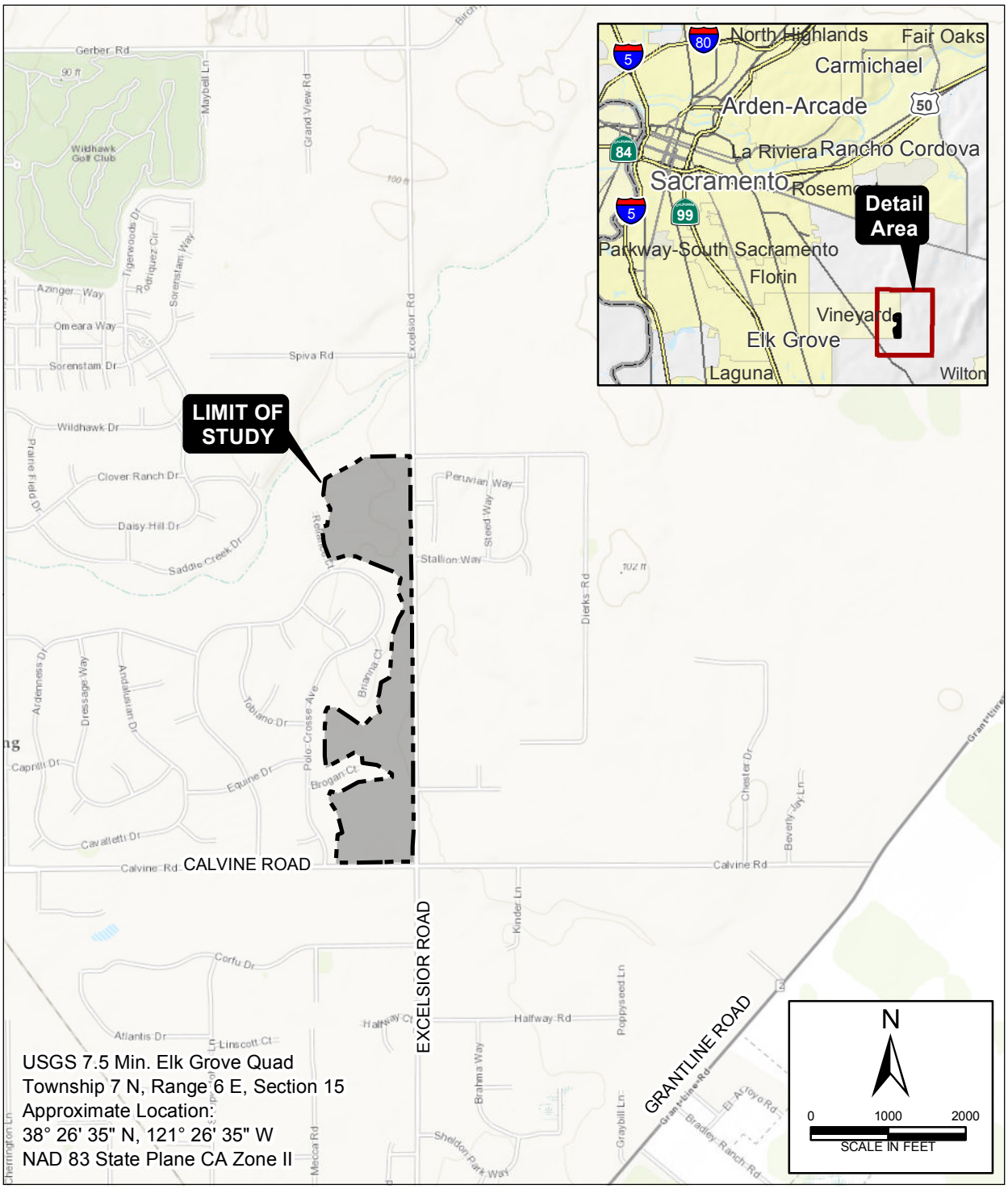
ATTACHMENT A

Public Notice # _____



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DRAWING TITLE: SITE AND VICINITY

PROJECT: Silver Springs East

LOCATION: Sacramento County

DATE: 01/11/2016

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FIGURE 1 OF 3

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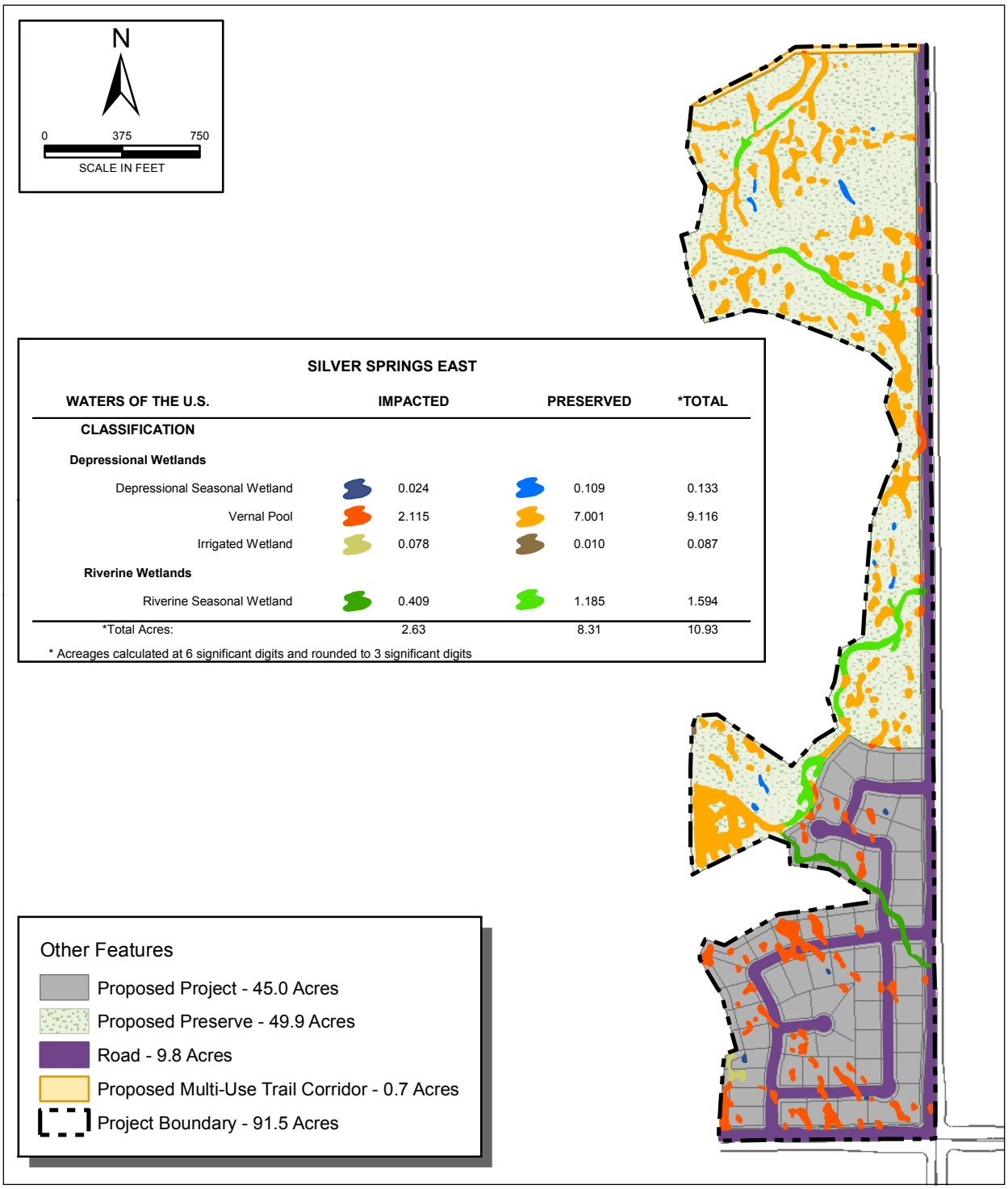

SILVER SPRINGS EAST

WATERS OF THE U.S.	IMPACTED	PRESERVED	*TOTAL
CLASSIFICATION			
Depressional Wetlands			
Depressional Seasonal Wetland	0.024	0.109	0.133
Vernal Pool	2.115	7.001	9.116
Irrigated Wetland	0.078	0.010	0.087
Riverine Wetlands			
Riverine Seasonal Wetland	0.409	1.185	1.594
*Total Acres:	2.63	8.31	10.93

* Acreages calculated at 6 significant digits and rounded to 3 significant digits

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DRAWING TITLE: PROPOSED PROJECT

PROJECT: Silver Springs East

LOCATION: Sacramento County

DATE: 01/11/2016

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FIGURE 2 OF 3

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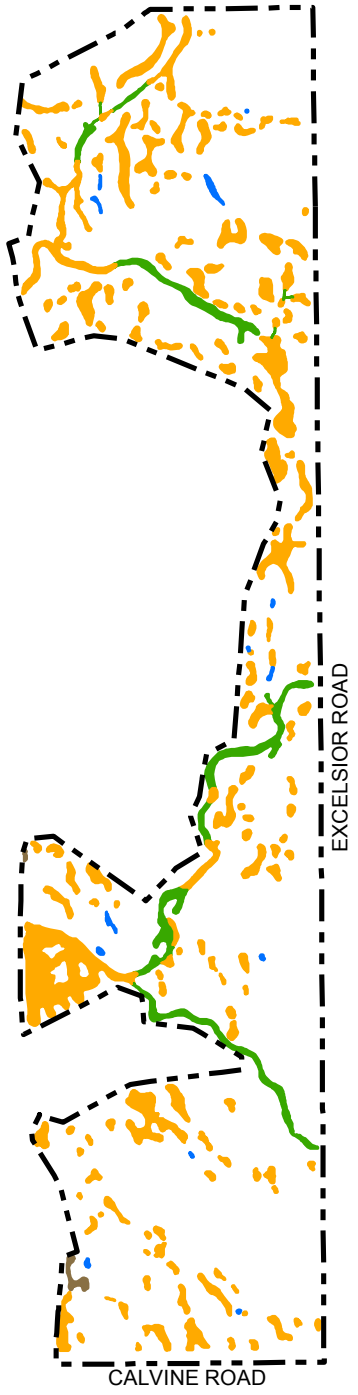
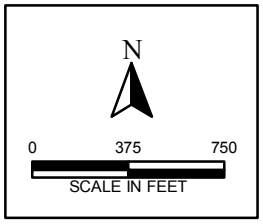
Public Notice # _____

WATERS OF THE UNITED STATES

CLASSIFICATION	ACREAGE
Depressional Wetlands	
Vernal Pool	9.116
Seasonal Wetland	0.133
Irrigated Wetland	0.087
Riverine Wetlands	
Seasonal Wetland	1.594
TOTAL:	**10.93**





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DRAWING TITLE: WETLAND DELINEATION

PROJECT: Silver Springs East

LOCATION: Sacramento County

DATE: 01/11/2016

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FIGURE 3 OF 3

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ATTACHMENT B

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TRANSMITTAL **May 9, 2016**

TO: Lisa Gibson **WITH:** U.S. Army Corps of Engineers

FROM: Ed Armstrong/ Kyrsten Shields

SUBJECT: Mitigation Strategy for Silver Springs East (SPK-2005-00325)

This memorandum summarizes the proposed mitigation strategy for the Silver Springs East Project (SPK-2005-00325). To mitigate for direct effects to waters of the U.S., the Applicant (AKT Silver Springs, LLC) will implement the improvements listed below within the proposed Preserve in order to enhance the functions and values of onsite vernal pools and depressional and riverine seasonal wetlands within the proposed Silver Springs East Preserve. The measures proposed below have been selected based on ongoing observations of long-term land use factors adversely influencing vernal pool and seasonal wetland habitats. As shown on **Figure 1**, proposed improvements include the following measures:

1. Creation of stormwater swales to intercept runoff from existing and proposed development in order to prevent nuisance water from entering the vernal pool complexes and changing their natural hydrologic regime. These features are not anticipated to affect the hydrology of wetlands within the Preserve other than those negatively impacted by non-seasonal runoff;
2. Creation of small water quality ponds to treat runoff from the middle culvert under Excelsior Road, as well as water intercepted by the stormwater swales;
3. Invasive species removal and control of woody vegetation, primarily eucalyptus, which has become established in the Preserve;
4. Clean-up of debris, primarily yard waste, that residents of the existing development have dumped over the backyard fences;
5. Signage and fencing repairs to restrict equestrian access to the Preserve; and
6. Establishment of annual grazing within the Preserve to manage invasive species and create additional microtopography in vernal pools, both of which benefit vernal pool plants and animals.

Implementation of these practices will result in enhancement of 7.01 acres of vernal pools and 1.19 acres of seasonal wetlands, which will offset direct effects to 2.115 acres of vernal pools and 0.40 acres of seasonal wetlands at ratios of 3.3:1 and 3:1 respectively (see **Table 1**, Mitigation Checklist [**Attachment 1**] and discussion below). Additionally, creation of 0.59 acres of water quality wetlands will offset 0.11 acres of direct effects to seasonal and other wetlands at a 5.20:1 ratio.

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Table 1 — Proposed Compensatory Mitigation

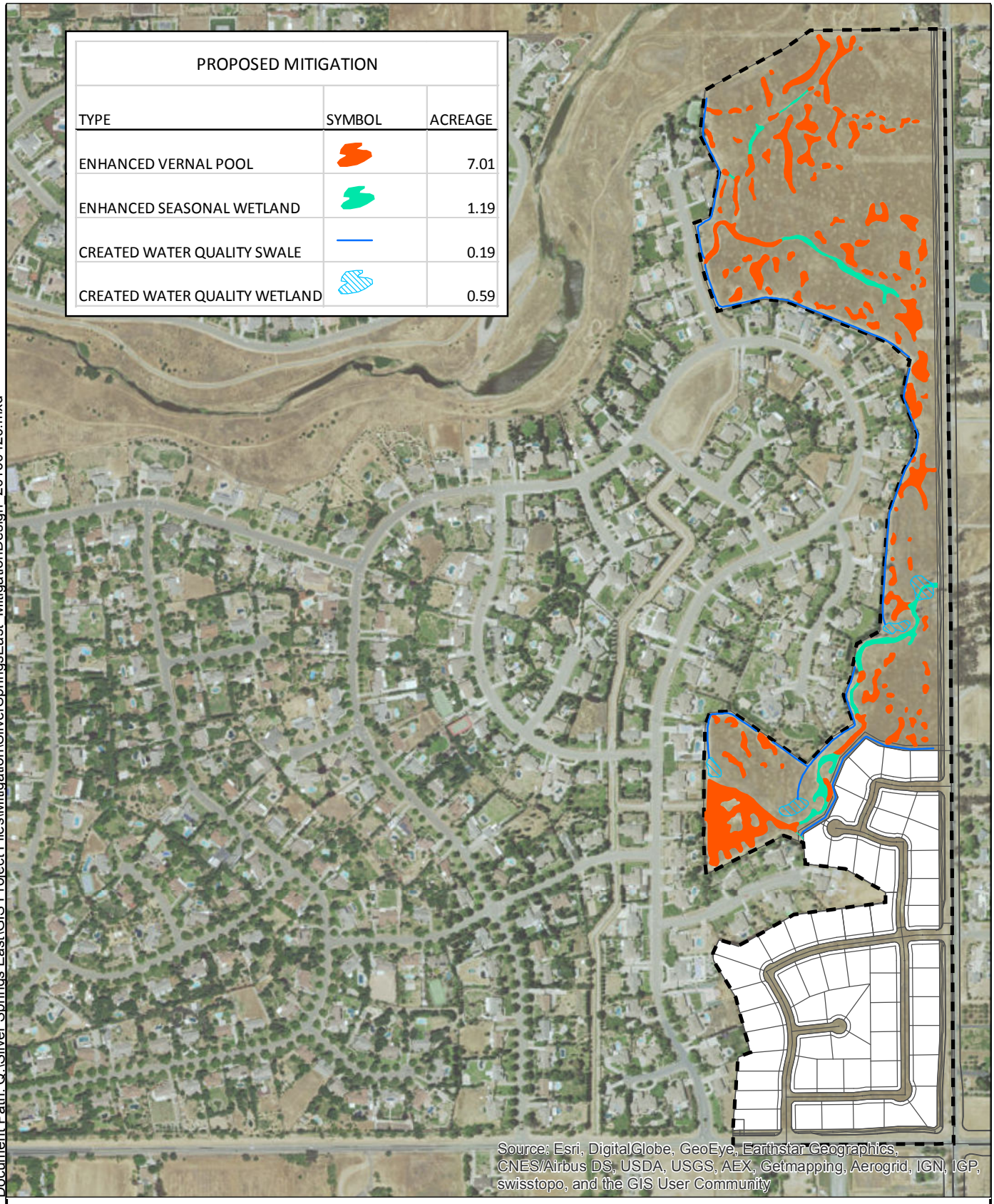
Mitigation Type	Proposed Ratio	Impact Acreage	Mitigation Acreage	Credit at Ratio	Remaining
Vernal Pool Enhancement	3.3 : 1	2.115	7.001	2.122	-0.007
Seasonal Wetland Enhancement	3 : 1	0.511	1.190	0.397	0.114
Water Quality Wetland Creation	5.2 : 1		0.592	0.114	0.000

The Corps Mitigation Checklist (**Attachment 1**) was completed for three mitigation strategies: 1) enhancement of vernal pools, 2) enhancement of seasonal and other wetlands, and 3) creation of water quality wetlands. Creation of approximately 5,600 linear feet of water quality swales was not considered, but would add additional functions and values amounting to approximately 0.19 acre to the Preserve (assuming a swale width of 1.5 feet).

A CRAM analysis was conducted on the Silver Springs East project site in 2010 by the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and Foothill Associates, and largely reflects the existing current conditions in the Preserve. However, site assessments conducted by Foothill Associates in 2015 identified additional degradation within onsite vernal pools resulting from stormwater and irrigation runoff from adjacent residences abutting the Preserve. Because this condition was not included in the prior analysis, the 2010 CRAM was updated to reflect current conditions (**Attachment 2**). A post-project CRAM score was developed based upon the proposed improvements, and the BAMI process was used in Step 3 of the Mitigation Checklist to determine the base mitigation ratio for vernal pool enhancement (see CRAM/BAMI analysis materials, **Attachment 2**). Because the 2010 CRAM focused on vernal pools, Step 2 (the Qualitative Impact-Mitigation Comparison) was used to determine baseline ratios for Seasonal Wetland Enhancement and Water Quality Wetland Creation.

In summary, the enhancement of 7.01 acres of vernal pools and 1.19 acres of seasonal wetlands will offset project-related direct effects to 2.115 acres of vernal pools and 0.40 acres of seasonal wetlands at ratios of 3.3:1 and 3:1 respectively. Additionally, creation of 0.59 acres of water quality wetlands will offset 0.11 acres of direct effects to seasonal and irrigated wetlands at a 5.20:1 ratio. This proposed strategy therefore fully satisfies the mitigation obligation for direct effects to waters of the U.S. for the Silver Springs East Project.

If you have any questions, please feel free to contact us at (916) 435-1202. Thank you.



PROPOSED MITIGATION

TYPE	SYMBOL	ACREAGE
ENHANCED VERNAL POOL		7.01
ENHANCED SEASONAL WETLAND		1.19
CREATED WATER QUALITY SWALE		0.19
CREATED WATER QUALITY WETLAND		0.59

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SILVER SPINGS EAST MITIGATION STRATEGY

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N

0 325 650
Feet
1 inch = 650 feet

Drawn By: ETA
Date: 04/20/2016

FIGURE 1

SILVER SPRINGS EAST (LOT P)

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Lot P - Direct Impacts - Baseline Scenario

1	Date:	Corps File No.:		Project Manager:			
	Impact Site Name:	ON SITE RESTORATION	ORM Resource Type:	ON-SITE CREATION		Hydrology:	
	Impact Cowardin or HGM type:		Impact area : Direct Impacts		acres Impact distance:		linear feet
		Column A - Direct Effects		**Column B - Direct Effects**		**Column C -Direct Effects**	
		Mitigation Site Name:	Lot P	Mitigation Site Name:	Lot P	Mitigation Site Name:	Lot P
		Mitigation Type:	Enhancement	Mitigation Type:	Enhancement	Mitigation Type:	Creation
		ORM Resource Type:		ORM Resource Type:		ORM Resource Type:	
		Cowardin/HGM type:	Vernal Pool	Cowardin/HGM type:	Non-VP wetlands	Cowardin/HGM type:	Water Quality Wetlands
		Hydrology:		Hydrology:		Hydrology:	
2	**Qualitative impact-mitigation comparison**:	Starting ratio:	**N/A : N/A**	Starting ratio:	**1.0 : 1.0**	Starting ratio:	**1.0 : 1.0**
		Ratio adjustment:		Ratio adjustment:	**1.0**	Ratio adjustment:	**2.0**
		Baseline ratio:	**1.00 : 1.00**	Baseline ratio:	**2.00 : 1.00**	Baseline ratio:	**3.00 : 1.00**
		PM justification: N/A -- CRAM/BAMI used to determine on-site enhancement		PM justification: Enhancement adds functions and values, but to an extent less than that lost by directly effected wetlands; therefore I > M.		PM justification: Created water quality wetlands add functions and values to site similar to, but slightly less than, those lost by impacted non-VP wetlands.	
3	**Quantitative impact-mitigation comparison**:	Ratio adjustment from BAMI procedure (attached):	**2.3 : 1.0**	Ratio adjustment from BAMI procedure (attached):	**N/A : N/A**	Ratio adjustment from BAMI procedure (attached):	**N/A : N/A**
4	**Mitigation site location**:	Ratio adjustment:	**0**	Ratio adjustment:	**0**	Ratio adjustment:	**0**
		PM justification: Mitigation site is within the same watershed as impact site.		PM justification: Mitigation site is within the same watershed as impact site.		PM justification: Mitigation site is within the same watershed as impact site.	
5	**Net loss of aquatic resource surface area**:	Ratio adjustment:	**1**	Ratio adjustment:	**1**	Ratio adjustment:	**0**
		PM justification: Enhancement is +1		PM justification: Enhamcement is +1		PM justification: No net loss	
6	**Type conversion:**	Ratio adjustment:	**0**	Ratio adjustment:	**0**	Ratio adjustment:	**1**
		PM justification: In-kind mitigation		PM justification: In-kind mitigation		PM justification:out-of-kind mitigation	
7	**Risk and uncertainty**:	Ratio adjustment:	**0**	Ratio adjustment:	**0**	Ratio adjustment:	**0.2**
		PM justification: No risk uncertainty in enhancement of established and functioning vernal pools through land management changes.		PM justification: No risk uncertainty in enhancement of established and functioning wetlands through land management changes.		PM justification: Applicant is experienced creating wetlands with greater than 90% success rate	
8	**Temporal loss**:	Ratio adjustment:	**0**	Ratio adjustment:	**0**	Ratio adjustment:	**1**
		PM justification: No temporal loss since applicant will enhance established and functioning vernal pools		PM justification: No temporal loss since applicant will enhance established and functioning wetlands		PM justification: Herbaceous vegetation	
9	**Final mitigation ratio(s):**	Baseline ratio from 2 or 3:	2.30 : 1.00	Baseline ratio from 2 or 3:	2.00 : 1.00	Baseline ratio from 2 or 3:	3.00 : 1.00
		Total adjustments (4-8):	1	Total adjustments (4-8):	1	Total adjustments (4-8):	2.2
		Final ratio:	**3.30 : 1.00**	Final ratio:	**3.00 : 1.00**	Final ratio:	**5.20 : 1.00**
		Proposed impact (total):	2.115 acres	Proposed impact:	0.51 acres	Remaining impact (acres):	0.11 acres
			0 linear feet		0 linear feet	Remaining impact (linear feet):	0 linear feet
		to Resource type:	0	to Resource type:	0	to Resource type:	0
		Cowardin or HGM:	0	Cowardin or HGM:	0	Cowardin or HGM:	0
		Hydrology:	On Site	Hydrology:	On Site	Hydrology:	On Site
		Required Mitigation*:	6.98 acres	Required Mitigation*:	1.53 acres	Required Mitigation:	0.59 acres
			0 linear feet		0.0 linear feet		0.0 linear feet
		of Resource type:	0	of Resource type:	0	of Resource type:	0
		Cowardin or HGM:	Vernal Pool	Cowardin or HGM:	Non-VP wetlands	Cowardin or HGM:	Water Quality Wetlands
		Hydrology:	0	Hydrology:	0	Hydrology:	0
		Proposed Mitigation**:	7.00 acres	Proposed Mitigation**:	1.19 acres	Proposed Mitigation**:	0.59 acres
			linear feet		linear feet		linear feet
		Impact Unmitigated:	0 %	Impact Unmitigated:	22 %	Impact Unmitigated:	0 %
			-0.01 acres		0.11 acres		0.00 acres
		Additional PM comments:		Additional PM comments:		Additional PM comments:	
10	**requirements:**						

*At PM's discretion, if applicant's proposed mitigation is less than checklist requirement and additional mitigation type(s) proposed, complete additional columns as needed.
**Only enter proposed mitigation into spreadsheet if accepting applicant's lower (than required ratio) proposal.

CRAM / BAMI Analysis

Silver Springs East Project
Sacramento County, California

Prepared for:

AKT Silver Springs, LLC

May 9, 2016

Submitted by:

FOOTHILL ASSOCIATES

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1.0 INTRODUCTION

1.1 Purpose and Background

This report summarizes the methods and findings of the California Rapid Assessment Method (CRAM)/Before-After-Mitigation-Impact (BAMI) analysis prepared in support of the Draft Mitigation Strategy for Lot P in March and April, 2016. This analysis is based upon a CRAM performed by the U.S. Army Corps of Engineers (Corps), U.S. Fish and Wildlife Service (Service) and Foothill Associates on July 9, 2010. This CRAM, updated based upon existing conditions, forms the baseline condition for the BAMI. The future condition CRAM is based upon "Figure 2 – Proposed Project", dated January 11, 2016, from the draft Public Notice, prepared by Foothill Associates. This analysis was conducted to determine the baseline mitigation ratio using Step 3, Quantitative Impact-Mitigation Comparison in the U.S. Army Corps of Engineers (Corps) Mitigation Ratio Setting Checklist (Attachment 12501.1 of 1205-SPD Regulatory Program Standard Operating Procedure for Determination of Mitigation Ratios).

1.2 Project Description

The ±92-acre Silver Springs East project site is located in southern Sacramento County, immediately north of and adjacent to the City of Elk Grove city limits. It is bound on the north by the Laguna Creek Corridor and low density residential development, on the south by Calvine Road, on the east by Excelsior Road and on the west by existing residential development (**Figure 1**). It is located in the U.S.G.S. *Elk Grove* 7.5' quadrangle and includes a portion of Section 15, Township 7 North, Range 6 East, MDBM.

Development of the Silver Springs East Project (Proposed Project) will result in the construction of 57 single-family residences on 45 acres in a rapidly urbanizing area of Sacramento County. The Proposed Project will also result in the establishment of a 49.9-acre preserve and a proposed 0.7-acre multi-use trail corridor (**Figure 2**).

As shown in **Table 1** below, a total of 10.93 acres of waters of the U.S. have been delineated within the project site including: 9.116 acres of vernal pools, 0.133 acre of depressional seasonal wetland, 0.087 acre of irrigated wetland, and 1.594 acres of riverine seasonal wetland. Development of the Proposed Project will result in direct impacts to 2.63 acres of waters of the U.S., which includes 2.115 acres of vernal pools, 0.024 acre of depressional seasonal wetland, 0.078 acre of irrigated wetland, and 0.409 acre of riverine seasonal wetland. The Proposed Project will avoid and preserve a total of 8.31 acres of waters of the U.S. which includes 7.001 acres of vernal pools, 0.109 acre of depressional seasonal wetland, 0.010 acre of irrigated wetland, and 1.185 acres of riverine seasonal wetland.

Table 1 — Jurisdictional Aquatic Features

Waters of the U.S. Acreage			
Classification	**Direct Impacts**	**Preserved**	**Total**
Depressional Wetlands			
Vernal Pool	2.115	7.001	9.116
Seasonal Wetland	0.024	0.109	0.133
Irrigated Wetland	0.078	0.010	0.087
Riverine Wetlands			
Seasonal Wetland	0.409	1.185	1.594
Total	**2.63**	**8.31**	**10.93**

1.3 Compensatory Mitigation

The Proposed Project has been designed and will be constructed to avoid and minimize adverse effects to waters of the U.S. to the maximum extent possible. Compensatory mitigation will be used to supplement minimization measures to the extent necessary to ensure that adverse effects to the aquatic environment are minimized. The proposed mitigation for the Proposed Project consists of two components: preservation and enhancement. The project proponent shall mitigate for direct impacts within the Silver Springs East Preserve (Preserve) through three mechanisms:

1. Preserving existing vernal pools, depressional seasonal wetlands, and riverine seasonal wetlands;

2. Enhancing all wetlands within the proposed preserve through establishment of management strategies to prohibit trespass and implement seasonal grazing; and

3. Creation of a number of swales and other detention features designed to minimize the impact of nuisance runoff currently impacting existing wetland features.

1.3.1 Preservation Component

A total of 8.31 acres of wetlands are proposed for onsite preservation within the proposed preserve, which is comprised of 7.001 acres of vernal pools, 0.109 acre of depressional seasonal wetland, 0.010 acre of irrigated wetland, and 1.185 acres of riverine seasonal wetlands.

1.3.2 Enhancement Component

In addition to the preservation component described above, the project proponent will undertake the following improvements within the proposed preserve in order to enhance the natural habitat value and restore vernal pool, depressional and riverine seasonal

wetland features within the proposed preserve. These improvements include the following measures:

1. Establishment of stormwater swales to intercept runoff from existing and proposed development in order to prevent nuisance water from entering the vernal pool complexes and changing their natural hydrologic regime. These features are not anticipated to affect the hydrology of wetlands within the Preserve other than those negatively impacted by non-seasonal runoff;

2. Establishment of small water quality ponds to treat runoff from the middle culvert under Excelsior Road;

3. Invasive species removal and control of woody vegetation (primarily eucalyptus);

4. Clean-up of debris (primarily yard waste) that residents of the existing development have dumped over the backyard fences;

5. Signage and fencing repairs to restrict equestrian and other non-authorized access to the proposed preserve; and

6. Establishment of a regular seasonal (October through May) grazing program outlined in a Corps-approved Operations and Management Plan for the proposed preserve.

Enacting these methods will significantly improve the quality of wetland habitats within the proposed preserve.

2.0 ASSESSMENT METHODS

2.1 California Rapid Assessment Method

The California Rapid Assessment Method (CRAM) was used to assess the existing, pre-project conditions and the proposed post-project conditions. CRAM is a rapid assessment protocol for monitoring the conditions of wetlands. It is designed to assess ambient conditions of wetlands throughout the State, including vernal pools, and is also useful for assessing the performance of restoration projects. Within any one area each type of wetland is assessed separately using the appropriate field book. Thus, while the general CRAM approach is the same for all wetlands, the criteria used to evaluate a riparian area are different than a vernal pool or seasonal marsh.

In vernal pool landscapes, such as on the Silver Springs East project site, CRAM is most often used to assess systems of vernal pools. Vernal pools that are isolated or significantly different from the surrounding pools in the system (i.e. much larger or deeper) are assessed as individual pools. The Assessment Area (AA) for a vernal pool system is typically established based on the hydrology of the vernal pool landscape as well as anthropogenic hydrologic changes such as weirs, levees, or raised road beds. A single AA should include all pools located within one drainage system with a preferred maximum size of 10 hectares and a minimum size of at least three pools. The AA for both individual vernal pools and vernal pool systems extends up to 30 meters from the perimeter of the pools or to the edge of the microwatershed, whichever is less. As mentioned above, only wetlands of a single type are included in the CRAM analysis. Thus, although the AA may contain a number of riverine seasonal wetlands or swales connecting the vernal pools, these swales are not included in the vernal pool system CRAM analysis.

CRAM evaluates the conditions of vernal pools based on the average of four primary attributes: Buffer and Landscape Context, Hydrology, Physical Structure, and Biotic Structure. Within each attribute there are a number of metrics and submetrics. Each metric is evaluated against a scoring rubric for the specific type of wetland and given a letter score of A through D, which corresponds to numeric scores of 12, 9, 6, and 3. An "A" score represents the highest score for each metric and generally indicates that there is little to no non-natural influences on that metric. A "D" score indicates that the wetland is highly degraded or not functioning naturally in regards to the metric in question. The highest total score is 100; the lowest is 25. Each of the evaluation metrics area are discussed in more detail in **Table 2** below.

Table 2 — Summary of CRAM Score Sheet for Vernal Pools

Metric	Description
Attribute 1: Buffer and Landscape Context	
Aquatic Area Abundance	This metric measures the proximity of the AA to other aquatic habitat within 500 meters. Aquatic features in close proximity are assumed to have a greater potential to interact ecologically and hydrologically. The entirety of other vernal pool system AAs are considered "wetland habitat" for the purposes of this metric.
Buffer	Buffer is the area surrounding the AA that is in a natural or semi-natural state and helps protect the AA from stress or disturbance, such as contaminants, human disturbance, or non-native predators. It can extend up to 250 meters from the edge of the AA.
Buffer: Percent of AA with Buffer	This sub-metric measures the percent of the AA perimeter that is surrounded by at least 5 meters of buffer land.
Buffer: Average Width of Buffer	This sub-metric measures the average width of the buffer identified in the sub-metric above.
Buffer: Condition	This sub-metric evaluates the condition of the buffer zones identified previously.
Attribute 2: Hydrology	
Water Source	This metric reflects whether the water source effecting the AA hydrology is natural or altered.
Hydroperiod	This metric evaluates impacts to the frequency and duration of inundation of the AA.
Hydrologic Connectivity	This metric reflects the ability of water to drain out of the AA and is influenced by the presence of levees, road grades, and similar hydrologic constraints.
Attribute 3: Physical Structure	
Structural Patch Richness	This metric evaluates the number of different physical features that provide varied microhabitats within the AA. A total of 17 habitat patch types are possible.
Pool and Swale Density (VP Systems only)	This metric evaluates the density of wetlands, including both vernal pools and swales, within the AA. This metric is not used in individual vernal pool scoring.
Topographic Complexity	This metric assesses the macro- and micro-topographic complexity of a subset of randomly selected vernal pools within the AA. Between 3 and 6 pools are evaluated.
Attribute 4: Biotic Structure	
Horizontal Interspersion and Zonation	This metric measures the number of distinct plant zones and the amount and complexity of edges between them. The same 3-6 pools used for topographic complexity are evaluated here.
Plant Community	This metric reflects the diversity and health of the native plant community. The same 3-6 pools used for topographic complexity are evaluated here.
Plant Community: # of Codominant Species	This sub-metric evaluates the diversity of plant species in each pool evaluated. Dominant species are those with 10% or greater relative cover.
Plant Community: Percent Non-Native	The sub-metric reflects the number of non-native dominant species found the group of evaluated pools.

Metric	Description
Plant Community: Endemic Species Richness	This sub-metric evaluates the number of vernal pool endemic dominant species found the group of evaluated pools.

2.2 Pre-Project Assessment

An analysis was completed on Silver Springs East project site on July 9, 2010 by a team comprised of U.S. Army Corps of Engineers staff, U.S. Fish and Wildlife Service staff, and Foothill Associates staff. This assessment was completed using the CRAM *Version 5.0.3 Vernal Pool Systems* and *Individual Vernal Pools* Field Books. Six AAs were established, consisting of four vernal pool systems and 2 individual vernal pools (**Figure 3**). The AAs were created by dividing the project site into geographic sub-areas, rather than based entirely on hydrologic connectivity and watersheds.

2.2.1 Modifications to the 2010 CRAM scores

Modifications were made to the scores of two sections of the 2010 CRAM to reflect current site conditions. In 2010, the sub-metrics *Water Source* and *Hydroperiod* were evaluated as A scores for most of the AAs, indicating that there was no substantial artificial water sources or artificially extended inundation. However, site assessments completed in 2015 noted that nuisance irrigation runoff from the adjacent residences is impacting a number of existing vernal pools on the project site. Therefore, the scores for both of these metrics was lowered to reflect current non-natural conditions. Additionally, the *Pool and Swale Density* metric was not used in Version 5.0.3. This has been calculated based on current conditions and added to the pre-project CRAM scores for the purposes of the BAMI analysis. The modified 2010 CRAM scores are shown in **Appendix A**.

2.3 Post-Project Assessment

In March 2016, the proposed post-project condition was assessed using the CRAM *Version 6.1 Vernal Pool Systems* and *Individual Vernal Pools* Field Books. For consistency, the same AAs were used as in the 2010 evaluation (**Figure 3**). Of these, two AAs will be eliminated completely and one is partially directly impacted by the proposed development.

2.3.1 Assumptions for 2016 CRAM Analysis

As described previously, the proposed mitigation plan will construct perimeter swales between the existing and proposed residential development and the preserved vernal pool systems to intercept nuisance irrigation runoff. Similar water quality wetlands will be constructed on the main drainage from Excelsior Road to catch and treat the first flush of road runoff before it enters the preserved vernal pools. Additionally, the non-native Eucalyptus trees will be removed from along the drainage. The area will also be managed as an open space preserve with perimeter fencing to prevent unauthorized access and the Preserve will implement a regular grazing regime. The proposed

development and mitigation plan are assumed to impact various CRAM metric and sub-metric scores as follows:

- *Percent AA with Buffer*: Decreased on some AAs due to new development on southern portion of project site.

- *Buffer Width*: Decreased on some AAs due to new development on southern portion of project site.

- *Buffer Condition*: Increased to reflect removal of non-native trees, less disturbance by people as compared to existing conditions due to new perimeter fencing, and expected improvement in annual grassland condition due to regular grazing.

- *Water Source*: Increased for all AAs since new swale will intercept nuisance runoff.

- *Hydroperiod*: Increased for all AAs since new swale will intercept nuisance runoff.

- *Hydrologic Connectivity*: Reduced for some AAs due to adjacent grading and development.

- *Structural Patch Richness*: Reduced in one AA due to direct impacts from proposed development.

- *Topographic Complexity*: Increased due to implementation of grazing, which will create more micro-topography within the vernal pools.

- *Plant Co-Dominance*: Increased due to increased topographic complexity and reduction in thatch resulting from implementation of grazing.

- *Percent Non-Native Species*: Score increased to reflect a decrease in non-native species due to implementation of grazing, which is anticipated to remove thatch and reduce grasses, creating a more favorable habitat for native vernal pool species.

- *Endemic Species Richness*: Increased due to implementation of grazing, which is anticipated to remove thatch and reduce grasses, creating a more favorable habitat for native vernal pool species.

The 2016 CRAM scores are shown in **Appendix B**.

3.0 BAMI ANALYSIS

The modified 2010 CRAM scores (**Appendix A**) and the 2016 CRAM scores (**Appendix B**) were used to conduct a Before-After Mitigation Impact (BAMI) analysis. While two of the AAs (A-3 and B-2) will be completely impacted, the CRAM scores of the five remaining AAs are expected to increase due to the proposed mitigation plan. The most significant improvements to all the remaining AAs are to the hydrology attribute. It is expected that there will be improvements to the *Buffer and Landscape Condition* attribute in the majority of the AAs. Changes in CRAM Attribute scores are summarized in **Chart 1**. **Chart 2** shows the change in overall CRAM scores. The complete BAMI spreadsheet is included in **Appendix C**.

Chart 1 — Summary of Change in CRAM Attribute Scores

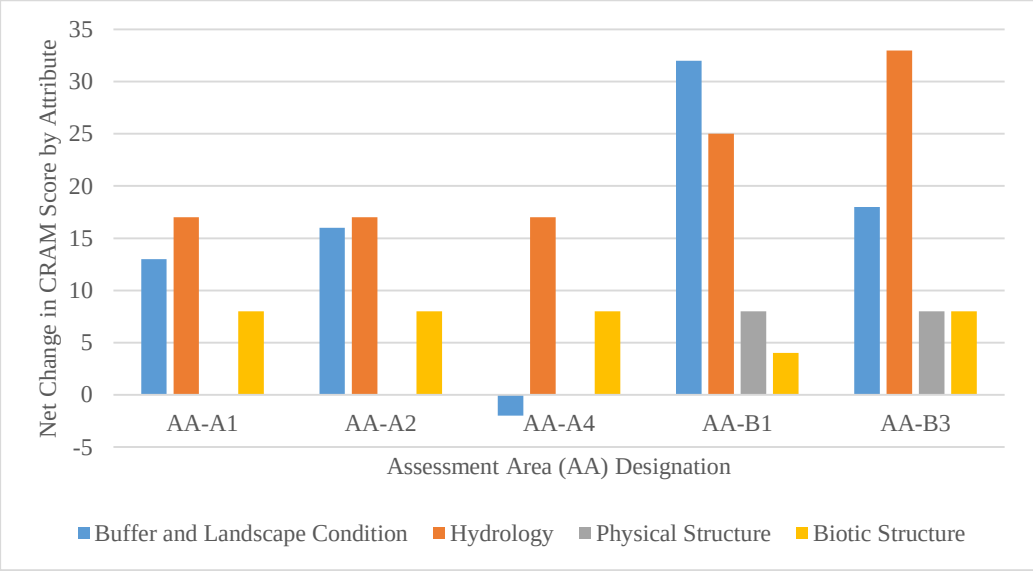
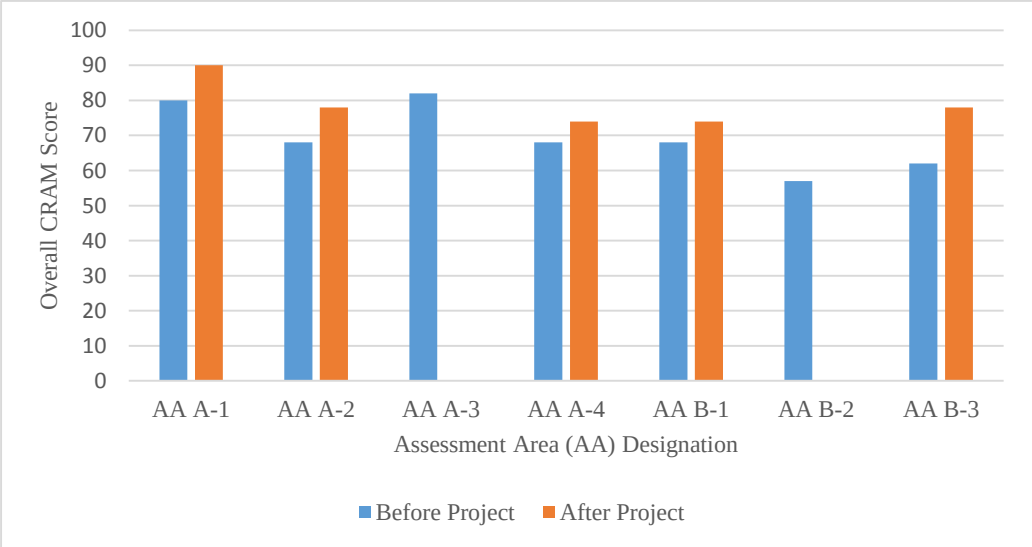
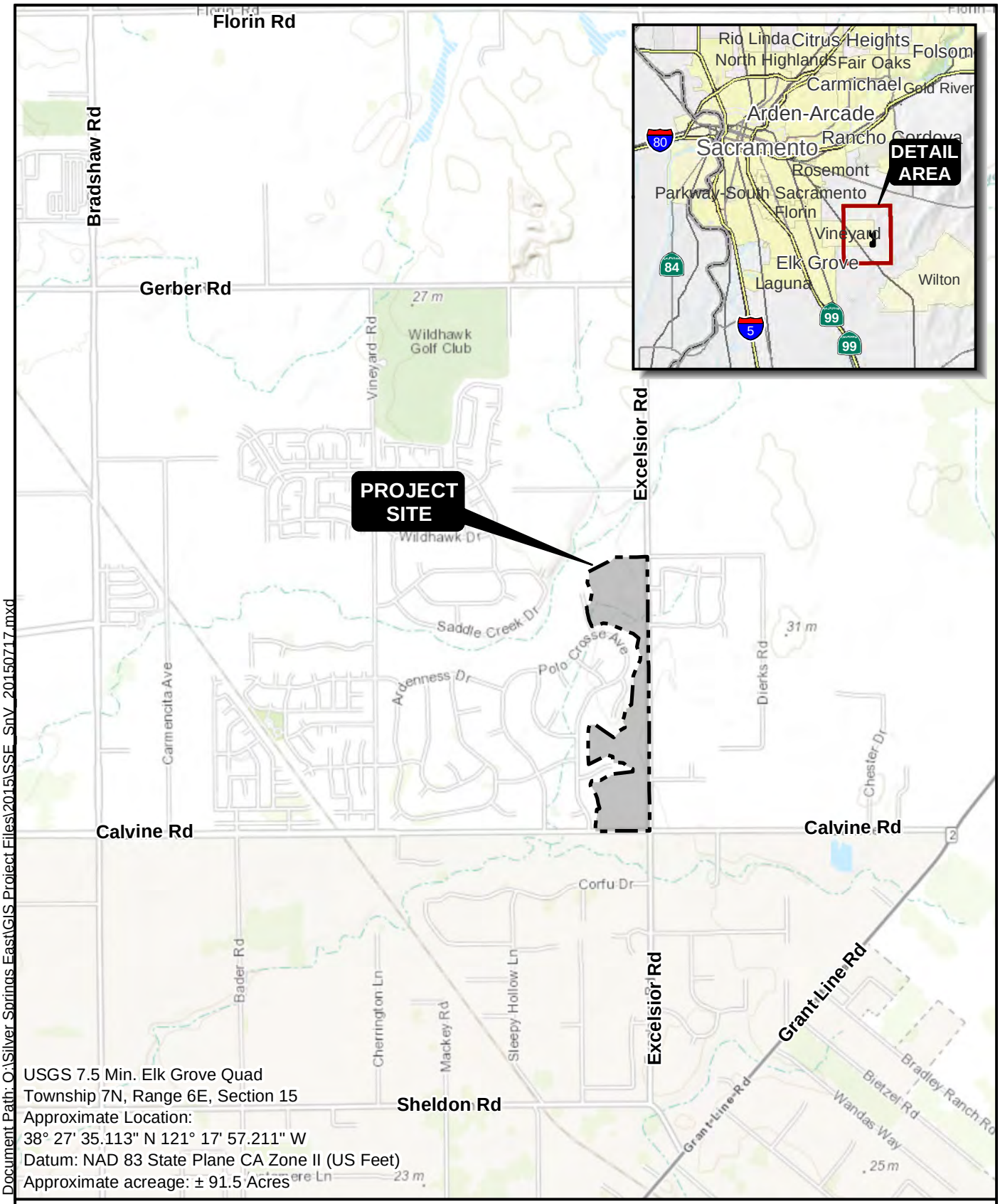


Chart 2 — Change in Overall CRAM Score





USGS 7.5 Min. Elk Grove Quad
Township 7N, Range 6E, Section 15
Approximate Location:
38° 27' 35.113" N 121° 17' 57.211" W
Datum: NAD 83 State Plane CA Zone II (US Feet)
Approximate acreage: ± 91.5 Acres

Document Path: O:\Silver Springs East\GIS Project Files\2015\SSE_SnV_20150717.mxd

SITE AND VICINITY

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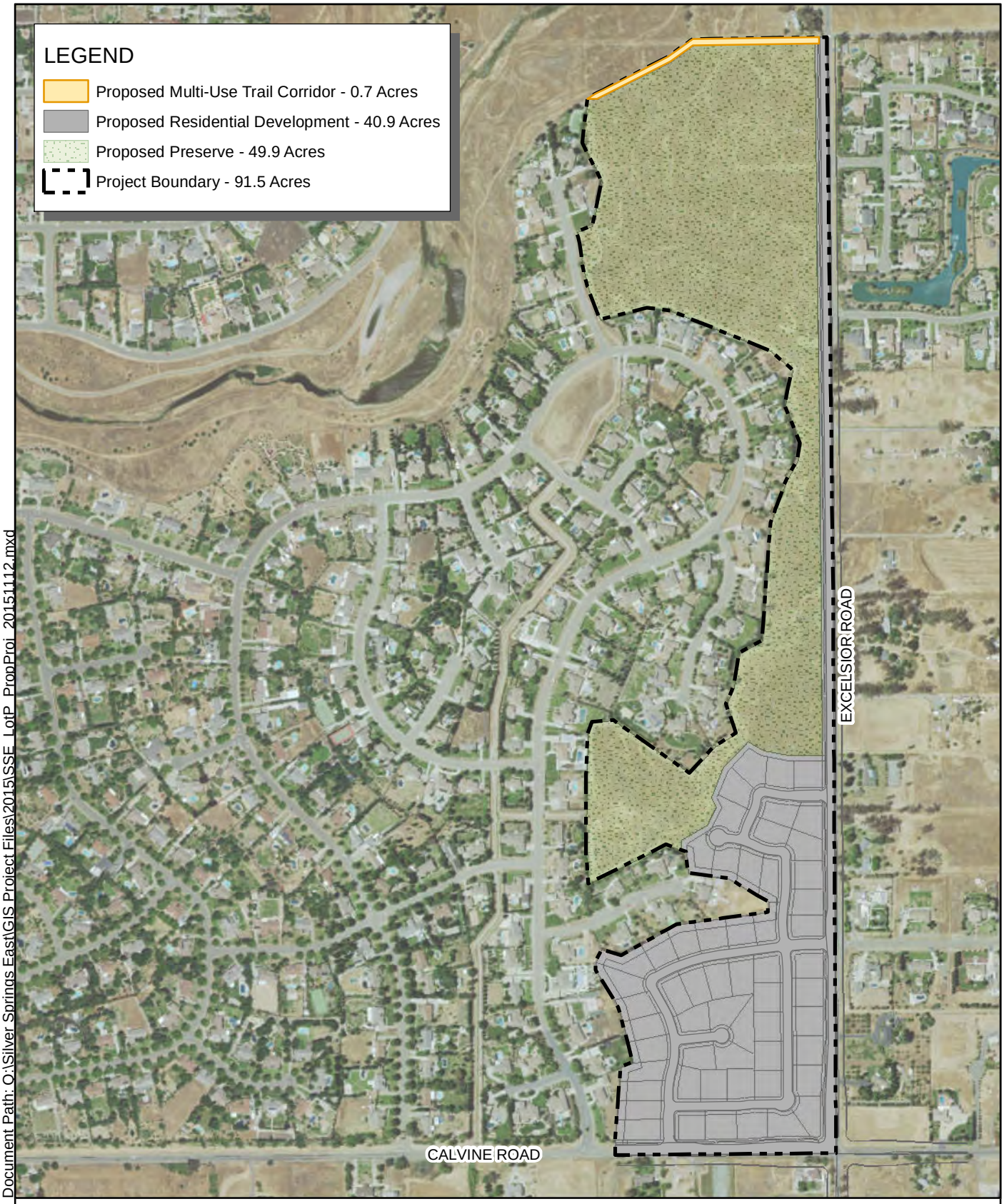
© 2016

N

0 0.25 0.5
Miles
1 in = 0.5 miles

Drawn By: MUB
Date: 07/17/2015

FIGURE 1



Document Path: Q:\Silver Springs East\GIS Project Files\2015\SSE_LotP_PropProj_20151112.mxd

PROPOSED PROJECT

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© 2016

N

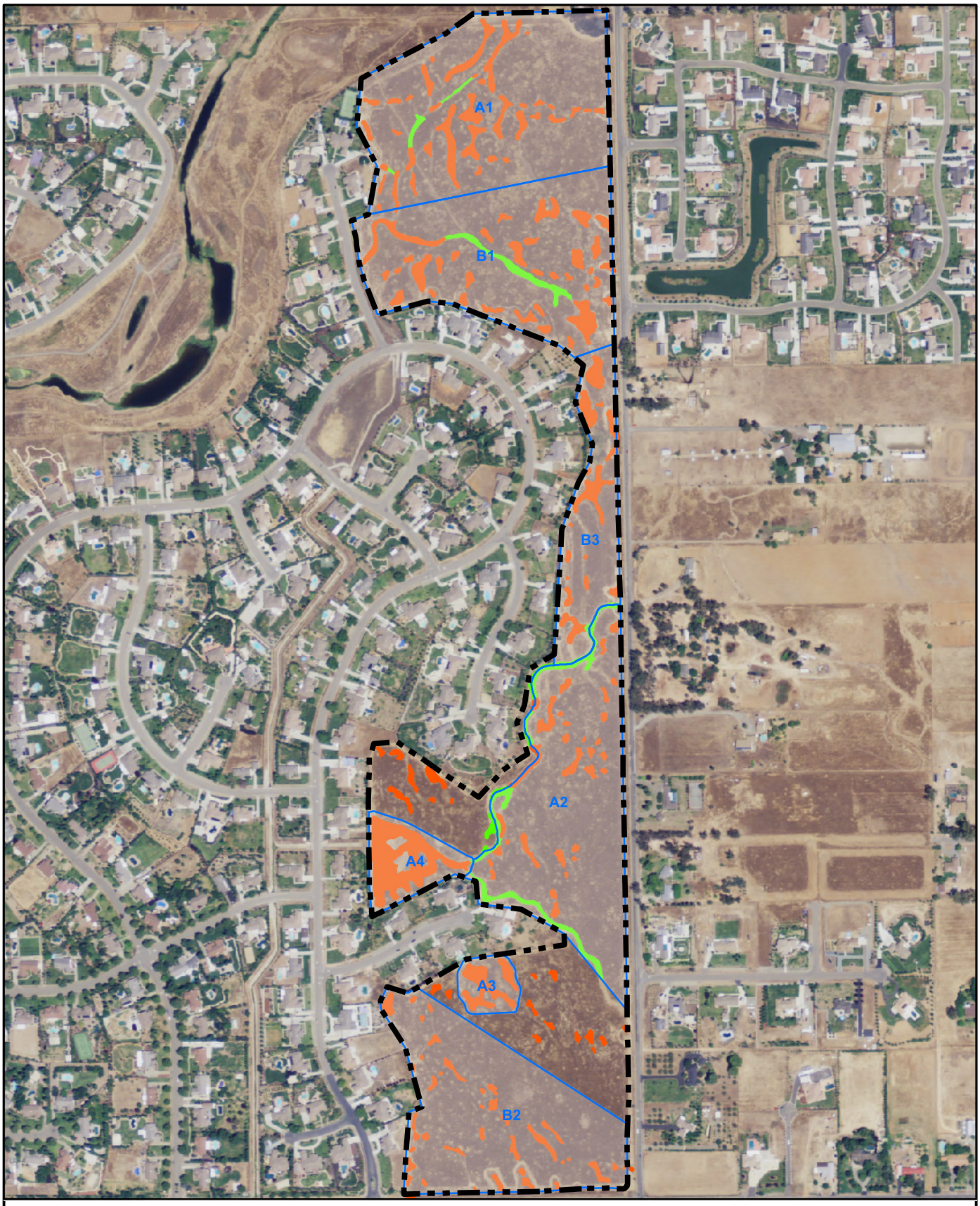
0 325 650
Feet
1 inch = 650 feet

Drawn By: MUB
Date: 11/16/2015

FIGURE 2

SILVER SPRINGS EAST

Document Name: SSE_LotP_PropProj_20151112 : 11/16/2015 1:20:31 PM



2010 CRAM ANALYSIS SECTIONS

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N

0 300 600
SCALE IN FEET

Drawn By: RJM
Date: 10/08/10

FIGURE 3

SILVER SPRINGS EAST

cram_analysis_sections.mxd © 2010

Appendix A — Modified 2010 CRAM Scores

Adjusted 2010 CRAM Assessment

Assessment Area	A-1 (System)	A-2 (System)	A-3 (Individual)	A-4 (Individual)	B-1 (System)	B-2 (System)	B-3 (System)
Landscape Connectivity	9	9	12	9	12	9	12
Percent AA with Buffer	9	6	12	9	6	6	3
Buffer Width	12	9	9	6	12	9	9
Buffer Condition	9	6	9	6	6	6	6
Buffer and Landscape Context Attribute	**77.80**	**65.17**	**90.30**	**65.17**	**79.73**	**65.17**	**73.27**
Water Source	9	6	9	9	6	6	6
Hydroperiod	9	9	9	9	9	9	9
Hydrologic Connectivity	9	9	9	6	6	6	3
Hydrology Attribute	**75.00**	**67.00**	**75.00**	**67.00**	**58.00**	**58.00**	**50.00**
Structural Patch Richness	12	12	12	9	12	9	9
Pool and Swale Density	9	6	N/A	N/A	9	6	6
Topographic Complexity	12	9	12	12	9	6	9
Physical Structure Attribute	**137.50**	**112.50**	**100.00**	**87.50**	**125.00**	**87.50**	**100.00**
Horizontal Interspersion	12	9	12	12	9	9	9
Plant Co -Dominance	12	12	12	12	12	12	12
Percent Invasion	6	6	6	3	6	6	3
Endemic Species Richness	9	9	9	3	12	6	6
Biological Structure Attribute	**87.50**	**75.00**	**87.50**	**75.00**	**79.17**	**70.83**	**66.67**
Overall Score	**94.4**	**79.9**	**88.2**	**73.7**	**85.5**	**70.4**	**72.5**

This assessment was done using CRAM Version 5.0 on 7/9/2010
Landscape Connectivity and Hydrology updated to match current conditions

Appendix B — 2016 CRAM Scores

2016 CRAM Assessment

Assessment Area	A-1 (System)	A-2 (System)	A-3 (Individual)	A-4 (Individual)	B-1 (System)	B-2 (System)	B-3 (System)
Aquatic Area Abundance	9	9	0	3	12	0	12
Percent AA with Buffer	9	6	0	3	6	0	3
Buffer Width	12	6	0	6	12	0	9
Buffer Condition	9	9	0	9	9	0	9
Buffer and Landscape Context Attribute	**77.80**	**68.12**	**0.00**	**38.25**	**86.41**	**0**	**78.49**
Water Source	12	12	0	12	12	0	12
Hydroperiod	12	12	0	12	12	0	12
Hydrologic Connectivity	9	6	0	6	6	0	6
Hydrology Attribute	**91.67**	**83.33**	**0.00**	**83.33**	**83.33**	**0.00**	**83.33**
Structural Patch Richness	12	9	0	9	12	0	9
Pool and Swale Density	9	6	0	N/A	9	0	6
Topographic Complexity	12	12	0	12	12	0	12
Physical Structure Attribute	**91.67**	**75.00**	**0.00**	**87.50**	**91.67**	**0.00**	**75.00**
Horizontal Interspersion	12	9	0	12	9	0	9
Plant Co -Dominance	12	12	0	12	12	0	12
Percent Non-native	9	9	0	6	9	0	6
Endemic Species Richness	12	12	0	6	12	0	9
Biological Structure Attribute	**95.83**	**83.33**	**0.00**	**83.33**	**83.33**	**0.00**	**75.00**
Overall Score	**89.24**	**77.45**	**0.00**	**73.10**	**86.19**	**0.00**	**77.96**

Assessment done using CRAM Version 6.1 for Vernal Pool Systems and Individual Pools

Appendix C — BAMI Assessment

Attachment 12501.4-SPD - Before-After-Mitigation-Impact (BAMI) procedure

	AA A-3 Impact			AA B-2 Impact			AA A-1 Mitigation			AA A-2 Mitigation		
Functions/conditions	$Impact_{Before}$	$Impact_{After}$	$Impact_{delta}$	$Impact_{Before}$	$Impact_{After}$	$Impact_{delta}$	$Mitigation_{Before}$	$Mitigation_{After}$	$Mitigation_{delta}$	$Mitigation_{Before}$	$Mitigation_{After}$	$Mitigation_{delta}$
4.1 Buffer and Landscape Context												
4.1.1 Aquatic Area Abundance	6	0	-6	3	0	-3	6	9	3	6	9	3
4.1.2 Percent of AA with Buffer	12	0	-12	6	0	-6	9	9	0	6	6	0
4.1.3 Average Buffer Width	9	0	-9	9	0	-9	12	12	0	9	6	-3
4.1.4 Buffer Condition	9	0	-9	6	0	-6	9	9	0	6	9	3
RAW SCORE	**15.7**	**0.0**	**-16**	**9.6**	**0.0**	**-10**	**15.7**	**18.7**	**3**	**12.6**	**16.3**	**4**
FINAL SCORE	**65.3**	**0.0**	**-65**	**40.2**	**0.0**	**-40**	**65.3**	**77.8**	**13**	**52.7**	**68.2**	**16**
4.2 Attribute 2: Hydrology												
4.2.1 Water Source	9	0	-9	6	0	-6	9	12	3	6	12	6
4.2.2 Hydroperiod or Channel Stability	9	0	-9	9	0	-9	9	12	3	9	12	3
4.2.3 Hydrologic Connectivity	9	0	-9	6	0	-6	9	9	0	9	6	-3
RAW SCORE	**27.0**	**0.0**	**-27**	**21.0**	**0.0**	**-21**	**27.0**	**33.0**	**6**	**24.0**	**30.0**	**6**
FINAL SCORE	**75.0**	**0.0**	**-75**	**58.4**	**0.0**	**-58**	**75.0**	**91.7**	**17**	**66.7**	**83.4**	**17**
4.3 Attribute 3: Physical Structure												
4.3.1 Structural Patch Richness	12	0	-12	9	0	-9	12	12	0	12	9	-3
4.3.2 Pool and Swale Density				6	0	-6	9	9	0	6	6	0
4.3.3 Topographic Complexity	12	0	-12	6	0	-6	12	12	0	9	12	3
RAW SCORE	**24.0**	**0.0**	**-24**	**21.0**	**0.0**	**-21**	**33.0**	**33.0**	**0**	**27.0**	**27.0**	**0**
FINAL SCORE	**100.0**	**0.0**	**-100**	**58.4**	**0.0**	**-58**	**91.7**	**91.7**	**0**	**75.0**	**75.0**	**0**
4.4 Attribute 4: Biotic Structure												
4.4.1 Interspersion/Zonation	12	0	-12	9	0	-9	12	12	0	9	9	0
4.4.2 Co-Dominant Species	12	0	-12	12	0	-12	12	12	0	12	12	0
4.4.3 Percent Invasion	6	0	-6	6	0	-6	6	9	3	6	9	3
4.4.4 Endemic spp Richness	9	0	-9	6	0	-6	9	12	3	9	12	3
RAW SCORE	**21**	**0**	**-21**	**17**	**0**	**-17**	**21**	**23**	**2**	**18**	**20**	**2**
FINAL SCORE	**87.5**	**0.0**	**-88**	**70.9**	**0.0**	**-71**	**87.5**	**95.9**	**8**	**75.0**	**83.4**	**8**
OVERALL SCORE	**82.0**	**0.0**	**-82**	**57.0**	**0.0**	**-57**	**80.0**	**90.0**	**10**	**68.0**	**78.0**	**10**

Attachment 12501.4-SPD - Before-Aft

Functions/conditions	AA A-4 Mitigation			AA B-1 Mitigation			AA B-3 Mitigation		
	$Mitigation_{Before}$	$Mitigation_{After}$	$Mitigation_{delta}$	$Mitigation_{Before}$	$Mitigation_{After}$	$Mitigation_{delta}$	$Mitigation_{Before}$	$Mitigation_{After}$	$Mitigation_{delta}$
4.1 Buffer and Landscape Context									
4.1.1 Aquatic Area Abundance	3	3	0	6	12	6	9	12	3
4.1.2 Percent of AA with Buffer	9	3	-6	6	6	0	3	3	0
4.1.3 Average Buffer Width	6	6	0	12	12	0	9	9	0
4.1.4 Buffer Condition	6	9	3	6	9	3	6	9	3
RAW SCORE	**9.6**	**9.2**	**0**	**13.1**	**20.7**	**8**	**14.6**	**18.8**	**4**
FINAL SCORE	**40.2**	**38.3**	**-2**	**54.8**	**86.5**	**32**	**60.8**	**78.5**	**18**
4.2 Attribute 2: Hydrology									
4.2.1 Water Source	9	12	3	6	12	6	6	12	6
4.2.2 Hydroperiod or Channel Stability	9	12	3	9	12	3	9	12	3
4.2.3 Hydrologic Connectivity	6	6	0	6	6	0	3	6	3
RAW SCORE	**24.0**	**30.0**	**6**	**21.0**	**30.0**	**9**	**18.0**	**30.0**	**12**
FINAL SCORE	**66.7**	**83.4**	**17**	**58.4**	**83.4**	**25**	**50.0**	**83.4**	**33**
4.3 Attribute 3: Physical Structure									
4.3.1 Structural Patch Richness	9	9	0	12	12	0	9	9	0
4.3.2 Pool and Swale Density				9	9	0	6	6	0
4.3.3 Topographic Complexity	12	12	0	9	12	3	9	12	3
RAW SCORE	**21.0**	**21.0**	**0**	**30.0**	**33.0**	**3**	**24.0**	**27.0**	**3**
FINAL SCORE	**87.5**	**87.5**	**0**	**83.4**	**91.7**	**8**	**66.7**	**75.0**	**8**
4.4 Attribute 4: Biotic Structure									
4.4.1 Interspersion/Zonation	12	12	0	9	9	0	9	9	0
4.4.2 Co-Dominant Species	12	12	0	12	12	0	12	12	0
4.4.3 Percent Invasion	3	6	3	6	9	3	3	6	3
4.4.4 Endemic spp Richness	3	6	3	12	12	0	6	9	3
									Quotient=ABS(M/I)$_{deltas}$
RAW SCORE	**18**	**20**	**2**	**19**	**20**	**1**	**16**	**18**	**2**
FINAL SCORE	**75.0**	**83.4**	**8**	**79.2**	**83.4**	**4**	**66.7**	**75.0**	**8**
OVERALL SCORE	**68.0**	**74.0**	**6**	**69.0**	**87.0**	**18**	**62.0**	**78.0**	**16**

41/95

Baseline ratio:

2.3 : 1.0