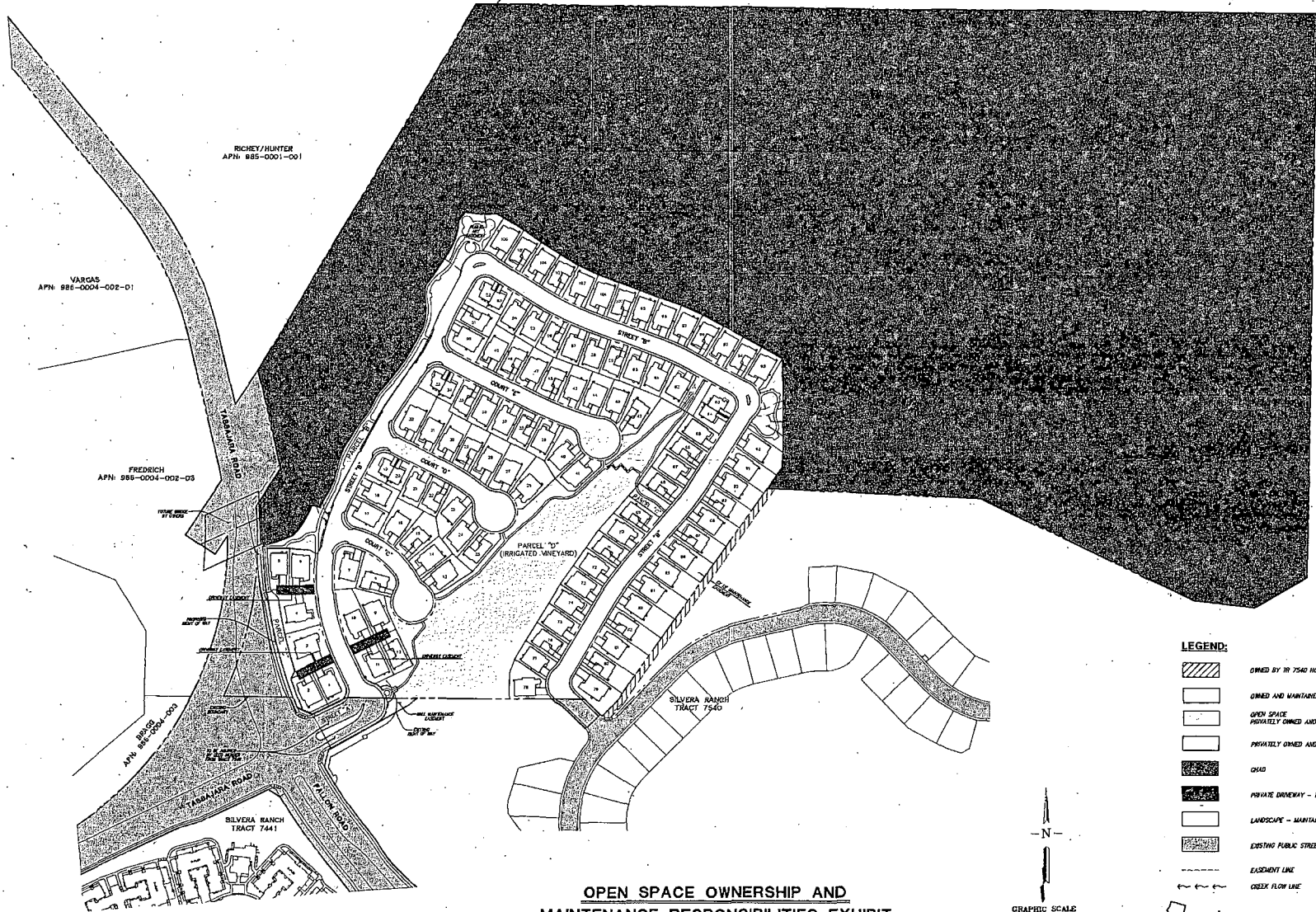
WILLIAM R. STEVENS
GE 2330

QAT

378/60

EXHIBIT A

**OPEN SPACE OWNERSHIP AND
MAINTENANCE RESPONSIBILITIES EXHIBIT**



RICHEY/HUNTER
APN: 885-0001-001

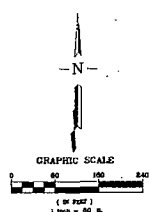
VARGAS
APN: 985-0004-002-D1

FREDRICH
APN: 985-0004-002-D3

APN: 985-0004-002-D3

SILVERA RANCH
TRACT 7441

**OPEN SPACE OWNERSHIP AND
MAINTENANCE RESPONSIBILITIES EXHIBIT**
TRACT 7617 - FALLON CROSSING
CITY OF DUBLIN, ALAMEDA COUNTY, CALIFORNIA



- LEGEND:**
- OWNED BY TR 7540 HOA, MAINTAINED BY GHAD
 - OWNED AND MAINTAINED BY THE CITY OF DUBLIN
 - OPEN SPACE
PRIVATELY OWNED AND MAINTAINED BY HOMEOWNERS ASSOCIATION
 - PRIVATELY OWNED AND MAINTAINED
 - GHAD
 - PRIVATE DRIVEWAY - MAINTAINED BY HOA
 - LANDSCAPE - MAINTAINED BY HOA, OWNED BY CITY
 - EXISTING PUBLIC STREET
 - EASEMENT LINE
 - CREEK FLOW LINE

**Ruggeri
Jensen
& Associates**
PLANNERS & ARCHITECTS
4400 CHURCH DRIVE, SUITE 200 - PLEASANTON, CA 94588
PHONE: (925) 527-5000 • FAX: (925) 527-5000

DATE: FEBRUARY, 2011 JOB NO.: 031008

3807160

TRACT 7617
FALLON CROSSING
PLANNED USE DEVELOPMENT
SHEETS
7

398/160

EXHIBIT B

**LEGAL DESCRIPTIONS OF GHAD BOUNDARY
AND MAINTENANCE EASEMENT**

Standard Pacific Corporation
City of Dublin
County of Alameda

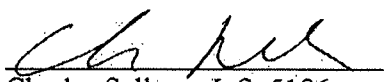
Exhibit "B"
Legal Description
GHAD Parcel 1

Real property situate in the City of Dublin, County of Alameda, State of California,
described as follows:

Being a portion of the Parcel described in the deed recorded on April 14, 2005 to
Standard Pacific Corporation in Document No. 2005146527, Official Records of the
County of Alameda, State of California, described as follows:

Beginning at the northeastern corner of said Parcel; thence along the eastern line of said
Parcel, South 01°04'38"West, 1264.53 feet to the southern line of said Parcel; thence
South 60°19'01"West, 133.52 feet; thence North 83°40'59"West, 135.30 feet; thence
North 64°10'59"West, 528.00 feet; thence North 87°10'59"West, 473.88 feet; thence,
South 34°49'01"West, 576.18 feet; thence North 89°25'59"West, 725.18 feet to a non-
tangent curve to the right having a radial which bears South 69°08'38" West, a radius of
1066.00 feet, a delta of 17°39'41"; thence leaving said southern line, northwesterly along
said curve an arc length of 328.59 feet; thence North 03°11'41"West, 121.68; thence
North 33°23'01"East, 83.52; thence North 13°02'00"West, 227.15 feet to the
northwestern line of said parcel; thence along said northwestern line, North 31°01'01"
East, 953.44 feet to the northwest corner of said Parcel; thence along the northern line of
said Parcel, South 89°20'13"East, 1866.04 feet to the Point of Beginning.

Containing 66.4 Acres ±


Charles Sellman L.S. 5186

09-23-2008
Date



4/8/160
Pfeiffer Ranch Investors II Inc
City of Dublin
County of Alameda

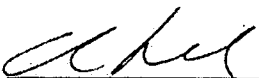
Exhibit "B"
Legal Description
GHAD Parcel 2

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described as follows:

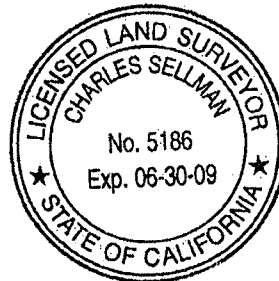
Being a portion of Lot "A3" as shown on the map entitled "Tract 7441" filed in Book 279
of Maps at Page 68, Records of the County of Alameda, State of California, described as
follows:

Beginning at an angle point on the northern line of said Lot, said point being the
southwestern terminus of the course shown as "N34°49'01"E 576.18"; thence, South
44°22'05"West, 50.43 feet to a non-tangent curve to the right having a radial which bears
South 32°49'52" West, a radius of 25.00 feet, a delta of 11°32'13"; thence, northwesterly
along said curve an arc length of 5.03 feet; thence North 45°37'55"West, 48.12 feet to
said northern line; thence along said northern line, South 89°25'59"East, 73.60 to the
Point of Beginning.

Containing .03 Acres ±


Charles Sellman L.S. 5186

09-23-2008
Date



428160

Pfeiffer Ranch Investors II Inc
City of Dublin
County of Alameda

Exhibit "B"
Legal Description
GHAD Parcel 3

Real property situate in the City of Dublin, County of Alameda, State of California,
described as follows:

Being Lot "A4" as shown on the map entitled "Tract 7441" filed in Book 279 of Maps at
Page 68, Records of the County of Alameda, State of California, described as follows:

Containing .01 Acres ±


Charles Sellman L.S. 5186

09-23-2008
Date



437 160

EXHIBIT C

**PLATS OF GHAD BOUNDARY AND
MAINTENANCE EASEMENT**

448 160

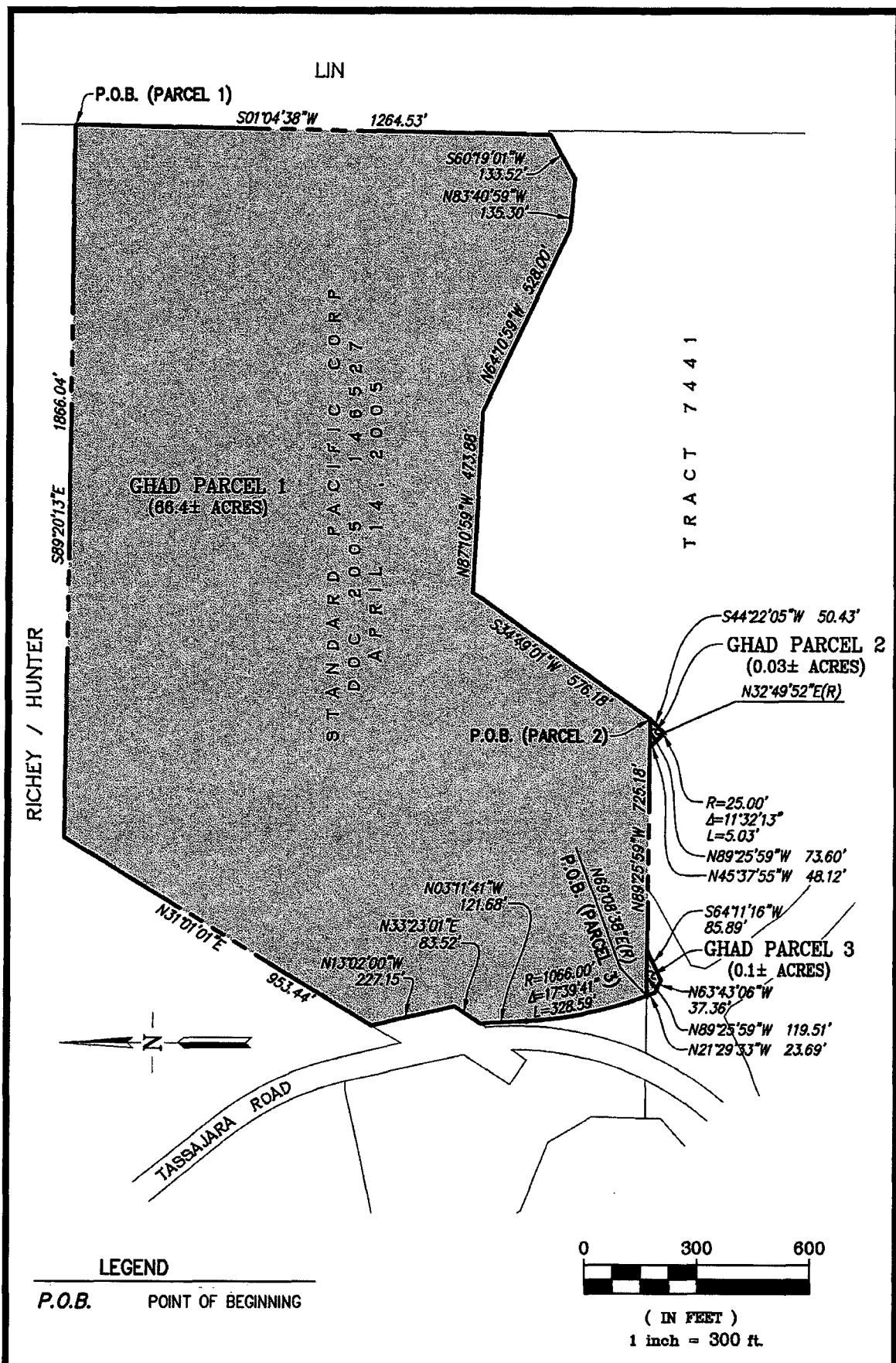


EXHIBIT C
PLAT TO ACCOMPANY LEGAL DESCRIPTION
FOR
GHAD
CITY OF DUBLIN, ALAMEDA COUNTY, CALIFORNIA

GA:\Job2003\031006\MAPPING\PLATS\GHAD.dwg 9/23/2008 10:49:13 AM PDT

RJA
RUGGERI-JENSEN-AZAR
ENGINEERS • PLANNERS • SURVEYORS
4690 CHABOT DRIVE, SUITE 200 PLEASANTON, CA 94588
PHONE: (925) 227-9100 FAX: (925) 227-9300

LINE TABLE		
LINE	BEARING	DISTANCE
L1	N34°49'01"E	57.61'
L2	N04°47'56"E	34.01'
L3	N00°17'39"W	210.60'
L4	N60°18'13"W	52.63'
L5	N61°34'05"W	47.51'
L6	N59°34'36"W	50.00'
L7	N62°07'31"W	51.44'
L8	N65°02'52"W	52.17'
L9	N70°46'53"W	51.50'
L10	N69°51'14"W	95.00'
L11	N69°05'47"W	49.38'
L12	N64°33'23"W	47.61'
L13	N59°07'40"W	46.83'
L14	N57°35'14"W	50.01'
L15	N55°25'40"W	47.55'
L16	N58°09'02"W	71.54'
L17	N76°05'13"W	7.82'
L18	S04°09'06"W	28.49'
L19	S33°44'44"W	65.05'
L20	S41°43'13"W	14.49'
L21	S29°56'12"W	55.14'
L22	S31°01'46"W	28.98'
L23	S15°19'25"W	14.51'
L24	S20°36'59"W	12.63'
L25	S68°51'33"W	89.14'
L26	S74°08'44"W	25.93'
L27	N03°11'41"W	104.23'
L28	N33°23'01"E	83.52'
L29	N13°02'00"W	227.15'

CURVE TABLE			
CURVE	RADIUS	DELTA	LENGTH
C1	200.00'	21°26'23"	74.84'
C2	125.00'	29°35'38"	64.56'
C3	44.00'	54°00'29"	41.48'
C4	121.00'	42°13'28"	89.17'
C5	211.00'	20°24'45"	75.17'
C6	104.00'	26°41'28"	48.45'
C7	161.00'	14°49'00"	41.63'
C8	304.00'	27°24'06"	145.39'
C9	111.00'	19°57'23"	38.66'
C10	59.00'	15°42'21"	16.17'
C11	100.00'	5°17'34"	9.24'
C12	29.00'	18°27'11"	9.34'
C13	100.00'	5°17'11"	9.23'

EXHIBIT C
 PLAT TO ACCOMPANY LEGAL DESCRIPTION
 FOR
 GHAD

CITY OF DUBLIN, ALAMEDA COUNTY, CALIFORNIA

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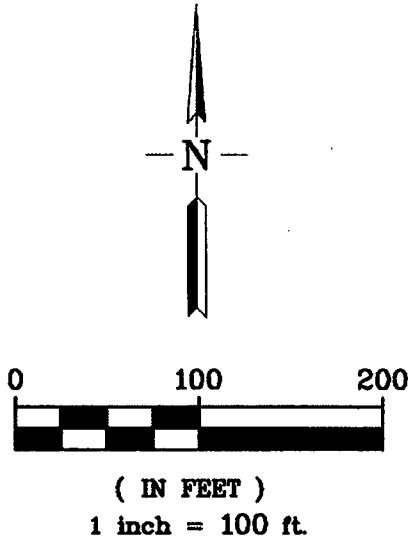


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 PHONE: (925) 227-9100 FAX: (925) 227-9300

SCALE: N/A	DATE: 7-31-08	JOB NO.: 031006
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4588/60

467160



STANDARD PACIFIC CORP
DOC 2005 146527
APRIL 14, 2005

P.O.B.

S87°10'59"E
17.69'

MAINTENANCE EASEMENT
REQUIRED FROM TRACT 7540
AREA = 9,437 SQ. FT.

LOT ' A 3 '
TRACT 7 4 4 1

N44°22'05"E
50.43'
S32°49'52"W(R)
R=25.00'
Δ=41°35'35"
L=18.15'
S44°22'05"W
42.19'
N08°45'43"W(R)

LEGEND

P.O.B. POINT OF BEGINNING
SQ. FT. SQUARE FEET

EXHIBIT C PLAT TO ACCOMPANY LEGAL DESCRIPTION FOR MAINTENANCE EASEMENT

CITY OF DUBLIN, ALAMEDA COUNTY, CALIFORNIA

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PHONE: (925) 227-9100 FAX: (925) 227-9300

SCALE:
1"=100'

DATE:
7-31-08

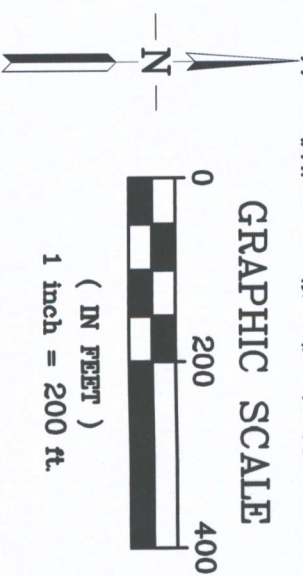
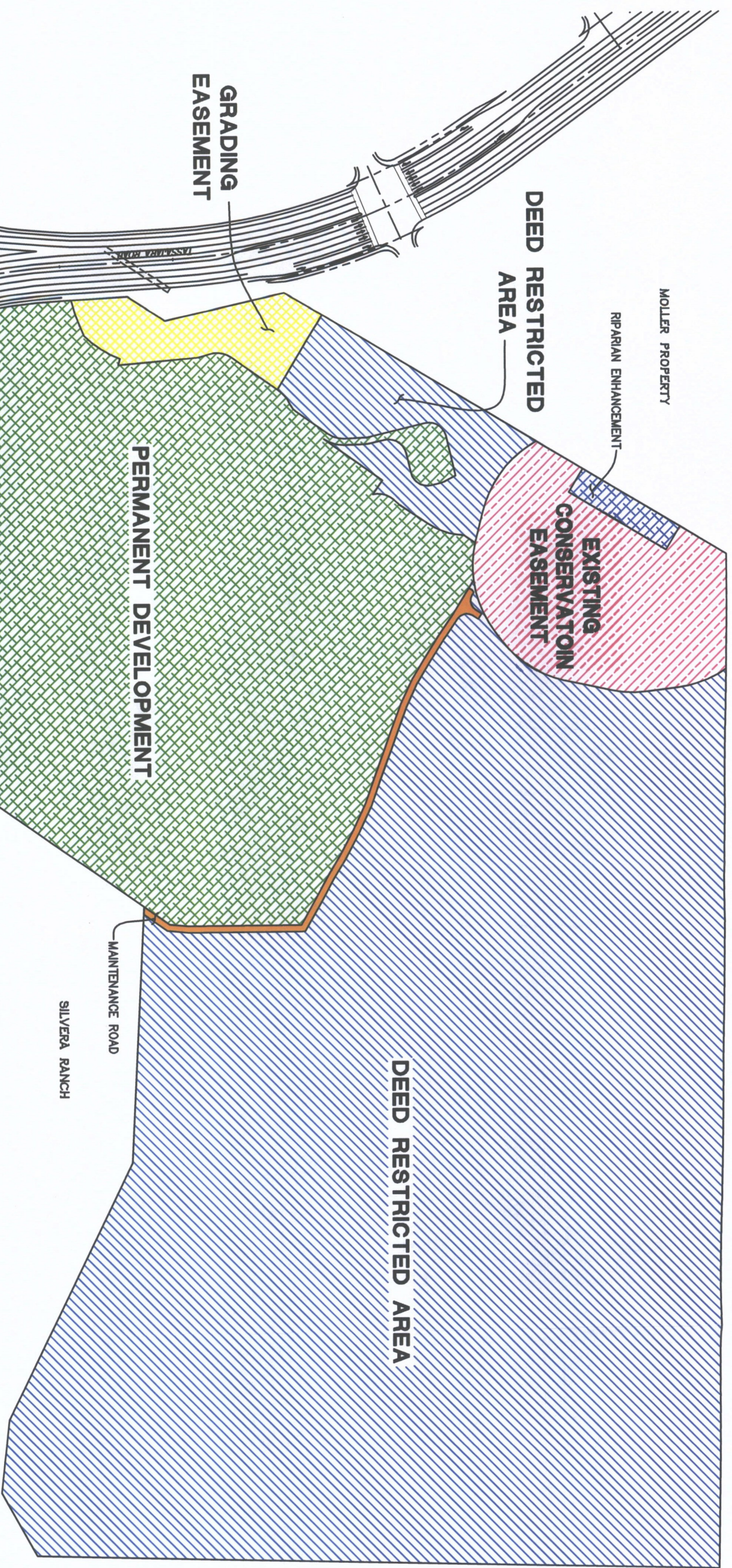
JOB NO.:
031006

4786/60

EXHIBIT D

DEED RESTRICTION EXHIBIT

428160



DEVELOPMENT AREA EXHIBIT

FALLON CROSSING
DUBLIN, CALIFORNIA

498 160

APPENDIX A

DETENTION/WATER QUALITY BASIN OPERATIONS AND MAINTENANCE MANUAL

Prepared By:
Ruggeri-Jensen-Azar and Associates

508/160

GHAD Management

**Detention/Water Quality Basin Operations and Maintenance
Manual**

**Tract 7617 Fallon Crossing
Dublin, Alameda County, California**

Prepared by:



RUGGERI-JENSEN-AZAR
ENGINEERS • PLANNERS • SURVEYORS

4690 Chabot Drive, Suite 200
Pleasanton, CA 94588
(925) 227-9100



February 15, 2011
Updated April 13, 2011

FOREWORD

The purpose of this document is to provide a manual for the management and maintenance of the Fallon Crossing Detention/Water Quality Basin. The Fallon Crossing project is located at the intersection of Tassajara Road and Fallon Road in the City of Dublin. The two Water Quality Ponds are in the western portion of the site and treat runoff from the entire site. Stormwater runoff from the northern and eastern portion of the development is collected and treated by filtration through 18 inches of sandy loam in the Upper Water Quality Pond before outletting to the detention basin through a storm drain. The southern and western portion of the site drains to the Lower Water Quality Pond where it is also filtered through 18 inches of sandy loam, then outletted to the detention basin.

The water quality ponds are located along Tassajara Creek and are within an area which has been recognized as habitat for both the federally protected California red-legged frog and California tiger salamander. All maintenance activities are to be performed in a manner which does not result in the "take" or harm to either of these species. Maintenance activities will be performed in a manner which avoids, to the maximum extent practicable, impacts to these species.

Maintenance of the Water Quality Ponds and Detention Basin will initially be performed by Standard Pacific Homes and will remain their responsibility until the Geologic Hazard Abatement District (GHAD) assumes the maintenance duties.

The Basin Operations and Maintenance Manual provides policies, responsibilities, authorities, and procedural guidance for management and maintenance of the Water Quality and Detention Basins. The GHAD Manager will provide to regulatory agencies requesting them, annual reports on maintenance activities and will comply with all applicable State of California and federal laws and requirements governing the maintenance activities.

Maintenance activities may generally be summarized as follows:

GHAD Management
Task
Open Space Maintenance
Detention/Water Quality Basin Operation and Maintenance
Erosion Repairs
Revegetation
Sediment Removal from Ponds
Access Road Maintenance

Basin Operations and Maintenance

The basin maintenance responsibilities include monitoring and maintenance so that Detention and Water Quality Basins function within the intended purpose. The Basin Operations and Maintenance Manual may be modified from time to time at the discretion of the GHAD Manager, subject to applicable laws and rules.

528/60

BASIN OPERATIONS AND MAINTENANCE MANUAL

Procedures and Guidance for
Implementation of Policies

OVERVIEW

The procedures in the following chapters are applicable to the identified organizational elements. Chapter 1 presents Procedures for General Basin Maintenance. Chapter 2 presents procedures for Maintenance of Basin Water Height and Facilities.

Refinement of the O&M Program should be expected based on the recommendation and agreement of the GHAD Manager, GHAD, the Regional Water Quality Control Board and other applicable public agencies.

General Maintenance and Monitoring

Sediment accumulation measurements will occur quarterly, with the exception of monitoring during the wet season, the rate of sedimentation in the Detention/Water Quality Basins and identify the need for removal. Some sedimentation is expected within the basin; removal is planned only to the extent necessary to maintain proper basin function and performed in a manner which reduces impacts to wildlife.

The Detention/Water Quality Basins will be monitored to assure that they are self-draining with a residence time that does not significantly exceed the design criteria. Quarterly monitoring during January, April, July and October is planned with additional monitoring within two working days after significant storm events, i.e., one inch of rainfall in a 12-hour period. The Detention/Water Quality Basins should drain within five days. All inlet structures will be monitored to ensure proper function. Remedial procedures for the inlets should be taken immediately if the water level overtops an emergency overflow structure. Overtopping of the basin, or a drain time in excess of five days would be indicative of silt built-up or an inoperable basin outlet structure that should be maintained/repared to prepare for subsequent storm events.

As the Detention/Water Quality Basins fill, the rate of discharge from the basin should increase with increased water depth. The basin outlet structure should be monitored for proper function during significant storm events. Vegetation that does not preclude the proposed function of the Detention/Water Quality Basins should be allowed on the floor of the basins to aid in the trapping of sediment. Herbicides will not be used in the Fallon Crossing Detention/Water Quality Basins unless absolutely necessary. Pesticide use will be limited and only used if absolutely necessary for mosquito control, with input from Alameda County Mosquito Abatement District, and in conformance with all applicable rules and regulations. All herbicides/pesticides used in the management of the Fallon Crossing Detention/Water Quality Basins will be selected from a California Department of Fish and Game (CDFG) approved list.

Policy Implementation

GHAD Manager maintenance and monitoring procedures will include:

- Inspection and repair of inlet and outlet structures.
- Stabilization and/or repair of eroded areas or failures of the embankment surrounding the Detention/Water Quality Basins.
- Pruning/cutting of the vegetation within and surrounding the Detention/Water Quality Basins.
- Maintenance of all access roadways.
- Monitoring any perimeter fencing for public safety, if present.
- Measurement of Detention/Water Quality Basin water levels.
- Mosquito abatement.

Technicians retained by the GHAD Manager will carry out the quarterly site inspections and utilize the Monitoring Report Form included at the back of this manual. The GHAD Manager will ultimately be responsible for determining the need for more frequent monitoring. Personnel and subcontractors involved in Detention/ Water Quality Basin management will be trained on reading the staff gage, proper running/cutting techniques, and inspection measures by the GHAD Manager. A sample Inspection Report is included at the end of this manual.

An annual review shall be made by the GHAD Manager to assess the effectiveness of the maintenance program and to make recommendations as to which measures should be undertaken in the next fiscal year. The GHAD Manager should submit an annual Program Review report to the GHAD verifying that O&M Program performance goals are being attained. Any appropriate site-specific study or request for remedial repair shall be determined at that time. Consultants, if necessary, will be retained to undertake the needed studies/repairs.

Emergency Response and Scheduled Remedial Repair

Emergency response and scheduled repair expenditures are to be prioritized at the discretion of the GHAD Manager, based upon available funds and the approved operating budget. When available funds are not sufficient to undertake all of the identified remedial and preventive stabilization measures, the expenditures are to be prioritized as follows in descending order or priority:

- A. Prevention, mitigation, abatement or control of hazards that have either damaged or pose a significant threat of damage to the Detention/Water Quality Basin levees or overflow structures.
- B. Prevention, mitigation, abatement or control of hazards which have either damaged or pose a significant threat of damage to ancillary structures, including but not limited to the inlet and outlet pipes.
- C. Prevention, mitigation, abatement or control of geologic hazards which have either damaged or pose a significant threat of damage to the Detention/Water Quality Basins.

The techniques which may be employed by the GHAD Manager to prevent, mitigate, abate, or control hazards include, but are not limited to, the following:

- 1. Repair, maintenance or replacement of inlet or outlet control valves structures.
- 2. Stabilization (either partial or total) of levee embankments by removal and replacement with compacted, drained fill.
- 3. Construction of erosion control measures. Whenever, feasible, bioengineering techniques will be utilized and are preferred over hard armor.
- 4. Placement of subsurface drainage devices (e.g., underdrains, or horizontal drilled drains).
- 5. Slope correction (e.g., gradient change, slope trimming or contouring).
- 6. Construction of additional surface ditches, sediment traps, or backfill of eroded channels.

CHAPTER 1 PROCEDURES FOR GENERAL BASIN MAINTENANCE

II-1-1 Procedures. The GHAD Manager provides technical guidance for the O&M Program process and promotes management practices with standards and guidelines. The GHAD Manager is responsible for providing effective and efficient use of staff and subcontractors. Procedures for the following maintenance items are presented in the following sections of this chapter:

- Inlet and outlet structures
- Maintenance of access roads
- Detention/Water Quality Basin Embankments
- Fencing repair
- Desilting and clearing of basin
- Mosquito abatement
- Vegetation control

II-1-2 Inlet and Outlet Structures. Maintenance of inlet and outlet structures will involve the clearing of debris and repair of the trash rack structure, as required to allow passage of storm flows. The outlet structure in the Upper Water Quality Pond is a 48-inch-diameter riser pipe with 2-inch-diameter holes as shown on the Fallon Crossing Storm Water Treatment Plan. The outlet structure in the Detention Basin is also a 48-inch-diameter riser pipe with 3-inch and 4-inch diameter holes. The inlet and outlet structures should be visually inspected during or immediately after large storm events to avoid prolonged blockage. The holes on the outlet structure should be clear of debris and observed during each maintenance check. Any observed damage or apparent inoperability of the structures will be reported to the GHAD Manager immediately.

In the event that the primary Detention/Water Quality Basin outlet is rendered inoperable during a major storm event, the emergency overflow structure should be allowed to operate as designed to pass the storm flows. Emergency maintenance of the inoperable outlet structure should be undertaken at such time and with the equipment that the GHAD Manager deems appropriate.

II-1-3 Maintenance of Access Road. Maintenance of access roads, as shown on the attached improvement plans, will involve repair of excessive bumps, cracks and depressions such that maintenance vehicles can easily navigate the roads. The roadways will be inspected on a quarterly basis and repaired as needed. Any damage to or failures of the embankments near the road will be reported to the GHAD Manager immediately. Pavement repairs should be performed in accordance with the general repair practices of the City of Dublin's Public Works/Maintenance Department.

II-1-4 Detention/Water Quality Basin Embankments. Maintenance of the Detention/Water Quality Basin embankments shall involve visual inspection of the Detention/Water Quality Basin embankments and slopes. Observations should occur on a quarterly basis in conjunction with the inlet and outlet structure inspections. The Detention/Water Quality Basin slopes should be inspected for obvious signs of vertical and/or horizontal displacements. Embankment sides should be free of erosion, rills, slumps or landslides. Any observed slope displacement should be reported to the GHAD Manager immediately.

II-1-5 Fencing Repair. Fencing installation on the eastern side of the Detention/Water Quality Basin will occur with the development of Fallon Crossing. Maintenance of fencing involves repair of all gaps, tears, sags and breaks such that public safety is provided. All perimeter fencing will be monitored quarterly and maintained in good condition without breaks or damage.

5/28/60

II-1-6 Desilting and Clearing of Basin. Detention/Water Quality Basin floors should be regularly cleared of excess sediment and excess vegetation to enable proper flow characteristics. Failure to do so can create flood hazards; however, a vegetative growth of less than 5 feet in height contributes to sediment trapping within the basin. Although vegetative growth is generally encouraged, excess vegetation (defined as shrub and tree growth in excess of 5 feet in height) should be removed from the basin floor by pruning. Aggressive, non-native species such as bamboo may need total removal with shovels.

The floor of the Detention/Water Quality Basin should be monitored by GHAD Manager on a quarterly basis. If sediment in excess of 18 inches or 10 percent of the storage capacity, whichever is greater, has accumulated above design grades, the sediment should be removed. Vegetation in excess of 5 feet in height and grass exceeding 4-inches in height will require removal. Sediment accumulation will be measured with installed staff gages. Vegetation accumulation will be measured with a tape measure in at least four locations within the basin floor. Vegetation removal would be restricted to the period of August 1 through September 30. Prior to sediment removal or vegetation pruning, the procedure should be reviewed and authorized by the GHAD Manager.

If sediment in excess of 18 inches or 10 percent of the storage capacity, whichever is greater, has accumulated above design grades during a quarterly sediment monitoring event, sediment removal shall be undertaken before the next wet season. Sediment removal shall be restricted to the period of August 1 through September 30. Sediment removal for routine maintenance will be with hand labor, lawn mowers and wheelbarrows as much as possible within the pond and mechanized equipment working from the maintenance road for heavier work to maintain compliance with regulatory agency requirements. Emergency repairs may require use of larger equipment including, but not limited to, excavators and dump trucks. Sediment will be removed in small sections, with as little disturbance to existing vegetation as possible. No heavy equipment will be used within the Detention/Water Quality Basin without permission from the GHAD Manager. Prior to any mechanized removal of silt or vegetation, a pre-construction survey shall be performed by a biologist having direct knowledge of local flora and fauna to remove wildlife species and assure that all special-status species including but not limited to the California red-legged frog (CRLF) are not impacted by the maintenance activity.

Standing water should not remain in the Water Quality Ponds for more than five days. If water is visible in the Water Quality Ponds for longer periods with no evidence of sediment on the surface, the sandy loam should be removed and replaced with a soil mixture meeting the Alameda Countywide Clean Water Program soil specifications included in appendix G of the Stormwater Management Plan.

The sediment shall be off-hauled to a landfill or other suitable disposal site with no biological restraints.

- a. Vegetation maintenance will be accomplished by hand pruning, unless aggressive, non-native species become a problem, in which case other methods of removal can be initiated at the discretion of the GHAD Manager. Pruning will only involve the cutting and removing of vegetation above the ground, e.g., mowing, rotary cutting, and chain-sawing, where the activity neither substantially disturbs the root system nor involves mechanized pushing, dragging, or other similar activities. No heavy equipment will be used within the Detention/Water Quality Basins for routine maintenance. Pruning debris will be removed from the basin in burlap or canvas bundles and trucked to an authorized dumpsite reviewed and approved by the GHAD Manager. Vegetation removed or destroyed during maintenance will be allowed to re-establish naturally without replanting.

- b. The sides of the Detention/Water Quality Basins are to be monitored on a quarterly basis. Plantings and other vegetation are to be inspected for health and vigor. All embankment sides should be free of erosion, rills, slumps or landslides. Embankment slope irregularities should be reported to the GHAD Manager in the monitoring report. Irrigation systems, if present, are to be monitored for proper function. Leaking or malfunctioning irrigation systems will be repaired within two days of inspection.

II-1-7 Mosquito Abatement. As part of Detention/Water Quality Basin maintenance, the GHAD Manager will coordinate with Alameda County Mosquito Abatement District to monitor for the potential presence of mosquito vectors as necessary. Should mosquito populations be detected in the basin, the GHAD Manager will coordinate with Alameda County Mosquito Abatement District to employ techniques to control mosquito production that are acceptable to the applicable regulatory agencies.

CHAPTER 2 MAINTENANCE OF BASIN FACILITIES

II-2-1 Procedures. Procedures for the following maintenance items are outlined in the subsequent chapter sections.

- Monitoring stormwater height in the Detention/Water Quality Basin.
- Cleaning of all debris racks.
- Maintenance of basin outflow structures.
- Repair tasks.
- Embankment stabilization.

II-2-2 Monitoring Stormwater Height & Cleaning Debris Racks

- a. The Detention/Water Quality Basin inlets will be inspected quarterly and maintained in good condition without obstructions. It is of utmost importance that the inlet functions properly, substantially free of debris or other obstructions. Special attention should be given to whether erosion is occurring around the edges of the inlet structures as well as at or immediately downstream from the discharge point into the basin. Litter and obstruction removal should be undertaken during routine maintenance visits.
- b. The Detention/Water Quality Basin outlets and the emergency overflow structure will be inspected quarterly and after all storm events generating more than 1.0 inch of rainfall in any 12-hour period. The overflow structure should be additionally inspected after any event that causes flow over the overflow structure. Any debris accumulating on trash racks is to be removed. All trash racks and the emergency overflow structure will be maintained and repaired as necessary to allow proper function.
- c. The basin should drain within 72 hours of significant precipitation. The water level should not be significantly higher than the maximum elevation of the outlet control structure, or less than one foot below the level of the emergency overflow structure.

II-2-3 Maintenance Discharges. Water removed from the Detention/Water Quality Basin facilities for maintenance will be directly released into the 24-inch storm drains.

Maintenance discharges are limited to those approved by the GHAD Manager. Before approving the removal of water or sediment from the Detention/Water Quality Basins, the GHAD Manager will consider the following factors:

- The size and age of the facility.
- The construction quality of the facility.
- The maintenance history.
- Whether the facility has been functioning at capacity and for how long.
- Present vs. original stormwater control needs.
- Whether sensitive/unique functions and values may be adversely affected.

II-2-4 Repair Tasks. In determining the need for repairs to the Detention/Water Quality Basin's embankments, overflow structures, inlets or outlets, the GHAD Manager will consider the following factors:

- Any original mitigation required.
- The current environmental setting.
- Any adverse effects of the repair project including those to wildlife species utilizing the basin.

The GHAD Manager will immediately undertake maintenance for completion of any basin repairs, provided that the GHAD Manager established a schedule for the identification, approval, development, construction and completion of the required repair in accordance with City policy.

II-2-5 Embankment Stabilization. The embankment of the basins should be maintained in a stable condition and are designed to remain stable throughout the life of the project; however, if areas of weakness are noted during the monitoring process, stabilization should be undertaken in a timely fashion. The following guidelines are applied to all grading accomplished for non-emergency construction of stabilization measures:

- Both an Engineering Geologist and Civil Engineer should be consulted on significant embankment repairs.
- Soil removal/placement should be limited to the minimum needed for erosion/flood protection.
- No material should be placed in any special aquatic site, including wetlands, without proper resource agency permitting.
- Preference will be given to soft armor and bioengineering techniques whenever possible.
- No material should be placed in any location, or in any manner, so as to impair surface water flow into or out of any wetland area without proper resource agency permitting.
- No material should be placed within a surrounding open space area without the consent of the GHAD.
- No material should be placed in a manner that will be eroded by normal or expected high flows.

608/160

MONITORING REPORT

Fallon Crossing
Alameda County, California

Fallon Crossing Detention/Water Quality Basin Operations and Maintenance Site Monitoring and Maintenance Report Form

(to be completed quarterly in January, April, July and October and as necessary during heavy rainfall, and submitted in the semi-annual sediment accumulation and hydrologic function reports in February and August, and in the Stormwater Maintenance and Monitoring Report by December 31 of each year)

Inspector: _____ Date: _____

Weather Conditions: _____

Days since last rainfall: _____ Dry season? _____ Wet season? _____

Basin Water Level: _____ Sediment Accumulated since Last Monitoring Event: _____

MONITORED CONTROL	YES	NO	N/A	COMMENTS/ SUGGESTED MAINTENANCE
1. Are inlet and outlet structures functioning properly, allowing the basin to drain and are they in satisfactory condition?				
2. Are all holes on the outlet structure clear of debris and allowed to function properly?				
3. Are access roads in satisfactory condition?				
4. Is all perimeter fencing (if present) in good condition without breaks, gaps or damage?				
5. Have the debris racks been cleaned and are they in good condition?				
6. Are embankments surrounding the basin in good condition without rills or failure?				
7. Is the vegetation less than 5 feet in height?				
8. Are embankment slopes protected with mulch or vegetation?				
9. Has water removal been undertaken in the last 3 months? If so, describe procedure?				

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MONITORED CONTROL	YES	NO	N/A	COMMENTS/ SUGGESTED MAINTENANCE
10. Has sediment removal been undertaken in the last 3 months?				
11. Do any basin devices require maintenance to provide more effective function?				
12. Are there any signs of leaking irrigation systems?				
13. Are there any signs of vandalism?				
14. Are mosquitoes evident?				
15. Has mosquito abatement been undertaken since the last monitoring event?				
16. Are there remedial/repair tasks that should be undertaken in the near future?				
17. Is there evidence or information received in the last 3 months to indicate a lengthy drain time?				

"No" answers to Items 1-9 or "Yes" answers to Items 10-17 require a corrective action.

**FALLON CROSSING DETENTION/WATER QUALITY BASIN OPERATIONS AND
MAINTENANCE
SITE MONITORING AND MAINTENANCE
REPORT FORM (CONTINUED)**

CORRECTIVE ACTIONS UNDERTAKEN
(if none required, enter date and "none")

[illegible]

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[illegible]

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APPENDIX

RUGGERI-JENSEN-AZAR & ASSOCIATES
Fallon Crossing
Stormwater Treatment Plan
Alameda County, California

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**Stormwater Management Plan
Fallon Crossing – Tract 7617
Dublin, Alameda County, California**

Prepared for: Standard Pacific Homes

Prepared by:



**Project No. 031006IP
September 19, 2008
Updated July 30, 2009
Updated April 13, 2011**

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Introduction

The Fallon Crossing Residential project (Project) is a planned development in the City of Dublin, Alameda County, California. The stormwater runoff generated by the Project site is subject to Provision C.3 of the NPDES permit issued to the local municipality by the California Regional Water Quality Control Board (RWQCB) for the San Francisco Bay Region. The regulations require treatment of the post construction runoff from new developments and significant redevelopments before the runoff is discharged to the municipal storm drains to the Maximum Extent Practicable (MEP). In addition, many projects must also control the rates and durations of runoff flows to match pre-development levels for a particular range of storm events. RWQCB staff monitors each municipality's implementation of permit requirements. Each municipality must report on its development review process, number and type of projects reviewed and what Integrated Management Practices (IMP) were utilized in projects.

Development and redevelopment activities can degrade water quality during construction with erosion and sedimentation as well discharge of other pollutants. Since 1999, a Storm Water Pollution Prevention Plan (SWPPP) has been a standard part of grading plans to be used to winterize jobs where the hardscape and landscaping has not been completed prior to the rainy season.

In addition to these short term source pollutants, long term pollutant sources can degrade the water quality being discharged to receiving streams, lakes, estuaries and bays. While stormwater runoff is a natural part of the hydrologic process, urbanization and agricultural land uses have altered the natural drainage patterns and added pollutants to receiving waters.

Project applicants are required to incorporate IMPs into the site to offset the negative impacts of urbanization. This plan addresses both water quality and flow control measures at the planning level of detail to show compliance with the post-construction, long term requirements of Provision C.3. A SWPPP will be prepared as a separate document to control short term, construction related discharge pollutants as required by the California State Water Resources Control Board Order No. 99-08-DWQ.

Purpose and Scope

The purpose and scope of this plan is:

1. Determine the existing hydrologic, topographic, soils, and drainage features of the site.
2. Identify site constraints and opportunities for selection of treatment and flow control facilities.
3. Utilize these features to design water quality treatment facilities for removal of pollutants.
4. Utilize existing site features described above and proposed site features to design hydrograph modification facilities, if needed, using the Bay Area Hydrograph Model (BAHM).

5. Document design decisions within this report to quantify the benefits achieved by the site design.

This Stormwater Management Plan (SMP) has been developed using guidelines provided by the Alameda Countywide Clean Water Program (ACCCWP) *C.3 Stormwater Technical Guidance*, the California Stormwater Quality Association (CASQA) *Stormwater Best Management Practice Handbook*, the Bay Area Stormwater Management Agencies Association (BASMAA) *Using Site Design Techniques to Meet Development Standards for Stormwater Quality* and past experience in the design of stormwater quality facilities.

Water Quality

Impervious surfaces in developed areas such as roofs, roads, parking lots and sidewalks prevent stormwater from infiltrating into the soil. Most of the rainfall remains on the surface which is designed to drain as quickly and efficiently as possible. The surface flow washes debris, dirt, oil and other vehicle fluids, chemicals and other pollutants into the storm drain system which eventually outlets into receiving waters such as streams, rivers or bays.

Approximately 80% of annual rainfall occurs in more frequent, low intensity storms that produce less runoff. The goal of the SMP is to remove pollutants from the stormwater runoff during these low intensity storm events while still providing flood protection for the infrequent high intensity events.

CASQA lists the following pollutants of concern and their impacts on water quality in their 2003 handbook:

- Sediment – nutrient transport and interferes with aquatic life
- Nutrients – excessive or accelerated growth of algae
- Bacteria and Viruses – health concerns for humans at recreational facilities
- Oil and Grease – toxic to aquatic organisms at low concentrations
- Metals – toxic to aquatic organisms, bioaccumulation and drinking water contamination
- Organics – synthetic organic compounds are environmentally harmful to water quality
- Pesticides – environmental, wildlife and human health concerns through bioaccumulation
- Gross Pollutants – includes trash, debris and floatables that creates an eyesore in waterways
- Vector Production – mosquitoes, flies and rodents are attracted to areas of standing water and can spread disease

Water Quantity

Hydrograph modification is the change in timing and volume of stormwater runoff when a site is developed. In August 2006, Provision C.3.f in the stormwater National Pollutant Discharge Elimination System (NPDES) permit requires municipalities to manage increases in peak runoff flow and volume from all projects that create or replace an acre or more of impervious area (Group 1 Project) where the increase in flow or volume is likely to cause increased erosion in creek beds and banks, generate silt pollution or otherwise impact beneficial uses of water bodies. Larger volumes and faster flow rates in unprotected creeks or channels increase erosion. As the channel enlarges due to erosion, damage to habitat, water quality and property occurs. Traditional detention designs have not adequately addressed this problem in the past due to the fact that relatively low flows can cause erosive damage. For this reason, ACCWP requires continuous simulation using record rainfall data to evaluate Hydrograph Modification for the storm event range of 10% of the 2 year storm to the 10 year storm. ACCWP has participated, along with San Mateo County, Santa Clara County and Clear Creek Solutions, Inc. in developing a computer model for this purpose. The Bay Area Hydrograph Model (BAHM) is the result of this collaboration and is used in this plan to evaluate Hydrograph Modification for the site.

Projects are subject to Provision C.3.f unless they can show that the project will not cause erosion or other significant effects to beneficial uses in the receiving waters.

Site Location and Description

The Project site is a 67± acre undeveloped parcel located at the intersection of Tassajara Road and Fallon Road in the City of Dublin as shown on the vicinity map (Figure 1). The Project is situated on a city block that does not yet have fully developed streets. Bordering on the north is an undeveloped parcel owned by Charles Richey and Charles Hunter. The western boundary is Tassajara Road, which connects Alameda County and Contra Costa County. To the south and east borders Silvera Ranch, a recently developed residential development.

Soils Conditions

Based on the design level geotechnical investigation report by Berlogar Geotechnical Consultants, residual soils, colluvial deposits, and alluvial deposits were encountered in boring logs performed.

The residual soils encountered consisted of dark gray and dark gray-brown silty clay (CL-CH). Colluvial deposits were also found to consist of dark gray to dark gray-brown to dark brown silty clay (CH). Alluvial deposits were located within and adjacent to Tassajara Creek. The alluvial soils consisted of stiff to very stiff sandy clay and silty clay (CL-CH), medium stiff to stiff clayey silt (ML), medium dense sandy silt (ML), clayed sand (SC) and silty sand (SM).

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Climate

Dublin has a climate characterized by wet winters and dry summers receiving a mean annual precipitation of 16 inches (ACCWP, Attachment-6). The typical wet season is from October to April with occasional, uncharacteristic rainfall during the other months.

Ground Water and Surface Water

Groundwater conditions at the site are expected to vary significantly depending on weather conditions during the time of year, water level in the creek, and irrigation practices. It is not anticipated that groundwater will interfere with stormwater facilities on this site.

Surface runoff begins when the soils reach their saturation level and additional rainfall begins overland flow. The surface water begins as overland flow down the hillside eventually makes its way to Tassajara Creek.

Project Description

The Project is planned to be composed of 106 single family homes. The development consists of 3 private driveways, 3 cul-de-sacs, and one street which runs through the entire site. A 3± acre trail/landscaping area is planned to be centrally located and landscaping areas are planned to maximize the green areas of the site. 100% of storm water runoff will be treated in the proposed Upper and Lower Water Quality Ponds which will have 18" of sandy loam meeting the ACCWP soil specifications (Appendix G) on the bottom surface to filter stormwater prior to discharge to a detention basin designed using BAHM to meet the hydromodification standard. The detention basin discharges into the Tassajara Creek through a storm drain pipe and energy dissipater.

The property fronts on existing Tassajara Road which is currently not treated for stormwater quality. The project will construct curb, gutter and sidewalk on the existing road and replace existing pavement with the ultimate road section. The portion of the existing street that drains toward the new curb, gutter and sidewalk will be treated in two 6 feet by 10 feet Filterra units. The total area contributing to these Filterra units is 0.74 acres (Areas 4 and 5 in the table below). The number and size of the Filterra units has been designed to treat double the contributing area.

Drainage Management Areas

For the purpose of this report, the project has been divided into Drainage Management Areas (DMA) as shown in Figure 2. The table below describes the treatment method used for each DMA.

Area ID	Surface	Impervious Area (SF) (Treated)	BMP Used	Required Volume (Ac-ft)	Volume Provided (Ac-ft)
Area 1	Roof/Paving/SWK/DWY	186,250	Upper Water Quality Pond*	0.18	0.25
Area 2	Roof/Paving/SWK/DWY	226,347	Lower Water Quality Pond*	0.26	0.30
Area 3	Open Space	0	Self Treating	-	-
Area 4	Paving/SWK (offsite)	23,565	Filtration Unit	-	-
Area 5	Paving/SWK (offsite)	8,837	Filtration Unit	-	-

*Water quality pond sized using 80% capture method described in Alameda Countywide Clean Water Program (see appendix)

Detention Design Guidelines

Flow control for this site is planned to be addressed prior to connection to the existing City storm drain system. The BAHM model described earlier in this report was used to determine the amount of storage required and the outlet structure needed to meet the HMP standard (see appendix).

Additional Source Controls

In addition to the water quality pond, education is an important factor to water quality. Education includes printed material available from ACCWP that should be provided to all buyers and tenants as they move in. The printed materials have information regarding the damaging effects of spilled oil, car washing, paint products and many more common sources of pollution from developments and how to minimize or eliminate them. In addition to this, stenciling "NO DUMPING, DRAINS TO CREEK" on all storm water inlets is another way of informing the public.

The use of drought tolerant planting will reduce irrigation requirements thereby reducing the potential for polluted runoff.

Maintenance

Maintenance of the ponds will be the responsibility of the owner until it is delegated to the Geological Hazard Abatement District (GHAD). The focus of the maintenance is to keep the ponds in the condition to provide the services required to meet water quality and flow control standards.

Primary maintenance of detention basins and water quality ponds should include managing vegetation annually during the summer, trimming vegetation at the beginning and end of the wet season and inspecting on a month to month basis to prevent establishment of woody vegetation and for aesthetic and mosquito control reasons. The

basins and ponds should be regraded every ten years or when the accumulated sediment volume exceeds ten percent of the basin volume.

A separate and more detailed Operations and Maintenance has been prepared for the ponds.

The Filterra units will be maintained by Filterra for the first year, then by Standard Pacific Homes until such time as the City of Dublin accepts the right of way dedication. Once the dedication is accepted, maintenance will be performed by the City or its designee.

Filterra will provide an Operations and Maintenance manual for these units.

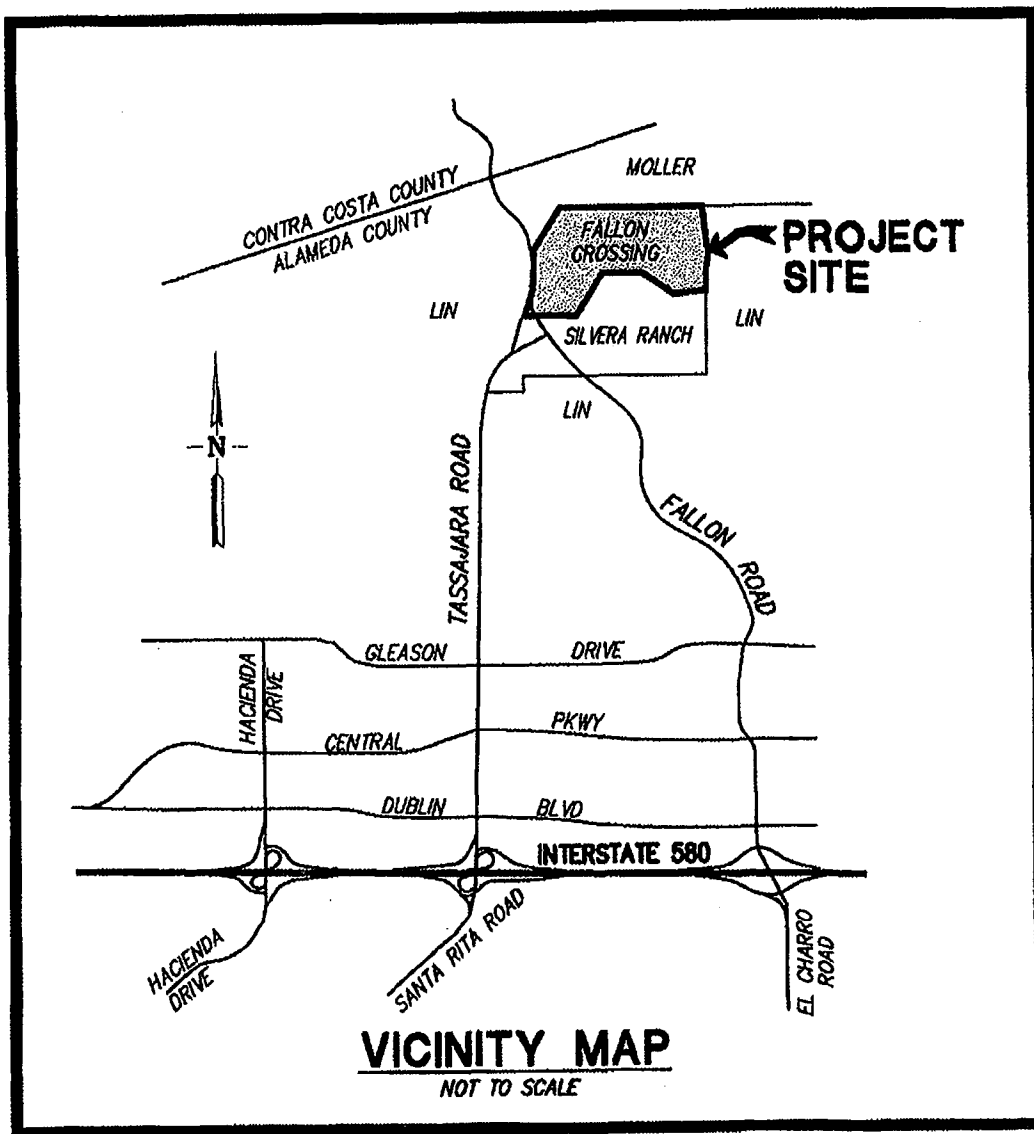
References

1. Alameda Countywide Clean Water Program, C.3 Stormwater Technical Guidance: A handbook for developers, builders and project applicants, August 31, 2006.
2. Alameda Countywide Clean Water Program, C.3 Stormwater Technical Guidance: A handbook for developers, builders and project applicants, October 19, 2010.
3. Bay Area Stormwater Management Agencies Association, Using Site Design Techniques to Meet Development Standards for Stormwater Quality, May 2003.
4. California State Water Resources Control Board, August 19, 1999, General Permit No. CAS000002, State Board Order No. 99-08-DWQ, WDID No. 207S313525.
5. California Stormwater Quality Association, Stormwater Best Management Practice Handbook, January 2003.
6. Contra Costa County Clean Water Program, Stormwater C.3 Guidebook, 3rd Edition, October 2006.
7. United States Department of Agriculture, Urban Hydrology for Small Watersheds: Technical Release 55, June 1986.
8. United States Department of Agriculture, Web Soils Survey, <http://websoilsurvey.nrcs.usda.gov/app/>.

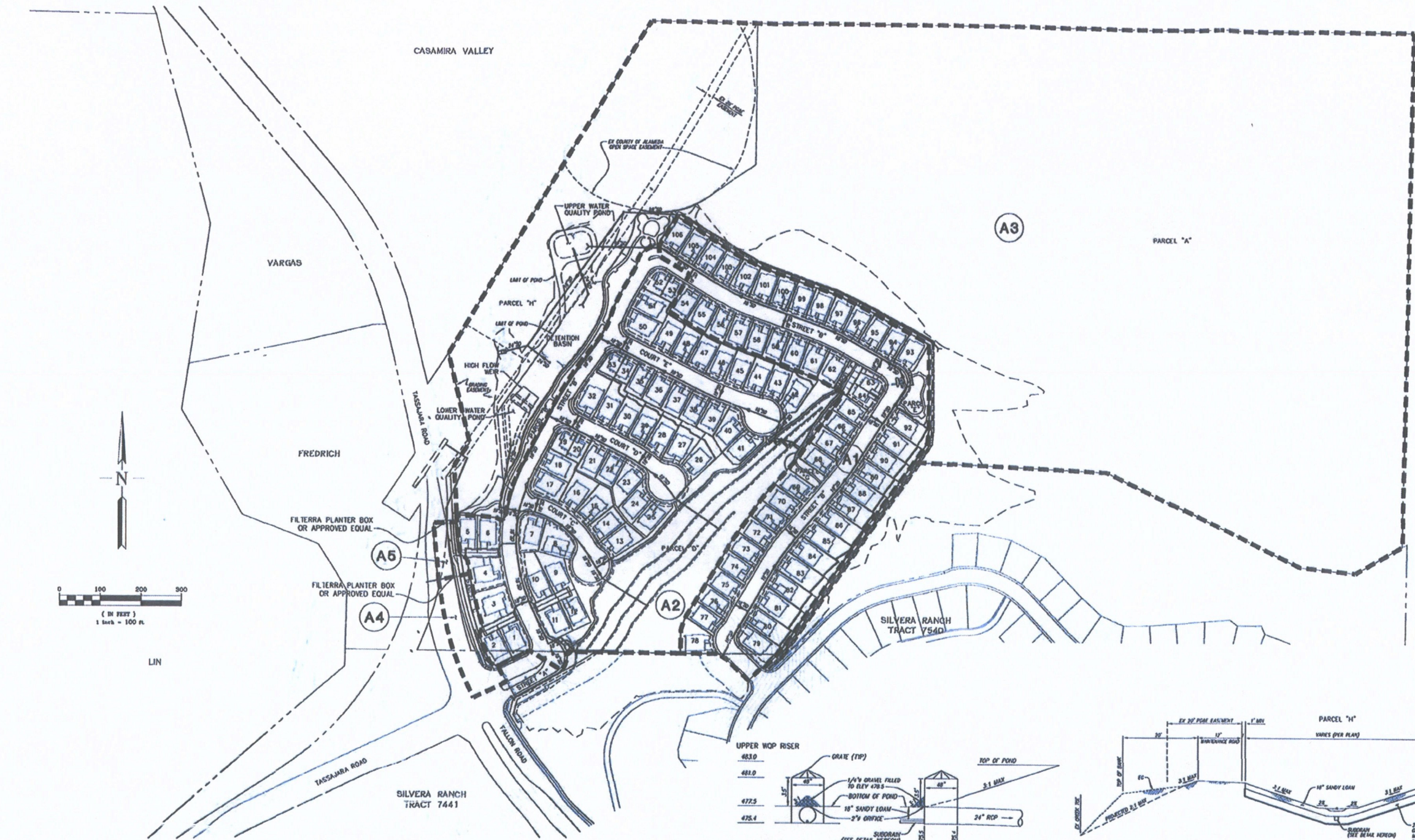
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Appendix

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A. PRE-DEVELOPMENT IMPERVIOUS AREA • 13,842± S.F.

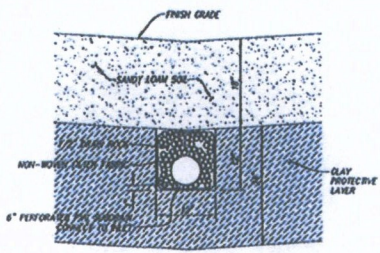
B. POST DEVELOPMENT IMPERVIOUS AREA

1. ROADWAY (INCLUDING COMMON DRIVEWAYS)	• 210,594± S.F.
2. ROOFS	• 181,757± S.F.
3. SIDEWALK	• 62,848± S.F.
TOTAL POST DEVELOPMENT IMPERVIOUS AREA	• 444,999± S.F.

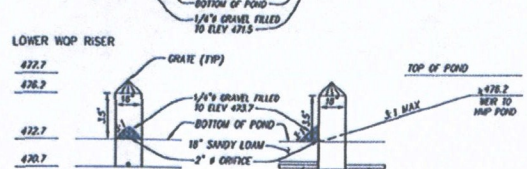
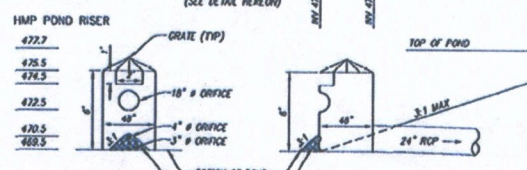
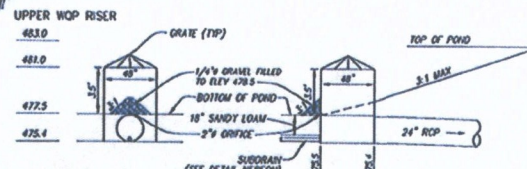
STORM WATER TREATMENT CALCULATIONS:

AREA ID	SURFACE	IMPERVIOUS AREA (SF) (TREATED)	IMP USED	REQUIRED VOLUME	VOLUME PROVIDED
AREA 1	ROOF/PAVING/DRIVEWAY	106,250	UPPER WATER QUALITY POND*	0.18 CC-R	0.35 CC-R
AREA 2	ROOF/PAVING/DRIVEWAY	226,347	LOWER WATER QUALITY POND*	0.26 CC-R	0.31 CC-R
AREA 3	OPEN SPACE	0	SELF TREATING	-	-
AREA 4	PAVING/DRIVEWAY	23,565	FILTRATION UNIT	-	-
AREA 5	PAVING/DRIVEWAY	8,037	FILTRATION UNIT	-	-

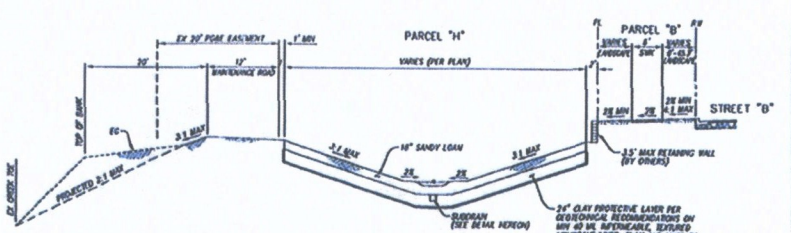
* WATERS QUALITY POND SIZED USING BOX CAPTURE METHOD DESCRIBED IN ALAMEDA COUNTYWIDE CLEAN WATER PROGRAM.



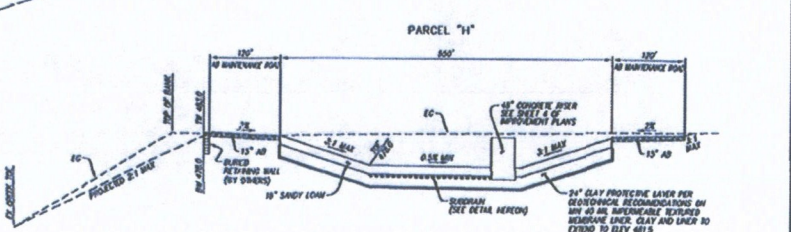
SUBDRAIN DETAIL
NOT TO SCALE



OUTLET WORKS DETAILS
NOT TO SCALE



HMP POND SECTION
NOT TO SCALE



WATER QUALITY POND SECTION
NOT TO SCALE

STORM WATER TREATMENT PLAN - FALLON CROSSING
CITY OF DUBLIN, COUNTY OF ALAMEDA, CALIFORNIA

RJA
RUGGERI-JENSEN-AZAR
ENGINEERS • PLANNERS • SURVEYORS
4690 CHADRON DRIVE, SUITE 200 PLEASANTON, CA 94566
PHONE: (925) 227-9100 FAX: (925) 227-9300

DATE: SEPTEMBER 19, 2008

JOB NO. 031006

- C -

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FALLON CROSSING

Water Quality Sizing Calculations - 80% Capture Method (ACCWP)

Total Drainage Area(WQP1)= 7.91 AC (UPPER)
Total Drainage Area(WQP2)= 12.77 AC (LOWER)

Flows to	Lot No.	Lot Area	Average Roof Area*	Typical Dwy area	Total DCIA	% DCIA	Pervious Area
LOWER WQP	1	4,790	1,760	234	1,994	42%	2,796
LOWER WQP	2	4,651	1,907	283	2,190	47%	2,461
LOWER WQP	3	9,266	2,140	288	2,428	26%	6,838
LOWER WQP	4	8,643	1,919	276	2,195	25%	6,448
LOWER WQP	5	4,159	1,760	243	2,003	48%	2,156
LOWER WQP	6	4,361	1,760	190	1,950	45%	2,411
LOWER WQP	7	5,210	1,907	410	2,317	44%	2,893
LOWER WQP	8	5,633	1,527	614	2,141	38%	3,492
LOWER WQP	9	5,603	1,760	304	2,064	37%	3,539
LOWER WQP	10	7,183	1,907	357	2,264	32%	4,919
LOWER WQP	11	5,431	2,134	277	2,411	44%	3,020
LOWER WQP	12	4,277	1,501	589	2,090	49%	2,187
LOWER WQP	13	5,229	2,134	325	2,459	47%	2,770
LOWER WQP	14	4,621	1,907	398	2,305	50%	2,316
LOWER WQP	15	5,637	1,501	592	2,093	37%	3,544
LOWER WQP	16	5,378	1,919	359	2,278	42%	3,100
LOWER WQP	17	5,119	2,127	333	2,460	48%	2,659
LOWER WQP	18	4,762	1,907	357	2,264	48%	2,498
LOWER WQP	19	2,950	857	175	1,032	35%	1,918
LOWER WQP	20	2,493	543	215	758	30%	1,735
LOWER WQP	21	4,000	1,919	357	2,276	57%	1,724
LOWER WQP	22	3,889	1,502	579	2,081	54%	1,808
LOWER WQP	23	4,837	1,760	252	2,012	42%	2,825
LOWER WQP	24	4,318	2,134	256	2,390	55%	1,928
LOWER WQP	25	4,211	1,502	575	2,077	49%	2,134
LOWER WQP	26	5,966	1,919	312	2,231	37%	3,735
LOWER WQP	27	5,937	2,127	240	2,367	40%	3,570
LOWER WQP	28	5,244	1,907	463	2,370	45%	2,874
LOWER WQP	29	4,763	1,501	594	2,095	44%	2,668
LOWER WQP	30	5,000	1,907	357	2,264	45%	2,736
LOWER WQP	31	5,334	1,760	304	2,064	39%	3,270
LOWER WQP	32	6,381	2,140	371	2,511	39%	3,870
LOWER WQP	33	2,633	843	214	1,057	40%	1,576
LOWER WQP	34	2,465	887	175	1,062	43%	1,403
LOWER WQP	35	3,800	1,527	589	2,116	56%	1,684
LOWER WQP	36	4,000	2,127	288	2,415	60%	1,585
LOWER WQP	37	4,000	1,919	357	2,276	57%	1,724
LOWER WQP	38	3,939	1,501	596	2,097	53%	1,842
LOWER WQP	39	4,161	1,760	316	2,076	50%	2,085
LOWER WQP	40	4,926	1,907	359	2,266	46%	2,660
LOWER WQP	41	4,476	2,134	253	2,387	53%	2,089
LOWER WQP	42	5,598	1,527	663	2,190	39%	3,408
LOWER WQP	43	4,125	1,760	279	2,039	49%	2,086

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Flows to	Lot No.	Lot Area	Average Roof Area*	Typical Dwy area	Total DCIA	% DCIA	Pervious Area
LOWER WQP	44	4,587	1,907	331	2,238	49%	2,349
LOWER WQP	45	4,417	1,760	249	2,009	45%	2,408
LOWER WQP	46	4,498	1,502	580	2,082	46%	2,416
LOWER WQP	47	4,427	2,140	288	2,428	55%	1,999
LOWER WQP	48	4,299	1,501	589	2,090	49%	2,209
LOWER WQP	49	4,726	1,907	387	2,294	49%	2,432
LOWER WQP	50	5,202	2,134	354	2,488	48%	2,714
LOWER WQP	51	4,533	1,502	571	2,073	46%	2,460
LOWER WQP	52	3,238	857	161	1,018	31%	2,220
LOWER WQP	53	2,083	843	201	1,044	50%	1,039

Streets 118,162 SF

Totals 246,619 89,140 19,045 108,185 92% 138,434

C (Ala Co. Clean Water Program) 0.7 NA 0.75 0.8 NA NA 0.1

Open Space 199,940 SF

Weighted C* 0.39 Correction Factor= 1.11111111

Unit Basin Stor 0.22 in

Corr UBS= 0.24 in

WQv= 0.26 Ac-ft

At 3.5' max WQ depth, need area= 0.08 ac

Flows to	Lot No.	Lot Area	Average Roof Area*	Typical Dwy area	Total DCIA	% DCIA	Pervious Area
UPPER WQP	54	3,992	1,760	304	2,064	52%	1,928
UPPER WQP	55	4,115	1,919	356	2,275	55%	1,840
UPPER WQP	56	4,052	1,502	579	2,081	51%	1,971
UPPER WQP	57	3,909	1,760	255	2,015	52%	1,894
UPPER WQP	58	4,025	1,907	387	2,294	57%	1,731
UPPER WQP	59	3,825	1,501	589	2,090	55%	1,735
UPPER WQP	60	4,075	1,907	357	2,264	56%	1,811
UPPER WQP	61	4,107	1,760	311	2,071	50%	2,036
UPPER WQP	62	4,217	2,134	310	2,444	58%	1,773
UPPER WQP	63	3,227	889	231	1,120	35%	2,107
UPPER WQP	64	2,791	843	271	1,114	40%	1,677
UPPER WQP	65	3,871	1,760	324	2,084	54%	1,787
UPPER WQP	66	3,982	1,501	604	2,105	53%	1,877
UPPER WQP	67	4,307	1,907	409	2,316	54%	1,991
UPPER WQP	68	4,082	1,502	570	2,072	51%	2,010
UPPER WQP	69	4,242	2,127	265	2,392	56%	1,850
UPPER WQP	70	4,263	1,919	334	2,253	53%	2,010
UPPER WQP	71	3,953	1,527	574	2,101	53%	1,852
UPPER WQP	72	4,013	1,501	354	1,855	46%	2,158
UPPER WQP	73	3,872	1,501	610	2,111	55%	1,761
UPPER WQP	74	4,187	1,907	425	2,332	56%	1,855
UPPER WQP	75	4,226	2,134	337	2,471	58%	1,755
UPPER WQP	76	4,054	1,501	614	2,115	52%	1,939
UPPER WQP	77	3,927	1,760	257	2,017	51%	1,910
UPPER WQP	78	5,505	1,919	407	2,326	42%	3,179
UPPER WQP	79	6,410	2,127	476	2,603	41%	3,807

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Flows to	Lot No.	Lot Area	Average Roof Area*	Typical Dwy area	Total DCIA	% DCIA	Pervious Area
UPPER WQP	80	5,440	1,527	574	2,101	39%	3,339
UPPER WQP	81	5,919	1,907	338	2,245	38%	3,674
UPPER WQP	82	5,805	1,502	565	2,067	36%	3,738
UPPER WQP	83	5,950	1,760	241	2,001	34%	3,949
UPPER WQP	84	6,219	1,919	384	2,303	37%	3,916
UPPER WQP	85	5,999	2,134	344	2,478	41%	3,521
UPPER WQP	86	5,761	1,907	434	2,341	41%	3,420
UPPER WQP	87	5,252	1,501	619	2,120	40%	3,132
UPPER WQP	88	5,276	1,907	380	2,287	43%	2,989
UPPER WQP	89	4,984	1,527	582	2,109	42%	2,875
UPPER WQP	90	5,086	1,760	296	2,056	40%	3,030
UPPER WQP	91	5,474	1,919	341	2,260	41%	3,214
UPPER WQP	92	5,347	2,140	274	2,414	45%	2,933
UPPER WQP	93	4,115	2,127	342	2,469	60%	1,646
UPPER WQP	94	3,848	1,527	559	2,086	54%	1,762
UPPER WQP	95	4,036	1,907	387	2,294	57%	1,742
UPPER WQP	96	3,951	1,501	589	2,090	53%	1,861
UPPER WQP	97	3,907	1,760	257	2,017	52%	1,890
UPPER WQP	98	4,058	1,919	357	2,276	56%	1,782
UPPER WQP	99	3,800	1,760	304	2,064	54%	1,736
UPPER WQP	100	3,800	1,502	579	2,081	55%	1,719
UPPER WQP	101	3,900	1,760	307	2,067	53%	1,833
UPPER WQP	102	4,132	1,907	361	2,268	55%	1,864
UPPER WQP	103	3,975	1,527	593	2,120	53%	1,855
UPPER WQP	104	4,004	1,907	360	2,267	57%	1,737
UPPER WQP	105	3,852	1,501	592	2,093	54%	1,759
UPPER WQP	106	4,065	2,127	316	2,443	60%	1,622

Streets 71848 SF

Totals 235,184 92,617 21,785 114,402 79% 120,782

C (Ala Co. Clean Water Program) 0.7 NA 0.75 0.8 NA NA 0.1

Open space 31258

Weighted C* 0.45 Correction Factor= 1.1111111

Unit Basin Stor 0.25 in

Corr UBS= 0.28 in

WQv= 0.18 Ac-ft

At 3.5' max WQ depth, need area= 0.05 ac

798160

Fallon Crossing Pond Volume Calculations

Lower WQ Pond

<u>Contour</u>	<u>Area (sf)</u>	<u>Volume (cf)</u>	<u>Volume (Ac-Ft)</u>
472.7	0.0		
		597.8	0.01
473.2	2391.0	2318.8	0.05
474.0	3406.0	8728.0	0.20
476.0	5322.0	1081.7	0.02
476.2	5495.0		
		TOTAL	0.29

Upper WQ Pond

<u>Contour</u>	<u>Area (sf)</u>	<u>Volume (cf)</u>	<u>Volume (Ac-Ft)</u>
477.5	0.0		
		369.5	0.01
478.0	1478.0	4038.0	0.09
480.0	2560.0	4560.0	0.10
481.5	3520.0		
		TOTAL	0.21

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Bay Area Hydrology Model
PROJECT REPORT

Project Name: Fallon Crossing
 Site Address: Tassajara/Fallon Rd
 City : Dublin
 Report Date : 9/19/2008
 Gage : LIVERMORE
 Data Start : 1959/10/01
 Data End : 2004/09/30
 Precip Scale: 1.07
 BAHM Version:

PREDEVELOPED LAND USE

Name : Pre-Developed
 Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>Acres</u>
C D, Grass, Very (>20%)	103.5

<u>Impervious Land Use</u>	<u>Acres</u>
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Element Flows To:		
Surface	Interflow	Groundwater

Name : Lower Development
 Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>Acres</u>
C D, Urban, Flat (0-5%)	3.18
C D, Urban, Very (>20%)	4.39

<u>Impervious Land Use</u>	<u>Acres</u>
Roads, Flat (0-5%)	1.2
Mod (5-10%)	1.51
Roof Area	2.05
Mod (5-10%)	0.44

Element Flows To:		
Surface	Interflow	Groundwater

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LOWER WQP, LOWER WQP,

Name : Upper Development

Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>Acres</u>
C D, Urban, Flat (0-5%)	2.77
C D, Urban, Very (>20%)	.86

<u>Impervious Land Use</u>	<u>Acres</u>
Roads, Flat (0-5%)	0.5
Mod(5-10%)	1.15
Roof Area	2.13
Mod(5-10%)	0.5

Element Flows To:

Surface

Interflow

Groundwater

UPPER WQP, UPPER WQP,

Name : LOWER WQP

Bottom Length: 63ft.

Bottom Width: 40ft.

Depth : 5ft.

Volume at riser head : 0.3078ft.

Side slope 1: 3 To 1

Side slope 2: 3 To 1

Side slope 3: 3 To 1

Side slope 4: 3 To 1

Discharge Structure

Riser Height: 3.5 ft.

Riser Diameter: 198 in.

Orifice 1 Diameter: 2 in. Elevation: 0 ft.

Element Flows To:

Outlet 1

Outlet 2

Detention Pond,

Pond Hydraulic Table

<u>Stage(ft)</u>	<u>Area(acr)</u>	<u>Volume(acr-ft)</u>	<u>Dschrg(cfs)</u>	<u>Infilt(cfs)</u>
0.000	0.058	0.000	0.000	0.000
0.056	0.059	0.003	0.025	0.000
0.111	0.059	0.007	0.035	0.000
0.167	0.060	0.010	0.043	0.000
0.222	0.061	0.013	0.050	0.000
0.278	0.062	0.017	0.055	0.000

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0.333	0.063	0.020	0.061	0.000
0.389	0.063	0.024	0.066	0.000
0.444	0.064	0.027	0.070	0.000
0.500	0.065	0.031	0.074	0.000
0.556	0.066	0.034	0.078	0.000
0.611	0.067	0.038	0.082	0.000
0.667	0.068	0.042	0.086	0.000
0.722	0.069	0.046	0.089	0.000
0.778	0.069	0.049	0.093	0.000
0.833	0.070	0.053	0.096	0.000
0.889	0.071	0.057	0.099	0.000
0.944	0.072	0.061	0.102	0.000
1.000	0.073	0.065	0.105	0.000
1.056	0.074	0.069	0.108	0.000
1.111	0.075	0.073	0.111	0.000
1.167	0.076	0.078	0.113	0.000
1.222	0.076	0.082	0.116	0.000
1.278	0.077	0.086	0.119	0.000
1.333	0.078	0.090	0.121	0.000
1.389	0.079	0.095	0.124	0.000
1.444	0.080	0.099	0.126	0.000
1.500	0.081	0.104	0.129	0.000
1.556	0.082	0.108	0.131	0.000
1.611	0.083	0.113	0.133	0.000
1.667	0.084	0.117	0.136	0.000
1.722	0.085	0.122	0.138	0.000
1.778	0.086	0.127	0.140	0.000
1.833	0.087	0.132	0.142	0.000
1.889	0.088	0.136	0.144	0.000
1.944	0.089	0.141	0.146	0.000
2.000	0.090	0.146	0.149	0.000
2.056	0.091	0.151	0.151	0.000
2.111	0.091	0.156	0.153	0.000
2.167	0.092	0.161	0.155	0.000
2.222	0.093	0.167	0.157	0.000
2.278	0.094	0.172	0.159	0.000
2.333	0.095	0.177	0.160	0.000
2.389	0.096	0.182	0.162	0.000
2.444	0.097	0.188	0.164	0.000
2.500	0.098	0.193	0.166	0.000
2.556	0.100	0.199	0.168	0.000
2.611	0.101	0.204	0.170	0.000
2.667	0.102	0.210	0.172	0.000
2.722	0.103	0.216	0.173	0.000
2.778	0.104	0.221	0.175	0.000
2.833	0.105	0.227	0.177	0.000
2.889	0.106	0.233	0.179	0.000
2.944	0.107	0.239	0.180	0.000
3.000	0.108	0.245	0.182	0.000
3.056	0.109	0.251	0.184	0.000
3.111	0.110	0.257	0.185	0.000
3.167	0.111	0.263	0.187	0.000
3.222	0.112	0.269	0.189	0.000
3.278	0.113	0.276	0.190	0.000
3.333	0.114	0.282	0.192	0.000
3.389	0.115	0.288	0.193	0.000
3.444	0.117	0.295	0.195	0.000

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3.500	0.118	0.301	0.197	0.000
3.556	0.119	0.308	2.302	0.000
3.611	0.120	0.314	6.151	0.000
3.667	0.121	0.321	11.13	0.000
3.722	0.122	0.328	17.04	0.000
3.778	0.123	0.335	23.73	0.000
3.833	0.124	0.342	31.13	0.000
3.889	0.126	0.348	39.18	0.000
3.944	0.127	0.355	47.82	0.000
4.000	0.128	0.363	57.02	0.000
4.056	0.129	0.370	66.75	0.000
4.111	0.130	0.377	76.98	0.000
4.167	0.131	0.384	87.68	0.000
4.222	0.132	0.391	98.84	0.000
4.278	0.134	0.399	110.4	0.000
4.333	0.135	0.406	122.5	0.000
4.389	0.136	0.414	134.9	0.000
4.444	0.137	0.421	147.7	0.000
4.500	0.138	0.429	160.9	0.000
4.556	0.140	0.437	174.5	0.000
4.611	0.141	0.445	188.4	0.000
4.667	0.142	0.452	202.7	0.000
4.722	0.143	0.460	217.4	0.000
4.778	0.145	0.468	232.3	0.000
4.833	0.146	0.476	247.6	0.000
4.889	0.147	0.485	263.3	0.000
4.944	0.148	0.493	279.2	0.000
5.000	0.149	0.501	295.4	0.000
5.056	0.151	0.509	312.0	0.000

Name : UPPER WQP
 Bottom Length: 60ft.
 Bottom Width: 25ft.
 Depth : 5.5ft.
 Volume at riser head : 0.2079ft.
 Side slope 1: 3 To 1
 Side slope 2: 3 To 1
 Side slope 3: 3 To 1
 Side slope 4: 3 To 1
Discharge Structure
 Riser Height: 3.5 ft.
 Riser Diameter: 48 in.
 Orifice 1 Diameter: 2 in. Elevation: 0 ft.

Element Flows To:
 Outlet 1 Outlet 2
 Detention Pond,

Pond Hydraulic Table

Stage(ft)	Area(acr)	Volume(acr-ft)	Dischrg(cfs)	Infilt(cfs)
0.000	0.034	0.000	0.000	0.000
0.061	0.035	0.002	0.026	0.000
0.122	0.036	0.004	0.037	0.000

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0.183	0.037	0.007	0.045	0.000
0.244	0.037	0.009	0.052	0.000
0.306	0.038	0.011	0.058	0.000
0.367	0.039	0.013	0.064	0.000
0.428	0.040	0.016	0.069	0.000
0.489	0.040	0.018	0.073	0.000
0.550	0.041	0.021	0.078	0.000
0.611	0.042	0.023	0.082	0.000
0.672	0.043	0.026	0.086	0.000
0.733	0.043	0.029	0.090	0.000
0.794	0.044	0.031	0.094	0.000
0.856	0.045	0.034	0.097	0.000
0.917	0.046	0.037	0.101	0.000
0.978	0.047	0.040	0.104	0.000
1.039	0.047	0.042	0.107	0.000
1.100	0.048	0.045	0.110	0.000
1.161	0.049	0.048	0.113	0.000
1.222	0.050	0.051	0.116	0.000
1.283	0.051	0.054	0.119	0.000
1.344	0.052	0.058	0.122	0.000
1.406	0.053	0.061	0.125	0.000
1.467	0.053	0.064	0.127	0.000
1.528	0.054	0.067	0.130	0.000
1.589	0.055	0.071	0.132	0.000
1.650	0.056	0.074	0.135	0.000
1.711	0.057	0.077	0.137	0.000
1.772	0.058	0.081	0.140	0.000
1.833	0.059	0.085	0.142	0.000
1.894	0.060	0.088	0.145	0.000
1.956	0.060	0.092	0.147	0.000
2.017	0.061	0.096	0.149	0.000
2.078	0.062	0.099	0.151	0.000
2.139	0.063	0.103	0.154	0.000
2.200	0.064	0.107	0.156	0.000
2.261	0.065	0.111	0.158	0.000
2.322	0.066	0.115	0.160	0.000
2.383	0.067	0.119	0.162	0.000
2.444	0.068	0.123	0.164	0.000
2.506	0.069	0.127	0.166	0.000
2.567	0.070	0.132	0.168	0.000
2.628	0.071	0.136	0.170	0.000
2.689	0.072	0.140	0.172	0.000
2.750	0.073	0.145	0.174	0.000
2.811	0.074	0.149	0.176	0.000
2.872	0.075	0.154	0.178	0.000
2.933	0.076	0.158	0.180	0.000
2.994	0.077	0.163	0.182	0.000
3.056	0.078	0.168	0.184	0.000
3.117	0.079	0.173	0.185	0.000
3.178	0.080	0.177	0.187	0.000
3.239	0.081	0.182	0.189	0.000
3.300	0.082	0.187	0.191	0.000
3.361	0.083	0.192	0.193	0.000
3.422	0.084	0.197	0.194	0.000
3.483	0.085	0.203	0.196	0.000
3.544	0.086	0.208	0.563	0.000
3.606	0.087	0.213	1.535	0.000

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3.667	0.088	0.219	2.852	0.000
3.728	0.090	0.224	4.438	0.000
3.789	0.091	0.229	6.253	0.000
3.850	0.092	0.235	8.272	0.000
3.911	0.093	0.241	10.48	0.000
3.972	0.094	0.246	12.85	0.000
4.033	0.095	0.252	15.38	0.000
4.094	0.096	0.258	18.07	0.000
4.156	0.097	0.264	20.89	0.000
4.217	0.098	0.270	23.85	0.000
4.278	0.100	0.276	26.94	0.000
4.339	0.101	0.282	30.15	0.000
4.400	0.102	0.288	33.48	0.000
4.461	0.103	0.295	36.93	0.000
4.522	0.104	0.301	40.49	0.000
4.583	0.105	0.307	44.15	0.000
4.644	0.107	0.314	47.92	0.000
4.706	0.108	0.320	51.79	0.000
4.767	0.109	0.327	55.76	0.000
4.828	0.110	0.334	59.83	0.000
4.889	0.111	0.340	64.00	0.000
4.950	0.113	0.347	68.25	0.000
5.011	0.114	0.354	72.60	0.000
5.072	0.115	0.361	77.03	0.000
5.133	0.116	0.368	81.56	0.000
5.194	0.118	0.375	86.16	0.000
5.256	0.119	0.383	90.86	0.000
5.317	0.120	0.390	95.63	0.000
5.378	0.121	0.397	100.5	0.000
5.439	0.123	0.405	105.4	0.000
5.500	0.124	0.412	110.4	0.000
5.561	0.125	0.420	115.5	0.000

Name : Detention Pond
Bottom Length: 172ft.
Bottom Width: 20ft.
Depth : 7.7ft.
Volume at riser head : 1.0826ft.

Side slope 1: 3 To 1
Side slope 2: 3 To 1
Side slope 3: 2 To 1
Side slope 4: 11 To 1

Discharge Structure

Riser Height: 6 ft.

Riser Diameter: 48 in.

NotchType : Rectangular

Notch Width : 2.000 ft.

Notch Height: 1.000 ft.

Orifice 1 Diameter: 3 in. Elevation: 0 ft.

Orifice 1 Diameter: 4 in. Elevation: 1 ft.

Orifice 1 Diameter: 18 in. Elevation: 3 ft.

Element Flows To:

Outlet 1

Outlet 2

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Pond Hydraulic Table

Stage(ft)	Area(acr)	Volume(acr-ft)	Dschrg(cfs)	Infilt(cfs)
470.0	0.079	0.000	0.000	0.000
470.1	0.081	0.007	0.069	0.000
470.2	0.083	0.014	0.098	0.000
470.3	0.086	0.021	0.120	0.000
470.3	0.088	0.029	0.138	0.000
470.4	0.090	0.036	0.155	0.000
470.5	0.093	0.044	0.169	0.000
470.6	0.095	0.052	0.183	0.000
470.7	0.098	0.060	0.196	0.000
470.8	0.100	0.069	0.207	0.000
470.9	0.103	0.077	0.219	0.000
470.9	0.105	0.086	0.229	0.000
471.0	0.108	0.095	0.308	0.000
471.1	0.110	0.105	0.390	0.000
471.2	0.113	0.114	0.446	0.000
471.3	0.115	0.124	0.491	0.000
471.4	0.118	0.134	0.532	0.000
471.5	0.120	0.144	0.568	0.000
471.5	0.123	0.155	0.602	0.000
471.6	0.126	0.165	0.634	0.000
471.7	0.128	0.176	0.664	0.000
471.8	0.131	0.187	0.692	0.000
471.9	0.134	0.199	0.719	0.000
472.0	0.137	0.210	0.745	0.000
472.1	0.139	0.222	0.770	0.000
472.1	0.142	0.234	0.794	0.000
472.2	0.145	0.246	0.818	0.000
472.3	0.148	0.259	0.840	0.000
472.4	0.151	0.272	0.862	0.000
472.5	0.154	0.285	0.884	0.000
472.6	0.157	0.298	0.905	0.000
472.7	0.160	0.311	0.925	0.000
472.7	0.163	0.325	0.945	0.000
472.8	0.166	0.339	0.965	0.000
472.9	0.169	0.354	0.984	0.000
473.0	0.172	0.368	1.002	0.000
473.1	0.175	0.383	3.428	0.000
473.2	0.178	0.398	4.501	0.000
473.3	0.181	0.413	5.321	0.000
473.3	0.184	0.429	6.012	0.000
473.4	0.187	0.445	6.621	0.000
473.5	0.191	0.461	7.172	0.000
473.6	0.194	0.478	7.680	0.000
473.7	0.197	0.494	8.153	0.000
473.8	0.200	0.511	8.597	0.000
473.9	0.204	0.529	9.019	0.000
473.9	0.207	0.546	9.420	0.000
474.0	0.210	0.564	9.803	0.000
474.1	0.214	0.582	10.17	0.000
474.2	0.217	0.601	10.53	0.000
474.3	0.220	0.619	10.87	0.000
474.4	0.224	0.638	11.20	0.000
474.4	0.227	0.658	11.52	0.000

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474.5	0.231	0.677	11.83	0.000
474.6	0.234	0.697	12.14	0.000
474.7	0.238	0.717	12.43	0.000
474.8	0.241	0.738	12.72	0.000
474.9	0.245	0.758	13.01	0.000
475.0	0.248	0.780	13.28	0.000
475.0	0.252	0.801	13.62	0.000
475.1	0.256	0.823	14.13	0.000
475.2	0.259	0.845	14.73	0.000
475.3	0.263	0.867	15.38	0.000
475.4	0.267	0.890	16.08	0.000
475.5	0.270	0.913	16.81	0.000
475.6	0.274	0.936	17.56	0.000
475.6	0.278	0.960	18.33	0.000
475.7	0.282	0.984	19.11	0.000
475.8	0.286	1.008	19.90	0.000
475.9	0.289	1.032	20.69	0.000
476.0	0.293	1.057	21.48	0.000
476.1	0.297	1.083	22.57	0.000
476.2	0.301	1.108	24.49	0.000
476.2	0.305	1.134	26.95	0.000
476.3	0.309	1.160	29.85	0.000
476.4	0.313	1.187	33.11	0.000
476.5	0.317	1.214	36.71	0.000
476.6	0.321	1.241	40.60	0.000
476.7	0.325	1.269	44.77	0.000
476.8	0.329	1.297	49.20	0.000
476.8	0.333	1.325	53.88	0.000
476.9	0.338	1.354	58.78	0.000
477.0	0.342	1.383	63.91	0.000
477.1	0.346	1.412	69.24	0.000
477.2	0.350	1.442	74.78	0.000
477.3	0.354	1.472	80.51	0.000
477.4	0.359	1.503	86.43	0.000
477.4	0.363	1.534	92.53	0.000
477.5	0.367	1.565	98.80	0.000
477.6	0.371	1.597	105.3	0.000
477.7	0.376	1.628	111.9	0.000

Name : Self treating area
Bypass: Yes

GroundWater: No

<u>Pervious Land Use</u>	<u>Acres</u>
C D, Grass, Very (>20%)	82.82

<u>Impervious Land Use</u>	<u>Acres</u>
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Element Flows To:		
Surface	Interflow	Groundwater

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MITIGATED LAND USE

ANALYSIS RESULTS

Flow Frequency Return Periods for Predeveloped. POC #1

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	22.4682
5 year	38.689691
10 year	51.572878
25 year	58.506461

Flow Frequency Return Periods for Mitigated. POC #1

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	19.7132
5 year	35.535061
10 year	46.202422
25 year	53.526743

Yearly Peaks for Predeveloped and Mitigated. POC #1

<u>Year</u>	<u>Predeveloped</u>	<u>Mitigated</u>
1961	19.106	15.672
1962	11.523	9.304
1963	24.571	19.713
1964	27.930	26.662
1965	6.526	9.684
1966	18.543	14.884
1967	16.321	13.156
1968	90.595	80.928
1969	22.468	22.075
1970	34.124	32.458
1971	30.374	24.734
1972	29.421	23.902
1973	0.185	0.775
1974	55.450	50.917
1975	37.786	30.977
1976	19.376	15.865
1977	0.009	0.338
1978	0.021	0.300
1979	33.759	27.511
1980	36.187	29.512
1981	24.023	21.994
1982	6.999	6.408
1983	51.821	45.619
1984	38.941	36.390
1985	20.796	16.922
1986	10.587	8.853
1987	52.343	48.169
1988	14.127	13.922
1989	1.261	1.143
1990	3.835	3.133
1991	13.391	12.390
1992	18.223	16.617
1993	21.669	17.606

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1994	24.365	23.361
1995	10.582	8.654
1996	42.572	41.953
1997	51.441	45.925
1998	27.877	26.500
1999	47.043	39.975
2000	27.154	22.002
2001	17.061	16.229
2002	3.115	2.532
2003	10.946	8.956
2004	29.769	27.763
2005	47.274	46.722

Ranked Yearly Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	90.5951	80.9280
2	55.4504	50.9171
3	52.3432	48.1688
4	51.8209	46.7224
5	51.4406	45.9251
6	47.2739	45.6185
7	47.0434	41.9528
8	42.5719	39.9749
9	38.9408	36.3898
10	37.7857	32.4580
11	36.1866	30.9768
12	34.1237	29.5121
13	33.7592	27.7634
14	30.3743	27.5114
15	29.7692	26.6622
16	29.4212	26.5000
17	27.9299	24.7336
18	27.8772	23.9019
19	27.1544	23.3614
20	24.5705	22.0753
21	24.3646	22.0022
22	24.0229	21.9936
23	22.4682	19.7132
24	21.6691	17.6057
25	20.7964	16.9222
26	19.3761	16.6167
27	19.1056	16.2291
28	18.5430	15.8649
29	18.2231	15.6718
30	17.0614	14.8841
31	16.3206	13.9221
32	14.1269	13.1556
33	13.3908	12.3895
34	11.5229	9.6845
35	10.9464	9.3037
36	10.5866	8.9559
37	10.5823	8.8535
38	6.9988	8.6545
39	6.5259	6.4083
40	3.8352	3.1326
41	3.1155	2.5323

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42	1.2611	1.1430
43	0.1851	0.7752
44	0.0209	0.3382
45	0.0093	0.3000

POC #1

The Facility PASSED

The Facility PASSED.

Flow(CFS)	Predev	Dev	Percentage	Pass/Fail
2.2468	1522	1513	99	Pass
2.7451	1353	1312	96	Pass
3.2433	1212	1157	95	Pass
3.7415	1107	1033	93	Pass
4.2398	1017	928	91	Pass
4.7380	931	847	90	Pass
5.2363	850	755	88	Pass
5.7345	777	685	88	Pass
6.2328	701	623	88	Pass
6.7310	651	566	86	Pass
7.2293	598	529	88	Pass
7.7275	554	488	88	Pass
8.2257	514	442	85	Pass
8.7240	487	396	81	Pass
9.2222	450	367	81	Pass
9.7205	410	341	83	Pass
10.2187	381	310	81	Pass
10.7170	354	281	79	Pass
11.2152	334	258	77	Pass
11.7134	308	238	77	Pass
12.2117	290	212	73	Pass
12.7099	272	201	73	Pass
13.2082	253	187	73	Pass
13.7064	234	173	73	Pass
14.2047	218	162	74	Pass
14.7029	202	152	75	Pass
15.2011	189	142	75	Pass
15.6994	177	130	73	Pass
16.1976	166	119	71	Pass
16.6959	154	106	68	Pass
17.1941	145	100	68	Pass
17.6924	133	94	70	Pass
18.1906	126	88	69	Pass
18.6888	117	83	70	Pass
19.1871	109	77	70	Pass
19.6853	97	75	77	Pass
20.1836	94	65	69	Pass
20.6818	90	64	71	Pass
21.1801	86	64	74	Pass
21.6783	79	61	77	Pass
22.1765	77	55	71	Pass
22.6748	72	54	75	Pass
23.1730	65	53	81	Pass
23.6713	62	52	83	Pass
24.1695	60	50	83	Pass

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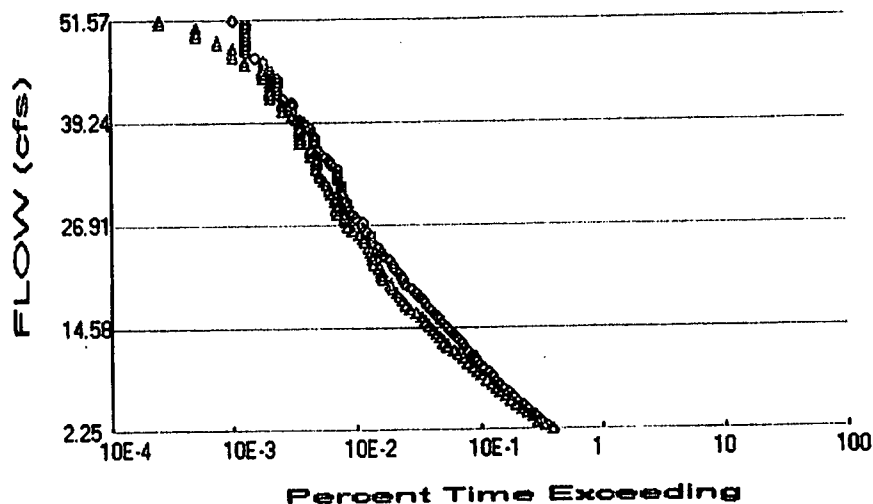
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24.6678	53	46	86	Pass
25.1660	52	45	86	Pass
25.6642	52	42	80	Pass
26.1625	48	37	77	Pass
26.6607	45	34	75	Pass
27.1590	45	33	73	Pass
27.6572	39	32	82	Pass
28.1555	37	28	75	Pass
28.6537	34	28	82	Pass
29.1519	34	28	82	Pass
29.6502	33	27	81	Pass
30.1484	31	27	87	Pass
30.6467	30	25	83	Pass
31.1449	30	24	80	Pass
31.6432	30	23	76	Pass
32.1414	28	22	78	Pass
32.6396	28	20	71	Pass
33.1379	28	20	71	Pass
33.6361	28	19	67	Pass
34.1344	25	19	76	Pass
34.6326	24	19	79	Pass
35.1309	22	17	77	Pass
35.6291	20	17	85	Pass
36.1273	19	17	89	Pass
36.6256	18	14	77	Pass
37.1238	18	14	77	Pass
37.6221	18	14	77	Pass
38.1203	17	14	82	Pass
38.6186	17	14	82	Pass
39.1168	15	14	93	Pass
39.6150	14	13	92	Pass
40.1133	12	12	100	Pass
40.6115	12	10	83	Pass
41.1098	12	10	83	Pass
41.6080	12	10	83	Pass
42.1063	10	8	80	Pass
42.6045	9	8	88	Pass
43.1027	9	8	88	Pass
43.6010	9	8	88	Pass
44.0992	9	8	88	Pass
44.5975	9	7	77	Pass
45.0957	8	7	87	Pass
45.5940	8	7	87	Pass
46.0922	7	5	71	Pass
46.5904	7	5	71	Pass
47.0887	6	4	66	Pass
47.5869	5	4	80	Pass
48.0852	5	4	80	Pass
48.5834	5	3	60	Pass
49.0817	5	3	60	Pass
49.5799	5	2	40	Pass
50.0781	5	2	40	Pass
50.5764	5	2	40	Pass
51.0746	5	1	20	Pass
51.5729	4	1	25	Pass

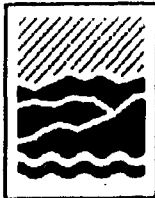
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**Alameda Countywide
Clean Water Program**
A Consortium of Local Agencies

SOIL SPECIFICATIONS FOR STORMWATER TREATMENT MEASURES

The Alameda Countywide Clean Water Program's New Development Subcommittee is providing these specifications to its member agencies for use in non-proprietary, landscaped-based stormwater treatment measures. The purpose of these specifications is to help applicants specify soils that will provide suitable growing conditions for appropriate plantings and meet the percolation requirements identified in Chapter 6 of ACCWP's C.3 Stormwater Technical Guidance for the specific types of landscape-based treatment measure proposed in their projects. Some requirements may vary from one jurisdiction to another. Project applicants should check with the jurisdiction having authority over the project regarding applicable local requirements.

The specifications refer specifically to treatment measures for which technical guidance is included in the Alameda Countywide Clean Water Program's C.3 Stormwater Technical Guidance (August 2006). The specifications identify planting soils to be used (Section I), requirements for compost amendments in the planting soils (Section II), and a top dressing layer of mulch (Section III).

I. PLANTING SOIL

Planting soil is to be placed for the purpose of providing a soil for plants to be established in the treatment measure. ACCWP previously provided specifications for dewatering soils for use in vegetated swales. The dewatering soil option has been removed, however, in preparation to implement the requirements of the Municipal Regional Stormwater Permit's (MRP) Provision C.3.c.i(2)(b)(vi) requirements for biotreatment soils with a long-term infiltration rate of 5 to 10 inches, and a biotreatment measure surface loading area no small than what is required to accommodate a 5 inches/hour surface loading rate. Project proponents may meet these requirements using the treatment soil mix specified below.

Treatment Soils (high percolation planting soils, such as loamy sands) shall be used for filtering of a volume of water in the treatment measures, such as flow-through planters and bioretention areas. These treatment measures shall treat runoff by passing it through the surface layer of high percolation planting soil, then saturating a zone of crushed drain rock and finally in most cases, entering a perforated sub-drain.

A. IMPORTED MATERIAL FOR TREATMENT (LOAMY SAND)

Planting soil material for treatment shall consist of high organics soil (no gravel) with a high percolation rate, supplied from previously tested and approved sources, and shall conform to the following specifications and requirements:

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1. All material shall be free of trash and debris, expansive clays or any other deleterious materials, and shall be subject to the approval and acceptance of the Authority Having Jurisdiction.
2. The contractor shall designate their proposed import sources in advance and shall provide source samples of material to the jurisdiction having authority.
3. Material shall be free of seeds.
4. The treatment planting soil shall have documentation from the supplier showing conformance to the following gradation guidelines:

Screen InformationPercentage

- a. Maximum particle size 2 millimeters (0.078 inch)
 - b. Percent passing No. 10 screen (2mm) 100 (coarse sand or finer)
 - c. Percent passing No. 200 screen (0.074mm) 10 to 15%
 - d. The overall dry weight percentages shall be 85-90% sand, less than 5% clay, and less than 5% silt. The range of clay and silt and organics should be 10-15% of total volume.
5. The treatment planting soil shall have 4 to 6% by dry weight organic compost mixed in. Organic compost percentage may be lowered by the jurisdiction of authority for varying plant species in the treatment measure. Native in-situ loamy sand soils can be used, with 4 to 6% of organic compost mixed in. This mixed soil must be certified to meet the imported planting soil requirements. Organic compost shall meet the specifications stated in Section II – Organic Compost Amendment. The soil shall have a salt concentration less than 500 mg/L. The pH shall be between 5.5 and 7, unless directed otherwise by the jurisdiction of authority.
 6. One test shall be conducted by the supplier per each 500 cubic yards supplied. Testing shall be conducted for the above gradation requirements, salt contents and pH range.
 7. Contractor shall demonstrate the in-situ percolation of each treatment measure for design storm flows through the installed soil to the satisfaction of the Authority Having Jurisdiction. The material shall have an onsite tested percolation rate of 5 to 10 inch per hour. In-field percolation test shall consist of a 1-foot diameter pipe, 2.5 feet long pipe, driven 1.5 feet deep into treatment soils. Pipe shall be filled with 1 foot of water after the treatment measure has been wetted. The pipe should empty 1 foot of water above the wetted soil layer in no less than 1 hour and 12 minutes, and no longer than 2 hours and 24 minutes. Contractor shall provide records of percolation tests to city inspector.
 8. Soil shall be placed in lifts of 8-10 inches.
 9. Standard compaction to a minimum of 85 percent shall be used when placing the mixed material. The method to achieve 85% compaction shall be approved by the local jurisdiction before the soil is placed in the treatment measure.

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II. ORGANIC COMPOST AMENDMENT

An organic amendment per Attachment 1 is to be mixed into the planting soil for the purpose of providing organic material to be utilized by plantings placed within the treatment measure. The following specifications are for amendments used in bioretention areas, flow through planters, vegetated buffer strips, vegetated swales, and extended detention basins only.

A. COMPOST SPECIFICATIONS

Organic compost shall meet the requirements of the Alameda County Bay Friendly Landscape program. Provide a lab analysis of proposed material performed by either: (1) a certified US Composting Council Compost Analysis Program (CAP) laboratory or (2) a laboratory approved by the local jurisdiction, using approved Test Methods for the Evaluation of Composting and Compost (TMECC). Verifying current participation in CAP can be achieved by visiting www.compostingcouncil.org. The TMECC methods are explained at www.tmecc.org/tmecc. Check with local jurisdiction for a list of approved laboratories.

See the attached Bay-Friendly Landscaping (BFL) Soil Preparation Specifications, Part 2.1.B.1, Section 02920: Soil Preparation for approved testing ranges of attributes for compost amendments.

Organic content may be lowered by the jurisdiction having authority for varying plant species in the treatment measure. This mixed soil must be certified by the laboratory to meet the imported planting soil requirements.

III. TOP DRESSING MULCH

A three-inch thick layer of top dressing mulch shall be placed in all designated planting areas for the purpose of retaining moisture, preventing erosion and minimizing weed growth. Keep top dressing six inches away from tree trunks for tree health except where approved by the jurisdiction having authority. The following specifications are for top dressing soils used in bioretention areas, flow through planters, vegetated buffer strips, vegetated swales, and extended detention basins only.

A. MULCH SPECIFICATIONS

Any of the following materials may be used as top dressing for any of the treatment measures listed above, subject to the jurisdiction of authority's approval. Options for top dressing material include:

Arbor Mulch: Arbor Mulch shall be wood waste from tree trimming and not contain eucalyptus. Local tree companies may have material available free of charge. Submit a minimum one-quart sample of proposed material to be used, to jurisdiction with authority.

Wood Chip Mulch: Wood Chip Mulch shall be a coarse wood mulch made from salvaged kiln dried lumber and be color enhanced with mineral pigments that have a

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demonstrated color longevity of one year. Mulch material shall pass a two inch screen.

Organic Compost: Organic Compost may be used as mulch as determined by the jurisdiction having authority. Organic compost shall meet the specifications stated above in Section II – Organic Compost Amendment.

The following are specifications for the above dressing materials:

1. The top dressing soil material shall not float when three inches or more of water has ponded in the treatment measure.
2. Natural compaction is adequate for top dressing layer soil.
3. The 3 inches of top dressing mulch shall be placed in a single lift.

IV. SOURCES/DOCUMENT PREPARERS

These specifications were prepared under the guidance of the New Development Subcommittee. BKF Engineers prepared the specifications with substantial input from Design, Community and Environment. Organic compost amendment specifications in Section II were based on Bay-Friendly Landscaping specifications prepared by Stopwaste.org. As the permit compliance consultant, EOA, Inc. coordinated work group meetings, reviews of draft specifications, and subcontracts with the consulting engineer and landscape architect.

V. DEFINITIONS

1. Lift – Depth of soil placed before compaction is necessary
2. Expansive clay soils – are in-situ clay soils. These soils must be amended to be used in the treatment measures.
3. Stormwater treatment measure – Any engineered system designed to remove pollutants from stormwater by simple gravity settling of particle pollutants, filtration, biological uptake, media adsorption or any other physical, biological, or chemical process. Sometimes called a treatment control, treatment control measure, treatment best management practice (BMP), or treatment facility.
4. Wetted soil – soil that has been irrigated until the water has penetrated soil to a minimum of 4 inches.

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Attachment 1

BFL Soil Preparation Specifications Part 2.1.B.1

Section 02920: Soil Preparation

1. Organic Amendment

Compost shall be a well decomposed, stable, weed free organic matter source. The product shall be certified through the US Composting Council's (USCC) Seal of Testing Assurance Program (STA) Program (a compost testing and information disclosure program). It shall be derived from agricultural or food waste or yard trimmings. The product shall contain no substances toxic to plants, shall possess no objectionable odors and shall not resemble the feedstock (the original materials from which it was derived).

Before delivery of the compost, the supplier shall submit a copy of lab analysis performed by a laboratory that is enrolled in the US Composting Council's CAP and using the approved Test Methods for the Evaluation of Composting and Compost (TMECC). The lab report shall verify:

- A. Feedstock Materials shall be specified and include one or more of the following:
landscape/yard trimmings, grass clippings, food scraps, and agricultural crop residues.
- B. Organic Matter Content: 50% - 60% by dry wt. preferred, 35-70% acceptable
- C. Carbon and Nitrogen Ratio: C:N < 25:1 plus at least one measure of stability and at least one measure of toxicity.
- D. Maturity/Stability: shall have a dark brown color and a soil-like odor. Compost exhibiting a sour or putrid smell, containing recognizable grass or leaves, or is hot (120°F) upon delivery or rewetting is not acceptable. In addition any one of the following is required to indicate stability
 - a. Oxygen Test < 1.3 O_2 / unit TS / hr
 - b. Specific oxy. Test < 1.5 O_2 / unit BVS / hr
 - c. Respiration test < 8 C / unit VS / day
 - d. Dewar test < 20 Temp. rise (°C)
 - e. Solvita® > 5 Index value
- E. Toxicity: any one of the following measures is sufficient to indicate non-toxicity.
 - a. NH_4^+ : NO_3-N < 3
 - b. Ammonium < 500 ppm, dry basis
 - c. Seed Germination > 80 % of control
 - d. Plant Trials > 80% of control
 - e. Solvita® > 5 Index value
- F. Nutrient Content: provide analysis detailing nutrient content including N-P-K, Ca, Na, Mg, S, and B.
 - a. Total Nitrogen content 0.9% or above preferred.
 - b. Boron: Total shall be <80 ppm; Soluble shall be <2.5 ppm
- G. Salinity: Must be reported; may vary but < 4.0 mmhos/cm preferred. Soil should also be tested: <2.5 mmhos/cm is preferred for soil/compost blend but may vary with plant species.
- H. pH: pH shall be between 6.5 and 8. May vary with plant species.

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- I. Particle size: 95% passing a 1/2" screen.
 - J. Bulk density: shall be between 500 and 1100 dry lbs/cubic yard
 - K. Moisture Content shall be between 35% - 55% of dry solids.
 - L. Inerts: compost shall be relatively free of inert ingredients, including glass, plastic and paper, < 1 % by weight or volume.¹
 - M. Weed seed/pathogen destruction: provide proof of process to further reduce pathogens (PFRP). For example, turned windrows must reach min. 55C for 15 days with at least 5 turnings during that period.
 - N. Select Pathogens: Salmonella <3 MPN/4grams of TS, or Coliform Bacteria <10000 MPN/gram.
 - O. Trace Contaminants Metals (Lead, Mercury, Etc.) Product must meet US EPA, 40 CFR 503 regulations.
2. Additional amendments and/or fertilizers as required in the soils report.
- a. Additional amendments and fertilizers that are approved for use by the Organics Materials Research Institute (OMRI) for use in crop production are approved for use. See www.omri.org. Fertilizers that are not approved or are restricted for use by OMRI shall be applied only after review and written approval by the Owner.

Notes:

- 1) Solvita is a registered trademark test. Please see <http://solvita.com/>
- 2) TS is Total Solids, BVS is Biological Volatile Solids, VS is Volatile Solids, MPN/gram is Most Probable Number per gram, ppm is parts per million.

¹ The 2007 version of this specification indicated a <0.1% threshold for allowable inerts. In September 2010, this was changed to <1% for consistency with the US Composting Council's Seal of Testing Assurance Program.

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APPENDIX B

FIRE HAZARD MITIGATION AND DEFENSIBLE SPACE VEGETATION MANAGEMENT PLAN

Prepared By:
Ralph J. Alexander & Associates

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FIRE HAZARD MITIGATION AND DEFENSIBLE SPACE VEGETATION MANAGEMENT PLAN

FALLON CROSSING

Prepared for:
Standard Pacific Homes
3825 Hopyard Road, Suite 195
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Prepared by:
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May 29, 2007

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LIST OF FIGURES

Drawing F-1. Fire Hazard Mitigation and Defensible Space Vegetation
Management Plan - 1"=50' - 0"

EXECUTIVE SUMMARY

The City of Dublin requires the preparation and submittal of a Wildfire Management Plan prior to any development approval. The Plan includes both a text description of the management concepts, defensible space zones and maintenance procedures, and a graphic plan delineation of the Defensible Space Zones. The graphic plan, Drawing F-1, is attached to this report.

This Plan lays out the criteria for design, management and maintenance of the landscape to achieve a fire-safe landscape installation that will achieve the proper gaps and spacing of landscaping to prevent the spread of fires to the development areas. Trees and vegetation with a high fire risk, including pyrophytic species, such as California Bay and Eucalyptus, are prohibited within the 0'-30' zone surrounding all project buildings. The existing trees of other species to remain must be limbed up, cleaned up and cleared underneath, as specified in this report. No new trees of these species shall be planted.

This plan describes the Vegetation Restoration and Management Concepts; the Defensible Space Zones, which include the 0-3' Critical Zone, and the 4'-14', 4'-24', 15'-30', 25'-55', and 55'-100' Defensible Space Zones; the Maintenance Procedures for Grass Mowing, Shrub Management and Pruning of Oak Savanna/Woodlands; the Frequency of Recommended Management; and Actions to be Taken During High Fire Danger. A map is included that delineates each of the above zones. The criteria for which zones are applicable are: upslope - to 30', sideslope - to 30' and downslope - to 30' or 100'. In addition, all grass must be mown to a 2" height within 10' of any road or driveway.

The areas shown on the Plan will be planted and irrigated, using plant materials specified in this report. The private yards will be planted and irrigated by the homeowners purchasing the affected houses. The CC&R's will specify that the installation will be complete within 6 months of occupancy of the home, and that maintenance must be carried out as specified in this plan.

References used in the preparation of this plan include "Pyrophytic vs. Fire Resistant Plants" by Ray Moritz and Pavel Svihra, obtained from the Marin County Fire Department, and "Fire-Safe Plant Selections, Landscape Restoration in Inverness Park" by Ray Moritz, and "Fire-Safe Landscape Database" by UCFPL.

EXISTING SITE DESCRIPTION

Fallon Crossing is a 66.9 acre site consisting of both flat and hillside topography, at the intersection of Fallon and Tassajara Roads. There are no existing structures on the site, and it is currently used for grazing.

The existing vegetation consists of primarily introduced and native grasses. There are no trees within the development area. The only trees occur within the creek area, and consist of native, riparian trees.

VEGETATION RESTORATION AND MANAGEMENT CONCEPT

There will be four zones delineated in the Defensible Space Vegetation Management plan, as required by the City of Dublin.

0-3'	Critical Zone
4'-14' & 4'-24'	Defensible Space Zone
15'-30' & 25'-55'	Defensible Space Zone
55'-100'	Defensible Space Zone

The subject property requires the following Fire Hazard Mitigation and Defensible Space Zones.

Up Slope to	30'
Cross Slope to	30'
Down Slope to	30' or 100'

Recommended Methods of Vegetation Management

Several methods of vegetation management are feasible. In fact, there are environmental benefits to occasionally changing the method used. The maintenance actions in the vegetation management guidelines can be categorized by vegetation types. Grass must be mowed, shrubs will be pruned of dead material, shortened or removed altogether. Trees and tree-like shrubs will not be removed, but pruned of lower branches when grasses under them are not mowed. Fire resistant, water conserving, landscaping will be installed near the structure, in the Defensible Zones, and along roads. All newly installed landscaping will be irrigated. **ALL NEW LANDSCAPED AREAS SHOULD BE MULCHED, BUT THE USE OF "MONKEY HAIR "OR "SHREDDED REDWOOD BARK" IS PROHIBITED.** Cut material may be left on the site only if it has been mechanically chipped.

Removal of brush and dead shrubs will take place throughout the site before construction begins, as construction itself can be an additional risk of ignition. Shrubs which will remain after the entire project has been completed will be identified in the field, marked and preserved. Other shrubs will be removed before construction begins. Pruning of any existing trees to be retained throughout the site is advisable, as is mowing the grass where pruning to a height higher than three times the unmowed grass height is undesirable.

Understory shrubs will need to be removed and shrub clusters formed in open shrubby vegetation.

There are several advantages to fuel treatment before construction begins. The cost of fuel modification in a wildland setting is many times less expensive than when improvements are even partly in place. The desired vegetation will have at least one season to re-grow and become visually appealing. Lastly, the chance of a damaging fire caused by construction itself is reduced.

The frequency of vegetation management is linked to the vegetation type, and is described in this plan.

Grass will need to be mowed annually when 30% of the grass cover has cured (any time from April 15-June 1). The grass will be cut within the week when 30% of the grass cover is determined to be cured, and no later than June 1. This may require re-mowing if late season rains promote grass growth after the first cutting. This will apply during construction and prior to occupancy, as all of the Defensible Space Zones will be irrigated, and not contain native grasses.

The expected frequency of treatment of shrubs should be as necessary to meet the requirements of this plan, but in no case less than five years. Shrubs may need to be pruned of dead wood, shortened, shrub groupings minimized in size, or new shrubs removed under tree canopies. Shrub removal or pruning may be done any time of year. Application of a herbicide to prevent re-sprouting may be more effective in the spring, but will follow recommendations.

Because trees typically grow from the top ends of branches, subsequent pruning needs to occur only every five years or so, depending on the rate of growth, and significant events which may cause dead wood to develop or breakage to occur. Pruning of oaks, other trees and tree-like shrubs can be done at any time of the year, depending on recommendations from a professional arborist.

Trees and large tree-form shrubs shall be pruned to provide clearance of three times the height of the understory plant material, or 8 feet, whichever is higher. Limbs which are smaller than 3 inches in diameter are to be pruned up to 8 feet off the ground, and in young trees, the lower one-third of the height of the tree. Thus, if a tree is 10 feet tall, the lower 3-4 feet will be pruned up and understory

plant material kept to less than 6 inches in height. Then as it grows to 24 feet in height, the 8-foot distance from ground can be achieved, and the understory plant material is allowed to reach 2.5 feet in height. The tree canopy will not be disturbed or thinned, since this promotes growth of more flammable vegetation.

Removal of a litter layer which is deeper than the guidelines allow is expected to be necessary only once every ten years.

Creation of "ladder fuel situation" (where a fire can climb from one vegetation layer to the next) will be avoided. Thus shrubs may be near, but not under, trees.

Individual plants or shrubs masses will create "shrub islands" with adequate horizontal spacing. Shrub islands are distinct groupings of shrubs designed to help control the spread of fire. Islands will be small enough to provide adequate horizontal separation between groupings and to ensure proper maintenance; shrub islands will be no wider than two times the shrub height, or 120 square feet in area. The space between islands would be greater than three times the height of the shrub or a 12 foot minimum. Emerging trees will have a spacing of 12 feet cleared from the edge of the canopy. As an alternative to "shrub islands", shrubs may be placed in sinuous single rows of varying length, but not more than 7 feet in width, and with spacing of at least 12 feet to other rows and/or "islands" of shrubs.

Trees may be planted singly or in clusters, but the crowns should be separated by at least 10 feet. This does not apply to trees within clusters, but does apply to crowns between clusters. The crowns should also be separated at least 10 feet from any flammable structures. An additional 5 feet shall be added to the above spacings for every 10 (10%) percent increase in slope.

DEFENSIBLE SPACE ZONES

0-3' Critical Zone

The zone 0-3' around the buildings is either hardscape, or irrigated and landscaped with plant material that is low growing and nonflammable, as well as deer resistant. Limited trees are proposed in this zone.

Groundcovers:

Arctostaphylos 'Hookeri'
Ceanothus gloriosus
Coprosma kirkii
Festuca longifolia
Liriope gigantea
Monardella purpurea

Monterey Carpet
Pt. Reyes Ceanothus
Creeping Coprosma
Hard Fescue
Giant Turf Lily
Coyote Mint

Myoporum parvifolium	Myoporum
Salvia sonomensis	Creeping Sage
Trachelospermum jasminoides	Star Jasmine

Perennials:

Coreopsis species	Coreopsis
Dietes bicolor	African Iris
Hemerocallis hybrids	Daylily
Iris douglasii	Douglas Iris
Lantana montevidensis	Lantana
Lavandula species	Lavender
Polystichum munitum	Sword Fern
Tulbaghia violacea	Society Garlic

Maintenance Standards:

The following standards will be used as guidance for maintenance as it applies to the zone between 0-3' from buildings.

All dead plants and combustible materials shall be removed to establish and maintain a defensible space. Removal of combustible materials includes keeping the ground, roofs, decking and balconies free of dead leaves, needles or other plant debris, and removing dead material that drapes over ground cover yearly, before June 1. This includes leaves, bark, and branches.

4'-14' or 4'-24' Defensible Space Zone

The zone 4'-14' or 24' around the buildings will be irrigated and planted with a variety of low and medium growing groundcovers and herbaceous shrubs that are fire-resistant, and deer resistant. Individual plants or shrub masses will create "shrub islands" with adequate horizontal spacing. Some clusters of trees are being proposed for screening. All landscaping will be irrigated.

Groundcovers:

Ajuga reptans	Carpet Bugle
Arctostaphylos 'Hookeri'	Monterey Carpet
Armeria maritime	Common Thrift
Ceanothus gloriosus	Pt. Reyes Ceanothus
Cerastium tomentosum	Snow-in-Summer
Cistus salvifolius	Sageleaf Rockrose
Coprosma kirkii	Creeping Coprosma
Cotoneaster spp.	Cotoneaster

Epilobium canum
 Festuca longifolia
 Fragaria chiloensis
 Liriope gigantea
 Monardella purpurea
 Myoporum parvifolium
 Osteospermum fruticosum
 Salvia sonomensis
 Teucrium chamaedys
 Thymus praecox articus
 Verbena peruviana

California Fuchsia
 Hard Fescue
 Beach Strawberry
 Giant Turf Lily
 Coyote Mint
 Myoporum
 Trailing African Daisy
 Creeping Sage
 Prostrate Germander
 Creeping Thyme
 Perennial Verbena

Perennials:

Achillea species
 Coreopsis species
 Dietes bicolor
 Erysimum linifolium
 Hemerocallis hybrids
 Iris douglasii
 Lantana montevidensis
 Lavandula species
 Limonium perzil
 Lupinus species
 Polystichum munitum
 Sidalcea hickmanii
 Tulbaghia violacea
 Zauschneria californica

Yarrow
 Coreopsis
 African Iris
 Wallflower
 Daylily
 Douglas Iris
 Lantana
 Lavender
 Sea Lavender
 Lupine
 Sword Fern
 Marin Checkerbloom
 Society Garlic
 California Fuchsia

Shrubs:

Ceanothus 'Dark Star'
 Cistus spp.
 Correa 'Carmine Bells'
 Corylus cornuta 'Californica'
 Elaeagnus pungens
 Eriophyllum lanatum
 Garrya elliptica
 Heteromeles arbutifolia
 Lonicera involucrata
 Mimulus aurantiacus
 Myrica californica
 Polystichum munitum
 Prunus ilicifolia
 Rhamnus californica 'Eve Case'

Ceanothus
 Rockrose
 Australian Fuschia
 California Hazelnut
 Silverberry
 Woolly Sunflower
 Silktassel
 Toyon
 Twinberry
 Sticky Monkey Flower
 Wax Myrtle
 Sword Fern
 Holly-Leafed Cherry
 Coffeeberry

Ribes sanguineum
Salvia greggii
Solanum xanthi

Red-Flowering Current
Autumn Sage
Chaparral Nightshade

Trees:

Aesculus californica
Alnus rhombifolia
Arbutus unedo
Cercis occidentalis
Crataegus phaenopyrum
Pistachia chinensis
Quercus coccinea
Quercus ilex
Quercus lobata
Quercus rubra
Quercus suber
Schinus molle

California Buckeye
White Alder
Strawberry Tree
Western Redbud
Washington Thorn
Chinese Pistache
Coast Live Oak
Holly Oak
Valley Oak
Black Oak
Cork Oak
California Pepper

Maintenance Standards:

The following proposed set of maintenance standards will be used as guidance for work performance for maintenance as it applies to the zone between 0-30' from buildings.

1. All dead plants and dry vegetation shall be removed to establish and maintain a defensible space. The following actions will provide the equivalent level of fire safety as removing all combustible material.
 - a. Cut grass and weeds to less than 2 inches yearly when 30% of the grasses have cured. The grass will be cut within the week when 30% of the grass cover is determined to be cured, and no later than June 1. This may require re-mowing if late season rains promote grass growth after the first cutting. All cut grass shall be raked and removed from the site. This will apply during construction and prior to occupancy, as all of the Defensible Space Zones will be irrigated, and not contain native grasses.
 - b. Keep the ground, roofs, decking and balconies free of dead leaves or other plant debris.

- c. Leaves, bark and humus will be cleared every year under trees and shrubs. At no time will a buildup of leaves and humus exceed 1 inch in depth anywhere in a landscaped area. However, bare earth will not be exposed in over 50% of the site.
 - d. Dead material that drapes over ground cover will need to be removed yearly, before June 1. This includes leaves, bark, and branches.
 - e. Remove all dead branches from within live ground covers, vines and shrubs, immature and landscape trees.
2. Mechanically chipped materials can remain on the site provided the mulch layer is no greater than 2 inches in depth.
 3. Creation of "ladder fuel situation" (where a fire can climb from one vegetation layer to the next) will be avoided. Thus shrubs may be near but not under trees. If there is a choice, place trees downhill and shrubs uphill where the structure is above the open space.
 4. No stacked wood piles will be located in this zone.

15'-30' or 25'-55' Defensible Space Zone

A portion of the zone 15'-55' from the buildings will provide additional defensible space. Most of this area will be irrigated, and will be landscaped with groupings of low and medium height, fire resistant plant material, and will be aggressively maintained. There will be a few random tree groupings for screening.

Groundcovers:

Arctostaphylos 'Hookeri'	Manzanita
Ceanothus gloriosus	Pt. Reyes Ceanothus
Cistus salvifolius	Sageleaf Rockrose
Coprosma kirkii	Creeping Coprosma
Cotoneaster spp.	Cotoneaster
Epilobium canum	California Fuschia
Festuca longifolia	Hard Fescue
Monardella purpurea	Coyote Mint
Myoporum parvifolium	Myoporum
Salvia sonomensis	Creeping Sage

Shrubs:

Ceanothus 'Dark Star'	Ceanothus
Cistus spp.	Rockrose
Correa 'Carmine Bells'	Australian Fuschia
Corylus cornuta 'Californica'	California Hazelnut
Elaeagnus pungens	Silverberry
Garrya elliptica	Silktassel
Heteromeles arbutifolia	Toyon
Mimulus aurantiacus	Sticky Monkey Flower
Myrica californica	Wax Myrtle
Prunus ilicifolia	Holly-Leafed Cherry
Rhamnus californica 'Eve Case'	Coffeeberry
Ribes sanguineum	Red-Flowering Current
Salvia greggii	Autumn Sage

Trees:

Aesculus californica	Buckeye
Alnus rhombifolia	White Alder
Arbutus menziesii	Madrone
Cercis occidentalis	Western Redbud
Pistache chinensis	Chinese Pistache
Quercus coccinea	Coast Live Oak
Quercus illex	Holly Oak
Quercus lobata	Valley Oak
Quercus rubra	Black Oak
Quercus suber	Cork Oak
Schinus molle	California Pepper

Maintenance Standards:

The following proposed set of maintenance standards will be used as guidance for work performance for maintenance as it applies to the zone between 15'-55' from the home.

1. All dead plants and dry vegetation shall be removed to establish and maintain a defensible space. The following actions will provide the equivalent level of fire safety as removing all combustible material.
 - a. Cut grass and weeds to less than 2 inches yearly when 30% of the grasses have cured. The grass will be cut within the week when 30% of the grass cover is determined to be cured, and no later than June 1. This may require re-mowing if late season rains promote grass growth after the first cutting. All cut grass shall be raked and

removed from the site. This will apply during construction and prior to occupancy, as all of the Defensible Space Zones will be irrigated, and not contain native grasses.

- b. Leaves, bark and humus will be cleared every year under trees and shrubs. At no time will a buildup of leaves and humus exceed 1 inch in depth anywhere in a landscaped area. However, bare earth will not be exposed in over 50% of the site.
 - c. Dead material that drapes over ground cover will need to be removed yearly, before June 1. This includes leaves, bark, and branches.
 - d. Remove from mature trees all vines, loose papery bark, dead branches and live branches smaller than 3 inches in diameter; to 8 feet above ground.
 - e. Remove all dead branches from within live ground covers, vines and shrubs, immature and landscape trees.
2. Remove and safely dispose of all cut vegetation and hazardous refuse.
 3. Mechanically chipped materials can remain on the site provided the mulch layer is no greater than 2 inches in depth.
 4. Creation of "ladder fuel situation" (where a fire can climb from one vegetation layer to the next) will be avoided. Thus shrubs may be near but not under trees. If there is a choice, place trees downhill and shrubs uphill where the structure is above the open space.
 5. No stacked wood piles will be located in this zone.

55'-100' Defensible Space Zone

A portion of the zone 55'-100' from the buildings will provide additional downslope defensible space. Some, but not all of this area will be irrigated, and will be encouraged to revert to a natural landscape fabric. Landscaping will consist of hydroseeded annual grasses and wild flowers with strong slope stabilization qualities and low fuel volume. Some random tree clusters will be created for screening and aesthetic appeal, and reforestation. All vegetation will be aggressively maintained.

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Grasses and Wildflowers:

Seed Mix % by weight	Botanical Name	Common Name
25%	<i>Festuca rubra</i> cv. Molate	Red Fescue
25%	<i>Hordeum brachyantherum</i>	Meadow Barley
15%	<i>Melica imperfecta</i>	Coast Range Melic
15%	<i>Nassella pulchra</i> (Stipa)	Purple Needlegrass
7%	<i>Mimulus aurantiacus</i>	Monkeyflower
6%	<i>Artemisia californica</i>	California Sage
3%	<i>Lupinus succulentus</i>	Succulent Lupine
2.50%	<i>Eschscholzia californica</i>	California Poppy
.75%	<i>Layia platyglossa</i>	Tidy Tips
.50%	<i>Clarkia amoena</i> ssp.	Godetia
.25%	<i>Achillea millefolium</i>	Yarrow

Trees:

<i>Aesculus californica</i>	Buckeye
<i>Alnus cordata</i>	Italian Alder
<i>Alnus rhombifolia</i>	White Alder
<i>Cercis occidentalis</i>	Western Redbud
<i>Heteromeles arbutifolia</i>	Toyon
<i>Prunus ilicifolia</i>	Holly-Leafed Cherry
<i>Quercus coccinea</i>	Coast Live Oak
<i>Quercus lobata</i>	Valley Oak
<i>Quercus rubra</i>	Black Oak
<i>Quercus suber</i>	Cork Oak

Maintenance Standards:

The following proposed set of maintenance standards will be used as guidance for work performance for maintenance as it applies to the zone between 55'-100' from buildings.

Creation of "ladder fuel situations" (where a fire can climb from one vegetation layer to the next) will be avoided.

In openings between trees, shrubs may remain. Maintain individual plants or shrub masses to create "shrub islands" with adequate horizontal spacing.

The crown cover of shrubs will not exceed 30% shrub, with remaining vegetation ideally comprising 50% grass and 20% other herbaceous plants. The maximum dead-to-live ratio would be 20% in the fuel modification zones. Those shrubs which readily reseed (poison oak and coyote bush) will be preferentially cut before those shrubs which depend upon seeding for replacement.

1. All dead plants and combustible materials shall be removed within 100 feet of the structure to establish and maintain a defensible space. The following actions will provide the equivalent level of fire safety as removing all combustible material.
 - a. Cut grass and weeds to less than 4 inches in height under short trees (trees under 24 feet in height) to preclude excessive pruning. This will be done yearly before May 1. Cutting of native grass and wildflowers may be delayed under after seed set provided they do not form a means of rapidly transmitting fire to any structures.
 - b. Remove from mature trees all vines, loose papery bark, dead branches and live branches smaller than 3 inches in diameter, to 8 feet above ground.
 - c. Remove all dead branches from within live ground covers, vines and shrubs, immature and landscape trees.
2. Trees and large tree-form shrubs shall be pruned to provide clearance of three times the height of the understory plant material or 8 feet, whichever is higher.
3. Mechanically chipped materials can remain on the site provided the mulch layer is no greater than 2 inches in depth.
4. Remove and safely dispose of all cut vegetation and hazardous refuse.

DESCRIPTIONS OF MAINTENANCE PROCEDURES

Grass Mowing

Grass will be mowed with a nylon cord weed whipper or grazed with goats. The control that is afforded by manual or goat herds, as compared to mechanical equipment, is advantageous to avoid harming new and existing oak seedlings, as well as damaging rock formations. Weeds will be removed with manual labor using a weed whipper or applying herbicides on a spot basis.

Weeds, grass and removal of any oak leaf litter or other dead material in the critical zone will similarly need to be done manually, possible with a rake.

This will apply during construction and prior to occupancy, as all of the Defensible Space Zones, except for the 55'-100' zone, will be irrigated, and not contain native grasses.

Shrub Management

Shrubs that need to be removed will be cut with weed whips that have a cutting blade attached, or grazed with a goat herd. Branches which are larger than can be handled by the weed whip, or consumed by goats will be cut with a chainsaw. When manual labor is used, special precautions will be needed in poison oak. To avoid re-cutting or otherwise re-treating undesired shrubs, spot application of a Category 3 or 4 herbicide will be applied to the foliage or stump, depending on the recommendation provided by a licensed Pest Control Advisor (PCA).

If goat grazing were used, dead material which was not broken up or consumed will need to be cut manually with loppers and saws. Oak seedlings and small oaks will need to be protected from goat grazing, as the animals will browse and girdle the trees. Protection may take the form of "cages" made from fencing or temporarily wrapping the tree trunk. If manual labor is used, dead material will need to be cut with loppers and/or saws. Pruning and shortening shrub height will need to be accomplished with the same method.

The debris of the shrubs can be cut and hauled away, or mechanically chipped and left in place.

Following the initial treatment, manual labor or a goat herd will be used to remove incipient shrubs in the grasslands before they flower. While the plants need not be removed the first year they appear (since the shrubs would provide some improved deer browse), they will be cut or grazed before they are old enough to set seed and spread (this is approximately three years).

While the initial treatment is likely to be substantial, subsequent maintenance will require significantly less effort. Application of herbicides to undesired shrubs will further diminish subsequent maintenance requirements, as it will prevent re-sprouting.

In addition to reduction of fire hazards, hand crews will be used for the removal of undesirable and hazardous plants such as poison oak, artichoke thistle, purple and yellow star thistle, and Russian thistle. These species will be removed with a combination of repeated manual cutting, spot application of a Category 3 or 4 herbicide, and mowing at the time of flowering. The open space will need to be monitored through the year, every year, in order to eradicate these weeds before they become dominant and constitute a significant fire hazard.

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Pruning of Oak Savanna/Woodlands

Pruning of lower branches of oaks, other trees and tree-like shrubs wherever they occur will need to be performed by hand crews, using loppers, hand saws, chain saws and chain saws on poles under supervision of an arborist. Similarly, dead material in the tree crowns will need to be accomplished in the same manner.

Where leaf litter has accumulated to a depth which triggers management action, hand crews with rakes will need to be used to remove the material.

Debris of the pruning operation can be hauled away, or mechanically chipped and left in place.

SUMMARY OF FREQUENCY OF RECOMMENDED MANAGEMENT*Annual Management*

- mow, graze grass near structures and under trees and shrubs during construction, prior to occupancy and along roads and driveways
- hand crew cut shrubs and weeds in grasslands
- monitor site for weed and shrub encroachment
- inspect trees for deadwood, vertical clearances
- re-establish vertical clearance in Landscape Zone
- remove weeds, all dead material in Landscape Zone

Management That Will Occur Every 5 Years, Or More Frequently As Necessary To Meet The Plan

- thin shrubs into groupings
- remove new understory shrubs
- prune trees of lower branches to re-establish vertical clearance

ACTIONS TO BE TAKEN DURING HIGH FIRE DANGER

In times of very high fire danger, extra precautionary procedures should be instituted by the facility.

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APPENDIX C

RIPARIAN MITIGATION & MONITORING PLAN

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**REVISED
RIPARIAN MITIGATION AND
MONITORING PLAN**

**FOR THE

FALLON CROSSING
DEVELOPMENT PROJECT

ALAMEDA COUNTY, CALIFORNIA**

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This report should be cited as: Olberding Environmental, Inc. May 2011. Revised *Riparian Mitigation and Monitoring Plan for the Fallon Crossing Development Project, Alameda County, California*. Prepared for Standard Pacific Homes, Pleasanton, California.

1.0 PROJECT DESCRIPTION FOR WHICH MITIGATION IS REQUIRED

1.1 Brief Summary of Overall Project

The Fallon Crossing Property (Property) consists of 66.9 acres of gently rolling hills primarily vegetated with non-native annual grassland habitat (Attachment 1, Figures 1-4). A segment of a degraded incised creek channel (Moller Creek) flows across the northern portion of the Property. Proposed development of approximately 106 single family residential units, interior streets, utilities, a storm water detention basin and two water quality basins will result in permanent impacts to 21 acres of the Property (Attachment 1, Figure 5). An additional 9.8 acres (6.1 acres located on-site and 3.7 acres located on an adjacent property) will be temporarily impacted by grading in order to stabilize the hillsides above the development Project. All areas temporarily impacted for geotechnical rehabilitation purposes will be restored back to grassland habitat upon completion.

The Development Project will involve the construction of an outfall structure within Moller Creek with impacts to the bank of Moller Creek above and below the ordinary high water (OHW) line. The outfall will consist of a 9x20x12 foot concrete structure (180 square feet) or 0.004 acres of impact along a degraded creek embankment. Sheet pilings will be installed just above the OHW line to provide a footing for the outfall. Three concrete chambers have been designed to dissipate water velocity from storm water discharges. Work includes placement of 1/4 ton rock rip rap to slow water flow as it enters the creek. The rock rip rap protection apron and coir fabric will be positioned at the base of the outfall. The bank protection material will be installed over a 15-foot wide length of channel and extend 5 feet below the OHW line. The dimensions of the rock rip rap are 15x5x3 feet for a total of (75 square feet). Permanent impacts within the creek total 255 square feet (0.006 acres). Additionally, a detention basin and the two storm water quality basins (water quality ponds) will be constructed to treat water that will flow from the development site into Moller Creek. The detention and water quality basins will be located between the development and Moller Creek and managed for water quality purposes. The outfall will discharge stormwater which collects within the detention basin and two water quality ponds. These facilities will be maintained by the Geologic Hazard Abatement District (GHAD) as described in the Stormwater Management Plan which has been submitted under separate cover.

Additional work in Moller Creek consists of the placement of the discharge culvert from the water treatment basin within an excavated trench through the bank of Moller Creek. This activity includes the excavation of a trench 15x4 feet from the edge of the riparian dripline to the outfall structure for a total of 60 square feet. Finally, an additional 18-inch storm drain line will be installed along Tassajara Road. The storm drain will tie into the existing culvert located under the Tassajara Road Bridge. This activity involves the excavation of a trench 47x5 feet along the edge of the creek bank with a portion of the trench located in the riparian dripline for a total of 235 square feet of impact. In both cases, the utility trench accommodating the storm drain lines will be backfilled and restored. Temporary impacts within the creek total 295 square feet (0.007 acres).

A total of 550 square feet (0.013 acres) of impact (255 sqft permanent and 295sqft temporary) would occur along a combined total of 33 linear feet of the Moller Creek channel and embankment, to install an outfall structure and riprap and allow for trenching work to accommodate storm drain lines. The outfall structure is positioned between a break in the willow riparian vegetation, but construction may require the trimming of trees to accommodate equipment access to the work area. Native material will be removed for the placement of the storm drain lines, gravel will be installed in the trenches, and native soils will be replaced.

The on-site mitigation area proposed for project related impacts to Moller Creek and associated riparian habitat is approximately 150 feet long by 50 feet wide, 7,500 square feet (0.17 acres) and occurs between Pond 2 (lower pond) and Moller Creek (Attachment 1, Figure 6). The mitigation calls for the installation of 82 native riparian trees and shrubs that will provide additional cover for CRLF. The expansion of riparian habitat will enhance the existing setback buffer between planned residential development, the Creek and the lower pond.

1.2 Location of Project

The 66.9-acre Property is located on the east side of Tassajara Road, northeast of the city of Dublin. The Property is found approximately 2.5 miles north of the Highway 580 and Tassajara Road interchange. The Property is situated at the first bend in the roadway where it curves east to cross over Moller Creek in Alameda County, just south of the Contra Costa/Alameda County line. Moller Creek forms the northwestern boundary of the site, Tassajara Road forms the western border, Pinn Brothers Silvera Development is located along the southern boundary and fence lines and undeveloped lands form all other boundaries. Attachment 1, Figure 2 illustrates the vicinity of the Property in relationship to the City of Dublin. Attachment 1, Figure 3 identifies the location of the Property on the USGS 7.5 Quadrangle Map for Livermore. An aerial photograph of the Property is contained in Attachment 1, Figure 4. The development Project is depicted in Attachment 1, Figure 5.

1.3 Responsible Parties

The applicant for this project is:

Standard Pacific Homes
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Pleasanton, California 94558
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Telephone: (925)-730-1375
Fax: (949) 789-9601
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This riparian mitigation plan is being prepared by:

Olberding Environmental, Inc.
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San Ramon, California 94583
Contact: Mr. Jeff Olberding
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1.4 Habitat Types and Functions of the Jurisdictional Areas Impacted

Moller Creek is defined by a very deeply incised bed and bank. Approximately 1,460 linear feet of the channel occur along the northwestern property line. The active channel averages approximately five feet wide and lies approximately 20 feet below the top of the bank. A narrow flood terrace is also located along portions of the Creek adding an average of nine additional feet to the channel. The slopes of the banks approach vertical, however, a few locations occur that are less steep allowing access to the channel. Scour is ongoing along the banks of the channel and there is a lack of channel vegetation. The portion of the channel in the property area and directly downstream appears to suffer from a very high erosion rate. Arroyo willow (*Salix lasiolepis*) and valley oak (*Quercus lobata*) are found along the active portion of the channel and up to the top of the bank. Elderberry (*Sambucus mexicana*) and coyote brush (*Baccharis pilularis*) were also observed as secondary species in the corridor and were the only understory components along the channel. Several mature blue gum (*Eucalyptus globulus*) occur on the top of the east bank and within the channel. Fine gravel material and silt are found in the bed of the Creek. Where Tassajara Road crosses the Creek, a large corrugated metal culvert transports flows beneath the roadway. Approximately 1,200 feet southwest from the property, Moller Creek joins the main channel of Tassajara Creek.

A stock pond is located along the east bank of Moller Creek in the northwestern corner of the property. This pond was restored in the spring of 2001 and planted with freshwater marsh and riparian species such as cattails (*Typha latifolia*), three square (*Scirpus americanus*), arroyo willow, western sycamore (*Platanus racemosa*), and cottonwood (*Populus fremontii*). The pond is approximately 9,280 square feet (58 feet by 160 feet) in size. Pond depths range from several inches along the edge of the pond to 13 feet deep near the center.

Both the pond and the creek channel provide habitat for the California red-legged frog (*Rana draytonii* (CRLF).

2.0 GOAL OF RESTORATION AND MITIGATION PLAN

The goal of this document is to set forth a riparian planting plan to enhance/restore 0.17 acres of riparian habitat along a 150-foot by 50-foot section of Moller Creek fully mitigating impacts to 0.013 acres of non-vegetated creek bank associated with outfall construction and utility trenching. The general purpose of the proposed mitigation is to enhance and expand the width of the existing riparian corridor along Moller Creek and provide species access to the creek from an existing stock pond known to contain CRLF.

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3.0 IMPLEMENTATION PLAN

The general sequence of construction tasks is shown in Table 1 below.

Sequence of Habitat Construction Tasks	
1.	Plan and permit check.
2.	Install protective flagging for preservation areas (riparian corridor and oak trees).
3.	Installation of exclusion fencing.
4.	Site grading.
5.	Weed control.
6.	Augering of holes for trees and shrubs.
7.	Planting.
8.	Installation of irrigation.
9.	Erosion control measures.
10.	Prepare as-built drawings and construction report.

All tasks will be overseen by an Ecological Monitor (EM), a qualified ecologist with experience in the areas of habitat development, hired by the applicant. Vehicular access to the restoration area will be restricted to restoration construction and later to emergency and maintenance purposes (estimated to occur twice per year or less).

3.1 Plan and Permit Check

Plan check requires an on-the-ground survey of all work detailed in the restoration plan. Permit checks require ensuring that all work complies with State, and local permits. The EM must identify in the field the preserve, weed control zones, access routes and materials and equipment storage.

3.2 Install Protective Flagging for Preservation and Pond Construction Areas

Prior to any site modification, all existing habitats within the general work area that will be protected (the riparian vegetation along the creek and preserved valley oaks) shall be staked and flagged by the EM. Flagging will consist of four-foot red or orange construction fencing and be replaced as necessary to be continuously in place during construction activities. Flagging shall extend around the protected area perimeters or along their entire lengths to prevent any wanted intrusions and/or damage.

Accidentally damaged plants or areas will be replaced or repaired and the damage and corrective action reported in the first monitoring report. If flagging proves an insufficient barrier to protected areas, fencing will be required. Fencing and flagging will be removed at the end of construction work. Garbage, including old barbed wire fences, on the restoration site or discovered during initial mobilization shall be removed to an approved disposal site.

3.3 Installation of Exclusion Fencing

A split rail or similar type of fence, to be field located by the landscape architect, will be permanently installed between the riparian mitigation area and the development. The location of the fence will roughly correspond to the outer edge of the 100-foot riparian setback buffer and the 200 foot setback around the constructed pond feature at the north boundary of the mitigation site.

3.4 Site Grading

No grading is anticipated within the riparian mitigation area. A truck mounted augur will be used in the establishment of tree and shrub planting. Shallow watering basins will also be placed around each of the new plants.

3.5 Weed Control

Invasive non-native plants within the mitigation area will be removed prior to any revegetation work. Treatment involves the mowing, disking, or removal of the primary plant, all roots, and any seed that could contaminate the site. These opportunistic species are known to out-compete California natives for light, water, nutrients and space. An aggressive eradication effort prior to revegetation will give the natives a much-needed competitive edge and significantly reduce future maintenance efforts.

Areas of noxious weeds shall be disked, watered to encourage seed growth, and disked again. The cycle may be repeated until weed growth is extremely sparse. Areas with little or no grading will require at least a thorough mowing so that debris will not hamper construction. A flail-type mower should be used, and all debris thoroughly mulched.

3.6 Auguring of Holes for Trees and Shrubs

Holes will be augured to a depth required for proper installation of restoration stock. Trees will be excavated to a width of 24 inches greater than that of the root ball, and to the depth of the root ball. Shrubs and vine will be excavated to a width of 12 inches greater than the width of the root ball, and to the depth of the root ball. Subgrade material in the holes shall be loosened to a depth of three inches.

3.7 Planting

A mix of riparian trees and shrubs is proposed to be planted to enhance the existing riparian corridor and to increase the area of the riparian habitat of the Moller Creek corridor. The species composition is detailed in Table 2 below.

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Proposed Riparian Plantings and Number Required			
Common Name	Botanical Name	Size *	Quantity
TREES			
California Buckeye	<i>Aesculus californica</i>	15 gal/1 gal	3
Western Sycamore	<i>Plantanus racemosa</i>	15 gal/1 gal	6
Coast Live Oak	<i>Quercus agrifolia</i>	15 gal/1 gal	3
California Bay	<i>Umbellularia californica</i>	15 gal/1 gal	3
SHRUBS			
Coyote Brush	<i>Baccharis pilularis</i>	1 gal	10
Mule Fat	<i>Baccharis salicifolia</i>	1 gal	5
Blue Blossom	<i>Ceanothus sp.</i>	1 gal	6
California Wild Rose	<i>Rosa californica</i>	1 gal	14
California Blackberry	<i>Rubus ursinus</i>	1 gal	21
Mexican Elderberry	<i>Sambucus Mexicana</i>	1 gal	6
Snowberry	<i>Symphoricarpos albus</i>	1 gal	5
TOTAL			82
* 15% of all trees shall be 15 gallon containers, remaining trees shall be 1 gallon containers.			

The species have been selected based upon presence near the site. Unless specifically noted below, it is the goal of this program that all plant materials – container stock, seeds, and plugs are to be planted from stock gathered in the immediate vicinity of the Project site. As a result, only genotypes of locally native species should be planted. Generally, plant material may be installed as container stock, bare root seedlings, cuttings, canes, plugs or seed. Viability and growth of different species varies by stock type, however, and the form chosen for this plan is based on the authors experience with these species.

The trees specified for planting shall meet the following minimum standards. The form shall be standard with the main scaffold branches established and properly distributed, preferably with a full skirt of branches. For 15 gallon container size trees, the minimum trunk caliper at six inches in height should be between one and 1.25 inches. The minimum height should be seven to eight feet, and the minimum canopy spread should be between two and three feet.

Prior to planting, all planting areas will be tilled to loosen soils to a minimum depth of eight inches. Plant material shall be free from damage, disease, insects and weeds, not be rootbound, and identified correctly to genus and species. Plants shall be sufficiently rooted to the edge of the container to maintain the root ball when removed. The planting area should be free of weeds, trash and other debris. Plants will be placed according to the plans of the landscape architect, using a triangular spacing method. The root collar will be placed at one inch above the surrounding grade. All holes shall be backfilled by the end of that same workday. Backfill material will include one part existing soil (or approved topsoil) and one part nitrolized fir shavings or nitrolized half-inch minus fir bark. Soils shall be completely saturated to promote

settling of excavated soil. Slow-release fertilizer such as agriform or osmocote will be added to each planting hole prior to planting.

After planting ammonium sulphate should be applied at a rate of five pounds per 1000 square feet to all planting areas. All areas with ground cover and shrubs shall have two-inch shredded bark mulch applied as well. All new plantings shall be watered deeply and thoroughly. All trees shall be staked, and trees and shrubs shall have watering basins. All plants will have deer protection such as screening for foliage and collars for the root structures if browsing is evident.

All trees shall be guaranteed for a minimum of one full year from the date of final acceptance. Shrubs and ground cover plantings will be guaranteed for a minimum of 6 months from the date of final acceptance. The landscape contractor, to be named by the property owner, shall be responsible for maintaining the plantings for 60 days from the date of final acceptance. The EM will oversee maintenance during this interval.

The trees and shrubs installed will eventually provide higher quality habitat and additional cover for CRLF than what currently exists on the site. It is estimated that it will take at least three to five years for the understory species and eight to ten years for tree species to provide habitat functions similar to those located along Moller Creek. It can be assumed that this habitat will provide food, cover, and nesting materials to a wide variety of riparian wildlife species once established.

3.8 Installation of Irrigation

The contractor shall provide shop drawings of the irrigation system which shall be reviewed by the landscape architect prior to installation. Irrigation shall be temporary for the first three years. After three years the irrigation system will no longer be utilized.

3.9 Complete Erosion Control Measures

All graded slopes will be revegetated and seeded as noted above, and the Project will be subject to State and local erosion control regulations.

3.10 Prepare As-Built Drawings and Construction Report

Within six months of completion of the construction project, the EM shall sign a copy of the construction log and as-builts for the Project. The as-builts will include Project topography and planting zones and shall be used in the future as the base map for the monitoring report. At that time, the applicant will send a copy of the signed as-builts to the City and request, in writing, inspection of the Project.

4.0 MAINTENANCE DURING MONITORING PERIOD

Inspection and maintenance activities will be undertaken by a contractor hired by Standard Pacific Homes with oversight by the EM. Inspection and maintenance activities will be

undertaken each year for a period of 10 years according to the schedule presented in Table 3 below. The monitoring schedule will be broken down into three categories: 1) Years 1-3 Plant Irrigation Period; 2) Years 4 & 5 Plant Establishment Period; and 3) Years 6-10 Extended Monitoring Period.

4.1 Maintenance Activities

Most native plants such as those proposed for the restoration site are pre-adapted to their normal regional growing conditions and do not require substantial maintenance. "Pre-adapted to their growing conditions" means simply that they will occur only where conditions are relatively optimal for their growth. However, the species to be planted pursuant to this plan will not have sprouted naturally.

Restoration is an artificial process undertaken in anticipation that a native plant community, one adapted to the site conditions, will develop. Maintenance activities will therefore be needed to ensure that (1) the community develops as a native plant community without the introduction of harmful non-native species, (2) the community can naturally regenerate and sustain itself in perpetuity, and (3) the development of this native community does not create potential hazards for the adjacent neighborhoods.

At the same time, maintenance shall not require significant modifications to the site. The guidance provided in this section describes maintenance activities that do not require further permitting actions. Maintenance activities shall be guided by defined treatments and restrictions.

4.1.1 Vandalism

Maintenance activities will be conducted quarterly during Years 1-5 and then annually during Years 6-10. Site inspections shall be performed by the contractor for any evidence of vandalism. Given the proximity of the mitigation sites to a residential neighborhood, it is possible that damage may occur from vandalism. The site will also be monitored for signs of excessive or uncontrolled human disturbance such as off-road vehicle use, presence of brush and litter and human foot traffic. Presence of human disturbance will be recorded along with suggested remedial action.

4.1.2 Weed Control

In most cases, careful design and pre-planting weed control procedures will reduce the burden of weed abatement. However, a freshly-graded construction site is a haven for weeds which may blow in from off-site. Additionally, misapplied cultural efforts (irrigation during the warm season in an area known to contain warm season weeds) may actually promote weed growth in the restoration area. The EM shall make a distinction between ruderal species that are part of natural succession and those species that will impede development of the target vegetation association. This latter group, particularly non-native and aggressive species, can be controlled using manual or chemical methods, bearing in mind that simply removing the weed is no guarantee that another will not replace it.

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The EM must also ensure that the appropriate native species replace the weed species and the conditions which resulted in weed growth will not re-occur. This step is best addressed prior to construction through development of a weed control program that emphasizes prevention followed by containment and elimination/reduction.

It is necessary to weed plant basins to control invasive non-native species that can reduce water or light availability. During the first one to two years after planting, it will be possible for weedy plants to grow as tall as or taller than the planted shrubs and to compete with the native species for water or nutrients. While some of these weeds will be native plants that might not compete with the planted species (they may simply appear due to the relatively high fertilization rates or presence of disturbed soils), few people aside from experienced horticulturalists or plant ecologists will recognize the difference between native plants which may be relatively benign and those weeds which can harm the restoration success. Consequently, this plan espouses manual and/or chemical removal of all weeds within the planting basins that compete with the planted species.

A desirable objective is to remove all non-natives prior to planting. This gives the natives the competitive edge needed to capture the site. Freshly graded soil from site preparation provides a perfect seedbed for windblown seed from invasive non-native species. The success of initial eradication efforts may strongly influence maintenance requirements.

Invading non-natives shall be removed before they are allowed to seed or become well-established on the site. Invasion of the restoration area by non-native species and weeds shall be noted in the monitoring reports and prescriptions for removal shall be provided in the maintenance manual.

Post-construction weed control must take into account the following steps:

1. Identify and address the conditions which allowed or encouraged the exotic to become established.
2. Remove the exotic.
3. Replace the exotic with the appropriate native plant.
4. Maintain the site such that further opportunities for the exotic to become re-established are limited.

Manual controls consist of either hand removal of the entire plant or cutting the plant above-ground. Hand removal of the entire weed is almost always possible but also labor-intensive and is best suited for woody plants. The advantage of hand removal is that the area of impact is usually quite small; less specific weed control activities can create the type of disturbance which results in more weed growth. It is often much less expensive to cut the weed and then spot-spray the stump with an herbicide (see below for herbicide cautions). For conditions that militate against the use of chemical controls, an array of tools are available from suppliers that can be used to selectively remove even mid-sized trees without disturbing the adjacent land or plants.

Cutting can include hand-pruning or chopping, weed "whips" or similar hand-held but gas-powered tools; and tractor-driven or floating mowers. Hand pruning or chopping is labor-

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intensive and costly unless the weeders are volunteers. Prior to selecting this method, the ecologist shall personally weed a specific area for at least two hours and develop an estimate of the amount of person-hours then required, multiplying this by the cost of the labor. Where weeding will occur in dense growth or where only a few plants among many are to be eliminated, this method is the most productive.

Weed whips and similar tools are very useful for clearing annual or soft perennial growth over large or small areas where tractors cannot be driven (slopes, marshes, etc.). These shall not be used near planted trees and shrubs or above-ground irrigation lines as even an experienced practitioner can inadvertently girdle a plant or chop up a poly line.

Mechanical mowers are the most efficient means of cutting large areas of vegetation. They cannot run on steep slopes (although some have mowing "booms" which can reach out and cut limited areas) and to operate need a certain distance between trees and shrubs which are to remain uncut. It also is important to consider these issues during the design phase. An easily maintained project is generally subject to fewer disturbances and may prove to be more successful.

Surveys for weed control needs shall start as soon after the construction as the growing season begins. Timing is often crucial in manually controlling weeds, especially annuals. Because cutting does not remove the root systems, it is generally important to cut the plant just prior to seed set to maximize the likelihood of complete control. Even this technique may not always work.

Chemical controls are often the least expensive means of eradicating or reducing weed growth. Application of a herbicide to the lowest portion of the tree provided good control for trees under 18 inches in diameter at the base while cutting and application to the stump was required for larger trees.

Few chemicals are licensed for use in wetlands and a licensed technician is often required by local regulations. Further, environmental conditions, e.g., wind speeds, must be carefully monitored to avoid damage outside the target area. Chemical controls include "pre-emergents" that are applied to the ground prior to the emergence of the weeds in the spring or "post-emergents" that kill or stunt plants during their active growth stages. Pre-emergent are most useful when applied adjacent to newly planted propagules as they limit the growth of competing weeds adjacent to the propagule. Post-emergent controls are most useful for broad areas completely dominated by weeds; areas where no plants are proposed (firebreaks, for example); or spot-spraying of individual weeds. On this site, spot spraying of a post-emergent broadleaf may be needed once to twice per year during the spring growing season with two additional applications latter in the summer. Tree and shrub basins should be maintained quarterly during the first five years and then annually in Years 6-10, removing weeds by hand pulling if possible to prevent overspray on the installed plants. The placement of mulch or wood chips within the planting basins will also reduce weed growth. Mulch should be checked on a quarterly basis during Years 1-5 and annually in Years 6-10.

4.1.3 Plant Maintenance

All new tree and shrub plantings will be checked by the EM on a quarterly basis for deer browsing, proper functioning of irrigation, healthy rootball, application of fertilizer, repair of water basins, and other pest damage during the first five years and annually thereafter up to Year 10. Irrigation shall be checked only for the first three years, after which plantings will no longer be irrigated. Hand clearing of weeds around the base of the installed plants will also be conducted on a quarterly basis. Once trees have become well-established, and if deemed necessary, some pruning of trees may be conducted to compensate for irregular growth due to excessive browsing or broken branches. Dead plants will be replaced annually in the late fall.

4.1.4 Irrigation Maintenance and Monitoring

Irrigation will be used during the first three years to assist in plant establishment. The irrigation system shall be checked quarterly during the three year irrigation period and as much as weekly immediately following plant installation, for malfunction and vandalism. All drip lines and filters shall be flushed as needed. Emitters must be checked regularly for malfunctions, position of emitter over root ball, and vandalism. Flushing end caps must also be checked regularly.

Irrigation for plantings is a temporary tool to help establish the constructed vegetation association. Water shall be decreased every year, and ideally shall not be needed after the third year. Caution shall be exercised not to create lush plants, which would become dependent on regular watering. Deep watering, spaced at the longest time possible before plants show signs of stress, shall be used. This type of watering will encourage plant roots to travel downward into the appropriate water zones in the soil.

4.1.5 Litter Removal

Litter can impede the growth of propagules or seedlings, and increase the cost of plant care maintenance efforts. Therefore, it is recommended that each site be thoroughly policed, and all litter and debris removed from the site at least quarterly during the first five years and annually in Years 6-10. Adjacent construction especially generates large numbers of small snack bags which lodge among plants. Construction projects which are near or within residential areas generally collect the most trash.

4.1.6 Erosion Control

The site will be inspected for signs of erosion quarterly during the first five years and annually in Years 6-10. Visual inspections of the restoration site will be conducted to ensure that there is not erosion or downcutting from broken irrigation lines or surface hydrology. The EM will determine if woody vegetation has become established. If it is determined that erosion is occurring, measures will be taken to divert or slow runoff prior to remedial actions.

4.1.7 Maintenance Records

Documentation of all maintenance activities will be prepared by the applicant during the five-year monitoring period, then annually in Years 6-10. Photographs documenting the progress of the plantings will be taken at each visit. Photographic reference points will be pre-determined during the as-built survey. These points will include the outfall, riparian plantings, and the new swale feature. A record of maintenance activities by date will be submitted in a monitoring report. All monitoring reports will include information on type of activity, frequency and dates of maintenance activities and a summary of repairs and remedial actions and any other maintenance activities.

4.2 Responsible Parties

Maintenance of the restoration area during the 10 year maintenance period will be the responsibility of the applicant with coordination from the EM. Maintenance, monitoring, and compliance reporting activities will be financed and carried out by the applicant through a contracted landscape maintenance company until mitigation has been determined to be successful by the EM and verified by the regulatory agencies. This mitigation plan is being designed so that restored riparian habitats are self-sustaining and will not require maintenance to assure continued viability. Maintenance may be required, however, to respond to disturbance by humans. For example, if unauthorized dumping were to occur within the restored area, maintenance would be required in order to properly dispose of the garbage or debris and clean up the site.

4.3 Schedule

For the first one to two years, most projects will require a walk-through by an ecologist or maintenance technician every month. The variation in the number of visits depends on the size of the site, its proximity to disturbance and the time of year. Visits may reasonably be required every week for the first year and twice monthly for the next two years. Smaller sites, for example those less than ten acres, can reasonably be visited once every two weeks during the first year, and monthly in subsequent years. The maintenance schedule determined for the site is listed in table 3 below.

Maintenance Activity	Years 1-3	Years 4, 5, and 6-10
Vandalism Inspection	Quarterly	Years 4&5 Quarterly, Years 6-10 Annually
Weed Control		
- Inspection	Quarterly	Years 4&5 Quarterly, Years 6-10 Annually
- Apply pre-emergent	Quarterly	Years 4&5 Quarterly, Years 6-10 Annually
- Add Mulch	Quarterly	Years 4&5 Quarterly, Years 6-10 Annually
- Weeding	Quarterly	Years 4&5 Quarterly, Years 6-10 Annually
Plant Maintenance		
- Inspection	Quarterly	Years 4&5 Quarterly, Years 6-10 Annually

Table 4.3 Maintenance Schedule (Years 1-10)		
Maintenance Activity	Years 1-3	Years 4, 5, and 6-10
- Replace Dead Plants	Annually	Annually
- Water Basin Repairs	Quarterly	Years 4&5 Quarterly, Years 6-10 Annually
- Fertilize Plants	Quarterly	Years 4&5 Quarterly, Years 6-10 Annually
Irrigation Maintenance		
- Inspection	Quarterly	-
- Adjustments/repairs	Quarterly	-
Litter Removal	Quarterly	Years 4&5 Quarterly, Years 6-10 Annually
Erosion Control Inspection	Quarterly	Years 4&5 Quarterly, Years 6-10 Annually
Maintenance Records		
- Photograph Site	Annually	Annually
- Prepare Report	Annually	Annually

4.4 Long-term Maintenance

The EM would be responsible for the coordination of site maintenance with the applicant and monitoring of the restoration site for ten years or until success criteria have been met and the regulatory agencies have provided a letter of release.

Following the ten years of monitoring and maintenance the property owner will incorporate passive long-term maintenance to ensure that the restoration site is functioning according to design and that vegetation is maintaining with minimum competition from invasive exotic plants or disturbance from public access or trash build-up. Long-term maintenance will include regular inspections for exotic plant species, to be periodically eradicated, and removal of trash.

Table 4.4 Long-term Maintenance Schedule Beyond Year 10	
Maintenance Activity	Beyond Year 10
Vandalism Inspection	Annually
Weed Control	
- Inspection	Annually
- Apply pre-emergent	Annually
- Weeding	Annually
Litter Removal	Annually
Erosion Control Inspection	Annually

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5.0 FINAL SUCCESS CRITERIA

The final success criteria will be used to determine if the applicant has met the obligations outlined in this plan. Attainment of the final success criteria will indicate that the restoration site is well on its way toward meeting the long-term habitat goals of the site with little chance of failure. Success criteria will be evaluated each year that monitoring is conducted with a final assessment performed the last year for which monitoring is required. Results of the final evaluation will be compared to the established success criteria and described in table format in the final report.

Restoration of the functions lost as a result of the impacts to riparian habitat is a primary goal of this plan. This will be measured through the successful establishment of riparian habitat on the restoration site. Attainment of final success will be determined by the regulatory agencies, which will verify success of the restoration site after being notified of attainment of the established criteria in the final report. Success criteria will be quantitatively evaluated by monitoring the restoration site annually during the 5-year monitoring period, then every other year until Year 10.

5.1 Overall Mitigation Objectives

Proposed mitigation will have the following overall objectives for mitigation of permanent impacts:

- To create 0.17 acres of self-sustaining riparian habitat;
- To attain 70 percent survival of planted trees and 80 percent survival of planted shrubs, evaluated individually for each planted species. ;
- Should the survival rate fall below 70 percent for tree species and 80 percent for shrub species at any point during the monitoring period (5 years for shrubs, and ten years for trees) until the success criteria in this plan are achieved, remedial planting shall be conducted and the monitoring period shall start anew.

5.2 Conditions Proposed for the Site that Will Insure Success

- The restoration area will be maintained in as natural a state as possible. The riparian habitat will not be mowed, burned, grazed or otherwise maintained, except as part of a regulatory agency approved long-term plan should such a plan be prepared, to maintain or enhance the natural values of the established habitats.
- No construction will occur in areas under regulatory agency jurisdiction outside the permitted mitigation project footprint;
- Unless authorized by the regulatory agencies, no work will be conducted within the restoration area that may modify the hydrologic regime of the riparian habitat once established;

- No farming or farming activity will be allowed within the restoration area;
- No grazing will be allowed within the restoration area;
- No off-road vehicle use will be allowed within the restoration area.

5.3 Quantitative Mitigation Success Criteria

The 0.17 acre mitigation area will be evaluated based on the following quantitative success criteria. Once the site has met these criteria and the circumstances on site have been confirmed by the regulatory agencies, the monitoring requirements will be considered satisfied and there will be no further obligation for this site. It is anticipated by the applicant's biological consultant that these criteria will likely be met within ten years. If the site has not met these criteria and ten years have past, monitoring and maintenance shall continue until the conditions are met or an alternate mitigation plan is approved by the regulatory agencies.

1. Non-native plant species identified by the EM as "nuisance species" shall not be greater than 10% of the total vegetation cover (cumulative for all species of nuisance plants) within the riparian mitigation area;
2. The restoration area shall demonstrate natural hydrology. This shall be indicated by the lack of artificial irrigation for at least two years (with no loss of vegetation); and
3. Restoration tree stock will remain alive at the end of the annual five year growing season (and every other year until year 10) with 70 percent survival of all planted trees. Restoration shrub stock will remain alive at the end of the annual five year growing season with 80 percent survival of all planted shrubs. All trees and shrubs planted in the restoration areas shall exhibit medium to high health and vigor and demonstrate new vegetative growth on an annual basis.

6.0 MONITORING PLAN

The restoration site will be monitored over a five-year (and ultimately ten-year) period to ascertain whether the performance and success criteria are met. Vegetation monitoring will be conducted annually for the first five years, then every other year until Year 10. By Year 5, the restoration site should be sufficiently well established to determine if it will reach the long-term goals, summarized below, with little chance of failure. The results of vegetative monitoring in Year 5 will be compared to the final success criteria to determine if these criteria have been met. If the final success criteria have not been met at the end of the monitoring period, monitoring will continue until they have been met. Additionally, creek monitoring will take place at the outfall location in order to evaluate any hydrogeomorphological changes associated with outfall construction. Three repeatable transect lines will be established across Moller Creek. One each up and downstream (50 feet) and the third at the outfall location. Measurements will be taken to demonstrate the location of top-of-bank, midpoint on the embankment, ordinary high water mark

and thalweg or bottom of the channel. Data collection will follow the vegetative monitoring schedule. Photo points will also be established at each transect line location.

6.1 Performance Criteria

This section contains the performance criteria for the restoration site. Monitoring of performance criteria will evaluate the extent to which original plantings remain so that the restoration site continues to meet the established final success criteria. The performance criteria are quantitative benchmarks against which the success of restoration will be tracked.

6.1.1 Number Remaining from Original Planting

At no time during the monitoring period, should the number of riparian plant species remaining from the original planting be lower than 70 percent survival for trees during the ten year monitoring period and 80 percent survival for shrubs during the five year monitoring period. If fewer than 70 percent of the original tree plantings and 80 percent of the original shrub plantings remain, replanting shall be conducted so that the original plantings are replaced. Percent survival must be evaluated individually for each planted species. If these success criteria are not achieved, dead plants must be replaced in kind, unless the Applicant demonstrates that the site is not conducive to the survival of a specific plant species, in which case alternate native riparian plant species may be used. Replacement plantings must be made within one year of survival rates failing to meet the specified success criteria. Replacement shrubs shall be monitored for five years from the date of replanting. Replacement trees shall be monitored for ten years from the date of replanting. Replacement plants are subject to the same performance criteria as the initial plantings.

Irrigation should only be conducted during the first three years unless replanting occurs. If replanting is needed irrigation shall be utilized for an additional 3 years to allow establishment of the newly planted stock.

6.1.2 Site Maintenance

Site maintenance is included in the performance criteria because of the critical importance of proper maintenance during the plant establishment period. Site maintenance will be monitored to assess weed control, irrigation adequacy, trash removal, and vandalism. Site maintenance will be monitored during the ten-year monitoring period.

6.1.3 Plant Vigor and Health/Abundance and Diversity

The health and vigor of each dominant native riparian species occurring in the restoration area will be qualitatively assessed. The following factors will be taken into consideration in this determination: plant color, seed development, new growth, herbivory, drought stress, fungal/insect infestation, and physical damage. Overall health and vigor of each dominant riparian species will be rated as high, medium, or low (Table 5).

Table 5 Plant Vigor and Health Ratings	
Health and Vigor	Percent Healthy Foliage
High	67-100%
Medium	34-66%
Low	0-33%

6.2 Monitoring Methods and Schedule

The restoration area will be monitored using the sampling techniques described below until the performance criteria described above have been met or exceeded, and it is demonstrated that the restored habitats have become self-maintaining. Permanent photo points that provide views of the restoration area would be established during the construction of the riparian habitats.

Monitoring will be conducted between February and June of each monitoring year. Monitoring reports will be prepared by the EM following data collection and will be submitted to the permitting agencies by December 31 of each monitoring year.

6.2.1 Number Remaining from Original Planting

The percentage of remaining plant species from the original planting at the restoration area will be measured by counting the number of individuals of each species of tree and shrub remaining. Sampling will be conducted at random locations throughout the restoration area site.

6.2.2 Site Maintenance

Site maintenance will be assessed during percent cover estimates and during general site monitoring as specified in the maintenance schedule. Pertinent information derived from visual observations, reports from site maintenance crews, or from other sources will be included in the summary for site maintenance.

6.2.3 Plant Vigor and Health/Abundance and Diversity

A rating of plant vigor and health will be assigned to all dominant plant species observed in the restoration area. An explanation of each rating will be provided in the text giving details of the rationale for each rating. The qualitative assessment will be conducted at each data point; then an assessment that characterizes the entire site will be determined based on the average rating of the species.

Abundance and diversity will be assessed by qualitatively analyzing the total number of plant species observed at the mitigation site. This information will be recorded on the data sheets by documenting each species encountered.

6.2.4. Photo-Documentation

Photo-documentation of the site will be conducted from fixed permanent locations along the creek channel. Photographs will also be taken to record any events that may have a significant effect on the success of restoration, such as flood, fire, or vandalism. Photos will be taken to document the success of plantings and erosion control measures. These locations will be predetermined during the as-built survey. Additional photos will be taken if it is determined that the initial photo points are not sufficient to track riparian plantings along Moller Creek. A minimum of four photo points would be established along the restoration area.

6.3 Data Analysis

The yearly monitoring results will be compared with results from previous years to evaluate site progress.

6.3.1 Number Remaining from Original Planting

The number of remaining individuals of each species will be tabulated each year. Number of remaining species will be compared to the number at the time of the original planting.

6.3.2 Site Maintenance

Success or failure of site maintenance will be analyzed and included in the monitoring report. Any recommendations will be provided based on yearly findings.

6.3.3 Plant Vigor and Health/Abundance and Diversity

Plant vigor and health will be reported as high, medium, or low for each dominant species. Health and vigor ratings will be compared between years. The vigor and health rating for each dominant species will be included for discussion in the report. The abundance and diversity of the site will be qualitatively discussed in reference to the dominant species.

6.4 Chancel Stability Monitoring

Creek monitoring will be performed along three repeatable transect lines established across stationary points on Moller Creek. Measurements will be taken to demonstrate the location of top-of-bank, midpoint on the embankment, ordinary high water mark and thalweg or bottom of the channel on each transect line. Information would be collected to assess the stability of the channel and determine if the outfall has had an impact on the channel feature. Observation and data comparisons will be used to document channel slumping, bank erosion, channel incision, undercutting of the banks and loss of vegetation due to increased scour or erosion. Data collection will follow the vegetative monitoring schedule. Photo points will also be established at each transect line location.

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6.5 Annual Reports

Annual reports will be completed and submitted by the EM that present vegetation and channel stability monitoring results for the year monitored. These reports will assess both attainment of yearly vegetation performance criteria and trend characteristics that demonstrate progress toward final success criteria. The reports will also include specific information collected from stationary/repeatable transect lines at the three locations across the channel to document channel stability characteristics. The report will include documentation of observed conditions, attainment of success criteria and an assessment of any identified changes. Data sheets and photo documentation developed from the monitoring effort would be combined with a compliance report summarizing monitoring results. This information will be submitted on an annual basis in the form of a mitigation monitoring report during the month of December or until success is achieved by meeting the final success criteria listed above.

As required, these reports will include a list of names, titles, and companies of persons preparing the report, as well as all participants in the monitoring activities; a copy of the Corps permit, Special Conditions, and subsequent Letters of Modification; analysis of quantitative monitoring data; prints of all included monitoring photographs; and maps identifying monitoring areas, transects, planting zones, etc.

Annual monitoring reports will be sent by December 31 of each monitoring year. Annual monitoring reports will include a brief description of the project, the methods used to collect and analyze the data, the results of the data analysis, a discussion of the results, and conclusions regarding the present condition of the site. The report will also include a remedial action section that will discuss any additional actions required to ensure that the site meets the success criteria.

6.6 Schedule

Monitoring to determine the successful attainment of the performance criteria shall be tied to the actual implementation date of the restoration effort rather than to predetermined years. It is anticipated that mitigation will be completed in 2011. The proposed monitoring schedule is outlined below:

1. Conduct baseline vegetation and channel stability monitoring in the fall of 2011.
2. Conduct annual site vegetation and channel monitoring to determine restoration success and channel stability between February and June 2012-2016, then every other year until 2021. The monitoring period will restart for any new plantings installed, should the survival rate fall below 70 percent for trees during the ten year monitoring period or 80 percent for shrubs during the initial five years of monitoring.
3. Submit an annual compliance monitoring report which includes data sheets, photo documentation and a report summarizing monitoring results in 2012-2016, 2018, 2020, and 2021.

7.0 COMPLETION OF RESTORATION

7.1 Notification of Completion

When the initial monitoring period is complete, and/or the applicant believes that the final success criteria have been met the applicant will notify the regulatory agencies when submitting the final annual report that documents this completion.

7.2 Confirmation

Upon submission of the above-mentioned final report, the regulatory agencies will conduct a site inspection (if needed), and upon determining that mitigation success has been achieved will provide a letter of release from further mitigation monitoring requirements.

8.0 CONTINGENCY MEASURES

If the number of restoration plants fails to meet the identified success criteria in a given year, additional planting will be required to bring the total number back to the original number planted with site monitoring starting over. If the identified success criteria are not achieved, dead plants must be replaced in kind, unless the Applicant demonstrates that the site is not conducive to the survival of a specific plant species, in which case alternate native riparian plant species may be used. These actions would be coordinated with the regulatory agencies.

Channel stability characteristics will also be evaluated each year reporting is required. In the event that instability problems are observed within the channel during monitoring events, an assessment will be made as to the appropriate action to be taken. This will include consultation with a hydrologist experienced in geomorphology. Recommendations will be assessed and evaluated and the problem corrected. Corrective actions may require permitting and oversight from resource agencies in order to conduct work in the creek channel.

8.1 Initiating Procedures

Subsequent to the first year's monitoring result of any subsequent years of the required ten-year monitoring period, corrective actions will be taken to correct unforeseen deficiencies in the establishment of riparian vegetative conditions. Analysis of the cause of site failures will be made and remedial actions will be recommended to correct the problem if a performance criterion or a final success criterion is not met.

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ATTACHMENTS

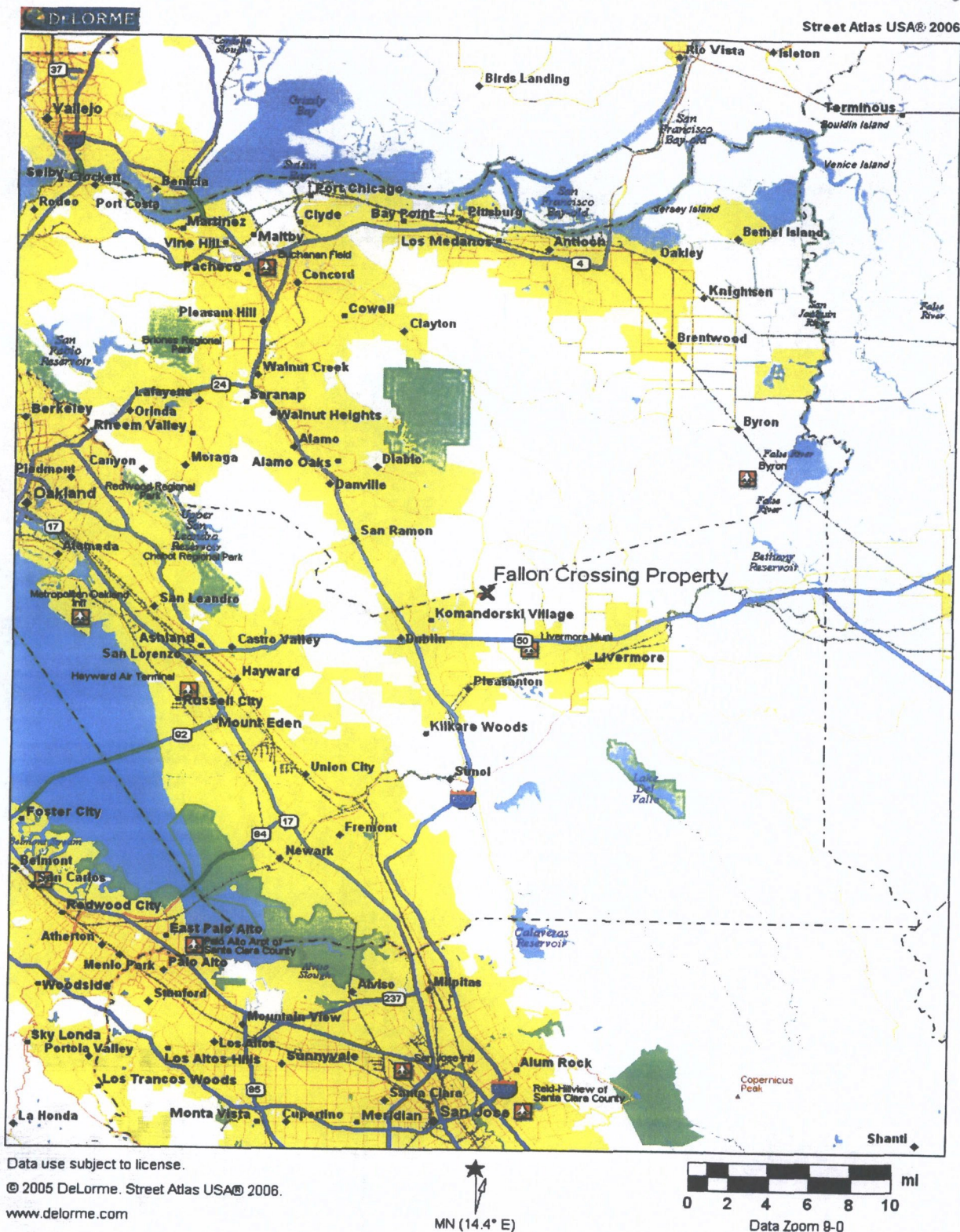
ATTACHMENT 1 FIGURES

- | | |
|-----------------|--|
| Figure 1 | Regional Map |
| Figure 2 | Vicinity Map |
| Figure 3 | USGS Quadrangle Map |
| Figure 4 | Aerial Photograph |
| Figure 5 | Fallon Crossing Development Site Plan |
| Figure 6 | Mitigation Area Map |
| Figure 7 | Riparian Planting Plan |
| Figure 8 | Deed Restriction Area Map |

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Figure 1
Regional Map

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Figure 1
Regional Map of the Fallon Crossing Development Project
 Alameda County, California

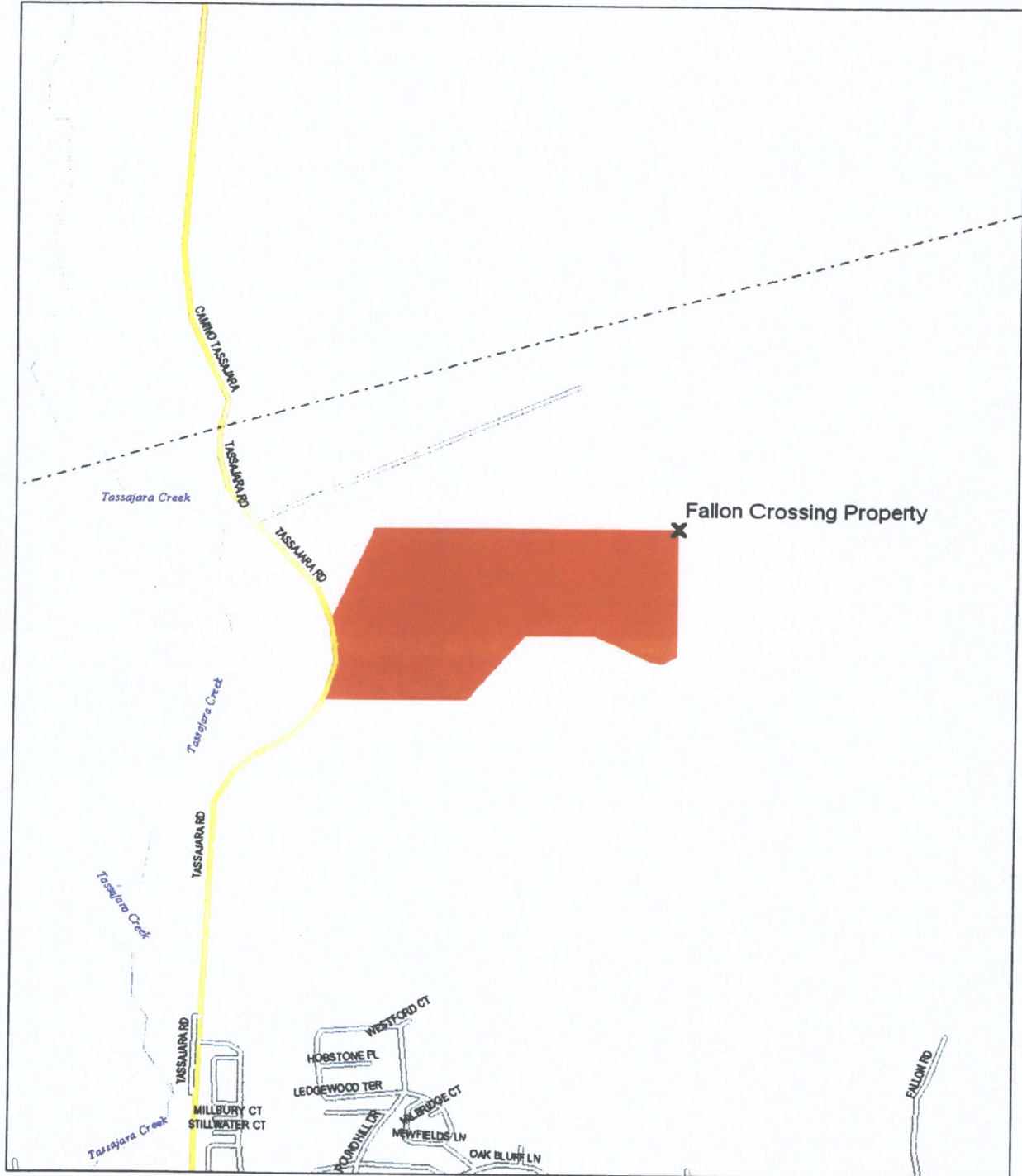
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Figure 2
Vicinity Map

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Street Atlas USA® 2006



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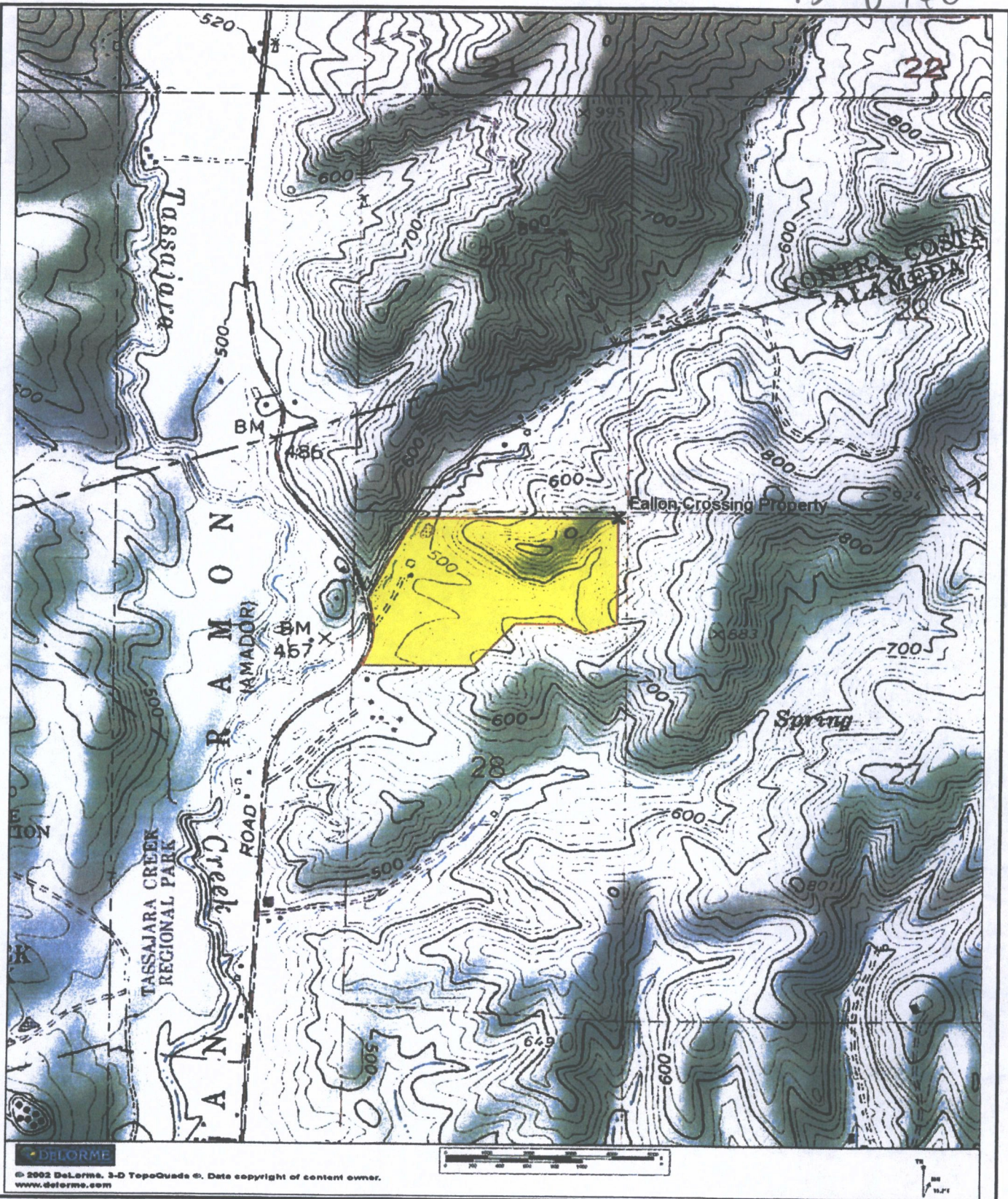
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Figure 2
Vicinity Map of the Fallon Crossing Development Project
Alameda County, California

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Figure 3
USGS Quadrangle Map for
Livermore

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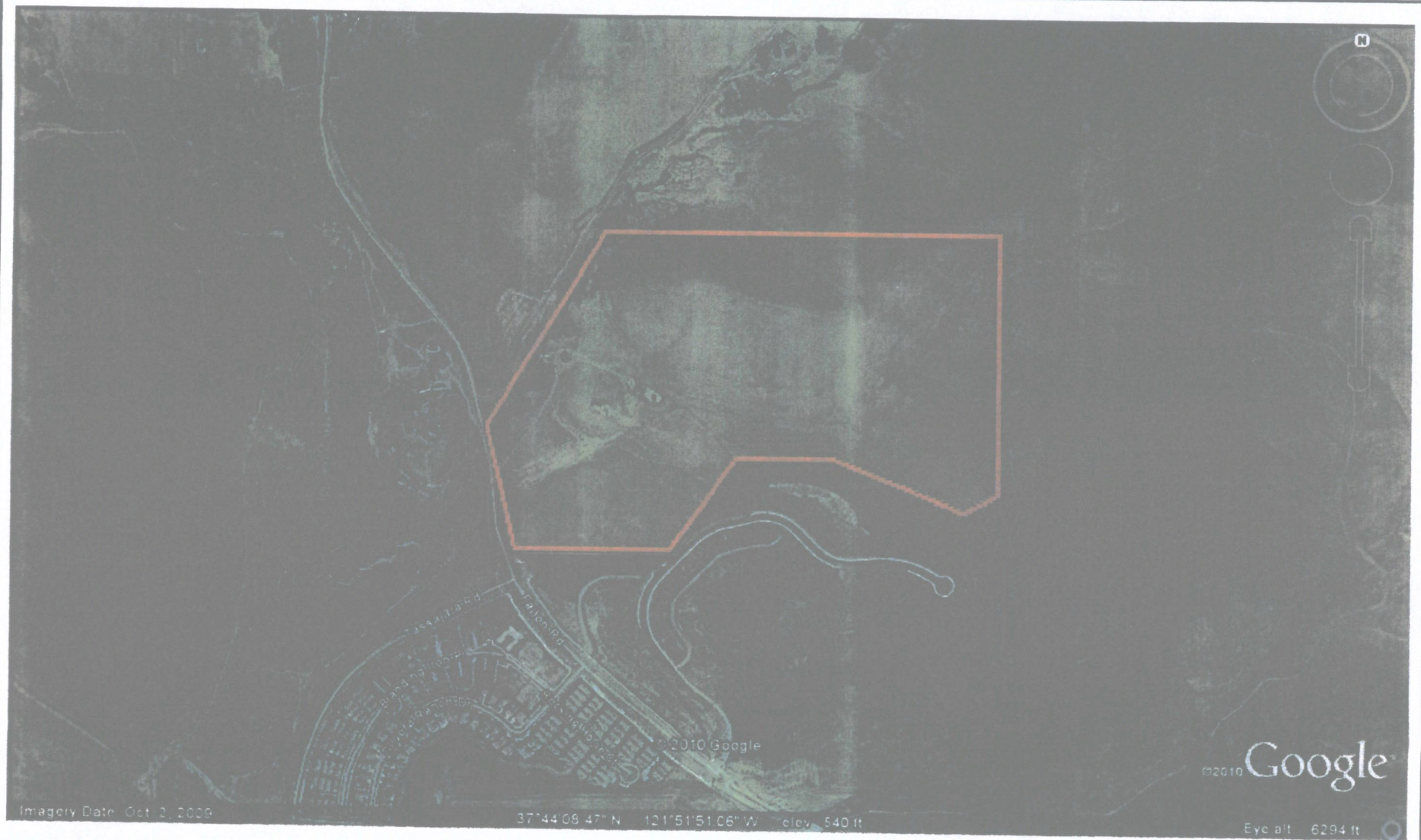
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Figure 3
USGS Quadrangle Map of the Fallon Crossing
Development Project
Livermore Quadrangle
Alameda County, California

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Figure 4
Aerial Photograph



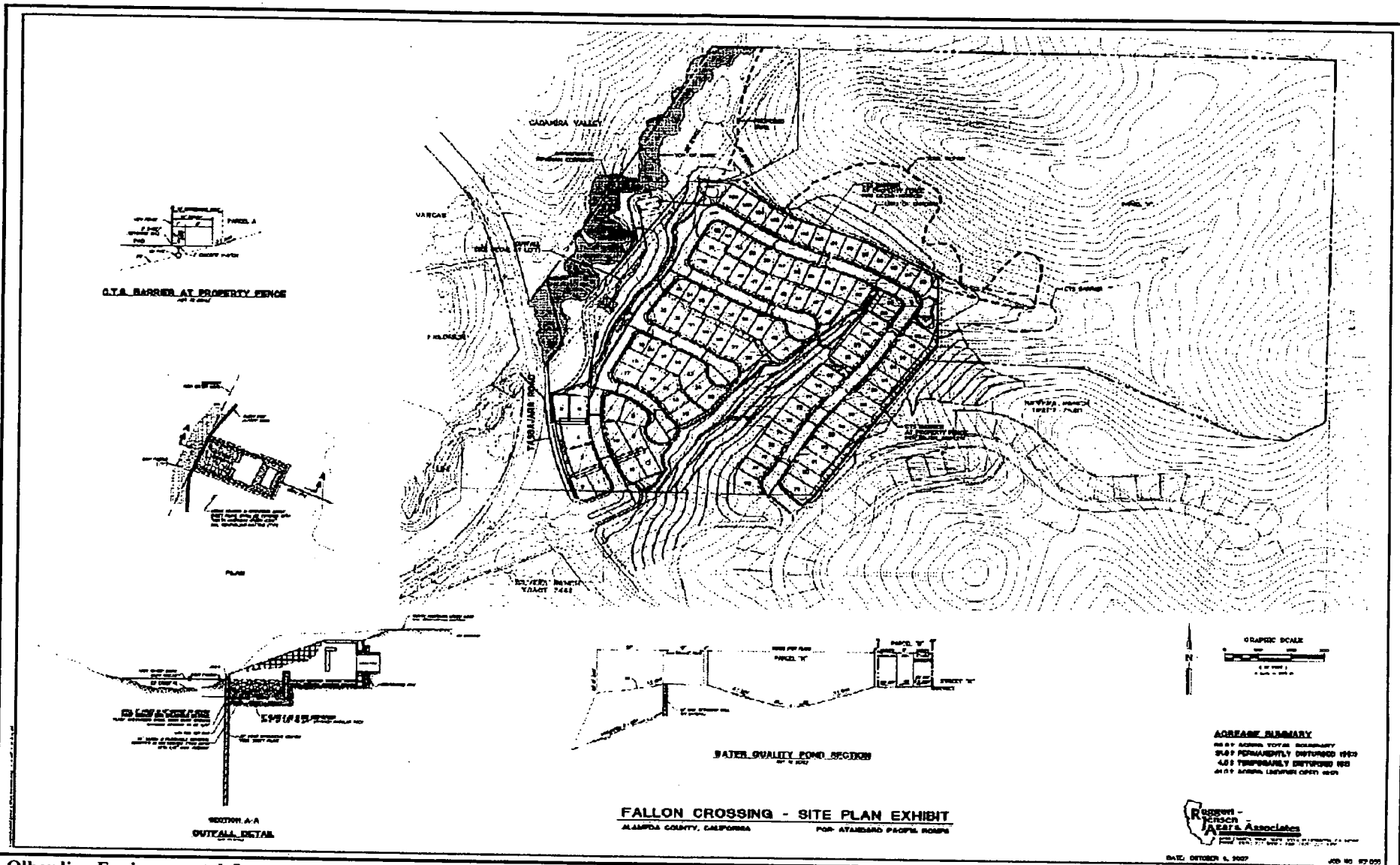
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Figure 4
Aerial Photo of the Fallon Crossing Development Project
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Figure 5
Fallon Crossing Development Site Plan



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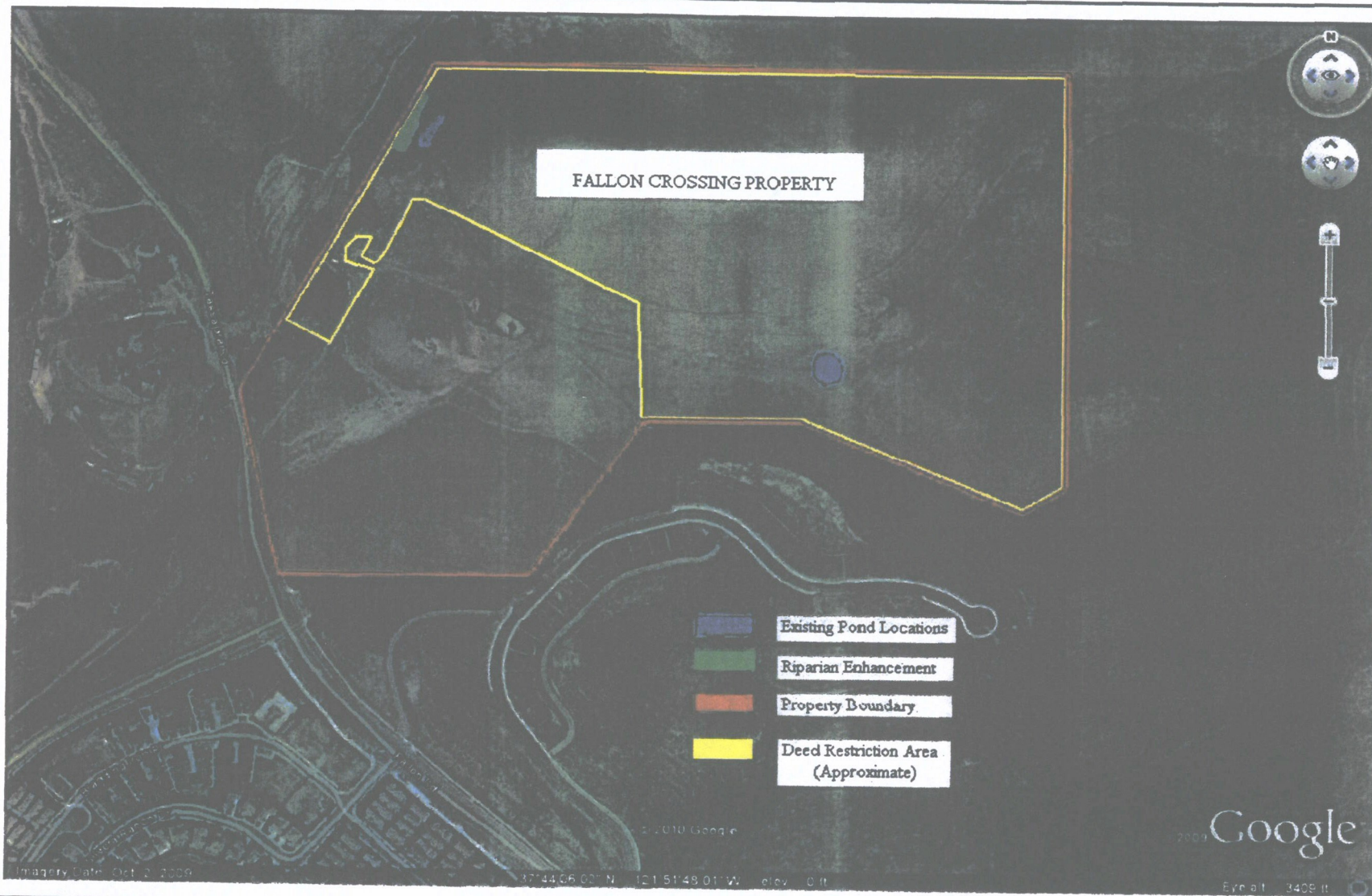
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Figure 5
 Site Plan of the Fallon Crossing Development Project
 Alameda County, California

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Figure 6
Mitigation Area Map



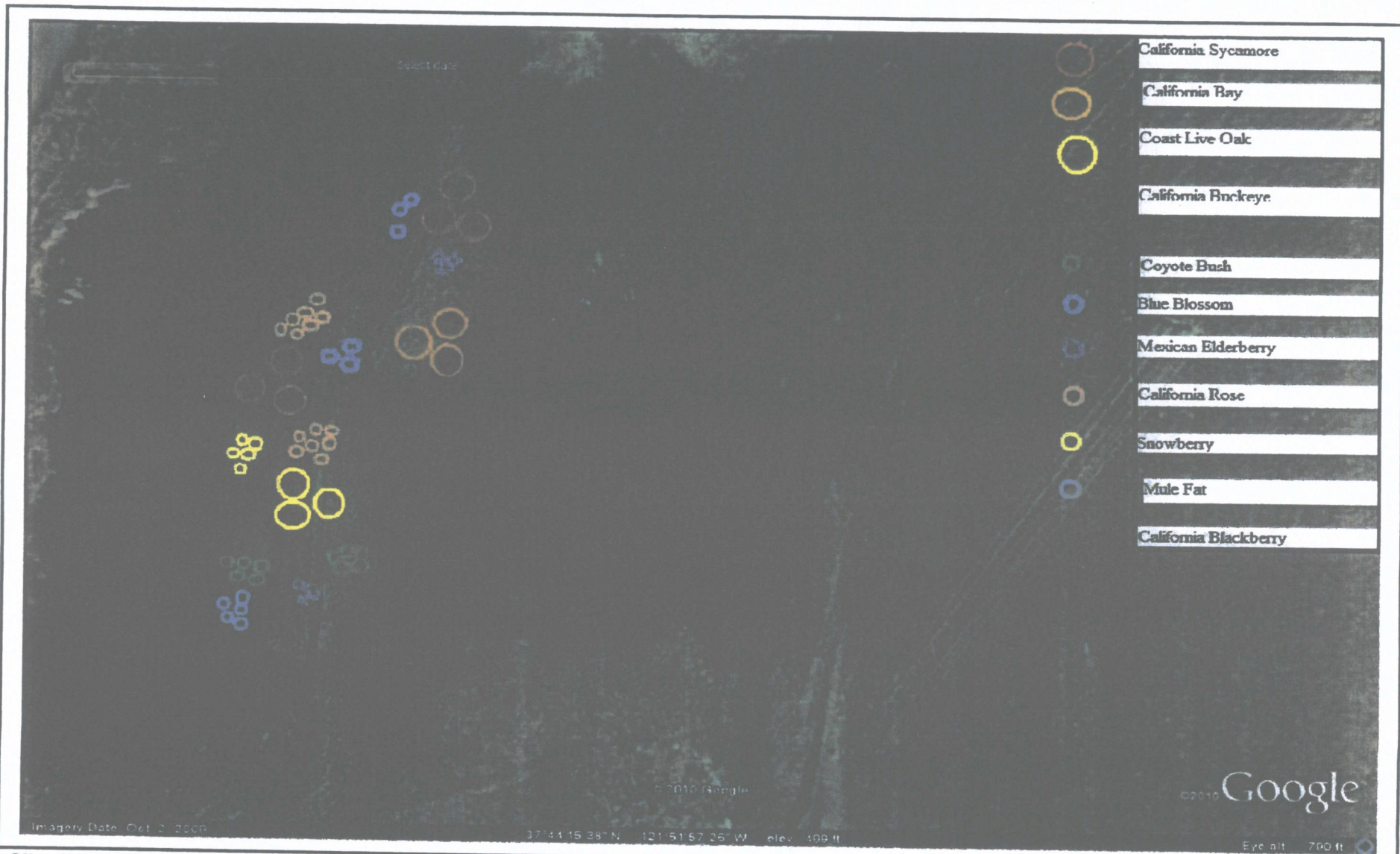
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Figure 6
Mitigation Area Map at the Fallon Crossing
Development Project
 Alameda County, California

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Figure 7
Riparian Planting Plan



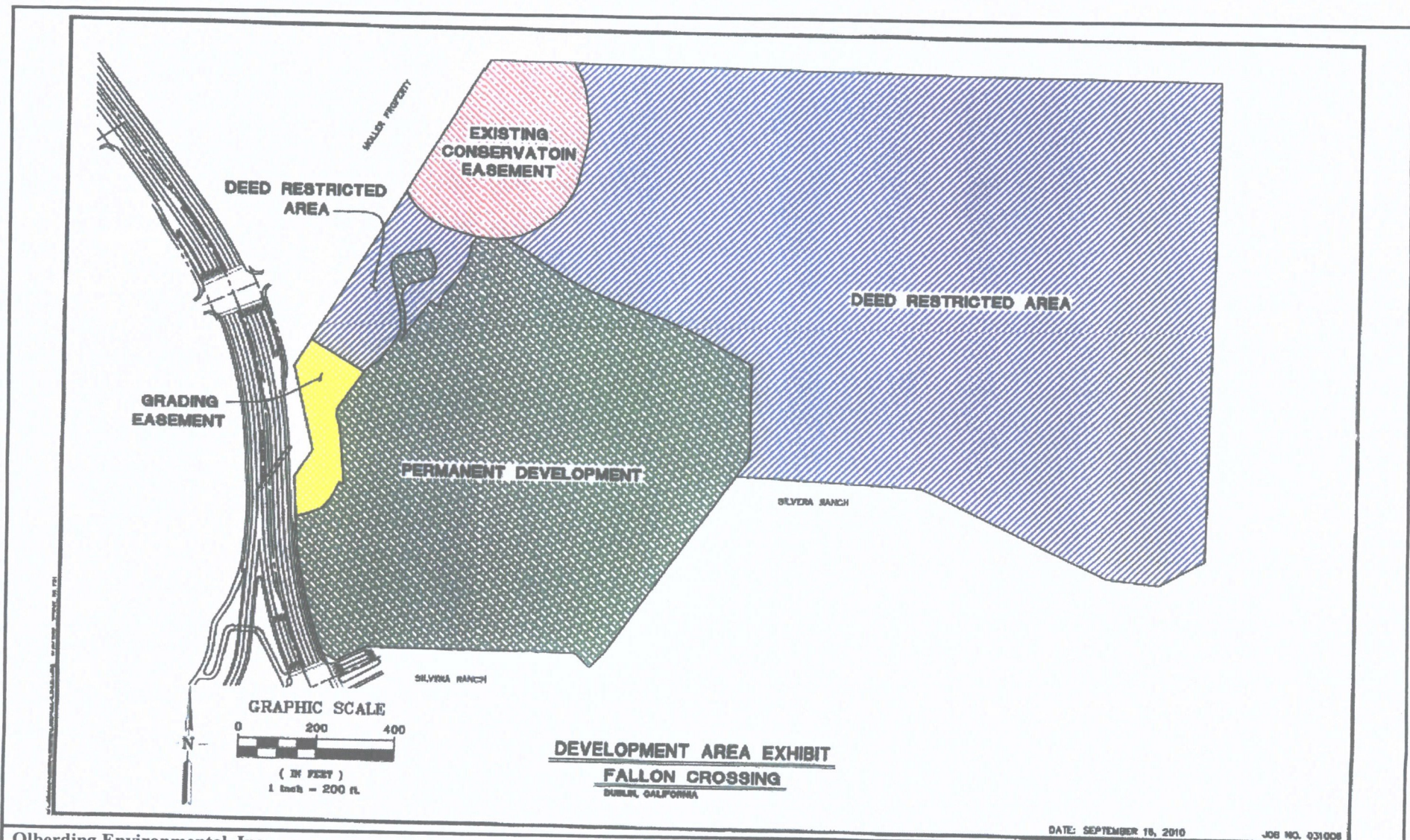
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Figure 7
Riparian Planting Plan at the Fallon Crossing
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Figure 8
Deed Restriction Area Map



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Figure 8
Deed Restriction Area Map at the Fallon Crossing
Development Project
Alameda County, California

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