ATTACHMENT 2 - 134-0220-NC

SUNSET POINT RD

DRAFT

Pinellas County, Florida

Bridge Replacement Report Phase II

Sunset Point Road Bridge

Project Number 000625A

Pinellas County

Prepared For:

Pinellas County ENVIRONMENT AND INFRASTRUCTURE

Department of Environment & Infrastructure

Engineering & Technical Support Division

Prepared By:

H.W. Lochner, Inc.

September 2013

LOCHNER

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TABLE OF CONTENTS

Section **Page**

LIST OF TABLES ..... **III**

LIST OF FIGURES ..... **IV**

EXECUTIVE SUMMARY **1**

SECTION 1 INTRODUCTION **2**

SECTION 2 EXISTING CONDITIONS **3**

2.1 Roadway 3
2.2 Structure 6
2.2.1 Bridge Typical Section 6
2.2.2 Asbestos Containing Materials (ACM) 7
2.2.3 Bridge Replacement Study Recommendation 7
2.3 Survey 7
2.4 Utilities 8
2.5 Geotechnical 8
2.6 Drainage 8
2.6.1 Existing Drainage 8
2.6.2 Proposed Drainage 10
2.7 Wetlands 11
2.7.1 SW-1 11
2.8 Protected Species 12
2.9 Permitting 12

SECTION 3 PROPOSED DESIGN CRITERIA **14**

3.1 Roadway 14
3.2 Bridge 16
3.2.1 Typical Section 16
3.2.2 Standards and Specifications 16
3.2.3 Design Methodology 16
3.2.4 Design Loadings 16
3.2.5 Material Properties 17
3.2.6 Environmental Classification 17
3.2.7 Hydraulics 17
3.2.8 Bridge Drainage 17
3.2.9 Utilities 17
3.2.10 Bridge Lighting 17
3.2.11 Signage 17
3.2.12 Noise Walls 17

3.2.13 Retaining Walls 17
3.2.14 Aesthetics 17
3.2.15 Traffic Data 18
3.2.16 ADA 18
3.2.17 Load Rating 18

SECTION 4 MAINTENANCE OF TRAFFIC 19

SECTION 5 DEVELOPMENT OF BRIDGE ALTERNATIVES 20

5.1 Bridge Alternatives 20
5.2 Box Culvert Cost Estimate 20

APPENDIX A PLAN AND ELEVATION DRAWING A-1

APPENDIX B COST ESTIMATE B-1

APPENDIX C BRIDGE REPLACEMENT STUDY C-1

APPENDIX D REFERENCE DOCUMENTATION D-1

APPENDIX E PRELIMINARY DESIGN CALCULATIONS E-1

LIST OF TABLES

Table	Title	Page
Table 1	Recommended Estimated Bridge Probable Construction Cost	1
Table 2	Roadway Design Criteria	15
Table 3	Design Dead Loads	16
Table 4	Material Properties	17
Table 5	2009 PER Bridge Alternatives Evaluated	20
Table 6	Estimated Bridge Probable Construction Costs	20

LIST OF FIGURES

Figure **Page**

Figure 1 – Project Location Map 2
Figure 2 – Sunset Point Road Looking East 3
Figure 3 – Aerial View of Bridge and Surrounding Homes 4
Figure 4 – Aerial View of Bridge and Existing Right-of-Way 5
Figure 5 – Existing Bridge Elevation 6
Figure 6 – Existing Pedestrian Truss Bridge 7
Figure 7 – Drainage Basin Map 9
Figure 8 – FEMA Flood Stages Map 10
Figure 9 – SW-1 Boundaries 11
Figure 10 – Sunset Point Road Detours 19

Executive Summary

The Sunset Point Road Bridge (No. BR0003) over Spring Branch Creek (**Figure 1**) is located on Sunset Point Road less than 200 feet west of North Betty Lane and approximately 1200 feet east of Douglas Avenue in Clearwater, Florida. The Pinellas County Department of Environment & Infrastructure, Engineering & Technical Support Division requested LOCHNER perform a Bridge Replacement Study to evaluate a bridge repair/rehabilitation versus a bridge replacement alternative. The recommendations were summarized in the Phase I Bridge Replacement Study dated March 2012 (**Appendix C**). Based on the replacement recommendation of the Study, LOCHNER was requested to provide a Bridge Replacement Report - Phase II for the Sunset Point Road Bridge. The objective of this report is two-fold. First, provide documented roadway, structural, environmental/stormwater and geotechnical criteria, standards, and impacts for the replacement of the existing structure. Second, provide an engineer's estimate for the bridge replacement as recommended in the Phase I Bridge Replacement Study.

Based on the information and analysis contained in this study, the estimated construction cost for the bridge replacement is the following:

Table 1
Recommended Estimated Bridge Probable Construction Cost

	10' x 10' Dual Cell CIP Box Culvert
Structure/Roadway	$406,259
Removal/Relocation of Existing Structures [3]	$41,220
Construction over Water 3% Premium [1]	$13,424
Estimated Bridge Construction Cost Subtotal	$460,903
Contingency (25% of Total) [2]	$115,226
Estimated Bridge Probable Construction Cost	$576,129

[1] A construction over water premium of 3% is used as recommended by FDOT.
[2] A contingency to account for project unknowns of 25% is included.
[3] Includes relocation of existing pedestrian truss bridge.

Based on Table 1, the Estimated Bridge Probable Construction Cost is approximately $576,129. This estimate does not include environmental mitigation, utility relocations, roadway/drainage improvement costs and engineering design fees.

Section 1 Introduction

The Sunset Point Road Bridge (No. BR0003) over Spring Branch Creek (**Figure 1**) is located on Sunset Point Road less than 200 feet west of North Betty Lane and approximately 1200 feet east of Douglas Avenue in Clearwater, Florida. The Pinellas County Department of Environment & Infrastructure, Engineering & Technical Support Division requested LOCHNER perform a Bridge Replacement Study to evaluate a bridge repair/rehabilitation versus a bridge replacement alternative. The recommendations were summarized in the Phase I Bridge Replacement Study dated March 2012 (**Appendix C**). Based on the replacement recommendation of the Study, LOCHNER was requested to provide a Bridge Replacement Report - Phase II for the Sunset Point Road Bridge. The objective of this report is two-fold. First, provide documented roadway, structural, environmental/stormwater and geotechnical criteria, standards, and impacts for the replacement of the existing structure. Second, provide an engineer's estimate for the bridge replacement as recommended in the Phase I Bridge Replacement Study.

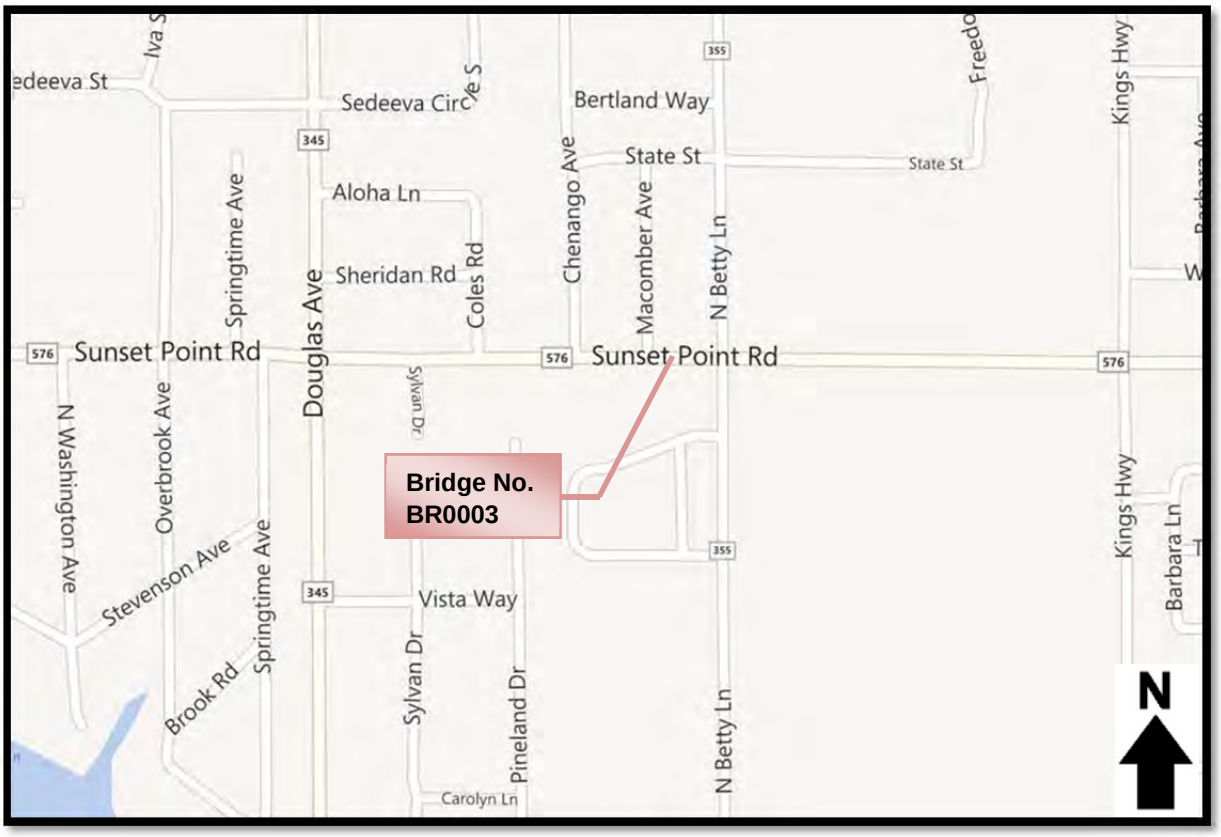


Figure 1 – Project Location Map

Section 2 Existing Conditions

2.1 ROADWAY

Sunset Point Road is classified as an Urban Minor Arterial per Pinellas County and provides east-west access through the County. The existing roadway (**Figure 2**) consists of two 12'-0" lanes with concrete curb on each side. Presently, there are no exclusive left turn lanes or right turn lanes within the vicinity of the bridge. There are no sidewalks or bicycle lanes on the roadway approaches to the bridge; however, there is an existing pedestrian truss structure located south of the bridge to accommodate pedestrians. Existing plans of the bridge were not available for this report.

The asphalt approaches to the bridge are generally in fair condition. Current traffic volume information was not available for this evaluation; however, based on the Sunset Point Road / North Betty Lane Intersection Feasibility Report (IFR) prepared by Lochner, the design year 2025 traffic projections (two-way) are: AADT = 9,667 between Edgewater Drive and North Betty Lane and AADT = 13,936 between North Betty Lane and Highland Avenue. The posted speed limit along Sunset Point Road is currently 35 mph. Based on the Florida Greenbook, traffic railing barriers need to satisfy TL-2 requirements for roads with design speeds less than 45 mph (Section C3.b). The existing bridge barriers may not meet current NHRCP 350 standards since they are not crash tested.

Figure 2 – Sunset Point Road Looking East

An area of concern with the bridge work at this location is the proximity of adjacent driveways and residences to the bridge and the maintenance of traffic for both vehicles and pedestrians during the bridge replacement construction (**Figure 3**).

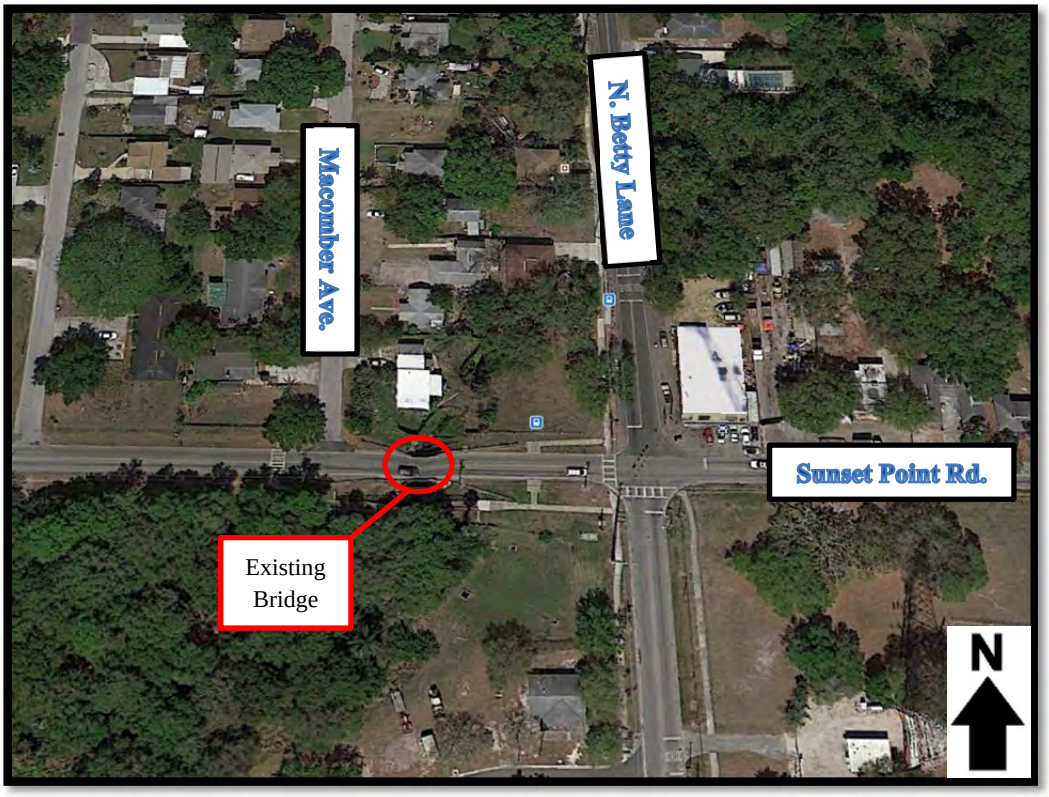


Figure 3 – Aerial View of Bridge and Surrounding Homes

Based on the Pinellas County GIS website and the 2009 Preliminary Engineering Report (PER), the existing right-of-way is 76-ft (26-feet to the north of the survey baseline and 50-feet to the south of the survey baseline) along Sunset Point Road between North Betty Lane and Macomber Avenue (**Figure 4**). Pinellas County also owns the two properties to the north of Sunset Point Road between N. Betty Lane and Macomber Avenue.

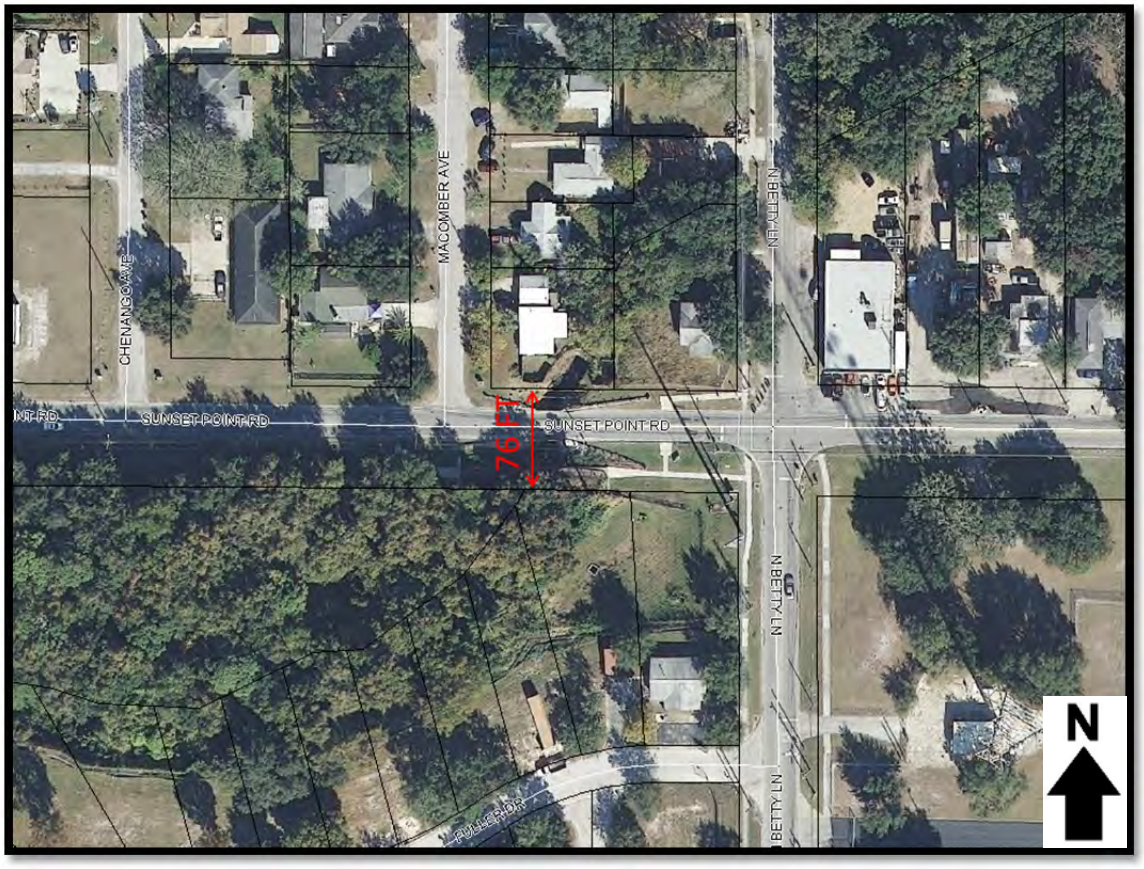


Figure 4 – Aerial View of Bridge and Existing Right-of-Way

2.2 STRUCTURE

2.2.1 Bridge Typical Section

The site of the existing bridge (Bridge No. BR0003) over Spring Branch Creek is located on Sunset Point Road less than 200 feet west of North Betty Lane and approximately 1200 feet east of Douglas Avenue in Clearwater, Florida. The structure is a cast-in-place concrete arch culvert with a span length of 19 feet (**Figure 5**) and a width of approximately 23 feet. The typical section consists of two 9'-3" wide lanes with 1'-3" shoulders and 8" wide concrete barriers. Existing bridge plans are not available and the year of construction is unknown. Based upon substandard lane widths and substandard traffic barriers, the bridge is functionally obsolete.

Figure 5 – Existing Bridge Elevation

There is a prefabricated truss pedestrian bridge (Bridge No. PB0015) located immediately to the south of the vehicular bridge which currently accommodates pedestrian traffic. The pedestrian bridge (**Figure 6**) is approximately 110-feet long with approximately 21-feet of lateral separation from the vehicular bridge. This pedestrian structure will be impacted by the construction of the proposed bridge. The substructure will need to be completely removed and the pedestrian truss bridge will be relocated to a site specified by the County.

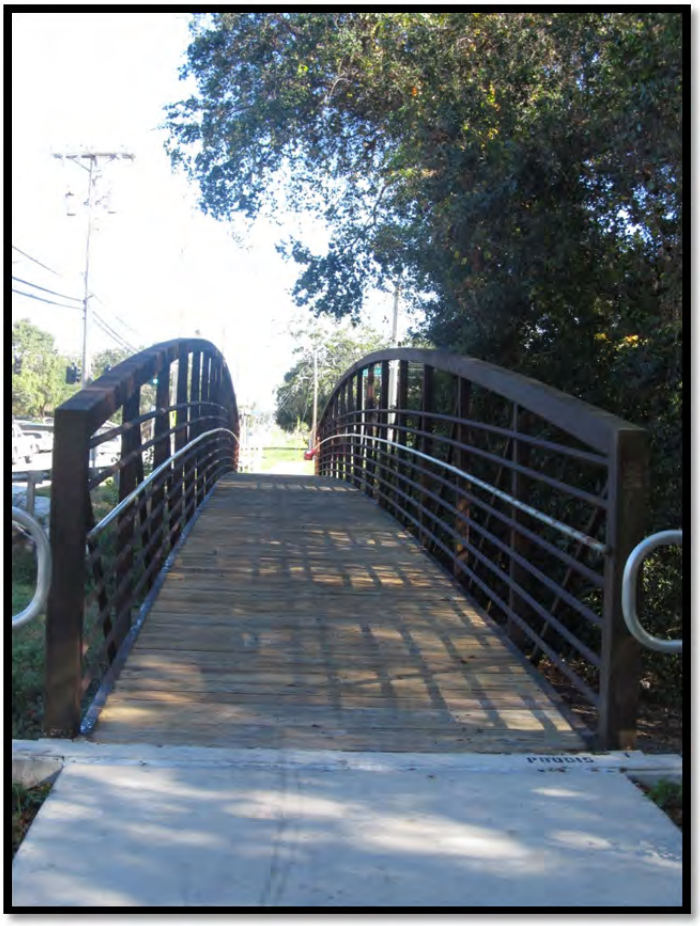


Figure 6 – Existing Pedestrian Truss Bridge

2.2.2 Asbestos Containing Materials (ACM)

The existing bridge may contain asbestos; therefore, the presence of the asbestos containing materials must be tested prior to the removal of the existing bridge and identified during the design phase. The proper abatement procedures will be determined if the presence of asbestos is detected.

2.2.3 Bridge Replacement Study Recommendation

A Bridge Replacement Study dated March 2012 was prepared for Pinellas County. This study evaluated the existing structure and made a recommendation for the rehabilitation or replacement of the existing bridge based on previous maintenance history and other pertinent documents. The study recommended replacement of the bridge structure and is provided in **Appendix C**.

2.3 SURVEY

Survey data for the existing bridge and the surrounding roadway was not provided for this Phase II evaluation; however, the 2009 PER does include a topographical survey from McKim & Creed. Based on this survey, Spring Branch Creek is at approximate Elevation 2.0 while the roadway above is at approximate Elevation 16.0. All new construction elevations (proposed plans) will be based on the NAVD88 Datum.

2.4 UTILITIES

Based on field reviews, the Sunset Point Road Bridge Existing Utility Report and a Sunshine State One Call design ticket, several utilities along the bridge corridor have been identified. They include:

- Overhead electric (Progress Energy) running parallel to the south fascia of the bridge and just north of the existing pedestrian bridge.
- Overhead electric (Progress Energy) running parallel to North Betty Lane to the east of the bridge.
- Gas marker (City of Clearwater Gas) near the Sunset Point Road / Macomber Avenue intersection located northwest of the bridge. Based on the 2009 PER topographical survey, this utility runs north/south and does not cross the bridge.
- 12 inch water line (City of Clearwater Water) running parallel to the north fascia of the bridge. The Sunset Point Road Bridge Existing Utility Report also indicates the presence of a 20 inch water line crossing Spring Branch Creek near the southern right-of-way. The pipe was not observed during field reviews.
- 12 inch steel casing (Verizon) running parallel to the north fascia of the bridge containing two copper cables and one fiber optic cable. The Sunset Point Road Bridge Existing Utility Report also indicates the presence of Verizon fiber optic cable in 1.25" subduct and two aerial copper lines on the south side.
- Three inch diameter pipe running parallel to the north fascia. Based on our experience with utilities in the area, we suspect this is a Verizon duct containing cable, fiber and/or phone lines. A final determination will be made during final design.
- CATV/Fiber (Brighthouse Networks and Knology Broadband of FL) running parallel to the south fascia of the bridge on the same poles occupied by the Progress Energy overhead electric.

Construction of the proposed bridge will likely affect several existing utilities. Coordination with the affected utilities will occur as the design progresses.

2.5 GEOTECHNICAL

No geotechnical work was performed as part of this evaluation.

As part of the 2009 PER, Professional Services Industries, Inc. (PSI) performed a preliminary subsurface study to support the bridge alternatives being developed at that time. Based on the report from PSI, the recommended subsurface environmental classification is moderately aggressive.

2.6 DRAINAGE

The project is located within the Stevenson Creek Watershed with flow generally being towards the southwest to the Gulf of Mexico.

2.6.1 Existing Drainage

Within the project limits, Sunset Point Road traverses one major tributary; Spring Branch Tributary bisects the existing roadway and functions as a basin divide. Sunset Point Road crosses over the Spring Branch Tributary just west of North Betty Lane. The existing two-lane bridge is a cast-in-place

concrete arch culvert that is functionally obsolete. The Spring Branch Tributary flows southwest into Stevenson's Creek before its ultimate outfall into the Gulf of Mexico. The open basins along Sunset Point Road currently drain to curb and gutter systems that discharge into the Spring Branch Tributary. Also, the north and south portion of North Betty Lane both have closed drainage systems that collect and convey offsite stormwater into the Spring Branch Tributary. **Figure 7** shows a detailed Drainage Basin Map.

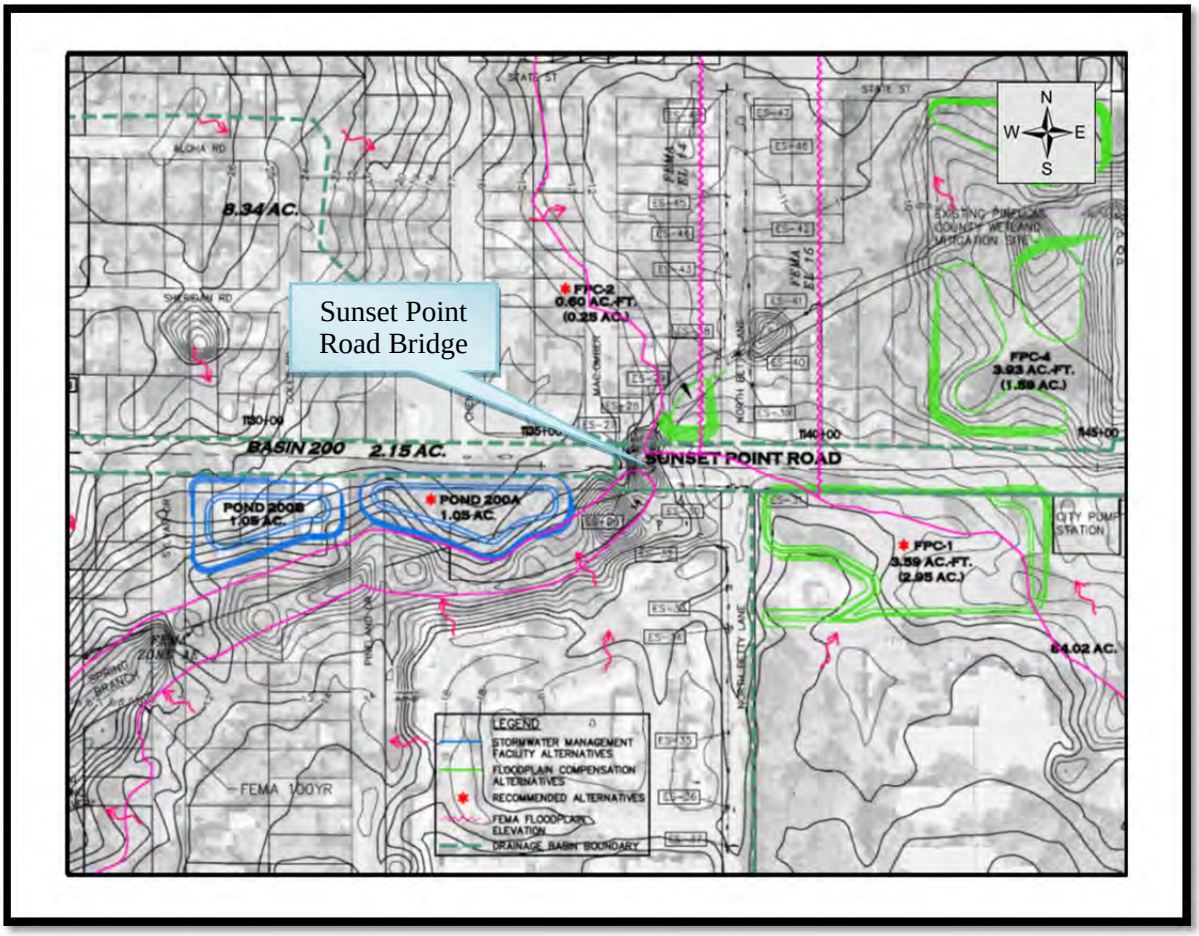


Figure 7 – Drainage Basin Map

As shown on the Floodplains Map in **Figure 8**, much of the project area is located in Zone AE, with base flood elevations determined (EL. 14 to EL. 15). In addition, according to Pinellas County Highway Division personnel, there have been significant localized flooding problems where Chenango Avenue and Macomber Avenue intersect with Sunset Point Road west of North Betty Lane which will be addressed by Lochner's Sunset Point Road and North Betty Lane intersection improvement project.

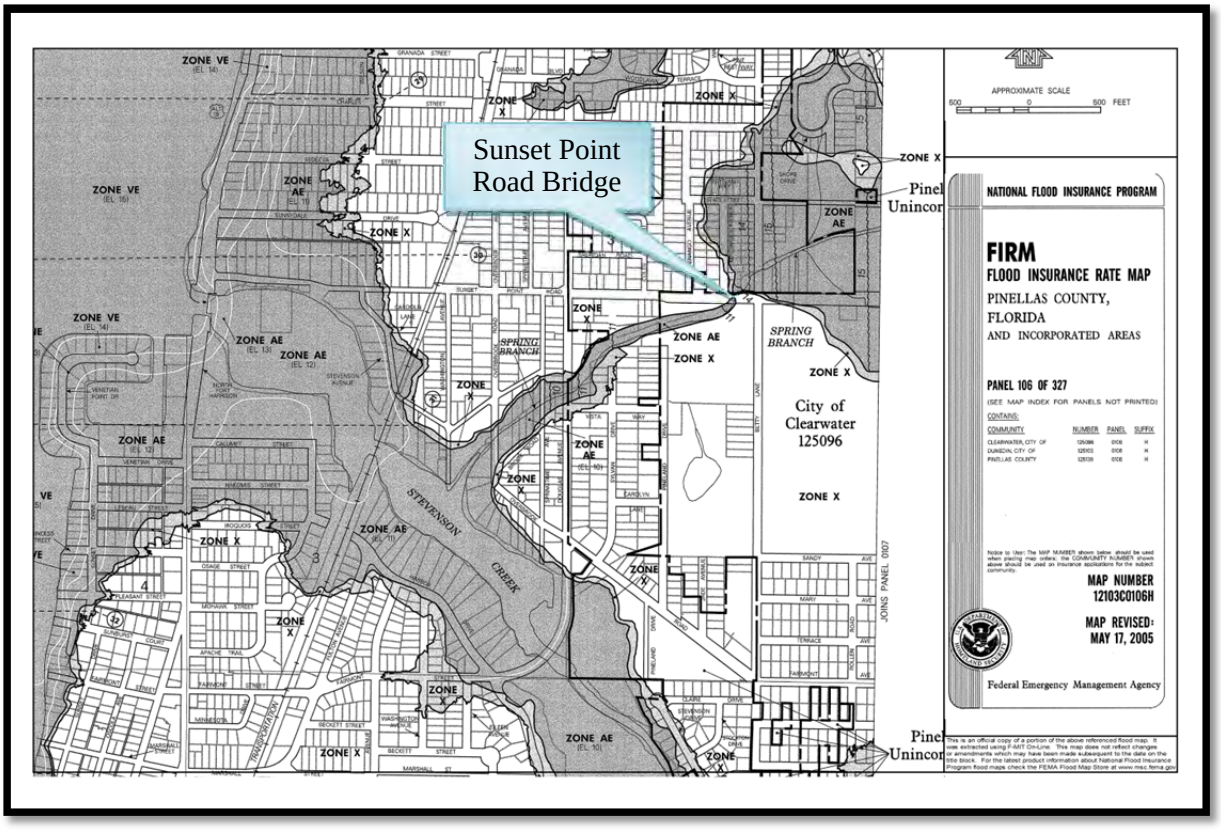


Figure 8 – FEMA Flood Stages Map

2.6.2 Proposed Drainage

In conjuction with Lochner's Sunset Point Road and North Betty Lane intersection improvement study, hydrualic modeling of Spring Branch Creek was performed by Interflow Engineering, LLC (Interflow). In an effort to identify any increased velocities upstream or downstream and any potential flooding impacts as a result of the bridge replacement, the hydraulics study was done to determine the ultimate waterway opening based on assumed future conditions of larger waterway openings downstream and the restricted waterway opening size that will be constructed with the new bridge culvert.

Based on the meomorandum (**Appendix D**) provided by Interflow, the following recommendations are made for the proposed crossing at Sunset Point Road over Spring Branch Creek:

- Dimensions: 10' x 10' twin box culverts
- Upstream Invert: 2.5' NGVD 29
- Downstream Invert: 1.5' NGVD 29
- Restriction plates are required if the private crossing upstream is removed as part of project. The twin box culvert would need to be restricted to create a single opening at the upstream face of the culvert that is 10' wide x 5.5' high.

2.7 WETLANDS

An environmental scientist field-delineated the wetlands and surface waters located within the bridge limits during field reviews in July 2012. Wetlands and other surface water (OSW) boundaries within the project area were delineated in accordance with guidelines found within the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual (Technical Report – Y-87-1) utilizing the USACOE/USEPA Rapanos Guidance and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0), and Chapter 62-340, F.A.C. – Delineation of the Landward Extent of Wetlands and Surface Waters.

2.7.1 SW-1

SW-1 is a small tributary (Spring Branch) to Stevenson Creek, which flows out to St. Joseph's Sound. SW-1 (**Figure 9**) crosses Sunset Point Road in a north-south orientation, west of Betty Lane. North of Sunset Point Road, it angles to the northeast and crosses North Betty Lane via a box culvert. South of Sunset Point Road, it angles to the southwest and approximately 0.5 miles it empties into Stevenson Creek (a designated Outstanding Florida Water). Within the Project Study Area, this surface water has approximately 1:1 side slopes armored with concrete/sand bags, poured concrete, and broken concrete riprap, There are only small portions of vegetated bank. During the 2009 PD&E study, it was determined that SW-1 in the vicinity of Sunset Point Road is not sovereign submerged land.

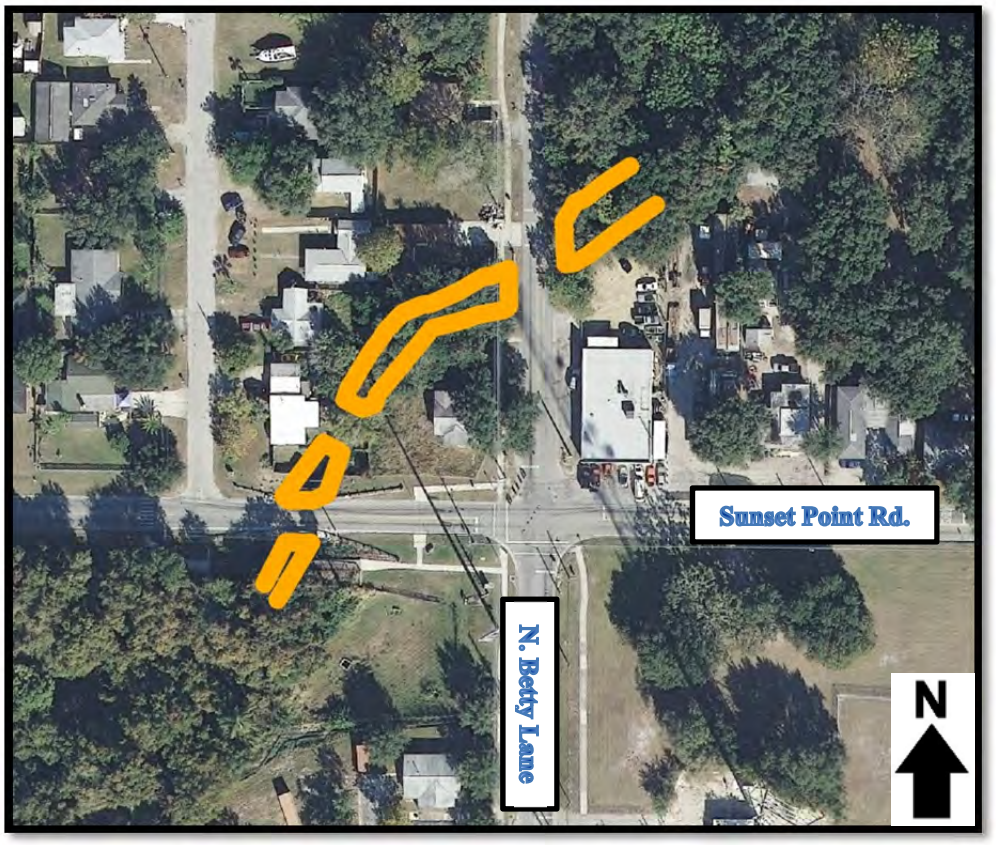


Figure 9 – SW-1 Boundaries

2.8 PROTECTED SPECIES

The Study Area was surveyed for habitat that has the potential to include protected species. Surveys, using pedestrian transects, were performed during field reviews in July 2012. Areas of preferred foraging habitat for several protected wading bird species are present within the project area. The project is located within the 15-mile Core Foraging Areas of a documented wood stork (*Mycteria americana*) rookery. Habitat Management Guidelines for the Wood Stork require that any alteration to wetlands within the CFA be compensated within the CFA. While small foraging areas utilized by these species may be affected by this project, there will be no permanent impacts to nesting areas or rookeries.

The eastern indigo snake (*Drymarchon corais couperi*) utilizes a wide variety of habitats ranging from mangrove swamps to xeric scrub communities. The eastern indigo snake prefers upland/wetland ecotone breaks for feeding. Due to available habitat within the project corridor, standard protective measures are recommended to be implemented during construction to minimize any impact.

2.9 PERMITTING

Several agencies regulate wetlands within the Study Area. These agencies include the U.S. Army Corps of Engineers (USACOE) and the Southwest Florida Water Management District (SWFWMD). Other agencies, including the U.S. Fish and Wildlife Service (USFWS), the U.S. Environmental Protection Agency (USEPA), and the Florida Fish and Wildlife Conservation Commission (FFWCC), review and comment on wetland permit applications. In addition, the Florida Department of Environmental Protection (FDEP) regulates stormwater discharges from construction sites. It is currently anticipated that the following permits will be required for this project:

Permits/Licenses	**Issuing Agency**
Section 404 Dredge and Fill Permit	USACOE
Environmental Resource Permit (ERP)	SFWMD
National Pollutant Discharge Elimination System (NPDES) Permit	FDEP

The complexity of the permitting process will depend greatly on the degree of the impact to jurisdictional areas. A Nationwide permit will likely be required from the USACOE. Nationwide permits (NWPs) are issued for minor activities if the conditions of the appropriate permit type are met. Nationwide Permit 14 for Linear Transportation Projects allows no greater than 1/2-acre of impact to waters of the United States. Mitigation will be required for wetland impacts.

SWFWMD requires an Environmental Resource Permit (ERP) when construction of any project results in the creation of a new, or modification of an existing surface water management system or results in impacts to waters of the State or isolated wetlands. In addition to potential wetland impacts, SWFWMD reviews water quality issues relating to the operation of the proposed project and water quantity attenuation resulting from project related changes in land use. As with USACOE permits, the complexity associated with the ERP permitting process will depend on the size of the project and/or the extent of wetland impacts. Based on the limited impact to wetlands (less than 1 acre), a general ERP will be required by SWFWMD. Mitigation will be required for wetland impacts.

Federal law 40 CFR Part 122 prohibits point source discharges of stormwater associated with industrial activity, including certain construction activities pursuant to 40 CFR 122.26(b)(14)(x), to waters of the United States without a National Pollutant Discharge Elimination System (NPDES)

permit. Under the State of Florida's delegated authority to administer the NPDES program (FDEP), operators that have stormwater discharge associated with industrial activity to surface waters of the State must file for and obtain either coverage under an appropriate generic permit contained in Chapter 62-621, Florida Administrative Code (F.A.C.), or an individual permit issued pursuant to Chapter 62-620, F.A.C. A major component of the NPDES permit is the development of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP identifies potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges from the site and discusses good engineering practices that will be used to reduce the pollutants.

Depending on the types of permits needed from the regulatory agencies, the permitting process can range from 60 to 180 days.

Section 3 Proposed Design Criteria

3.1 ROADWAY

The following Roadway Standards were used to establish the design criteria for the final design of the Sunset Point Road Bridge Replacement.

- Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (May 2011), Florida Department of Transportation also known as the Florida Greenbook.
- FDOT Design Standards (January 2013), Florida Department of Transportation
- A Policy on Geometric Design of Streets and Highways (2011), AASHTO
- Plans Preparation Manual (Volume I) (January 2013), Florida Department of Transportation
- SWFWMD = Environmental Resource Permitting Info Manual, Southwest Florida Water Management District

The recommended roadway design criteria for this project are shown in **Table 2**.

Table 2
Roadway Design Criteria

DESIGN CRITERIA REPORT SUMMARY TABLE Sunset Point Road (County Road 576) at North Betty Lane, Pinellas County				
DESIGN ELEMENT	**DESIGN CRITERIA**	**STANDARD REFERENCE**	**PROPOSED DESIGN**	**VARIATION OR EXCEPTION REQUIRED (YES/NO)**
General				
Functional Classification	Urban Minor Arterial	1, C.2	Urban Minor Arterial	No
Posted Speed (MPH)	35		35	No
Design Speed (MPH)	45	1, Table 3-1	45	No
Design Vehicle	P (Passenger Car) SU or BUS for turns	2	P (Passenger Car) SU or BUS for turns	No
Design Period	20 years after opening	2	20 years after opening	No
Cross Section Data				
Number of Through Lanes	2	N/A	2	No
Travel Lane Widths	11'	1, Table 3-7	11'	No
Auxiliary Lane (Turn Lanes)	10'	1, Table 3-7	12'	No
Bicycle Lane Width	4'	1, Figure 9-1	4'	No
Median Widths	15.5'	1, Table 3-11	N/A	No
Recoverable Terrain (Clear Zone)	4' (min: 1.5')	1, Table 3-12	4' (min: 1.5')	No
Border Width	1.5'	1, Chapter 19 E.10	1.5'	No
Cross Slope (travel lanes)	0.015% - 0.04%	1, Chapter 3, C.7.b.2	0.015% - 0.04%	No
Front Slopes	1:4	1, Chapter 3 C.7.f.2	1:4	No
Back Slopes	1:3	1, Chapter 3 C.7.f.2	1:3	No
VERTICAL GEOMETRY				
Minimum K value for Crest Vertical Curves	98	1, Table 3-6	98	No
Minimum Lengths of Crest Vertical Curves	135'	1, Table 3-6	135'	No
Minimum K value for Sag Vertical Curves	79	1, Table 3-6	79	No
Minimum Lengths of Sag Vertical Curves	135'	1, Table 3-6	135'	No
Stopping Sight Distance	360'	1, Table 3-6	360'	No
Passing Sight Distance	1625'	1, Table 3-6	1625'	No
Grades	6%	1, Table 3-4	0.06	No
Maximum Change in Grade Without a Vertical Curve	0.70%	1, Table 3-5	0.007	No
Minimum Vertical Clearances for Signals	16' (min: 14')	1, Chapter 3 C.7.j.4.(b)	16' (min: 14')	No
HORIZONTAL GEOMETRY				
Maximum Deflection Without Curve (DMS)	1°00'00"	3, Table 2.8.1A	1°00'00"	No
Length of Horizontal Curves	15V = 675' (min: 400')	3, Table 2.8.2A	15V = 675' (min: 400')	No
Maximum Curvature of Horizontal Curves	8°15'	1, Table 3-3	8°15'	No
Maximum Curvature of Horizontal Curve (Using Normal Cross Slope)	2°45'	3, Table - 2.8.4	2°45'	No
Superelevation Transition	80/20 to 50/50	3, Section 2.9	80/20 to 50/50	No
Superelevation Transition Rate	1:150	3, Table 2.9.4	1:150	No
e (max)	0.05 ft/ft	1, Table 3-3	0.05 ft/ft	No

1. "Manual of Uniform Minimum Standards for Design Construction and Maintenance for Streets and Highways", FDOT, May 2011 (aka Florida Green Book)
2. Previously approved Preliminary Engineering Report, prepared by American Engineering Consultants of Florida, LLC, November 2009
3. Plans Preperation Manual, Volume 1, January 2013

3.2 BRIDGE

This section includes the design data and criteria for the replacement of the existing Sunset point Road Bridge over Spring Branch Creek.

3.2.1 Typical Section

The existing bridge provides two 9'-3" travel lanes with 1'-3" shoulders on each side. The proposed typical section consists of two 11-ft lanes (1 in each direction), one continuous 12-foot center left turn lane, two 4-foot bicycle lanes, Type F curb and gutter (each side), two 8-foot sidewalks and two 32" vertical shape traffic railing (Index 423). The proposed overall bridge width is 64'-2".

3.2.2 Standards and Specifications

- Florida Department of Transportation Standard Specifications for Road and Bridge Construction (2013 edition) and applicable workbook modifications.
- American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Sixth Edition, 2012 and Interim Revisions.
- Florida Department of Transportation Structures Manual, January 2013 Edition.
- Florida Department of Transportation Drainage Manual, January 2013 Edition.
- AASHTO Manual on Bridge Evaluation, Second Edition, with 2011 and 2013 Interim Revisions.

3.2.3 Design Methodology

Load Resistance and Factor Design (LRFD).

3.2.4 Design Loadings

Dead Loads

Table 3
Design Dead Loads

Item	Unit	Load
Traffic Railing Barrier – 32" Vertical Shape (Index No. 423)	Lb/ft	385
Concrete, Structural	Lb/cf	150
Future Wearing Surface	Lb/sf	15
Soil, Compacted	Lb/cf	115
Bridge Supported Utilities	Lb/sf	0 [1]
Bullet Railing (Index 822)	Lb/ft/rail	10

[1] Standard conduit in barrier, therefore no additional loading is included. All other utilities assumed to be relocated off the proposed bridge.

Live Load:

- HL-93

3.2.5 Material Properties

Concrete

Table 4
Material Properties

Class	Minimum 28-day Compressive Strength (ksi)	Location
IV	f`c = 5.5	Traffic Barriers & Box Culvert

Reinforcing

- ASTM A615-05, Grade 60

3.2.6 Environmental Classification

- Substructure: Moderately Aggressive

3.2.7 Hydraulics

- A final hydraulics analysis will be performed during the design phase.

3.2.8 Bridge Drainage

- There are no deck drains located on the existing bridge. Bridge drainage will be collected at the ends of the proposed bridge.

3.2.9 Utilities

- Coordination is required during final design to determine whether to accommodate the utilities on the bridge or to provide separate support structures.

3.2.10 Bridge Lighting

- No lighting has been identified at this time.

3.2.11 Signage

- No signage is currently identified for the new bridge.

3.2.12 Noise Walls

- No noise walls are required for this project.

3.2.13 Retaining Walls

- Wingwalls on box culvert will be utilized to retain the roadway fill.

3.2.14 Aesthetics

- There are currently no aesthetic guidelines for this project. Therefore, Level One aesthetic criteria will be used.

3.2.15 Traffic Data

- The collection of traffic data was not carried out for this study.
- Posted Speed = 35 mph
- Design Speed = 45 mph

3.2.16 ADA

- Proposed Longitudinal and Lateral grades are well within the ADA guidelines.
- No special measures will be required.

3.2.17 Load Rating

- The load rating will be provided per the latest FDOT criteria.

Section 4 Maintenance of Traffic

During construction of the new Sunset Point Road Bridge over Spring Branch Creek, Sunset Point Road will need to be closed to traffic. To accommodate vehicles traveling west on Sunset Point Road, the recommended detour will reroute traffic north of the bridge culvert along N. Betty Lane to Union Street, and back south along Douglas Avenue to Sunset Point Road. For vehicles traveling east on Sunset Point Road, the recommended detour will reroute traffic south along Douglas Avenue to Overbrooke Avenue, then north along N. Betty Lane to Sunset Point Road. These recommended detours are depicted in **Figure 10.**

Figure 10 – Sunset Point Road Detours

Section 5 Development of Bridge Alternatives

5.1 BRIDGE ALTERNATIVES

The proposed bridge layout is based on the roadway and Spring Branch Creek layout as shown in **Appendix A**. The 2009 PER evaluated four feasible bridge types for this crossing. A summary of these alternatives along with a relative percentage cost difference between the four alternatives is presented below in **Table 5**.

Table 5
2009 PER Bridge Alternatives Evaluated

	Prestressed Concrete Slab Units, Transversely PT'd with 2" Asphalt Overlay	Prestressed Concrete Slab Units with 5" Cast-in-Place Topping	Cast-in-Place Concrete Flat Slab	Dual Cell 12' x 9' Cast-in-Place Concrete Box Culvert
% Above Minimum Alternative	18%	17%	22%	0%

The 2009 PER concluded that the cast-in-place box culvert alternative was approximately $100,000 less expensive than the prestressed concrete slab unit with 5" topping alternative. Based on the hydraulic analysis performed by Interflow, a dual cell 10' x 10' concrete box culvert is the preferred alternative hydraulically. As discussed in Section 2.6.2, using dual boxes will allow for restriction plates to be used in order to control the flow through the culvert. **Thus, the dual celled bridge culvert is the recommended alternative for Sunset Point Road over Spring Branch Creek based on cost and hydraulic considerations.**

5.2 BOX CULVERT COST ESTIMATE

Table 6 below summarizes the costs associated with the proposed dual cell cast-in-place box culvert.

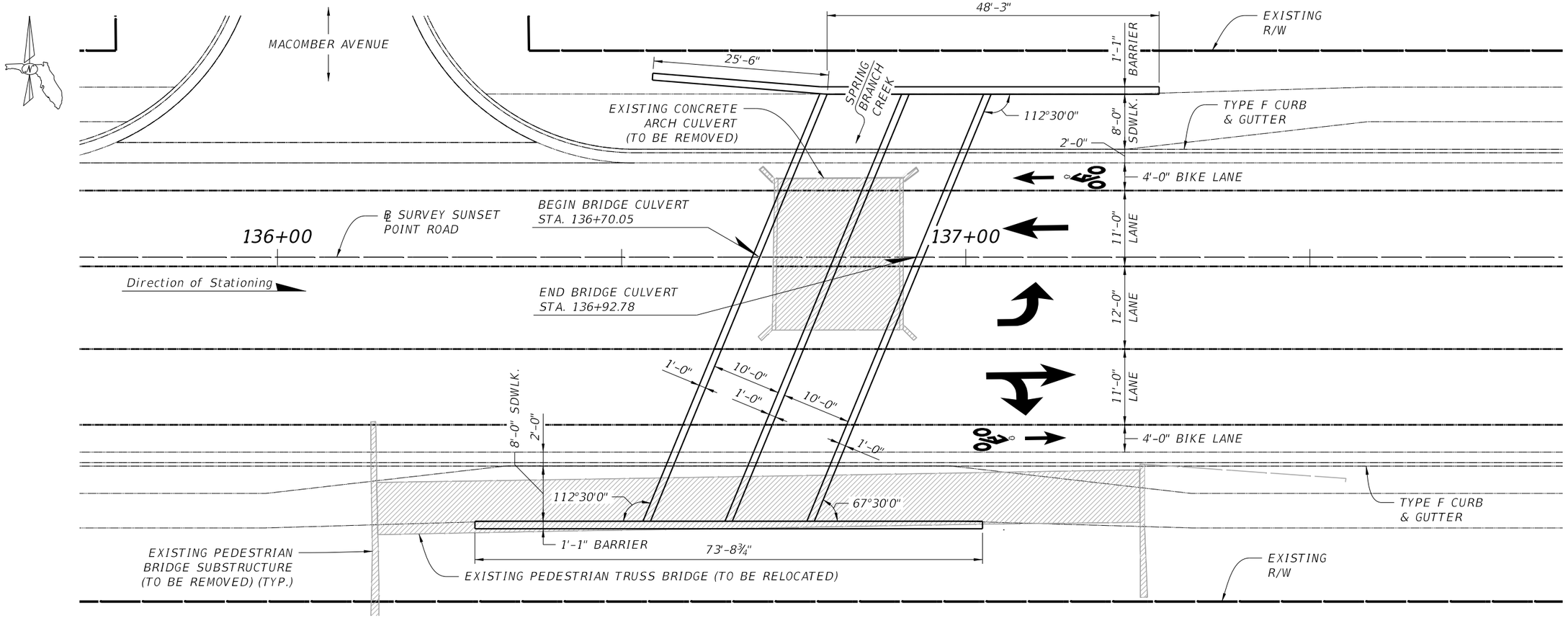
Table 6
Estimated Bridge Probable Construction Costs

	10' x 10' Dual Cell CIP Box Culvert
Structure/Roadway	$406,259
Removal/Relocation of Existing Structures [3]	$41,220
Construction over Water 3% Premium [1]	$13,424
Estimated Bridge Construction Cost Subtotal	$460,903
Contingency (25% of Total) [2]	$115,226
Estimated Bridge Probable Construction Cost	$576,129

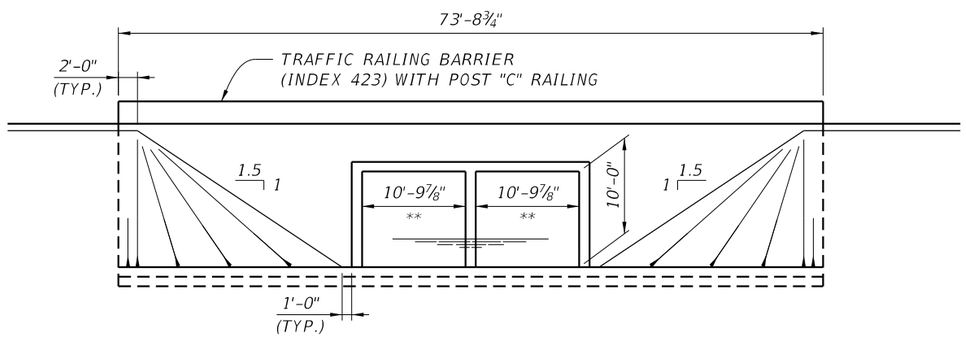
[1] A construction over water premium of 3% is used as recommended by FDOT.
[2] A contingency to account for project unknowns of 25% is included.
[3] Includes relocation of existing pedestrian truss bridge.

Based on **Table 6**, the estimated Bridge Probable Construction Cost is approximately $576,129 for the recommended (10’ x 10’ dual cell CIP box culvert) alternative. This estimate does not include environmental mitigation, utility relocations, roadway/drainage improvement costs and engineering design fees.

Appendix A
Plan and Elevation Drawing



PLAN



ELEVATION

(** = 10'-0" PERPENDICULAR)

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

LOCHNER
4350 West Cypress St., Suite 800
Tampa, FL 33607
FBPR Certificate of Auth. #894
Douglas M. Hershey, P.E. #63325

DRAWN BY: DMH
CHECKED BY:
DESIGNED BY: DMH
CHECKED BY:

PINELLAS COUNTY
DEPARTMENT OF PUBLIC WORKS

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
	PINELLAS	

SHEET TITLE: PLAN AND ELEVATION

REF. DWG. NO.

PROJECT NAME: SUNSET POINT ROAD BRIDGE
BRIDGE REPLACEMENT REPORT - PHASE II

SHEET NO.

Appendix B
Cost Estimate

Sunset Point Road over Spring Branch Creek - Phase II Bridge Report

Estimated Bridge Probable Construction Costs

	Cast-in-Place Concrete Box Culvert (Dual 10' x 10')
Structure/Roadway	$406,259
Removal/Relocation of Existing Structures	$41,220
Construction over Water (3% Premium)	$13,424
Estimated Bridge Construction Cost Subtotal	$460,903
Continency (25% of Total)	$115,226
Estimated Bridge Probable Construction Cost	$576,129

Sunset Point Road over Spring Branch Creek - Phase II Bridge Report

Removal of Existing Structure

Total Cost = $41,220

	Culvert & Pedestrian Truss Bridge				
	Concrete Portion				
Component	Length (ft)	Width (ft)	Area (SF)	Cost/SF *	Total Cost
Pedestrian Bridge	---	---	---	$15,000	$15,000
Culvert	19.000	23.000	437.000	$60	$26,220

* = FDOT range is $35-$60/SF. Use high range due to small quantity involved over water. Pedestrian bridge involves removal of substructure and relocation of truss to a site specificed by Pinellas County. Assumed cost shown is lump sum.

Sunset Point Road over Spring Branch Creek - Phase II Bridge Report

Cast-in-Place Concrete Box Culvert (Dual 10' x 10')

Total Cost = $406,259

Culvert

	Barriers (Along Wingwalls & Headwall)					
Component	Linear Feet	Weight (#/ft)	Total Wt. (Lbs.)	Volume (CY)	Cost/CY	Total Cost
32" Vertical Shape Barrier (Left)	74	385	28490	7.035	$450	$3,165.56
32" Vertical Shape Barrier (Right)	74	385	28490	7.035	$450	$3,165.56

	Box Culvert								
	Concrete Portion						Reinforcing Steel Portion		
Component	Length (ft)	Width (ft)	Thickness (ft)	Volume (CY)	Cost/CY	Total Cost	Rebar Wt. (Lbs.)	Cost/Lb.	Total Cost
Culvert	---	---	---	321.190	$961	$308,663.59	56080	$0.92	$51,593.60

Roadway

Component	Length ** (ft)	Length (mi)	Cost/mile	Total Cost
Urban Arterial	22.729	0.004	$9,215,602	$39,671.01

** = Length used is from begin bridge to end bridge limits

Florida Department of Transportation
Listing of Master Payitems

Spec Year : 13
DISPLAYING ONLY VALID ITEMS
From: 0 50 1 To: 0 50999
From: 0101 1 To: 9999999999

Item Number	Item Description	Unit Meas	Item Class	Spec Tech	Comb Flag	Obs Flag	Valid Date	Obs Date	LRE Reference Price
0350 1 11	PLAIN CEMENT CONCRETE PAVEMENT, 13"	SY	07		Y	N	2013/01/01		$67.59
0350 1 12	PLAIN CEMENT CONCRETE PAVEMENT, 11"	SY	07		Y	N	2013/01/01		$79.07
0350 1 13	PLAIN CEMENT CONCRETE PAVEMENT, 11 1/2"	SY	07		Y	N	2013/01/01		$68.67
0350 1 14	PLAIN CEMENT CONCRETE PAVEMENT, 14"	SY	07		Y	N	2013/01/01		$83.50
0350 1 15	PLAIN CEMENT CONCRETE PAVEMENT, 13 1/2"	SY	07		Y	N	2013/01/01		$80.00
0350 1 16	PLAIN CEMENT CONCRETE PAVEMENT, 10 1/2"	SY	07		Y	N	2013/01/01		$78.03
0350 1 17	PLAIN CEMENT CONCRETE PAVEMENT, 8 1/2"	SY	07		Y	N	2013/01/01		$80.00
0350 1 19	PLAIN CEMENT CONCRETE PAVEMENT, 12 1/2"	SY	07		Y	N	2013/01/01		$78.50
0350 1 20	PLAIN CEMENT CONCRETE PAVEMENT, 9 1/2"	SY	07		Y	N	2013/01/01		$68.61
0350 1 23	PLAIN CEMENT CONCRETE PAVEMENT, 14 1/2"	SY	07		Y	N	2013/01/01		$73.50
0350 2 1	CEMENT CONC PAVT REINFORCED, 6"	SY	07		Y	N	2013/01/01		$72.63
0350 2 3	CEMENT CONC PAVT REINFORCED, 8"	SY	07		Y	N	2013/01/01		$108.88
0350 2 4	CEMENT CONC PAVT REINFORCED, 9"	SY	07		Y	N	2013/01/01		$95.00
0350 2 10	CEMENT CONC PAVT REINFORCED,12"	SY	07		Y	N	2013/01/01		$93.00
0350 2 12	CEMENT CONC PAVT REINFORCED,11"	SY	07		Y	N	2013/01/01		$96.00
0350 2 17	CEMENT CONC PAVT REINFORCED, 8.5"	SY	07		Y	N	2013/01/01		$76.03
0350 72	CLEANING & RESEALING JOINTS- EXISTING CONCRETE PAVEMENT: REHAB	LF	07		Y	N	2013/01/01		$1.80
0350 78	CLEANING & SEALING RANDOM CRACKS IN EXISTING CONCRETE PAVEMENT- REHAB	LF	07		Y	N	2013/01/01		$2.44
0352 70	GRINDING CONCRETE PAVEMENT	SY	07		Y	N	2013/01/01		$4.34
0353 70	CONCRETE PAVEMENT SLAB REPLACEMENT	CY	07		Y	N	2013/01/01		$468.31
0370 1	BRIDGE APPROACH EXPANSION JOINT FOR CONCRETE PAVEMENT	LF	07		Y	N	2013/01/01		$50.96
0400 0 11	CONCRETE CLASS NS, GRAVITY WALL	CY	10		Y	N	2013/01/01		$431.58
0400 0 13	CONCRETE CLASS NS, STEPS	CY	10		Y	N	2013/01/01		$1,900.00
0400 1 2	CONCRETE CLASS I, ENDWALLS	CY	06		Y	N	2013/01/01		$898.62
0400 1 11	CONCRETE CLASS I, RETAINING WALLS	CY	10		Y	N	2013/01/01		$554.95
0400 1 25	CONC CLASS I, MASS SUBSTRUCTURE	CY	08		Y	N	2013/01/01		$448.75
0400 2 1	CONCRETE CLASS II, CULVERTS	CY	06		Y	N	2013/01/01		$960.70
0400 2 2	CONCRETE CLASS II, ENDWALLS	CY	06		Y	N	2013/01/01		$1,390.16
0400 2 4	CONC CLASS II, SUPERSTRUCTURE	CY	09		Y	N	2013/01/01		$574.96
0400 2 5	CONCRETE CLASS II, SUBSTRUCTURE	CY	08		Y	N	2013/01/01		$792.94
0400 2 8	CONCRETE CLASS II, BULKHEAD	CY	10		Y	N	2013/01/01		$742.43
0400 2 10	CONCRETE CLASS II, APPROACH SLABS	CY	10		Y	N	2013/01/01		$338.84
0400 2 11	CONCRETE CLASS II, RETAINING WALLS	CY	10		Y	N	2013/01/01		$516.24
0400 2 12	CONCRETE, CLASS II, TRENCH SLAB	CY	06		Y	N	2013/01/01		$410.95
0400 2 25	CONCRETE CLASS II, MASS, SUBSTRUCTURE	CY	08		Y	N	2013/01/01		$572.53

$961/CY

Florida Department of Transportation
Listing of Master Payitems

Spec Year : 13
DISPLAYING ONLY VALID ITEMS
From: 0 50 1 To: 0 50999
From: 0101 1 To: 9999999999

Item Number	Item Description	Unit Meas	Item Class	Spec Tech	Comb Flag	Obs Flag	Valid Date	Obs Date	LRE Reference Price
0405 71	VERY EARLY STRENGTH LATEX MODIFIED CONCRETE	CF	08B	M	Y	N	2013/07/01	2013/12/31	$.01
0407 1 21	PRECAST CONCRETE 3 SIDE BOX CULVERT, 20-29' SPAN, < OR = 10' HEIGHT	LF	06		Y	N	2013/01/01		$1,620.00
0411 1	EPOXY MATERIAL FOR CRACK INJECTION- STRUCTURES REHAB	GA	09B		Y	N	2013/01/01		$166.56
0411 2	CRACKS INJECT & SEAL- STRUCTURES REHAB	LF	09B		Y	N	2013/01/01		$37.03
0411 2 1	INJECT AND SEAL CRACK- MAINTENANCE CONTRACTS ONLY, GUNITE, OVER LAND AND <= 20' BRIDGE HEIGHT	LF	09B	T	Y	N	2013/01/01		$240.67
0411 2 2	INJECT AND SEAL CRACK- MAINTENANCE CONTRACTS ONLY, GUNITE, OVER LAND AND > 20' BRIDGE HEIGHT	LF	09B	T	Y	N	2013/01/01		$240.67
0411 2 3	INJECT AND SEAL CRACK- MAINTENANCE CONTRACTS ONLY, GUNITE, OVER WATER AND <= 20' BRIDGE HEIGHT	LF	09B	T	Y	N	2013/01/01		$240.67
0411 2 4	INJECT AND SEAL CRACK- MAINTENANCE CONTRACTS ONLY, GUNITE, OVER WATER AND > 20' BRIDGE HEIGHT	LF	09B	T	Y	N	2013/01/01		$240.67
0413149	PENETRANT SEALER	GA	09		Y	N	2013/01/01		$52.01
0413151	METHACRYLATE MONOMER	GA	09		Y	N	2013/01/01		$109.33
0413154	CLEANING & SEALING CONCRETE SURFACES - PENETRANT SEALER OR METHACRYLATES	SF	09		Y	N	2013/01/01		$.73
0415 1 1	REINF STEEL- ROADWAY	LB	10		Y	N	2013/01/01		$.65
0415 1 3	REINFORCING STEEL- RETAINING WALL	LB	10		Y	N	2013/01/01		$.91
0415 1 4	REINFORCING STEEL - SUPERSTRUCTURE	LB	09		Y	N	2013/01/01		$.80
0415 1 5	REINFORCING STEEL- SUBSTRUCTURE	LB	08		Y	N	2013/01/01		$.83
0415 1 6	REINFORCING STEEL- MISCELLANEOUS	LB	10		Y	N	2013/01/01		$.92
0415 1 8	REINFORCING STEEL- BULKHEAD	LB	10		Y	N	2013/01/01		$1.06
0415 1 9	REINFORCING STEEL- APPROACH SLABS	LB	10		Y	N	2013/01/01		$.82
0415 2 6	REINF STEEL- STAINLESS, MISCELLANEOUS	LB	08	T	Y	N	2013/01/01		$7.88
0425 1201	INLETS, CURB, TYPE 9, <10'	EA	06		Y	N	2013/01/01		$3,454.73
0425 1202	INLETS, CURB, TYPE 9, >10'	EA	06		Y	N	2013/01/01		$5,677.53
0425 1203	INLETS, CURB, TYPE 9, J BOT, <10'	EA	06		Y	N	2013/01/01		$5,051.93
0425 1204	INLETS, CURB, TYPE 9, J BOT, >10'	EA	06		Y	N	2013/01/01		$5,525.69
0425 1205	INLETS, CURB, TYPE 9, PARTIAL	EA	06		Y	N	2013/01/01		$2,262.78
0425 1209	INLETS, CURB, TYPE 9, MODIFY	EA	06		Y	N	2013/01/01		$2,981.84
0425 1211	INLETS, CURB, TYPE 10, <10'	EA	06		Y	N	2013/01/01		$3,950.00
0425 1212	INLETS, CURB, TYPE 10, >10'	EA	06		Y	N	2013/01/01		$4,600.98

$0.92/#

Roadway Cost Per Centerline Mile

Revised June 2012

	Construction Cost From LRE	MOT *	Mobilization *	Subtotal	Scope Contingency (25%)	Total Construction Cost	PE Design (15%)	CEI (15%)	Total Project Cost **
Rural Arterial									
New Construction (2-Lane Roadway) with 5' Paved Shoulders	$2,997,141	$299,714	$329,686	$3,626,541	$906,635	**$4,533,176**	$679,976	$679,976	$5,893,129
New Construction (4-Lane Roadway) with 5' Paved Shoulders	$4,783,393	$478,339	$526,173	$5,787,905	$1,446,976	**$7,234,881**	$1,085,232	$1,085,232	$9,405,346
New Construction (6-Lane Roadway) with 5' Paved Shoulders	$6,097,845	$609,785	$670,763	$7,378,393	$1,844,598	**$9,222,991**	$1,383,449	$1,383,449	$11,989,888
Milling and Resurfacing (4-Lane Roadway) with 5' Paved Shoulders	$1,031,387	$103,139	$113,453	$1,247,979	$311,995	**$1,559,973**	$233,996	$233,996	$2,027,965
Milling and Resurfacing (6-Lane Roadway) with 5' Paved Shoulders	$1,509,273	$150,927	$166,020	$1,826,220	$456,555	**$2,282,775**	$342,416	$342,416	$2,967,607
Add Lanes (2 to 4 Lanes) with 5' Paved Shoulders (Includes milling and resurfacing of existing pavement)	$3,764,991	$376,499	$414,149	$4,555,640	$1,138,910	**$5,694,550**	$854,182	$854,182	$7,402,914
Add Lanes (4 to 6 Lanes) with 5' Paved Shoulders (Includes milling and resurfacing of existing pavement)	$4,147,292	$414,729	$456,202	$5,018,223	$1,254,556	**$6,272,779**	$940,917	$940,917	$8,154,613
Add Lanes (4 to 8 Lanes) with 5' Paved Shoulders (Includes milling and resurfacing of existing pavement)	$5,567,988	$556,799	$612,479	$6,737,266	$1,684,317	**$8,421,583**	$1,263,237	$1,263,237	$10,948,057
Add Lanes (6 to 8 Lanes) with 5' Paved Shoulders (Includes milling and resurfacing of existing pavement)	$5,224,825	$522,483	$574,731	$6,322,039	$1,580,510	**$7,902,548**	$1,185,382	$1,185,382	$10,273,313
Add 1 Through Lane on Inside (To Existing) with 5' Paved Shoulders	$871,292	$87,129	$95,842	$1,054,263	$263,566	**$1,317,829**	$197,674	$197,674	$1,713,177
Add 1 Through Lane on Outside (To Existing) with 5' Paved Shoulders	$1,423,981	$142,398	$156,638	$1,723,017	$430,754	**$2,153,771**	$323,066	$323,066	$2,799,903
Add 300' Exclusive Left Turn Lane	$44,214	$6,632	$7,627	$58,473	$14,618	**$73,091**	$10,964	$10,964	$95,018
Add 300' Exclusive Right Turn Lane	$107,770	$16,165	$18,590	$142,526	$35,631	**$178,157**	$26,724	$26,724	$231,604
Urban Arterial									
New Construction (2-Lane Roadway) with 5' Sidewalk, and Curb & Gutter	$4,279,236	$427,924	$470,716	$5,177,876	$1,294,469	**$6,472,344**	$970,852	$970,852	$8,414,048
New Construction (4-Lane Roadway) with 5' Sidewalk, and Curb & Gutter	$6,040,559	$604,056	$664,462	$7,309,077	$1,827,269	**$9,136,346**	$1,370,452	$1,370,452	$11,877,250
New Construction (6-Lane Roadway) with 5' Sidewalk, and Curb & Gutter	$7,396,260	$739,626	$813,589	$8,949,474	$2,237,369	**$11,186,843**	$1,678,026	$1,678,026	$14,542,896
Milling and Resurfacing (4-Lane Roadway) with 5' Sidewalk, and Curb & Gutter	$1,108,757	$110,876	$121,963	$1,341,595	$335,399	**$1,676,994**	$251,549	$251,549	$2,180,093
Milling and Resurfacing (6-Lane Roadway) with 5' Sidewalk, and Curb & Gutter	$1,573,097	$157,310	$173,041	$1,903,447	$475,862	**$2,379,309**	$356,896	$356,896	$3,093,102
Add Lanes (2 to 4 Lanes) with 5' Sidewalk, and Curb & Gutter (Includes milling and resurfacing existing pavement)	$4,686,892	$468,689	$515,558	$5,671,140	$1,417,785	**$7,088,925**	$1,063,339	$1,063,339	$9,215,602
Add Lanes (4 to 6 Lanes) with 5' Sidewalk, and Curb & Gutter (Includes milling and resurfacing existing pavement)	$5,179,396	$517,940	$569,734	$6,267,070	$1,566,767	**$7,833,837**	$1,175,076	$1,175,076	$10,183,988
Add Lanes (4 to 8 Lanes) with 5' Sidewalk, and Curb & Gutter (Includes milling and resurfacing existing pavement)	$6,977,100	$697,710	$767,481	$8,442,291	$2,110,573	**$10,552,863**	$1,582,930	$1,582,930	$13,718,722
Add Lanes (6 to 8 Lanes) with 5' Sidewalk, and Curb & Gutter (Includes milling and resurfacing existing pavement)	$6,115,218	$611,522	$672,674	$7,399,413	$1,849,853	**$9,249,267**	$1,387,390	$1,387,390	$12,024,047
Add 1 Through Lane on Inside (To Existing) with 5' Sidewalk, and Curb & Gutter	$840,549	$84,055	$92,460	$1,017,064	$254,266	**$1,271,330**	$190,699	$190,699	$1,652,729
Add 1 Through Lane on Outside (To Existing) with 5' Sidewalk, and Curb & Gutter	$2,331,279	$233,128	$256,441	$2,820,847	$705,212	**$3,526,059**	$528,909	$528,909	$4,583,877
Add 300' Exclusive Left Turn Lane	$57,270	$8,591	$9,879	$75,740	$18,935	**$94,675**	$14,201	$14,201	$123,077
Add 300' Exclusive Right Turn Lane	$126,412	$18,962	$21,806	$167,179	$41,795	**$208,974**	$31,346	$31,346	$271,666

*** A 15% MOT and Mobilization factor was used for exclusive left and right turn lanes. A 10% factor was used for all other figures.**

**** Total cost shown is derived from a standard typical section. Costs will need to be adjusted to account for signals, bridges, or any additional item not deemed typical.**

Note:

1. **Estimates were derived from FDOT LRE system**
2. **These figures exclude costs for intersections/interchanges, improvements to cross streets, bridges over 20', right-of-way, landscaping, ITS, and traffic signals.**
3. **The figures are based on market costs for Hillsborough County.**
4. **Costs shown are present day costs.**
5. **The costs developed for this report are not project-specific and should be used for preliminary estimating purposes only.**

FDOT D7 planning office

Use this value

1 of 2

Roadway Cost Per Centerline Mile

Revised June 2012

	Construction Cost From LRE	MOT (10%)	Mobilization (10%)	Subtotal	Scope Contingency (25%)	Total Construction Cost	PE Design (15%)	CEI (15%)	Total Project Cost
Rural Arterial									
Add Lanes (4 to 6 Lanes) with 5' Paved Shoulders, 2 Traffic Signals, Highway Lighting, Fiber Based Communication Backbone, Widening 150' Low Level Bridge, and Milling & Resurfacing Existing 4 Lanes	$5,835,025	$583,503	$641,853	$7,060,381	$1,765,095	**$8,825,476**	$1,323,821	$1,323,821	**$11,473,119**
Urban Arterial									
Add Lanes (4 to 6 Lanes) with 5' Sidewalk, Bike Lanes, 2 Traffic Signals, Highway Lighting, Fiber Based Communication Backbone, Widening 150' Low Level Bridge, and Milling & Resurfacing Existing 4 Lanes	$6,392,794	$639,279	$703,207	$7,735,281	$1,933,820	**$9,669,101**	$1,450,365	$1,450,365	**$12,569,831**

Note:

1. Estimates were derived from FDOT LRE system
2. These figures exclude costs for intersections/interchanges, cross street improvements, right-of-way, ITS, and landscaping.
3. The figures are based on market costs for Hillsborough County.
4. Costs shown are present day costs.
5. The costs developed for this report are not site-specific and should be used for preliminary estimating purposes only.

2 of 2

Appendix C
Bridge Replacement Study

County

Bridge Replacement Study

Sunset Point Road Bridge

Project I.D. 000625A
Pinellas County

Prepared For:

Engineering & Technical Support Division

Department of Environment & Infrastructure, Pinellas County Public Works

Prepared By:

H.W. Lochner, Inc.

March 2012

LOCHNER

Bridge Replacement Study

Sunset Point Road Bridge

Project I.D. 000625A
Pinellas County

Prepared For:

Engineering & Technical Support Division
Department of Environment & Infrastructure
Pinellas County Public Works

Prepared By:

H.W. Lochner, Inc.
13577 Feather Sound Drive, Suite 600
Clearwater, FL 33762
Certificate of Authorization No. 894

DOUGLAS M. HERSHEY
LICENSE
No. 63325
STATE OF FLORIDA
PROFESSIONAL ENGINEER

3-23-2012

Douglas M. Hershey
P.E. No. 63325
H.W. Lochner, Inc.

TABLE OF CONTENTS

Section **Title** **Page**

LIST OF TABLES ..... **II**

LIST OF FIGURES ..... **III**

SECTION 1 EXECUTIVE SUMMARY **1-1**

1.1 Bridge Rehabilitation Versus Replacement 1-1
1.2 Next Step 1-1

SECTION 2 INTRODUCTION **2-1**

2.1 Project Location and Description 2-1
2.2 Existing Sunset Point Road Bridge (Bridge No. BR0003) Over Spring Branch Creek 2-2
2.3 Purpose of Bridge Replacement Study 2-3

SECTION 3 EXISTING CONDITIONS **3-1**

3.1 Roadway 3-1
3.2 Survey 3-2
3.3 Utilities 3-2
3.4 Geotechnical 3-3

SECTION 4 BRIDGE ASSESSMENT **4-1**

4.1 Initial Structural Evaluation 4-1
4.2 Overall Bridge Condition 4-2
4.3 Other Considerations 4-4

SECTION 5 CONCLUSIONS AND RECOMMENDATIONS **5-1**

5.1 General 5-1
5.2 Current Recommendations 5-1

LIST OF TABLES

Table	Title	Page
Table 2-1: Scour/Buildup Measurements		2-3
Table 2-2: Staged Approach		2-3
Table 4-1: Overall Bridge Condition		4-2
Table 5-1: Staged Approach		5-1

LIST OF FIGURES

Figure	Title	Page
Figure 2-1 – Project Location Map		2-1
Figure 2-2 – Bridge Location Map		2-2
Figure 3-1 – Roadway Typical Section		3-1
Figure 3-2 – Bridge Typical Section		3-2
Figure 4-1 – Bridge Barrier Impact Damage		4-3

SECTION 1
EXECUTIVE SUMMARY

1.1 BRIDGE REHABILITATION VERSUS REPLACEMENT

Lochner performed an initial evaluation of the following bridge documents provided by Pinellas County:

- 2006 and 2009 Bridge Inspection Reports by Ayres Associates, Inc.
- Sunset Point Road Bridge Existing Utility Report
- Topographic Survey Detail Sheet from Station 135+00 to Station 141+00 by McKim & Creed
- 2009 Preliminary Engineering Report (PER) [Sunset Point Road from U.S. Alternate 19 to Keene Road] by American Consulting Engineers, Inc.

In evaluating the overall bridge condition, the Numerical Condition Rating values from 2006 show the overall condition of the bridge is between satisfactory and good; however, failure of the southern bridge rail noted in 2009 would impact this rating. There is concern about erosion of the channel bottom and its effect on the footing. Additionally, the existing bridge is functionally obsolete with inadequate lane widths and substandard traffic railings.

Other factors besides the condition of the bridge have been taken into account when determining if the bridge should be rehabilitated or replaced. The proposed intersection improvement project at Sunset Point Road and North Betty Lane will increase the width of the roadway. Currently, the bridge carries two lanes and has an overall width of approximately 23 feet. The proposed bridge will carry three lanes of traffic, accommodate bikes and pedestrians and have an approximate width of 59 feet. Major widening of an older structure is not typically recommended especially when existing plans are not available.

Another factor to be considered is the current hydraulic opening of the bridge. Based on previous studies and the Stevenson Creek Watershed Management Plan, the existing bridge has been identified as a major cross-drain within the Sunset Point Road corridor. In order to reduce existing flooding issues upstream the opening must be increased. Widening the existing bridge will not help resolve these issues.

Based on the information evaluated in Section 4 of this report, a bridge replacement is the recommended alternative.

1.2 NEXT STEP

The next step of this evaluation is to develop a Bridge Replacement Study Report that will evaluate a minimum of two bridge options, provide documentation for the maintenance of traffic, bridge scour, environmental, utilities and an estimated construction cost.

SECTION 2
INTRODUCTION

2.1 PROJECT LOCATION AND DESCRIPTION

The Sunset Point Road Bridge (No. BR0003) over Spring Branch Creek, **Figure 2-1,** is located on Sunset Point Road less than 200 feet west of North Betty Lane and approximately 1200 feet east of Douglas Avenue in Clearwater, Florida. The structure provides east/west access along Sunset Point Road. The existing bridge is proposed to be rehabilitated or replaced as part of an intersection improvement project at Sunset Point Road and North Betty Lane. Based upon the bridge typical section shown in the 2009 PER, the future bridge width needs to be 58'-10" in order to accommodate the proposed roadway improvements along Sunset Point Road.

Figure 2-1 – Project Location Map

Figure 2-2 – Bridge Location Map

2.2 EXISTING SUNSET POINT ROAD BRIDGE (BRIDGE NO. BR0003) OVER SPRING BRANCH CREEK

The existing two-lane bridge over Spring Branch Creek carries one lane of traffic in each direction, EB and WB. The structure is a cast-in-place concrete arch culvert. It has a span length of 19 feet and is approximately 23 feet wide. The typical section consists of two 9'-3" lanes with 1'-3" shoulders and 8" wide concrete barriers. Existing bridge plans are not available and the year of construction is unknown. Based on inadequate lane widths and substandard traffic barriers the bridge is functionally obsolete.

There is a prefabricated truss pedestrian bridge (PB0015) to the south of the vehicular bridge to accommodate pedestrian traffic. The pedestrian bridge is approximately 110-feet long and there is approximately 20-feet of separation between the vehicular and pedestrian bridges.

The 2009 Bridge Inspection Report has a section pertaining to scour evaluation. Measurements from the top of the bridge railing to the ground line below were taken at three locations each along the north and south railings. **Table 2-1** compares measurements from

2006 and 2009. Based upon the measurements reported, there was 0.3 feet of scour at midspan on the left side while there was 0.8 feet of buildup on the right side.

Table 2-1: Scour/Buildup Measurements

Scour/Buildup Evaluation				
Location	Left Side		Right Side	
	2/2006	9/2009	2/2006	9/2009
Abutment 1	13.4	13.2	14.2	14.8
Midspan	16.8	17.1	17.6	16.8
Abutment 2	13.7	13.0	12.9	13.0
Waterline at Midspan	16.3	15.9	17.1	16.3

2.3 PURPOSE OF BRIDGE REPLACEMENT STUDY

The purpose of this Bridge Replacement Study will be carried out in three phases, and described as follows:

Table 2-2: Staged Approach

Stage	Scope of Work	Status
Stage 1	Evaluation to focus on determining if a Bridge Rehabilitation versus Replacement can be considered at this location.	Current Task
Stage 2	Develop a Bridge Replacement Study Report that will evaluate a minimum of two bridge options, provide documentation for maintenance of traffic, bridge scour, environmental, utilities and an estimated construction cost.	Future Task Assignment
Stage 3	Develop Final Design Plans	Future Task Assignment

SECTION 3
EXISTING CONDITIONS

3.1 ROADWAY

The roadway approaching the bridge, **Figure 3-1,** has a pair of 10-foot lanes with 2-foot shoulders and consists of an asphalt surface. The posted speed for this area is 35 mph. Based on the right-of-way mapping provided in the 2009 PER, there is an 80-foot right-of-way envelope (30-feet to the north of the survey baseline and 50-feet to the south of the survey baseline) along Sunset Point Road between North Betty Lane and Macomber Avenue.

Figure 3-1 – Roadway Typical Section

Figure 3-2 – Bridge Typical Section

3.2 SURVEY

No survey work was performed as part of this Stage 1 assignment; however, the 2009 PER does include a topographical survey from McKim & Creed.

3.3 UTILITIES

Based on our field review, the Sunset Point Road Bridge Existing Utility Report and a utility design ticket, the following utilities were observed:

- Overhead electric (Progress Energy) running parallel to the south fascia of the bridge and just north of the existing pedestrian bridge.
- Overhead electric (Progress Energy) running parallel to North Betty Lane to the east of the bridge.
- Gas marker (City of Clearwater Gas) near the Sunset Point Road / Macomber Avenue intersection located northwest of the bridge. Based on the 2009 PER topographical survey, this utility runs north/south and does not cross the bridge.

- 12 inch water line (City of Clearwater Water) running parallel to the north fascia of the bridge. The Sunset Point Road Bridge Existing Utility Report also indicates the presence of a 20 inch water line crossing Spring Branch Creek near the southern right-of-way. The pipe was not observed during field reviews.
- 12 inch steel casing (Verizon) running parallel to the north fascia of the bridge containing two copper cables and one fiber optic cable. The Sunset Point Road Bridge Existing Utility Report also indicates the presence of Verizon fiber optic cable in 1.25" subduct and two aerial copper lines on the south side.
- Three inch diameter pipe running parallel to the north fascia. Based on our experience with utilities in the area, we suspect this is a Verizon duct containing cable, fiber and/or phone lines. A final determination will be made during final design.
- CATV/Fiber (Brighthouse Networks and Knology Broadband of FL) running parallel to the south fascia of the bridge on the same poles occupied by the Progress Energy overhead electric.

3.4 GEOTECHNICAL

No geotechnical work was performed as part of this Stage 1 assignment; however, the 2009 PER does include a preliminary geotechnical report from PSI, Inc. dated March 6, 2008.

SECTION 4
BRIDGE ASSESSMENT

This section documents the evaluation and condition assessment of the bridge, leading to a rehabilitation or replacement recommendation.

4.1 INITIAL STRUCTURAL EVALUATION

Lochner performed an initial evaluation of the following bridge documents:

- Bridge Inspection Reports dated 2/24/2006 and 9/15/2009
- 2009 Project Engineering Report for Sunset Point Road from U.S. Alternate 19 to Keene Road

Neither existing plans nor repair plans for this bridge are available. Based on the above documentation and field reviews, the following assessments can be made as shown in the following sections.

4.2 OVERALL BRIDGE CONDITION

Table 4-1: Overall Bridge Condition

Approach Roadway Major Features		
BMIS No.	**Element Title**	**NCR**
G4.00	Approach Roadway Overall Rating	7
G4.02	Retaining Walls/Approach Slopes/Embankments/Shoulders	6
G4.03	Roadway - Transition	7
G4.04	Guardrails	6
G4.05	Roadway Alignment	8

Channel Major Features		
BMIS No.	**Element Title**	**NCR**
G5.00	Channel and Channel Protection Overall Rating	7
G5.03	Embankment/Slopes	7
G5.04	Degradation/Aggradation	6
G5.05	Alignment	7
G5.06	Flow	7

Non-Structural Features		
BMIS No.	**Element Title**	**NCR**
G6.03	Striping (Roadway Reflective)	3
G6.04	Reflectors	3
G6.09	Deck Cleanness	4

Culvert		
BMIS No.	**Element Title**	**NCR**
G7.00	Culvert Overall Rating	7
G7.01	Deck Slab (Top)	7
G7.02	Deck Slab (Underside)	6
G7.05	Wing Walls	7
G7.06	Floor Slabs	6
G7.07	Handrails/Bridge Rails/Sidewalks	7

The 2006 and 2009 Bridge Inspection Reports were reviewed and then compared with notes from field reviews. The Numerical Condition Rating (NCR) values above are from the 2006 Bridge Inspection Report and are based on a range from 0 (Failed Condition) to 9 (Excellent Condition). Based on the values shown above, the overall condition of the structure is between satisfactory and good.

The low ratings of the non-structural features can be rectified easily so they are of little concern when discussing whether or not the structure should be rehabilitated or replaced. Several relevant deficiencies in the structure based on the 2006 Bridge Inspection Report are:

- G7.02 – Deck Slab (Underside): The longitudinal construction joints at the centerline of the structure and at the north and south faces are cracked up to 1/16” wide allowing minor water seepage.
- G7.06 – Floor Slabs: The channel bottom has concrete debris that appears to be the floor slab that once lined the bottom. Due to unknown events or possibly scour, the floor slab appears to be collapsed and displaced. The footings are exposed up to 2.5 feet high.
- G7.07 – Handrails/Bridge Rails/Sidewalks: Both bridge rails have numerous spalls.

During the field reviews, we noted severe vehicular impact damage, **Figure 4-1,** at the east end of the southern bridge rail. This damage was identified in the 2009 Bridge Inspection Report. The bridge rail has diagonal cracking through the entire barrier. This failure mechanism is consistent with what would be expected according to yield line theory of barrier walls with impact near the end of the wall. The bridge railings do not meet current crash load requirements and are considered to be substandard and obsolete.

Figure 4-1 – Bridge Barrier Impact Damage

As a result of the scour and buildup noted in Section 2.2, there was a change in the NBI rating for the channel. The 2006 Bridge Inspection Report gave the channel a rating of 7 (minor damage) while the 2009 Bridge Inspection Report gave the channel a rating of 6 (bank slumping).

The year of construction and the existing bridge plans are not available. Without this information, calculating the load rating for this structure via traditional methods is not possible. Non-destructive testing techniques would need to be employed in order to determine the spacing, size and yield strength of the reinforcing steel in the structure along with the concrete compressive strength. Concrete cores would also be needed at regular intervals to determine the thickness of the culvert.

4.3 OTHER CONSIDERATIONS

In addition to the bridge condition, other considerations must be considered when determining whether the bridge should be rehabilitated or replaced.

As previously discussed, the current overall bridge width is approximately 23 feet. The proposed intersection improvement project at Sunset Point Road and North Betty Lane will increase the width of the roadway and also provide bike and pedestrian accommodations on both sides of the road. Currently, only pedestrian and bike accommodations are available on the south side via use of the pedestrian bridge. The 2009 PER proposed the upgraded roadway section over Spring Branch Creek consist of two thru lanes, a turn lane, bike lanes, sidewalks and crashworthy barriers. The proposed overall bridge width is 58'-10". The existing structure would need to be widened to both sides in order to accommodate the proposed roadway typical section. Major widening of older structures is typically avoided especially when plans are not available to determine the existing structural capacity.

The hydraulic opening of the existing bridge is another factor that needs to be considered. Based on the 2009 PER and the Stevenson Creek Watershed Management Plan, the existing bridge has been identified as a major cross-drain within the Sunset Point Road corridor. The 2009 PER suggests a hydraulic opening of 27 feet will be required in order to help alleviate the existing flooding issues. Based on this, the existing bridge provides an inadequate hydraulic opening since it has a span of 19 feet. Thus, widening of the existing bridge would not help alleviate this problem.

SECTION 5
CONCLUSIONS AND RECOMMENDATIONS

5.1 GENERAL

Based on the items evaluated in Section 4, a bridge replacement is recommended.

5.2 CURRENT RECOMMENDATIONS

The following is the recommended approach to developing the bridge replacement plans for this project:

Table 5-1: Staged Approach

Stage	Scope of Work	Status
Stage 1	Evaluation to focus on determining if a Bridge Rehabilitation versus Replacement can be considered at this location.	Completed
Stage 2	Develop a Bridge Replacement Study Report that will evaluate a minimum of two bridge options, provide documentation for maintenance of traffic, bridge scour, environmental, utilities and an estimated construction cost.	Next Task Assignment
Stage 3	Develop Final Design Plans	Future Task Assignment

Appendix D

Reference Documentation

[SEE ATTACHED CD]

Sunset Point Road Bridge Hydraulic Modeling Memo from Interflow Engineering, LLC

MEMORANDUM (DRAFT)

TO: **John Kenty (HW Lochner)**

FROM: **John Loper and Daniel Parsons (Interflow)**

DATE: **July 12, 2013**

RE: **Hydrologic and Hydraulic Modeling Services, Sunset Point Road Bridge over Spring Branch and Related Improvements**

Interflow Engineering, LLC (Interflow) was retained by HW Lochner to provide hydrologic and hydraulic modeling services related to the replacement of the Sunset Point Road Bridge over Spring Branch and related upstream and downstream hydraulic improvements. It is our understanding that the Sunset Point Road Bridge is scheduled to be replaced as part of the planned improvements to the intersection of Sunset Point Road and Betty Lane, within unincorporated Pinellas County. Interflow used the Interconnected Pond Routing model prepared for Stevenson Creek Watershed Management Plan to evaluate a number of alternative scenarios described hereafter.

1. Objectives

The objectives of this study are to develop recommendations for the following:

1. Proposed dimensions of a new bridge culvert under Sunset Point Road at Spring Branch. The new bridge culvert must have the capacity to convey ultimate flows resulting from current and future projects recommended in the 2001 Stevenson Creek Watershed Management Plan.
2. Dimensions of a temporary restriction to be placed over the proposed new bridge culvert under Sunset Point Road. The dimensions of the temporary restriction are to be based on the assumption that the private crossing immediately upstream of Sunset Point Road will be removed as part of this project. The removal of this crossing was recommended in the Stevenson Creek WMP.
3. Per a request by the City of Clearwater, proposed dimensions of potential future upsizing of the box culvert under Betty Lane at Spring Branch, in conjunction with raising the elevation of the Betty Lane. Betty Lane would be raised in order to meet the desired flood protection level of service for a 25-year design storm event.

2. Background

Parsons Engineering Science (Parsons) completed the Stevenson Creek Watershed Management Plan (SCWMP) for the City of Clearwater in August of 2001. As part of the SCWMP, Parsons developed an ICPR model of the Stevenson Creek Watershed to analyze the existing conditions and to evaluate proposed improvements within the watershed to improve the flood protection level of service (FPLOS). Several of the proposed projects are within the Spring Branch Subwatershed. The SCWMP did not consider any improvements

to the Sunset Point Road or Betty Lane crossings of Spring Branch. However, the SCWMP did recommend removal of a private culvert crossing immediately upstream of Sunset Point Road.

Recently, King Engineering Associates used the SCWMP ICPR model to compare existing and proposed conditions for the 'Idlewild and the Mall Sanitary Sewer System and Woodlawn Stormwater Improvements' and the 'Woodlawn Terrace Floodplain Storage Project' for the City of Clearwater. King updated the existing conditions model based on newer survey to establish a new baseline for their comparisons. King also developed a model representing the proposed conditions.

The proposed Woodlawn Stormwater Improvements and Woodlawn Terrace Floodplain Storage Projects are modified versions of projects recommended in the 2001 SCWMP. Because these two projects are upstream of the crossings at Sunset Point Road and Betty Lane, it was necessary to consider the effect these projects will have on proposed conditions within Spring Branch. The design recommendations for the crossings at Sunset Point Road and Betty Lane also considered the remaining potential future projects identified in the SCWMP that would have the potential for increasing flow rates within Spring Branch. Please refer to the Stevenson Creek Watershed Management Plan Final Report (Parsons Engineering Science, August 2001) for more information on the SCWMP.

3. Data Collection and Review

Interflow obtained and reviewed the following relevant documents and information:

- Final Construction Plans for Idlewild and the Mall Sanitary Sewer System and Woodlawn Stormwater Improvements, prepared by King Engineering for the City of Clearwater
- 60% Design Drawings for Woodland Terrace Floodplain Storage, also prepared by King for the City of Clearwater
- Woodlawn Terrace Floodplain Storage Project - 60% Drainage Documentation (September 2012)
- Existing and proposed conditions ICPR models, reflecting the two improvements listed above, as prepared by King Engineering
- 2009 McKim&Creed Survey depicting Spring Branch from upstream of Betty Lane, downstream to include the Douglass Avenue crossing.

On May 14, 2013, Interflow conducted field reconnaissance of the project area to verify whether or not the existing conditions model was an accurate representation of current conditions. Interflow noted that the culvert under Betty Lane had an incorrect size in the model. Recent survey data from November, 2011 was evidently used in the existing conditions model; however, the 2011 measurement did not account for the skew angle of the box culvert, and therefore over-represented the effective width. **Figure 1** shows the box

culvert under Betty Lane. **Figure 2** shows the existing concrete arch culvert under Sunset Point Road.

Figure 3 shows the private crossing proposed to be removed. The private crossing was identified in the SCWMP as a major restriction to flow, which contributes to upstream flooding problems.

Figure 1. Box Culvert under Betty Lane at Spring Branch

Figure 2. Concrete Arch under Sunset Point Road

Figure 3. Private Crossing Immediately Upstream of Sunset Point Road

4. Modeling Scenarios

Multiple scenarios were analyzed as part of this project described in **Table 1** below:

Table 1 – Description of Model Runs

Model Run	Description of Model / Revisions
Stevenson Creek Existing Conditions	Existing conditions when the Stevenson Creek Watershed Management Plan (SCWMP) was completed (2000-2001).
Stevenson Creek Alt-1	Proposed conditions based on the SCWMP
Woodlawn Terrace Projects 'Post' (King Engineering)	Proposed Conditions provided to Interflow with the below updates. • Revised span (P0600) based on field measurements to account for the skew angle of the box culvert. • Revised the inverts (P0600) on the box culvert under Betty Lane; the inverts were reversed from the "Idlewild and the Mall Sanitary Sewer System and Woodlawn Stormwater Improvements" plan data.
Run 1 (revised existing conditions)	Pre-conditions model provided by King Engineering with minor updates. • Revised span (P0600) based on field measurements to account for the skew angle of the box culverts. • Revised the inverts (P0600) on the box culverts under Betty Lane, the inverts were reversed from the "Idlewild and the Mall Sanitary Sewer System and Woodlawn Stormwater Improvements" plan data. • Revised invert of the weir across Betty Lane based on the existing grade shown on the "Idlewild and the Mall Sanitary Sewer System and Woodlawn Stormwater Improvements". (Note that this weir is 50' compared to a 300' weir in Stevenson Creek Alt-1 model.) • Revised weirs over Springtime Ave. and Douglas Ave. to reflect the guardrails restricting flow.
Run 2 (updated future conditions for Spring Branch, as contemplated in SCWMP; Sunset Point and Betty Lane crossings not included)	Proposed conditions model provided by King Engineering that represents the "Idlewild and the Mall Sanitary Sewer System and Woodlawn Stormwater Improvements" and the Woodlawn Terrace Floodplain Storage (this represents project 1D and a portion of 1C from the SCWMP). Additional proposed conditions were added to the model described below. • Made same changes mentioned above to Run1. • Revised culverts under Springtime Avenue and Douglas

	Avenue to 9' x 9' twin box culverts. Note: Project 1B of the SCWMP specified 12' x 9' box culverts. Smaller culverts are possible because of the addition of the Woodlawn Terrace Floodplain Storage Project. • Removed Private Drive culvert (P0580) and weir overtop (WOF0580). Re-routed subbasin B0580 to N0570 and changed downstream link of C0590 to N0570 and extended the channel length. • Revised channel downstream of Kings Highway to reflect proposed conditions for project 1A in the SCWMP. • Revised culverts and channel overflows upstream of Highland Ave. to represent the proposed conditions of 1A in the SCWMP. • Added Glen Oaks Park
Run 3 (Sunset Point Crossing Ultimate Size)	Starting with Run 2, added proposed bridge/culvert under Sunset Point Road; upsized to twin 10'x10' box culverts
Run 4 (Raise Betty Lane and Upsize Culverts)	Starting with Run 3, revised culvert under Betty Lane to twin 8' x 8' box culverts and raised the roadway weir overtopping elevation by 2'.
Run 5 (Sunset Point Rd crossing, and removal of private drive, interim configuration)	Starting with Run 1, revised to reflect interim configuration (no downstream improvements) • Removed Private Drive (P0580) between Betty Lane and Sunset Point Road. • Upsized the culvert under Sunset Point Road to 10'x10' twin box culvert but with restricting plates designed to avoid downstream impacts. The restriction would require blocking one 10" x 10' culvert off completely, and installing a steel plate (or equivalent) across the top 4.5 feet of the second culvert to leave an opening that is 10 feet wide and 5.5 feet high.
Run 6 (Sunset Point Rd crossing only)	Starting with Run 1, revised to reflect interim configuration (no downstream improvements) • Upsized the culvert under Sunset Point Road to 10'x10' twin box culvert (no restricting plate)

Locations of the project features described in the table above are shown on the 11 x 17 map attachment at the end of this memorandum.

5. Results and Recommendations

Based on the results of our modeling analysis, the recommended design parameters of the proposed crossings at Sunset Point Road and Betty Lane over Spring Branch are as follows:

- Sunset Point Road Crossing over Spring Branch:
    - Dimensions: 10'x10' twin box culverts
    - Upstream invert: 2.5' NGVD29
    - Downstream invert: 1.5' NGVD29
    - Restriction plates required **if** private crossing upstream is also removed as part of current project (refer to 'Run 5' description in **Table 1**).
- Potential Future Betty Lane Crossing over Spring Branch:
    - Dimensions: 8' x 8' twin box culvert
    - Upstream invert: 3.41' NGVD 29
    - Downstream invert: 2.21' NGVD 29

Because the private culvert crossing immediately upstream of Sunset Point Road is a major flow restriction, upsizing only the Sunset Point Road crossing of Spring Branch would have minimal effect on downstream or upstream flood elevations (Run 6). However, if the private culvert crossing between Betty Lane and Sunset Point Road is also to be removed as part of the current project, the culvert under Sunset Point Road will need to be restricted in order to minimize impacts downstream (Run 5). At Sunset Point Road, the twin box culverts will need to be restricted to create a single opening at the upstream face of the culvert that is 10' wide by 5.5' high. The restriction would have to remain in place until downstream improvements in Spring Branch, including replacement of the bridges at Douglass Avenue and Springtime Avenue, are constructed.

Tables 2 and 3 provide the results of Runs 1 through 6 for the 25- and 100-year storm events, respectively. Comparisons between Runs 2 through 6 and the updated existing conditions (Run 1) are also provided. Referenced model node locations are indicated on the map attachment.

Table 2 – 25-year Peak Flood Levels and Comparisons

	25-Year Peak Stages, Ft NGVD 29						Differences, Feet				
Node	**Run1**	**Run2**	**Run3**	**Run4**	**Run5**	**Run6**	**Run2-Run1**	**Run3-Run1**	**Run4-Run1**	**Run5-Run1**	**Run6-Run1**
N0500	6.22	6.22	6.22	6.31	6.23	6.21	0	0.01	0.1	0.01	0.00
N0510	6.75	7.02	7.02	7.23	6.79	6.74	0.29	0.29	0.5	0.04	0.00
N0520	6.79	7.14	7.14	7.35	6.84	6.79	0.36	0.36	0.57	0.05	0.00
N0530	9.43	7.34	7.34	7.73	9.68	9.41	-2.04	-2.04	-1.65	0.25	-0.02
N0540	10.65	7.87	7.87	8.61	11.00	10.63	-2.72	-2.72	-1.97	0.35	-0.02
N0550	10.76	8.26	8.26	8.95	11.10	10.73	-2.43	-2.43	-1.74	0.34	-0.02
N0560	10.81	8.67	8.67	9.26	11.14	10.78	-2.07	-2.07	-1.48	0.33	-0.02
N0570	10.94	9.42	8.8	9.34	12.16	10.82	-1.46	-2.07	-1.53	1.22	-0.11
N0590	13.06	10.74	10.7	11.01	12.39	12.76	-2.13	-2.16	-1.85	-0.67	-0.31
N0600	13.69	12.96	12.94	12.4	13.57	13.68	-0.77	-0.79	-1.33	-0.12	0.00
N0610	13.84	13.3	13.29	12.98	13.74	13.84	-0.58	-0.59	-0.9	-0.10	0.00
N0620	14.15	13.47	13.45	13.19	14.13	14.15	-0.71	-0.72	-0.98	-0.02	0.00
N0630	15.21	13.57	13.56	13.34	15.21	15.20	-1.64	-1.65	-1.86	0.00	0.00
N0680	13.85	13.35	13.34	13.05	13.75	13.84	-0.54	-0.55	-0.83	-0.10	0.00
N0690	13.85	13.35	13.34	13.05	13.75	13.84	-0.54	-0.55	-0.83	-0.10	0.00
N0740	13.86	13.37	13.36	13.08	13.77	13.86	-0.53	-0.54	-0.82	-0.09	0.00
N0750	13.86	13.37	13.36	13.08	13.77	13.86	-0.53	-0.54	-0.82	-0.09	0.00
N0760	14.21	14.12	14.11	14.06	14.18	14.21	-0.11	-0.11	-0.16	-0.03	0.00
N0765	14.30	14.23	14.23	14.18	14.27	14.30	-0.09	-0.09	-0.14	-0.03	0.00
N0768	14.21	14.06	14.05	14.01	14.18	14.20	-0.17	-0.17	-0.21	-0.03	0.00
N0770	14.38	14.33	14.33	14.29	14.35	14.37	-0.06	-0.06	-0.11	-0.03	0.00
N0775	15.60	15.38	15.38	15.36	15.59	15.59	-0.22	-0.22	-0.25	-0.01	-0.01
N0780	15.74	15.5	15.5	15.47	15.73	15.73	-0.24	-0.24	-0.27	-0.01	-0.01
N0790	15.90	15.67	15.67	15.64	15.89	15.89	-0.24	-0.24	-0.27	-0.01	-0.01
N0910	20.59	16.92	16.92	16.91	20.59	20.59	-3.67	-3.67	-3.69	0.00	0.00

Table 3 – 100-year Peak Flood Levels and Comparisons

	100-Year Peak Stages, Ft NGVD 29						Differences, Feet				
Node	Run1	Run2	Run3	Run4	Run5	Run6	Run2-Run1	Run3-Run1	Run4-Run1	Run5-Run1	Run6-Run1
N0500	7.35	7.44	7.44	7.46	7.35	7.35	0.1	0.1	0.11	0.00	0.00
N0510	8.32	9.67	9.66	9.64	8.28	8.31	1.36	1.36	1.33	-0.04	-0.01
N0520	8.33	9.7	9.7	9.67	8.29	8.32	1.38	1.38	1.36	-0.04	-0.01
N0530	11.12	10.65	10.65	10.59	10.96	11.11	-0.45	-0.45	-0.51	-0.16	-0.01
N0540	12.28	11.93	11.92	11.82	12.14	12.27	-0.34	-0.34	-0.44	-0.14	-0.01
N0550	12.35	12.08	12.08	11.97	12.21	12.34	-0.25	-0.25	-0.36	-0.14	-0.01
N0560	12.37	12.13	12.12	12.02	12.23	12.36	-0.22	-0.23	-0.33	-0.14	-0.01
N0570	12.47	12.28	12.25	12.14	15.13	12.43	-0.17	-0.2	-0.31	2.66	-0.04
N0590	15.28	12.62	12.59	12.49	15.18	15.23	-2.6	-2.62	-2.72	-0.10	-0.05
N0600	15.39	14.14	14.13	14.04	15.34	15.38	-1.22	-1.23	-1.33	-0.05	-0.01
N0610	15.47	14.42	14.41	14.31	15.42	15.45	-1.09	-1.11	-1.2	-0.05	-0.02
N0620	15.55	14.57	14.55	14.45	15.50	15.54	-1.03	-1.04	-1.14	-0.05	-0.01
N0630	16.34	14.65	14.64	14.54	16.35	16.34	-1.7	-1.71	-1.82	0.01	0.00
N0680	15.48	14.45	14.44	14.34	15.43	15.47	-1.08	-1.09	-1.19	-0.05	-0.01
N0690	15.48	14.45	14.44	14.34	15.43	15.47	-1.07	-1.09	-1.18	-0.05	-0.01
N0740	15.47	14.46	14.45	14.36	15.42	15.46	-1.05	-1.07	-1.16	-0.05	-0.01
N0750	15.47	14.47	14.45	14.36	15.42	15.46	-1.05	-1.06	-1.16	-0.05	-0.01
N0760	15.61	14.95	14.94	14.89	15.57	15.60	-0.7	-0.71	-0.77	-0.04	-0.01
N0770	15.75	15.21	15.2	15.14	15.71	15.74	-0.58	-0.59	-0.65	-0.04	-0.01
N0775	17.41	16.93	16.92	16.89	17.39	17.40	-0.5	-0.5	-0.54	-0.02	-0.01
N0780	17.63	17.11	17.11	17.08	17.62	17.62	-0.54	-0.54	-0.57	-0.01	-0.01
N0790	17.76	17.29	17.28	17.25	17.74	17.75	-0.49	-0.49	-0.52	-0.02	-0.02
N0910	21.18	19.82	19.82	19.81	21.17	21.18	-1.36	-1.36	-1.36	-0.01	0.00

Level of Service

Run 4, as described in Table 1, considers all of the planned and potential future conveyance improvements within Spring Branch. As shown in Table 4, the 25-year peak stages associated with the Sunset Point and Betty Lane crossings of Spring Branch are below the low edges of pavement. For the 100-year event, the peak stage is less than 0.5' above the low edge of pavement at Betty Lane, and well below the low edge of pavement at Sunset Point Road.

Roadway Location	Low Edge of Pavement (NGVD29)	25-Year Peak Stage Run 4 (NGVD29)	100-Year Peak Stage Run 4 (NGVD29)
Sunset Point at Spring Branch	16.61'	9.34'	12.14'
Betty Lane at Spring Branch	13.61' *	12.4'	14.04'

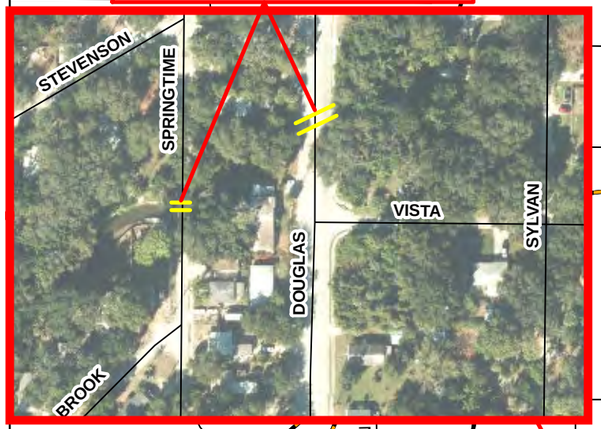
**As proposed in Run 4; approximately 2' higher than existing*

6. Recommendations for Future Study

The SCWMP was completed in 2001. Since that time, several changes have occurred throughout the watershed; these include some of the projects recommended in the SCWMP, as well as unrelated municipal infrastructure and land re-development projects. Although significant efforts were made in this study to update the model in the vicinity of the area of interest, there is still considerable uncertainty in the model results regarding the future improvements that will ultimately be required within Spring Branch downstream of Sunset Point Road. Of particular concern is the reach between Douglass Avenue and the confluence with Stevenson Creek. The original SCWMP anticipated that some increases in flood elevation in this reach may be permittable, due to the fact that the regulatory base flood elevation (governed by storm surge) in this area is several feet higher than the riverine flood elevations. However, this assumption may have to be revisited in the context of more current permitting guidelines.

The proposed box culvert dimensions at the Sunset Point Road and Betty Lane crossings of Spring Branch, as determined herein, will have the capacity to convey the projected future flows as contemplated in the SCWMP. However, before the restriction plate is removed from the Sunset Point Road Crossing, a more comprehensive update to the SCWM is recommended. This update should include all significant changes to the hydrology and hydraulics within the watershed that have occurred since 2001. In addition, a re-evaluation of the remaining future projects (those not implemented to date) to consider current watershed conditions, updated City goals and policies, and the current regulatory environment is recommended.

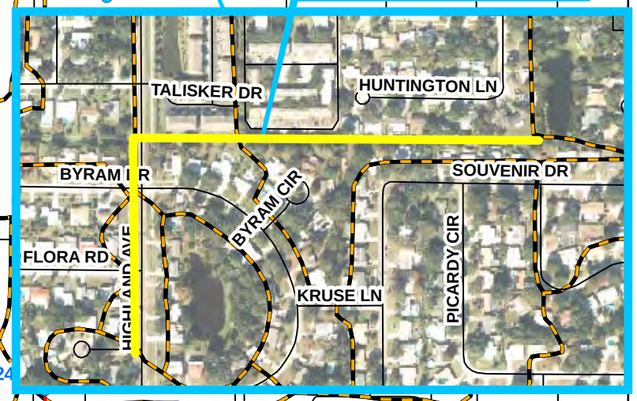
Proposed Twin 9'x9' Box Culverts at Douglas Ave. and Springtime Ave.



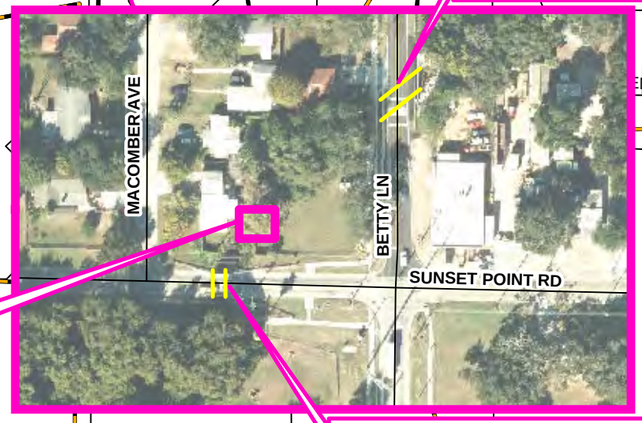
Updated as part of the post condition King model

Channel Improvements per SCWMP 1A

Proposed improvements per SCWMP project 1A



Proposed twin 8'x8' box culverts at Betty Lane



Remove Private Drive

Proposed twin 10'x10' box culverts at Sunset Point Road

Legend

- SCWMP Existing Nodes
- Bridges
- Channels
- Drop Structures
- Pipes
- Weirs
- SCWMP Existing Subbasins
- Street Centerlines

0 250 500 1,000 1,500 Feet

2009 Sunset Point Road Preliminary Engineering Report by American Consulting Engineers of Florida, LLC

Sunset Point Road (County Road 576)
From U.S. Alt. 19 (Edgewater Drive) to Keene Road

Pinellas County

CIP Number: 920476

FINAL PRELIMINARY ENGINEERING REPORT

Prepared for:

Pinellas County Department of Public Works

Prepared by:

American Consulting Engineers of Florida, LLC

November 2009

Executive Summary

The Project is located in northwestern Pinellas County. Improvements are being proposed to meet future traffic demands, provide drainage improvements, and permit pedestrian and bicycle access along Sunset Point Road (CR 576) from US Alt. 19 (Edgewater Drive) to Keene Road (CR 1). To achieve these objectives, the existing two-lane, undivided roadway will be modified as follows:

1. East of Edgewater Drive to Douglas Avenue – an 8 ft. sidewalk will be added along the north side of the proposed 2-lane roadway, and the existing pavement will be milled and resurfaced.
2. Douglas Avenue to west of Highland Avenue – roadway will be reconstructed to provide a two-lane roadway with a continuous two-way left turn lane. Also included are bike lanes and a 5 or 6 ft. sidewalk on each side.
3. Highland Avenue to Keene Road - roadway will be reconstructed to a four-lane divided section with bike lanes and sidewalk on each side.

Need for Improvement

The existing configuration of Sunset Point Road consists of a two lane roadway section from Edgewater Drive to west of Keene Road. This portion of Sunset Point Road is over capacity between Highland Avenue and Keene Road and has a high number of crashes. Geometric improvements are proposed at the intersections of Sunset Point and Keene Road and at Highland Avenue. Sunset Point Road also does not offer adequate multi-modal facilities such as sidewalks and bike lanes to meet the existing demand. The addition of left turn lanes at Douglas Avenue and North Betty Lane are proposed to improve safety. The existing bridge structure at Spring Branch Creek along Sunset Point Road is functionally obsolete with inadequate lane widths, no shoulders, and substandard traffic railing and is proposed to be replaced with a new bridge culvert .

Existing Conditions

Sunset Point Road is an east-west roadway and is classified as a minor arterial by Pinellas County. The current two-lane road has lane widths varying from 10 ft. to 12 ft. and has mainly curbs but no effective gutter pan. Four of the six major intersections within the corridor (US Alt. 19, Kings Highway, Highland Avenue and Keene Road) have separate left turn lanes. Left-turn lanes are not currently provided at the intersections of Douglas Avenue and Betty Lane. Sidewalks exist along portions of the corridor, but are mostly absent. A pedestrian bridge crosses Spring Branch Creek along side the existing roadway bridge and joins two segments of sidewalk that end shortly after the crossing. There are no bike lanes currently on this segment of Sunset Point Road. The Fred E. Marquis Pinellas Trail crosses the road between Edgewater Drive and Douglas Avenue.

The alignment has two short horizontal curves between Edgewater Drive and Douglas Avenue which transition the alignment from north to south. The second of the two horizontal curves is deficient in meeting the requirements for the posted 35 mph speed.

The existing vertical alignment varies in slopes from 0.3 percent to slopes of over 4 percent.

Sunset Point Road is over capacity within the segment of Highland Avenue and Keene Road. Based on existing traffic counts, the Average Annual Daily Traffic (AADT) varies from approximately 6,800 to 17,100 vehicles per day, increasing from west to east along the corridor. Deficient level of service (LOS) conditions exist at the intersection of Keene Road (LOS E for peak AM and PM hours).

There are numerous driveways (58) and sidestreets (13) which connect to Sunset Point Road between Highland Avenue and Keene Road.

The majority of the study area for the Sunset Point Road corridor is within the Stevenson Creek watershed. This watershed, which is the largest and most urbanized watershed within the City of Clearwater, drains 6,286 acres in west central Pinellas County. The Stevenson Creek watershed contains seven sub-watersheds (or sub-basins). Sunset Point Road, within the project limits, is within two of those seven sub-basins, the Spring Branch in the western portion of the project and the Upper Spring Branch along the eastern portion of the project.

Sunset Point Road crosses over the Spring Branch Tributary just west of North Betty Lane. The Spring Branch Tributary flows southwest into Stevenson's Creek before its ultimate outfall into the Gulf of Mexico. The existing roadway passes through three FEMA floodplain areas (one between US Alternate 19 and Stevenson Avenue, one between North Betty Lane and Kings Highway, and one near the intersection of Keene Road).

The existing roadway drainage system along Sunset Point Road consists of mostly overland flow along the roadway with relative few drainage structures present throughout the project limits. Erosion and minor flooding conditions exist along the corridor due to the lack of drainage facilities.

Preliminary Design

Based on the results of the traffic analyses (see the *Final Traffic Technical Memorandum dated May 2008*), limitations of the existing right-of-way, and multimodal considerations, the proposed improvements to Sunset Point Road were divided into three segments. From Edgewater Drive (US Alt. 19) to Douglas Avenue, a 35 mph design speed and a two lane, undivided roadway with 11 ft. lanes and an 8 ft. sidewalk is recommended. From Douglas Avenue to Highland Avenue, a 45 mph design speed and three lane (12 ft. continuous two-way left-turn lane) roadway with 11 ft. lanes, 4 ft. bike lanes, and 5 ft. sidewalks is recommended. From Highland Avenue to Keene Road, for safety and traffic capacity, a four lane divided roadway with 11 ft. lanes, 4 ft. bike lanes, 5 ft. sidewalks, and a raised 19.5 ft. median is recommended. Additional levels of safety are provided to the traveling public using Sunset Point Road by limiting the uncontrolled left turn movements between Highland Avenue and Keene Road, and by providing the mostly continuous left turn lane between Douglas Avenue and Highland Avenue. The pedestrian

and bicycle traffic present within this corridor will also enjoy the benefits of added safety from the proposed design.

The majority of the roadway improvements will be contained within the existing right-of-way. Additional right-of-way will be required in the curvilinear alignment area between US Alternate 19 and Stevenson Avenue due to the narrow width of existing right-of-way. Three alternative typical sections were considered between US Alternate 19 and Douglas Avenue. The least impact alternative was selected for this segment. There are five parcels which will be partially impacted in this area. Between Stevenson Avenue and Douglas Avenue, there are 11 parcels which will be partially impacted at intersection corners to allow sufficient turning radii for service vehicles onto and from side streets. No buildings will be impacted by any of these requirements.

The proposed widening and reconstruction of Sunset Point Road will include a drainage system with a combination of open roadside swales and closed conduit systems, which will require curb and gutter inlets and pipes to convey the runoff generated by the road into the proposed stormwater ponds. From preliminary analysis, two (2) wet-detention ponds will be required to meet the regulatory requirements for water quality and water quantity due to the widened roadway. The widened roadway will result in floodplain encroachment which will need to be compensated for by excavating and creating floodplain compensation areas within the affected drainage basin. Alternatives for both the stormwater ponds and floodplain compensation areas have been analyzed and are detailed in the separate document titled "*Alternative Stormwater Management Draft Pond Siting Report*" (August 2008, American Consulting Engineers of Florida, LLC).

The existing bridge over Spring Branch of Stevenson Creek will be replaced to accommodate the three lane typical section. Four (4) alternatives were considered and evaluated. The least cost alternative, a dual box culvert structure, is recommended to be utilized. The box culvert structure will also minimize the construction time and minimize temporary detours during construction.

Preliminary Costs

A preliminary construction cost estimate was prepared for the Sunset Point Road project. Based on our recommendations, costs were determined for the proposed construction and right-of-way acquisition. The breakdown of the cost is as follows:

Roadway Construction	$6,422,490
Bridge Culvert	$641,054
Signing and Pavement Marking	$189,923
Signalization	$1,500,000
Construction Subtotal	$8,753,467
20% Contingency	$1,750,693
Roadway Right-of-Way*	$300,000
Ponds, Floodplain Compensation and Mitigation - Right-of-Way*	$589,250
Project Grand Total Cost	**$11,393,410**

**Based upon estimated costs by the Pinellas County Real Estate Department.*

Table of Contents

Section **Page**

Executive Summary ..... **i**

1 Introduction **1-1**
1.1 Purpose 1-1
1.2 Project Description 1-1

2 Need for Improvement **2-1**
2.1 Deficiencies 2-1
2.2 Safety 2-2
2.3 Consistency with Transportation Plan 2-2
2.4 Social and Economic Demands 2-2

3 Existing Conditions **3-1**
3.1 Roadway 3-1
3.1.1 Functional Classification 3-1
3.1.2 Typical Sections 3-1
3.1.3 Pedestrian and Bicycle Facilities 3-1
3.1.4 Right-of-Way 3-1
3.1.5 Horizontal Alignment 3-4
3.1.6 Vertical Alignment 3-4
3.1.7 Drainage 3-5
3.1.8 Intersections and Signalization 3-10
3.1.9 Lighting 3-10
3.1.10 Utilities 3-10
3.1.11 Pavement 3-11
3.2 Bridge 3-12
3.2.1 Bridge Inspection Report 3-15

4 Traffic **4-1**
4.1 Existing Conditions 4-1
4.2 Proposed Conditions 4-2
4.2.1 Preliminary Design Concept 4-2
4.2.2 Future Traffic Projections 4-2
4.2.3 Recommendations and Conclusions 4-2

5 Design Controls and Standards **5-1**

6 Preliminary Design Analysis **6-1**
6.1 Typical Section 6-1
6.1.1 Description 6-1
6.1.2 Turn Lanes 6-1
6.1.3 Pavement Design 6-5

6.1.4 Alternatives 6-6
6.2 Alignment 6-9
6.2.1 Geometric Analysis 6-9
6.2.2 Environmental Impacts 6-10
6.2.3 Maintenance of Traffic 6-10
6.2.4 Right-of-Way Impacts 6-13
6.2.5 Utility Impacts 6-14
6.3 Access Management – Highland Avenue to Keene Road 6-14
6.3.1 Full Median Openings: Signalized 6-14
6.3.2 Full Median Openings: Unsignalized 6-14
6.3.3 Directional Median Openings: Unsignalized 6-15
6.3.4 Right-In/Out Intersections 6-15
6.4 Multi-modal Considerations 6-15
6.4.1 Pedestrian Features 6-15
6.4.2 Bicycle Features 6-16
6.4.3 Fred E. Marquis Pinellas Trail 6-16
6.4.4 Bus Services 6-17
6.4.5 Accessibility 6-17
6.5 Maintenance Issues 6-19
6.5.1 Storm Sewers 6-19
6.5.2 Drainage Ponds 6-19
6.5.3 Erosion Protection 6-20
6.5.4 Mowing 6-20
6.5.5 Landscaping/Clear Zone Maintenance 6-20
6.6 Drainage 6-21
6.7 Bridge 6-22
6.8 Landscaping 6-27
6.9 Cost Estimate 6-29

7 Permitting and Environmental Assessment 7-1
7.1 Wetlands and Surface Waters 7-1
7.2 Permitting 7-2

8 Hazardous Material Evaluation 8-1

9 Soils/Geotechnical Investigation and Analysis 9-1

10 Public Involvement 10-1

List of Figures

Number		Page
1-1	Project Location Map	1-2
2-1	2025 LRTP – 2025 Lanes Cost Feasible Plan	2-3
3-1	Pinellas County Evacuation Routes	3-2
3-2	Existing Sunset Point Road – Typical Section	3-3
3-3	Project Area Quad Map	3-7
3-4	Existing Stormwater Infrastructure	3-8
3-5	Existing Drainage Structures	3-9
6-1	Typical Section – Alternate C – E of US Alt 19 to Douglas	6-2
6-2	Typical Section – Douglas Ave to W of Highland Ave	6-3
6-3	Typical Section – Highland Ave to Keene Rd	6-4
6-4	Typical Section – Alternate A – E of US Alt 19 to Douglas	6-7
6-5	Typical Section – Alternate B – E of US Alt 19 to Douglas	6-8
6-6	Recommended Detours During Bridge Replacement	6-12
6-7	2025 LRTP – PSTA 2025 Fixed-Route System	6-18
7-1	Existing Wetlands	7-4
8-1	Potential Contamination Sites Map	8-3

List of Tables

Number		Page
3-1	Existing Right-of-Way Widths	3-4
4-1	Existing 2008 Daily Traffic Counts	4-1
6-1	Right-of-Way Costs	6-13
6-2	Bridge Structure Option Costs	6-27
6-3	Project Costs	6-29
8-1	Potential Contamination Sites	8-1
9-1	Project Soil Stratums	9-1

List of Appendices

A	Roadway Construction Cost Estimate
B	Bridge Alternative Calculations and Schematic Plans
C	Bridge Development Geotechnical Report
D	Geotechnical Reports (under Separate Cover)
E	Correspondence
F	Existing Conditions Photos
G	Public Involvement
H	Roadway Schematic Plans (under Separate Cover)
I	Access Management Plan (under Separate Cover)
J	Existing Right of Way Maps (under Separate Cover)
K	Topographic Survey (under Separate Cover)

Section 1

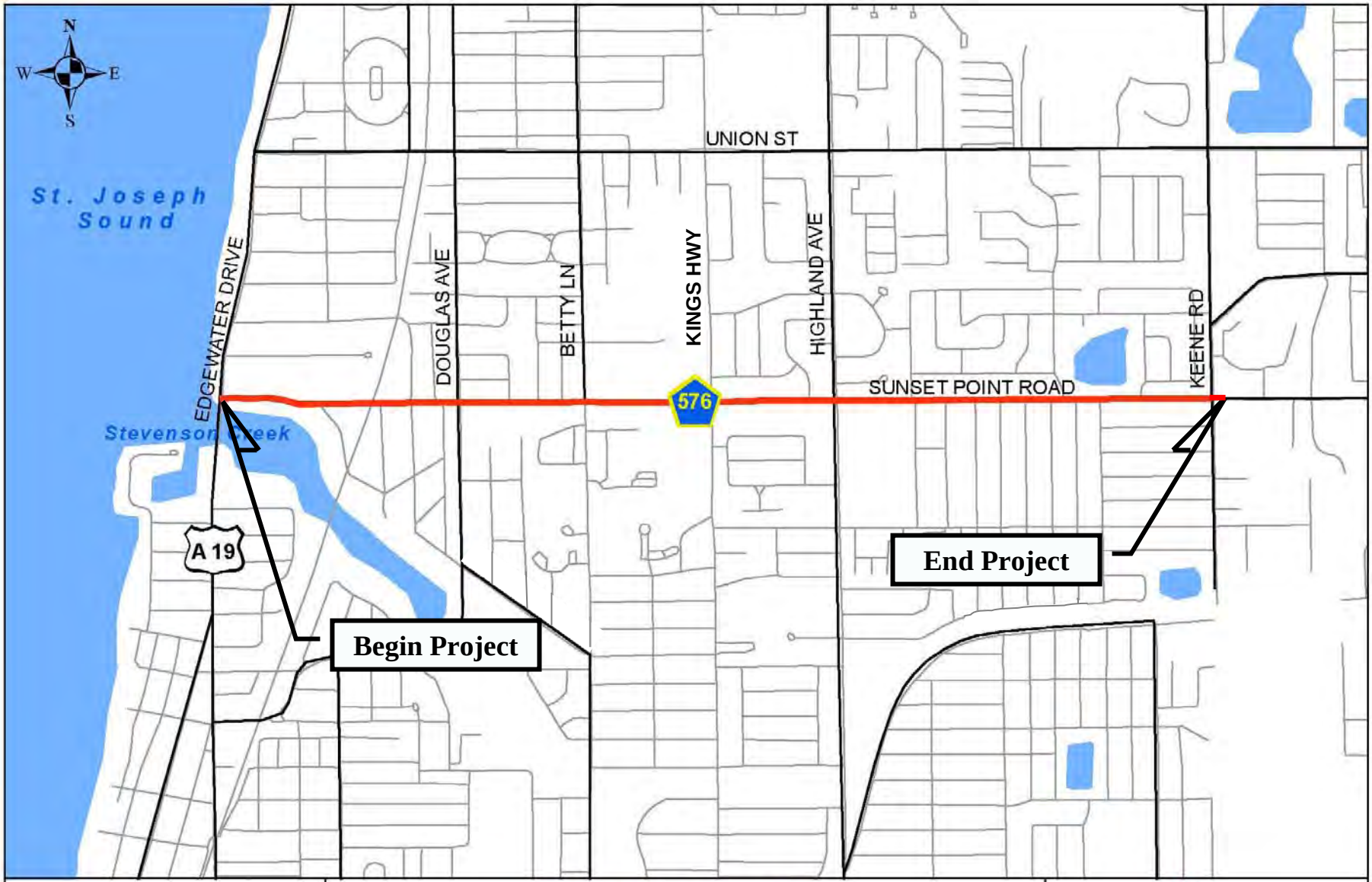
Introduction

1.1 Purpose

The purpose of this proposed project is to meet current and future traffic demand and provide drainage improvements and improved multi-modal facilities to the segment of County Road 576 (Sunset Point Road), from US Alt. 19 (Edgewater Drive) to Keene Road. This objective will be achieved by milling and resurfacing the existing two lane roadway from US Alt. 19 to Douglas Avenue, reconstructing the existing two-lane roadway from Douglas Avenue to Highland Avenue into three lanes, and reconstructing the existing two-lane roadway from Highland Avenue to Keene Road into four lanes. In addition, bicycle lanes and/or sidewalks will be added along the entire project, and improvements to major intersections will be made.

1.2 Project Description

The project is located within an unincorporated area of northwestern Pinellas County and an incorporated area of the City of Clearwater. The project location spans Sections 1, 2 and 3 of Township 29 S. and Range 15 E. and is approximately 2 miles long (see **Figure 1-1** for Project Location Map). Sunset Point Road is a two-lane undivided section with curb, but no gutter between US Alt. 19 and Keene Road. It is classified as an east-west urban minor arterial, per Pinellas County, for the entire length of the project. The Fred E. Marquis Pinellas Trail crosses the project between US Alt. 19 (Edgewater Drive) and Douglas Avenue.



American Consulting Engineers of Florida, LLC

Project Location Map

Sunset Point Road

US Alt 19 to Keene Road

S: 02,03; T: 29S; R: 15E

Pinellas County

Figure 1-1

Section 2

Need for Improvement

This section addresses the need for roadway improvements. The commission of this report is a result of increased travel demand along the corridor and aging infrastructure. In addition, the corridor lacks sufficient multi-modal and stormwater facilities, and has numerous safety issues which illustrate the need for corrective action along this corridor.

2.1 Deficiencies

Traffic

As shown in the *Traffic Technical Memorandum*, the signalized intersection of Sunset Point Road and Keene Road currently operates at LOS "E" during the AM and PM peak hour periods. The Pinellas County adopted standard is LOS "D" for intersections. The segment between Highland Avenue and Keene Road is also currently over capacity. Without geometric improvements, these conditions are expected to operate at an unacceptable LOS in the future.

Multi-Modal

There is an overall lack of pedestrian facilities (sidewalks) along the corridor. Some intermittent facilities exist, however; there is no continuity of facilities and with existing schools and residential communities there is a demand for these facilities. Provisions for bicycle travel are limited to shared-use of the narrow vehicular travel lanes. With the location of the Fred E. Marquis Pinellas Trail along the corridor, there is a demand for bicycle facilities.

Stormwater Facilities

There are few stormwater features along the corridor to provide for the existing stormwater runoff. There are relatively few drainage inlets (19 total inlets) along the entire corridor to serve over 90 acres of drainage area which drains along the roadway. Localized flooding is prevalent along the corridor according to the County's Highway Division personnel.

Safety

A review of the crash history along the corridor (see Section 2.2 below) revealed there were 260 crashes between July 1, 2004 and June 30, 2007.

2.2 Safety

The existing posted speed limit on Sunset Point Road is 35 miles per hour (mph). The eastern edge of the corridor is especially congested during peak travel times. Excessive travel delay influences driver behavior and safe operation of motor vehicles.

The crash history (July 1, 2004 to June 30, 2007) was evaluated along the corridor and is documented in Section 3.2.3 of the *Traffic Technical Memorandum*. There were 260 crashes documented over the 3-year period. Rear end, left turn, angle, and bicycle crash types documented are the predominant crashes along the corridor. Rear-end crashes are common at signalized intersections and in a corridor with numerous driveways and side streets with no turn lanes along Sunset Point Road. Most of the crashes (124 total) occurred between the intersections of Keene Road and Highland Avenue. The lack of turn lanes, uncontrolled movements, and traffic congestion may be contributing factors.

2.3 Consistency with Transportation Plan

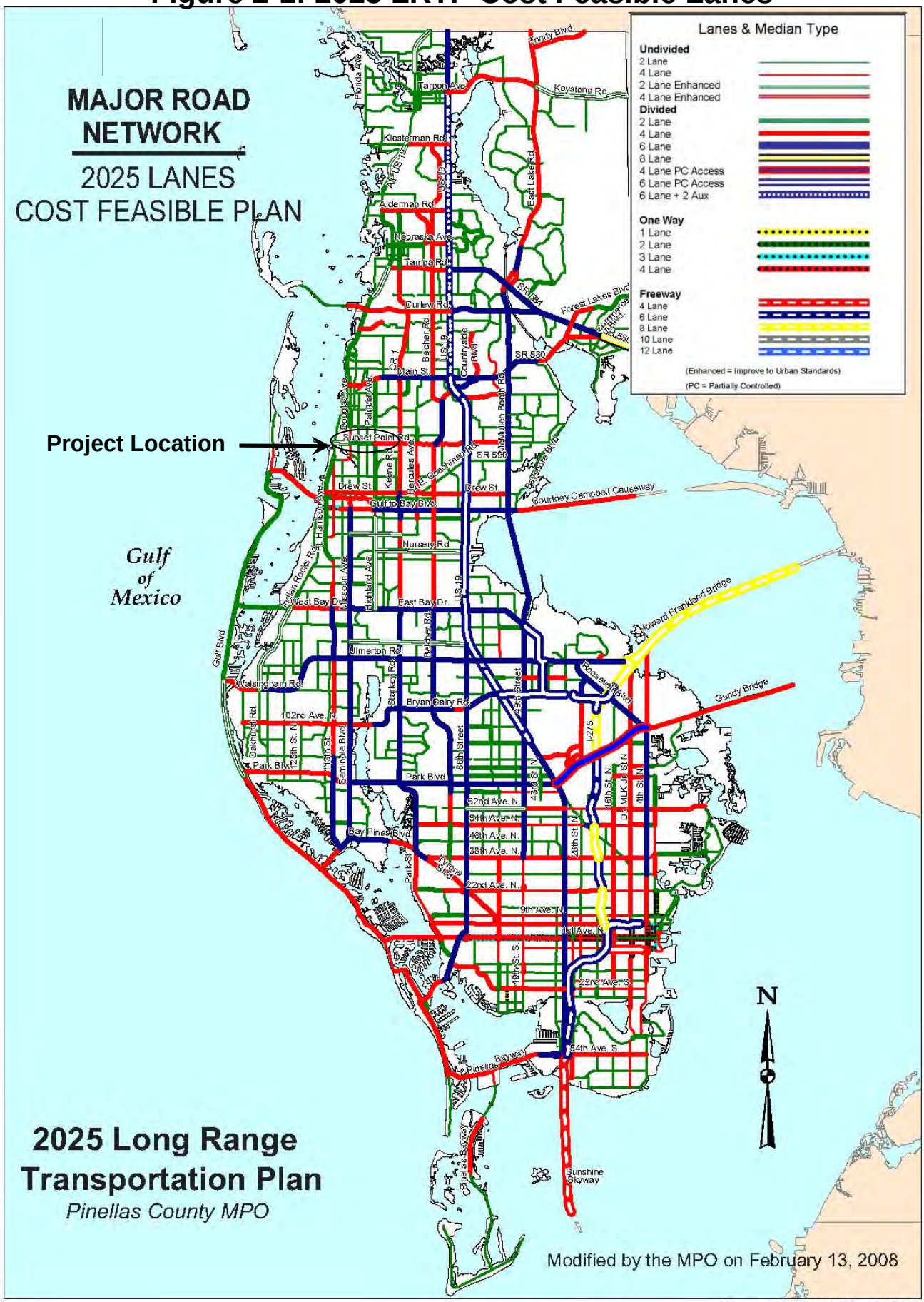
The preliminary engineering and design efforts commissioned by Pinellas County for the corridor are consistent with the Pinellas County Metropolitan Planning Organization (MPO) Transportation Improvement Program, adopted May 11, 2005. This document is in conformance with, and is a subset of the adopted Pinellas County 2025 Long Range Transportation Plan (LRTP) modification amended February 13, 2008. The LRTP (see **Figure 2-1**) shows a future four lane roadway on Sunset Point Road along a portion of this corridor, and the analysis shows to provide a four lane roadway from Highland Avenue to Keene Road.

2.4 Social and Economic Demands

The established community surrounding the project corridor has shaped the character of the roadway as an east-west commuter route for its local residents. Residential traffic from adjacent properties and intersecting neighborhood streets travels on the project corridor to reach employment and service destinations throughout northwest Pinellas County.

Acceptable levels of service must be maintained for residents, students, recreational users, and community and emergency service providers. The existing quality of service provided by Sunset Point Road has some unfavorable social and economic impact (i.e. increased travel times) on its users through the safety and delay that motorists are experiencing. The preliminary improvements evaluated in the report for this corridor consider these social and economic demands.

Figure 2-1: 2025 LRTP Cost Feasible Lanes



Thursday, April 10, 2008 4:10 PM

Section 3

Existing Conditions

3.1 Roadway

3.1.1 Functional Classification

Sunset Point Road is currently classified as an urban minor arterial per Pinellas County. The road does not presently serve as a hurricane evacuation route within the project limits. A map of hurricane evacuation routes is shown in **Figure 3-1**.

3.1.2 Typical Sections

The existing road is primarily a two-lane section within the majority of the study limits as shown in **Figure 3-2**. The lanes are varying in width from 10 ft. to 12 ft. with curbs and no effective gutter pan. Some left turn lanes are provided at Edgewater Drive, Kings Highway, Highland Avenue and Keene Road. A right turn lane is provided at Keene Road and Edgewater Drive.

3.1.3 Pedestrian and Bicycle Facilities

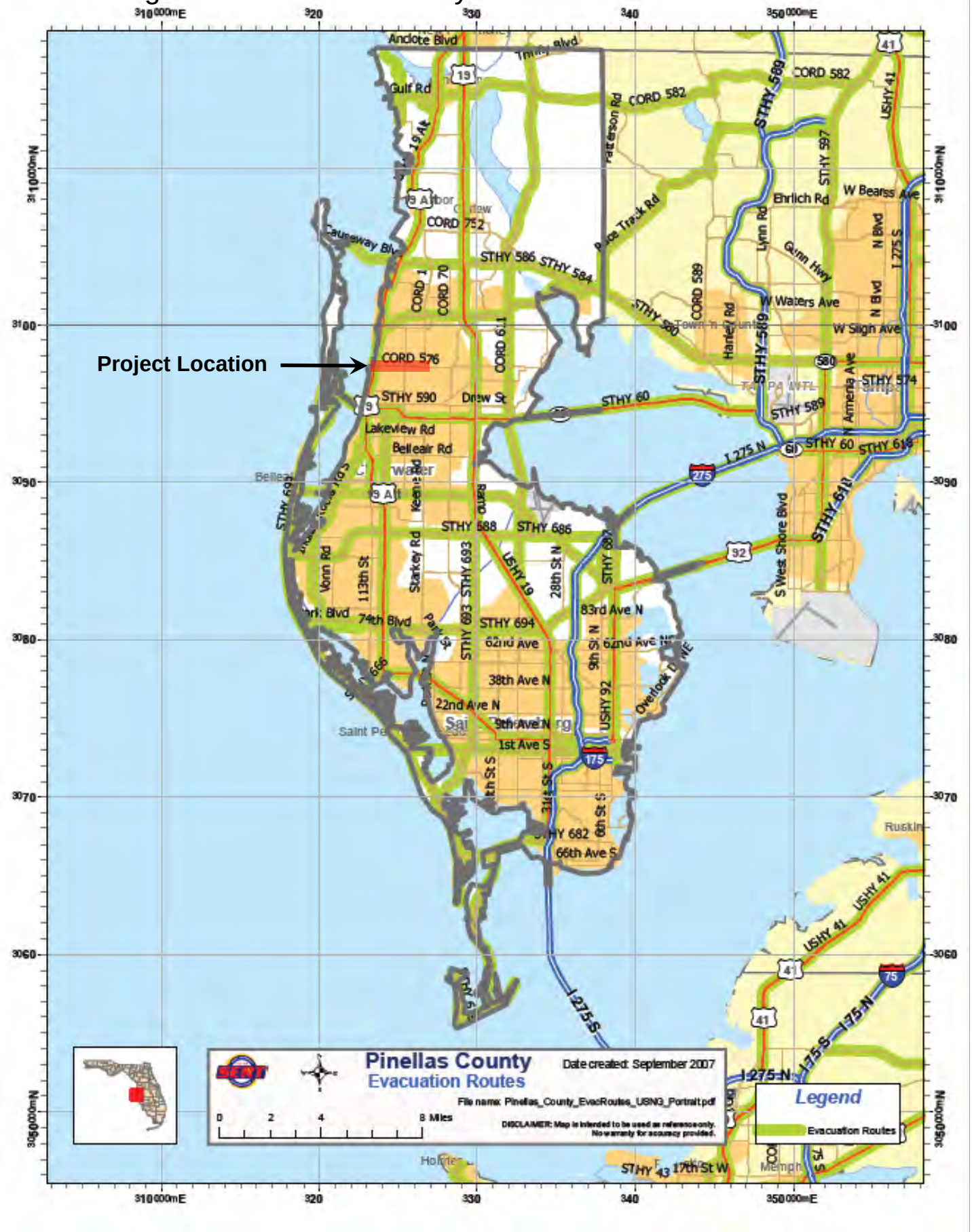
No designated bicycle lanes are located within the project limits. Continuous sidewalk is provided only on the south side of the segment between Kings Highway and Keene Road. The sidewalk varies in its distance from the edge of the road, with no consistent offset for either side. Other segments of sidewalk are present between Lombardy Drive and Keene Road on the north and spanning the Spring Branch Creek on the south, but they do not appear to connect with any other pedestrian facilities.

The Fred E. Marquis Pinellas Trail crosses Sunset Point Road between Edgewater Drive and Douglas Avenue. The trail accommodates both pedestrians and bicyclists. A warning signal beacon is provided on Sunset Point Road at this location. The warning signal consists of an overhead flashing yellow caution signal on Sunset Point Road and pole-mounted red flashing stop lights on the Pinellas Trail.

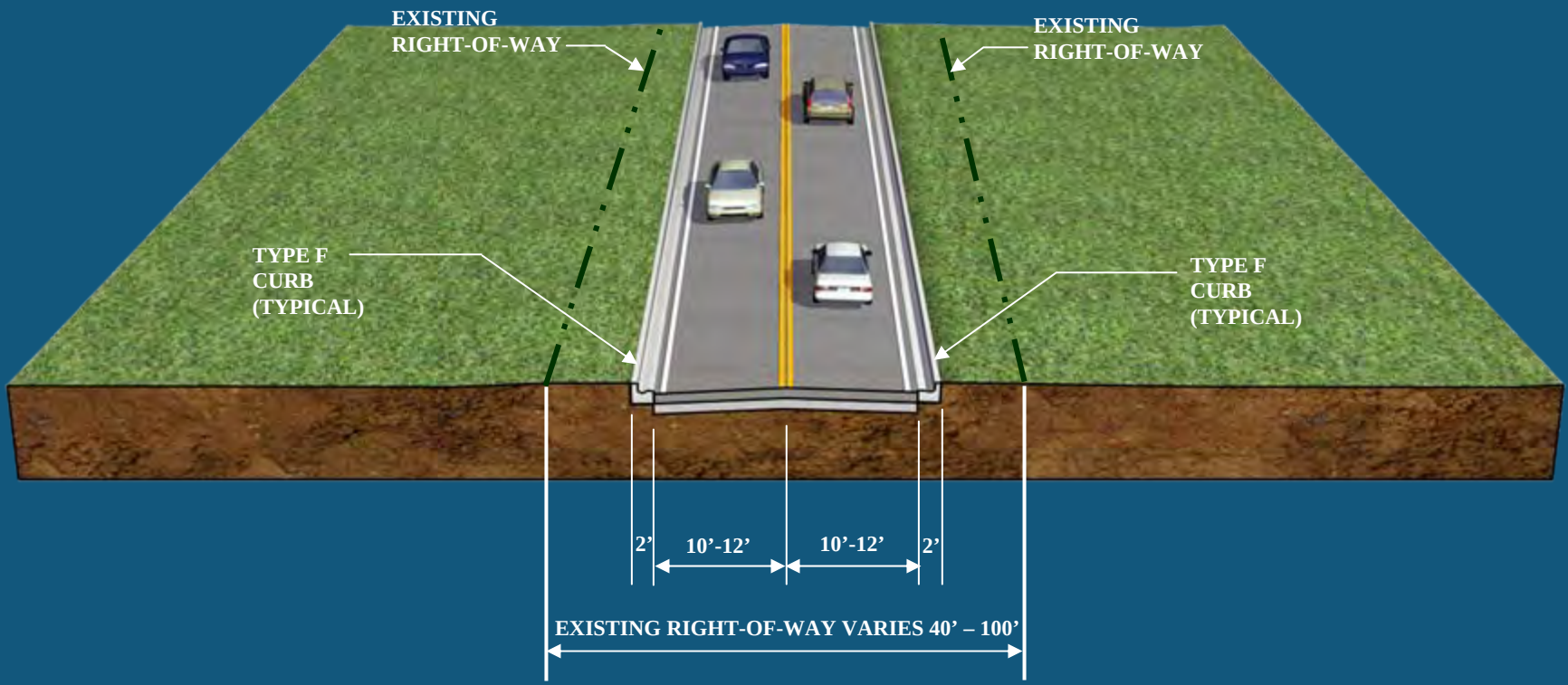
3.1.4 Right-of-Way

The existing right-of-way varies from 40 ft to 114 ft in width along the corridor. The existing right-of-way is shown on the Schematic Plans in **Appendix H** and the Existing Right-of-Way Maps in **Appendix J**. **Table 3-1** shows existing right-of-way widths over throughout the project.

Figure 3-1: Pinellas County Hurricane Evacuation Routes



EXISTING SUNSET POINT ROAD
FROM EAST OF US ALT. 19 TO DOUGLAS AVE.



2-LANE URBAN UNDIVIDED ROADWAY WITH CURB
DESIGN SPEED = 35 MPH
TYPICAL SECTION (N.T.S.)

American Consulting Engineers of Florida, LLC

Figure 3-2

Table 3-1
Existing Right-of-Way Widths
Sunset Point Road – Edgewater Drive to East of Keene Road

Existing Right-of-Way Widths	
Segment	**Right-of-Way Width**
US Alt. 19 (Edgewater Drive) Intersection	53 ft.
	Varies 53-40 ft.
Pinellas Trail Intersection	70 ft.
	Varies 70-40 ft.
Douglas Avenue Intersection	66 ft.
	Varies 66-100 ft.
N. Betty Lane Intersection	83 ft.
	Varies 83-100 ft.
Highland Avenue Intersection	100 ft.
	100 ft.
Keene Road Intersection	114 ft.
	114 ft.

3.1.5 Horizontal Alignment

The existing horizontal alignment generally is an east-west alignment. Beginning at Edgewater Drive, the existing alignment is a 600 ft tangent section followed by a curvilinear transition consisting of an approximately 650 ft radius curve and an approximately 475 ft radius curve (curve lengths approx. 157 ft and 129 ft respectively) joined in the middle by a 50 ft tangent. These curves transition the alignment from north to south with the transition ending 200 ft west of Stevenson Avenue. The alignment continues in an east-west direction on tangents with minor deflections of 1 degree or less from the end of this curve transition through the intersection with Keene Road.

Based on the existing posted speed, the second of the two existing horizontal curves in the beginning of the corridor does not meet the Florida Department of Transportation (FDOT) design criteria (Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways, Table 3-3) for maximum curvature of 14 degrees, 15 minutes for urban highways and streets. The first curve does meet FDOT design standards for maximum curvature, but does so by a small margin. Neither of the two curves fit the minimum radius design standards for an urban minor arterial outlined in Figure 3-2 of the same manual.

3.1.6 Vertical Alignment

The existing vertical alignment is in a semi-rolling terrain, which has areas of flat slopes which range from 0.3 percent to more than 4 percent. From Edgewater Drive to Overbrook Road the grade drops at an average slope of 0.7% for the first 500 ft and then

climbs at an average of 1.9% until reaching a peak at the intersection of Overbrook Road. From this intersection, the grade drops at an average of 0.73% until reaching an existing cross drain 800 ft east of Betty Lane. From this structure the grade slopes up to Nugget Drive an average of 1.1% with a slight dip 250 ft east of Highland Avenue. From Nugget Drive to 200 ft east of Clearview Lake Drive, the grade is relatively flat with a slope of approximately 0.15%. From this point east of Clearview Lake Drive, the grade drops at an average of .75% until reaching the intersection of Keene Road.

3.1.7 Drainage

The United States Geological Survey (USGS) Quadrangle (QUAD) map shown in **Figure 3-3** illustrates the location of the study area with respect to the overall watershed and the Sunset Point Road. As illustrated on the QUAD map, this part of Pinellas County consists of flat uplands from elevation 40 to 60, flatwoods from elevation 10 to 40, and flood plains with elevations less than 10 feet.

As stated earlier, three water bodies are associated within the region of the Sunset Point Road widening project; Stevenson's Creek, Spring Branch Tributary of Stevenson's Creek, and Alligator Creek. The Sunset Point Road corridor traverses one major tributary; Spring Branch Tributary bisects the existing roadway and functions as a basin divide. Sunset Point Road crosses over the Spring Branch Tributary just west of North Betty Lane. The Spring Branch Tributary flows southwest into Stevenson's Creek before its ultimate outfall into the Gulf of Mexico. The Alligator Creek Channel A Basin begins near the intersection of Sunset Point Road at Keene Road and flows south then ultimately to the East into Tampa Bay.

The open basins within the study area typically drain to either of the aforementioned tributary or to an existing stormwater collection system which outfalls into Spring Branch Tributary, Stevenson's Creek, or Alligator Creek.

The stormwater management system associated with the Sunset Point Road corridor, within the study limits, is currently composed of a series of open roadside swale systems and curb and gutter systems that discharge into the Spring Branch Tributary or into Stevenson's Creek. The swale systems collect the stormwater runoff generated within the Sunset Point Road right-of-way, as well as contributing off-site runoff from adjacent subdivisions and developments.

There are three separate curb and gutter systems that collect and discharge stormwater into Stevenson's Creek between Alt. 19 (Edgewater Drive) and the Pinellas Trail. A closed drainage system along Douglas Avenue with a 24-inch RCP trunk line collects some off-site runoff from the north of Sunset Point Road and along Douglas Avenue. This system discharges into the Spring Branch Tributary where Douglas Avenue traverses the water body.

Runoff generated from Overbrook Avenue and to the east is directed into the open roadside swales that convey the stormwater into the Spring Branch Tributary via concrete

spillways located at the bridge. The north and south portion of North Betty Lane both have closed drainage systems that collect and convey offsite stormwater into the Spring Branch Tributary. Both systems have a 30-inch truck line and the south system discharges into a small stormwater pond prior to discharge into the tributary.

Just west of Kings Highway, approximately between stations 146+30 and 151+50, there is a natural ditch approximately 15 feet in width and 520 feet in length running east to west adjacent to the south side of Sunset Point Road. The ditch, which flows east to west, conveys stormwater generated from Kings Highway, the Sunset Point Road corridor, and a large portion of offsite runoff to a 38-inch by 24-inch elliptical RCP crossdrain under Sunset Point Road. There the ditch system continues to the west and northwest conveying the runoff into a Pinellas County owned wetland mitigation bank. The County owned wetland mitigation bank utilizes two individual control structures prior to discharging into the Spring Branch Tributary of Stevenson's Creek.

At N. Highland Avenue there is a curb and gutter system collecting runoff generated from Highland Avenue which conveys the stormwater north and under Sunset Point Road through an 18-inch RCP crossdrain. Just west of this south-north line there is a 36-inch trunk line with a 36-inch RCP crossdrain under Sunset Point Road collecting runoff from within the Sunset Point Road corridor and significant offsite areas to the east and southeast.

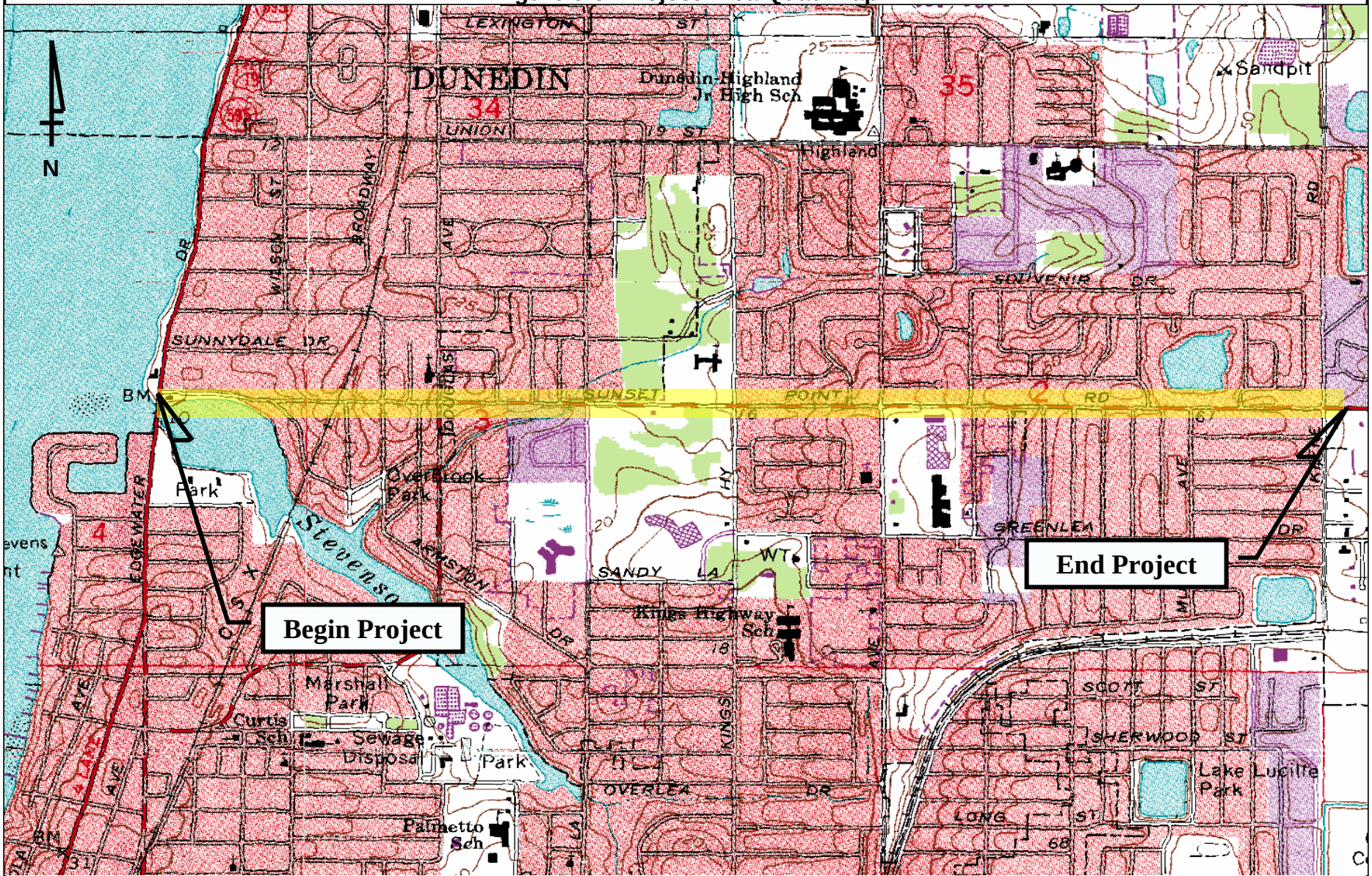
At approximately station 193+00 (Murray Avenue), there is a 30-inch by 19-inch elliptical RCP crossdrain that conveys runoff generated from the south side of Sunset Point Road and into Clearview Lake.

There are existing manholes at Keene Road (structures ES-160 and ES-142) that receive runoff from Keene Road both from the north and south, as well as from Sunset Point Road from the west. This runoff flows east through a 42-inch RCP storm sewer to Alligator Creek Channel A. The channel flows south through an existing 36-inch and 42-inch crossdrain located at station 1210+00 along Sunset Point Road east of Keene Road.

The existing stormwater management facilities within the Sunset Point Road study area currently function primarily as stormwater runoff conveyance systems; water quality and quantity are not addressed in the existing systems. **Figures 3-4** and **3-5** present the existing stormwater facilities within the Sunset Point Road corridor study area.

According to Pinellas County Highway Division personnel, there have been significant localized flooding problems where Chenango Avenue and Macomber Avenue intersect with Sunset Point Road west of N Betty Lane. It was also noted that there are erosion problems along the backside of the curb on the south side of Sunset Point Road east of Highland Avenue. This erosion is being primarily caused by runoff generated by offsite development and the lack of stormwater inlets. Apparently there is roadside flooding also occurring approximately at station 1168+00, which may be caused by a lack of capacity of the existing 36-inch RCP crossdrain. All locations should be evaluated further during final roadway design.

Figure 3-3: Project Area Quad Map



Project Area

Sunset Point Road – From Edgewater Drive to Keene Road

Pinellas County, Florida

American Consulting Engineers of Florida, LLC

Pinellas County

American Consulting Engineers of Florida, LLC

Pinellas County PUBLIC WORKS

SOURCE: McKIM & CREED

SUNSET POINT ROAD
US ALT 19 TO KEENE ROAD

FIGURE 3-4
EXISTING STORMWATER INFRASTRUCTURE

P:\PROJECTS\30576\CAD\Exhibits\OVERALL MAP.dwg LAYOUT:OVERALL Last Saved:Jan. 20, 09 Plot Date: 1/22/2009 5:34 PM By: townsend, james r.

NUMBER	STATION	OFFSET	DESCRIPTION
ES-1	N/A	N/A	CURB INLET TOP EL=6.52 GRATE EL=5.60 SE 18" RCP INV EL=0.48
ES-2	100+21.5	41.4 RT	CURB INLET TOP EL=7.08 GRATE EL=6.27 NW 18" RCP INV EL=1.25 N 18" RCP INV EL=1.13
ES-3	100+30.2	65.1 LT	GRATE INLET EL=6.14 S 18"RCP INV EL=1.56
ES-4	105+35.3	10.9 LT	GRATE INLET EL=2.66 S 18"RCP INV EL=0.10
ES-5	105+35.3	10.6 RT	CURB INLET TOP EL=3.67 GRATE EL=2.80 N 18"RCP INV EL=(-)0.25 S 18"RCP INV EL=(-)0.24
ES-6	105+34.3	40.5 RT	RAILROAD TIE HEADWALL TOP EL=1.52 18"RCP INV EL=(-)0.55
ES-7	107+78.8	15.3 LT	CURB INLET WITH MANHOLE RIM EL=3.97 THROAT EL=2.99 S 12"RCP INV EL=0.94
ES-8	107+80.4	72.4 RT	CONC HEADWALL TOP EL=0.80 12"RCP INV EL=(-)1.00
ES-9	113+90.1	46.4 LT	GRATE INLET EL=20.90 18"X12"RCP INV EL=19.55
ES-10	114+16.8	45.1 LT	CURB INLET WITH MANHOLE RIM EL=22.58 THROAT EL=21.72 W 18"X12"RCP INV EL=19.56 E 18"RCP INV EL=19.58
ES-11	114+51.7	45.6 LT	CURB INLET WITH MANHOLE RIM EL=22.62 THROAT EL=21.75 W 18"RCP INV EL=19.47 N 18"RCP INV EL=19.53
ES-12	114+50.4	113.2 LT	MANHOLE RIM EL=23.01 S 18"RCP INV EL=19.33 N 18"RCP INV EL=19.40
ES-13	114+60.3	138.5 LT	MANHOLE RIM EL= S 18"RCP INV EL=19.20 N 18"RCP INV EL=19.66 E 38"X24"RCP INV EL=19.04
ES-14	122+56.0	245.6 LT	GRATE INLET EL=26.55 E 12"VCP INV EL=21.99
ES-15	122+69.6	245.1 LT	GRATE INLET EL=26.66 W 12"VCP INV EL=22.07 E 15"RCP INV EL=22.28
ES-16	124+95.2	245.6 LT	CURB INLET TOP EL=24.76 GRATE EL=23.97 W 15"RCP INV EL=20.99 S 18"RCP INV EL=18.50 SE 15"RCP INV EL=18.61
ES-17	125+39.0	224.4 LT	CURB INLET TOP EL=24.35 GRATE EL=23.69 NW 15"RCP INV EL=19.74
ES-18	124+93.5	50.5 LT	CURB INLET TOP EL=24.33 GRATE EL=23.51 N 18"RCP INV EL=17.11 E 18"RCP INV EL=17.02 S 18"RCP INV EL=17.10 W 6"DIP INV EL=19.86
ES-19	125+46.0	60.5 LT	DRAIN INLET TOP EL=23.72 GRATE EL=23.47 W 18"RCP INV EL=18.93
ES-20	125+02.7	211.2 RT	CURB INLET TOP EL=22.72 GRATE EL=22.04 N 18"RCP INV EL=15.20 E 15"RCP INV EL=16.29 S 24"RCP INV EL=15.10 W 6"DIP INV EL=18.66
ES-21	125+46.0	210.4 RT	CURB INLET TOP EL=22.72 GRATE EL=21.89 W 15"RCP INV EL=18.63
ES-22	125+10.7	706.2 RT	CURB INLET TOP EL=8.92 GRATE EL=8.14 N 24"RCP INV EL=2.48 E 24"RCP INV EL=2.81 S 15"RCP INV EL=3.37 W 6"DIP INV EL=3.00
ES-23	125+53.7	704.4 RT	CURB INLET TOP EL=8.91 GRATE EL=8.02 W 24"RCP INV EL=3.12
ES-24	124+95.9	688.1 RT	CONC HEADWALL TOP EL=7.10 8' WIDE X 7' TALL BOX CULVERT INV EL=(-)1.95
ES-25	125+69.0	648.3 RT	CONC HEADWALL TOP EL=6.94 8' WIDE X 7' TALL BOX CULVERT INV EL=(-)1.96
ES-26	136+61.9	17.2 RT	CONCRETE SPILLWAY WITH HEADWALL TOP EL=14.60 THROAT EL=14.08
ES-27	136+57.1	14.4 LT	DRAIN INLET WITH CONFLICT GRATE EL=17.01 E 24"CMP INV EL=10.91 E-W 4"DIP THROUGH BOX TOP EL=14.56

NUMBER	STATION	OFFSET	DESCRIPTION
ES-28	136+74.6	18.2 LT	END OF PIPE 24"CMP INV EL=9.01
ES-29	137+15.1	14.5 LT	DRAIN INLET TOP EL=16.50 THROAT EL=15.38 W 12"X 18" ECMP FILLED WITH DIRT
ES-30	138+37.1	43.2 RT	CURB INLET WITH MANHOLE RIM EL=16.53 THROAT EL=15.53 W 15"RCP INV EL=12.52 E 15"RCP INV EL=12.69
ES-31	138+71.1	43.4 RT	CURB INLET WITH MANHOLE RIM EL=15.88 THROAT EL=15.03 W 15"RCP INV EL=13.15
ES-32	138+36.4	154.9 RT	MANHOLE RIM EL=17.52 NW 30"RCP INV EL=12.06 S 30"RCP INV EL=12.14
ES-33	138+38.4	217.7 RT	CURB INLET WITH MANHOLE RIM EL=16.78 THROAT EL=15.77 N 30"RCP INV EL=12.32 S 30"RCP INV EL=12.34
ES-34	138+40.6	290.4 RT	CURB INLET WITH MANHOLE RIM EL=17.02 THROAT EL=16.07 N 30"RCP INV EL=12.50 S 30"RCP INV EL=12.57
ES-35	138+43.0	472.9 RT	MANHOLE RIM EL=17.90 N 30"RCP INV EL=12.68 S 30"RCP INV EL=12.68
ES-36	138+44.6	603.4 RT	CURB INLET WITH MANHOLE RIM EL=18.22 THROAT EL=17.40 N 30"RCP INV EL=13.29 S 30"RCP INV EL=13.55
ES-37	138+45.4	670.8 RT	MANHOLE RIM EL=18.48 N 30"RCP INV EL=13.85 E 24"RCP INV EL=14.02 S 24"RCP INV EL=14.05
ES-38	138+28.1	180.6 LT	END OF PIPE 30"CMP INV EL=5.48
ES-39	138+76.1	133.2 LT	GRATE INLET EL=10.93 N 12"RCP INV EL=9.49
ES-40	138+73.6	198.8 LT	END OF PIPE 12"CMP INV EL=7.61
ES-41	138+73.9	214.1 LT	END OF PIPE 24"RCP INV EL=6.01
ES-42	138+62.6	403.5 LT	GRATE INLET EL=10.66 N 24"RCP INV EL=7.18 S 24"RCP INV EL=7.10
ES-43	138+28.9	325.9 LT	GRATE INLET EL=10.54 N 24"RCP INV EL=7.10 S 30"CMP INV EL=7.05
ES-44	138+26.7	398.2 LT	MANHOLE RIM EL=10.95 N 24"RCP INV EL=7.29 S 24"RCP INV EL=7.39
ES-45	138+25.6	466.4 LT	GRATE INLET EL=10.57 N 24"RCP INV EL=7.82 S 24"RCP INV EL=7.83
ES-46	138+58.6	538.7 LT	GRATE INLET EL=10.72 N 24"RCP INV EL=7.64 S 24"RCP INV EL=7.73
ES-47	138+57.1	639.2 LT	GRATE INLET EL=10.71 S 24"RCP INV EL=8.10
ES-48	138+24.3	649.1 LT	GRATE INLET EL=11.66 N 18"RCP INV EL=8.58 W 18"RCP INV EL=8.50 S 24"RCP INV EL=8.73
ES-49	146+29.8	17.0 RT	CURB INLET WITH MANHOLE RIM EL=11.10 N 38"X24"RCP INV EL=7.15 S 38"X24"RCP INV EL=7.23
	146+29.9	21.6 RT	CONC HEADWALL TOP EL=7.37 38"X24"RCP INV EL=7.19
ES-50	146+29.8	22.0 LT	CURB INLET WITH MANHOLE RIM EL=9.79 NE 15"RCP INV EL=7.56 NW 38"X24"RCP INV EL=5.81 S 38"X24"RCP INV EL=6.14
	146+39.8	25.4 LT	END OF PIPE 15"RCP INV EL=7.72
	146+20.7	25.2 LT	END OF PIPE 38"X24"RCP INV EL=5.81
ES-51	148+51.3	51.1 RT	END OF PIPE 15"ADS INV EL=8.16
ES-52	148+53.1	71.6 RT	END OF PIPE 15"ADS INV EL=8.97
ES-53	149+36.2	18.4 LT	CURB INLET TOP EL=11.26 GRATE EL=10.56 S 15"RCP INV EL=8.50
ES-54	149+36.1	18.2 RT	CURB INLET TOP EL=11.44 GRATE EL=10.80 N 15"RCP INV EL=8.38 S 24"RCP INV EL=8.40
ES-55	149+36.0	42.6 RT	END OF PIPE 24"RCP INV EL=7.70
ES-56	151+36.3	46.3 RT	END OF PIPE 48"RCP INV EL=8.13
ES-57	151+37.3	41.3 RT	END OF PIPE 18"RCP INV EL=9.14
ES-58	151+54.2	48.6 RT	GRATE INLET EL=15.30 W 48"RCP INV EL=8.57 S 48"RCP INV EL=8.68

NUMBER	STATION	OFFSET	DESCRIPTION
ES-59	151+66.4	39.2 RT	CURB INLET TOP EL=15.40 GRATE EL=14.63 W 18"RCP INV EL=9.65 E 18"RCP INV EL=9.65
ES-60	152+06.7	39.4 RT	CURB INLET TOP EL=15.31 GRATE EL=14.54 W 18"RCP INV EL=10.08
ES-61	151+57.8	194.1 RT	MANHOLE RIM EL=15.77 N 48"RCP INV EL=9.23 S 48"RCP INV EL=9.23 E 24"RCP INV EL=11.21
ES-62	151+70.5	194.4 RT	CURB INLET TOP EL=15.72 GRATE EL=14.97 W 24"RCP INV EL=11.76 E 12"CMP INV EL=12.94
ES-63	152+06.9	193.9 RT	CURB INLET TOP EL=15.83 GRATE EL=15.11 W 12"CMP INV EL=13.32
ES-64	151+63.6	373.7 RT	MANHOLE RIM EL=16.57 N 48"RCP INV EL=9.94 S 48"RCP INV EL=9.94 E 24"CMP INV EL=12.77
ES-65	152+10.5	381.3 RT	GRATE INLET EL=16.10 W 24"CMP INV EL=12.97
ES-66	151+64.9	422.6 RT	CURB INLET WITH MANHOLE MANHOLE EL=16.72 THROAT EL=15.60 N 48"RCP INV EL=9.97 E 36"CMP INV EL=10.10
ES-67	152+06.2	422.2 RT	MANHOLE WTH CONFLICT MANHOLE RIM EL=16.37 W 36"CMP INV EL=10.24 E 36"PVC INV EL=10.44 NW 6"PVC INV EL=11.07 N-S 12"DIP UNKNOWN LINE TOP OF PIPE EL=12.15
ES-68	152+16.0	422.5 RT	CURB INLET WITH MANHOLE MANHOLE RIM EL=16.53 THROAT EL=15.77 W 36"PVC INV EL=10.71 S 24"CMP INV EL=11.25
ES-69	152+14.7	458.1 RT	CURB INLET TOP EL=16.55 GRATE EL=15.77 N 24"CMP INV EL=12.17 S 24"CMP INV EL=11.32 E 6"CP INV EL=12.59
ES-70	153+29.6	419.5 RT	MANHOLE RIM EL=17.43 W 24"PVC INV EL=12.08 S 30"CMP INV EL=12.83 E 6"PVC INV EL=13.94 SE 18"PVC INV EL=13.16
ES-71	157+31.3	50.3 RT	CONC FLUME WITH ALUMINUM COVER RUNNING UNDER SIDEWALK WITH MES AND 11"WIDE X 3"DEEP WEIR WEIR INV EL=20.55
ES-72	157+31.4	58.8 RT	CONTROL STRUCTURE GRATE EL=22.18 SKIMMER EL=22.15 11"WIDE X 3"DEEP WEIR INV EL=21.43
ES-73	164+75.2	638.0 LT	GRATE INLET EL=17.92 S 53"X34"RCP INV EL=13.25
ES-74	164+76.1	587.2 LT	GRATE INLET EL=19.54 N 53"X34"RCP INV EL=13.71 SE 53"X34"RCP INV EL=14.55
ES-75	165+35.9	524.7 LT	GRATE INLET EL=23.25 NW 53"X34"RCP INV EL=15.59 S 48"RCP INV EL=15.74
ES-76	165+37.4	457.4 LT	GRATE INLET EL=24.61 N 48"RCP INV EL=15.56 S 48"RCP INV EL=15.72
ES-77	164+89.1	355.8 LT	INLET TOP EL=25.87 THROAT EL=24.87 N 15"CMP INV EL=22.80
ES-78	164+78.6	238.9 LT	MANHOLE RIM EL=28.58 S 24"CMP INV EL=23.34 W 15"RCP INV EL=23.28
ES-79	165+39.7	241.2 LT	GRATE INLET EL=27.37 N 48"RCP INV EL=19.74 S 42"RCP INV EL=22.21
ES-80	165+40.5	174.8 LT	GRATE INLET EL=27.95 N 42"RCP INV EL=23.28 S 42"RCP INV EL=23.30
ES-81	165+43.7	39.2 LT	MANHOLE RIM EL=32.13 N 42"RCP INV EL=24.81 E 36"RCP INV EL=24.81 S 18"RCP INV EL=25.96
ES-82	164+84.8	46.3 LT	MANHOLE RIM EL=31.34 S 24"CMP INV EL=25.42 E 24" CMP INV EL=25.53
ES-83	164+97.5	65.2 RT	CURB INLET TOP EL=34.15 GRATE EL=32.32 E 18"RCP INV EL=27.68
ES-84	165+53.5	66.3 RT	CURB INLET TOP EL=33.84 GRATE EL=33.05 W 18"RCP INV EL=27.51 N 18"RCP INV EL=25.98 S 18"RCP INV EL=27.32
ES-85	164+58.5	164.9 RT	UTILITY VAULT W/ GRATE 2"PVC PIPE THROUGH STRUCTURE W/ VALVE GRATE EL=34.85
ES-86	164+84.9	164.2 RT	GRATE INLET EL=34.08 S 8"DIP INV EL=32.54

NUMBER	STATION	OFFSET	DESCRIPTION
ES-87	164+85.9	244.9 RT	GRATE INLET EL=35.20 N 8"DIP INV EL=32.14 E 10"DIP INV EL=32.07 S 10"DIP INV EL=32.10
ES-88	164+99.3	244.0 RT	CURB INLET TOP EL=36.11 GRATE EL=35.35 W 10"DIP INV EL=32.80 E 18"RCP INV EL=29.44
ES-89	164+86.4	312.4 RT	GRATE INLET EL=35.50 N 10"DIP INV EL=32.84
ES-90	165+55.3	243.5 RT	CURB INLET TOP EL=35.69 GRATE EL=34.91 N 18"RCP INV EL=29.02 S 18"RCP INV EL=29.06 W 18"RCP INV EL=29.13
ES-91	165+57.1	436.3 RT	CURB INLET TOP EL=37.01 GRATE EL=36.22 N 18"RCP INV EL=31.35 W 18"RCP INV EL=31.45
ES-92	165+01.5	436.2 RT	CURB INLET TOP EL=37.22 GRATE EL=36.44 E 18"RCP INV EL=31.74 W 8"DIP INV EL=33.95
ES-93	164+88.5	436.9 RT	GRATE INLET EL=36.86 E 8"DIP INV EL=34.68 S 8"DIP INV EL=34.74
ES-94	164+90.1	538.4 RT	GRATE INLET EL=36.78 N 8"DIP INV EL=35.08 S 8"DIP INV EL=35.07
ES-95	164+91.2	617.3 RT	GRATE INLET EL=36.76 N 8"DIP INV EL=35.33
ES-96	165+95.6	192.5 RT	GRATE INLET EL=34.12 SKIMMER EL=34.64 E 18"RCP INV EL=31.43
ES-97	166+18.9	194.1 RT	END OF PIPE 18"RCP INV EL=31.49
ES-98	165+97.2	96.9 RT	END OF PIPE 23"X14"RCP INV EL=31.85
ES-99	166+58.5	96.5 RT	GRATE INLET TOP EL=35.07 E 23"X14"RCP INV EL=32.22
ES-100	166+80.4	139.3 RT	GRATE INLET TOP EL=36.25 N 18"RCP INV EL=28.96
ES-101	166+80.1	61.0 RT	MANHOLE RIM EL=35.47 E 18"RCP INV EL=29.21 S 18"RCP INV EL=29.25
ES-102	168+01.6	60.1 RT	MANHOLE RIM EL=35.40 N 18"RCP INV EL=28.72 W 18"RCP INV EL=28.63
ES-103	167+92.8	26.9 RT	MANHOLE RIM EL=32.72 W 36"RCP INV EL=28.47
	167+79.4	26.1 RT	END OF PIPE AT FLUME 36"RCP INV EL=28.86
ES-104	168+06.2	27.6 RT	MANHOLE RIM EL=32.77 N 3.5'X3.0' BOX CULVERT INV EL=27.95 S 18"RCP INV EL=27.83 E 36"RCP INV EL=28.03
ES-105	168+20.5	28.5 RT	END OF PIPE 36"RCP INV EL=27.97
ES-106	168+03.1	14.0 RT	CURB INLET WITH 2 GRATES GRATE AT FL EL=32.15 GRATE AT BC EL=33.37 N 36"RCP INV EL=27.84 S 3.5'X3.0' BOX CULVERT INV EL=27.66
ES-107	168+02.7	31.6 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=32.56 THROAT EL=32.01 N 36"RCP INV EL=27.63 S 36"RCP INV EL=27.67
ES-108	168+01.6	39.1 LT	GRATE INLET EL=31.82 W 36"RCP INV EL=27.30 S 36"RCP INV EL=27.39
ES-109	166+80.0	40.1 LT	CONFLICT BOX TOP EL=32.19 W 36"RCP INV EL=26.79 E 36"RCP INV EL=26.87 N-S 8"VCP THROUGH BOX SANITARY TOP EL=29.03
ES-110	168+56.5	35.1 RT	END OF PIPE 36"RCP INV EL=28.39
ES-111	169+38.7	36.0 RT	GRATE INLET EL=33.92 E 36"RCP INV EL=29.79 W 36"RCP INV EL=29.74 UNDER CONSTRUCTION
ES-112	171+02.6	33.1 RT	GRATE INLET EL=36.48 E 36"CMP INV EL=32.23 W 36"RCP INV EL=31.52 UNDER CONSTRUCTION
ES-113	171+48.8	32.9 RT	GRATE INLET EL=36.62 W 36"CMP INV EL=33.06 SE 36"RCP INV EL=33.09
ES-114	171+69.4	62.2 RT	INLET WITH MANHOLE MANHOLE RIM EL=37.07 WEIR EL=33.22 NW 36"RCP INV EL=33.27
ES-115	177+02.6	172.2 RT	END OF PIPE 10"PVC INV EL=45.09
ES-116	177+01.6	203.3 RT	END OF PIPE 10"PVC INV EL=45.26
ES-117	192+97.7	11.9 RT	GRATE INLET EL=58.86 N 30"X19"RCP INV EL=55.44

NUMBER	STATION	OFFSET	DESCRIPTION
ES-118	192+97.7	19.0 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=59.20 THROAT EL=58.38 N 30"X19"RCP INV EL=55.15 S 30"X19"RCP INV EL=55.16
ES-119	192+98.0	26.0 LT	MANHOLE RIM EL=59.28 S 30"X19"RCP INV EL=55.02 E 24"ADS INV EL=55.01
ES-120	193+30.4	39.7 LT	MANHOLE RIM EL=59.29 W 24"ADS INV EL=55.03 N 24"ADS INV EL=55.05
ES-121	193+32.5	177.7 LT	END OF PIPE 24"ADS INV EL=53.21
ES-122	196+01.3	209.7 LT	END OF PIPE 18"DIP INV EL=53.86 CONNECTS TO 18"ADS
ES-123	197+49.1	159.7 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=58.27 THROAT EL=57.22 W 18"DIP INV EL=55.17 E 12"DIP INV EL=55.76
ES-124	197+82.3	152.9 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=58.40 THROAT EL=57.51 W 12"DIP INV EL=55.83 N 12"DIP INV EL=55.97
ES-125	198+27.9	230.9 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=58.23 THROAT EL=57.20 S 12"DIP INV EL=56.12
ES-126	199+50.2	24.6 LT	CURB INLET TOP EL=61.06 GRATE EL=60.27 S 18"RCP INV EL=54.44 NW 6"PVC INV EL=57.22 E 18"RCP INV EL=54.32
ES-127	199+49.8	18.4 RT	CURB INLET TOP EL=61,12 GRATE EL=60.37 N 18"RCP INV EL=54.57 W 6"PVC INV EL=57.47
ES-128	201+88.6	32.6 LT	CURB INLET TOP EL=60.16 GRATE EL=59.39 E 18"RCP INV EL=52.84 E 6"PVC INV EL=56.79 S 18"RCP INV EL=52.78 W 18"RCP INV EL=53.68 W 6"PVC INV EL=56.91
ES-129	201+89.0	38.1 RT	CURB INLET TOP EL=59.97 GRATE EL=59.28 N 18"RCP INV EL=52.88 E 6"PVC INV EL=56.97 W 6"PVC INV EL=56.96
ES-130	203+10.9	33.4 LT	MANHOLE WTH CONFLICT MANHOLE RIM EL=58.71 W 18"RCP INV EL=50.53 E 18"RCP INV EL=51.96 N-S 12"DIP SANITARY CONFLICT TOP OF PIPE EL=52.53 E 18"RCP INV EL=51.96 W 18"RCP INV EL=50.53
ES-131	204+18.7	38.0 LT	CURB INLET TOP EL=57.00 THROAT EL=56.59 E 24"RCP INV EL=49.98 E 6"PVC INV EL=53.43 S 18"RCP INV EL=49.82 W 18"RCP INV EL=50.00 W 6"PVC INV EL=53.36
ES-132	204+22.6	38.3 RT	CURB INLET TOP EL=57.92 GRATE EL=57.20 N 18"RCP INV EL=53.06 E 6"PVC INV EL=53.34 W 6"PVC INV EL=54.40
ES-133	137+52.0	68.0 RT	MITERED END SECTION NE 15"RCP INV EL=11.52
ES-134	137+14.7	107 RT	CONTROL STRUCTYRE TOP EL=14.30 BOTTOM OF BOX EL=7.59 NW 36" RCP INV EL=7.68 NE 6" PVC INV EL=9.06 SE 6" PVC INV EL=8.90
ES-135	137+83.4	130 RT	MITERED END SECTION SE 30"RCP INV EL=11.87
ES-136	137+13	68 LT	13'X7.5' ARCHED CMP CULVERT WITH FLAT BOTTOM AND 1' DIRT INSIDE PIPE S INV EL=1.08 S CREEK BOTTOM EL=2.1 N INV EL=1.17 N CREEK BOTTOM EL=2.2
ES-137	138+53	191 LT	13'X7.5' ARCHED CMP CULVERT WITH FLAT BOTTOM AND 1' DIRT INSIDE PIPE W INV EL=1.39 W CREEK BOTTOM EL=2.4 E INV EL=1.44 E CREEK BOTTOM EL=2.6
ES-138	137+54.6	43.0 RT	MANHOLE RIM EL=17.01 E 15"RCP INV EL=11.89 S 15"RCP INV EL=11.86
ES-139	137+00.0	19.2 LT	END OF PIPE 12"X18" ECMP INV EL=8.75
ES-140	136+72.5 136+90.4	0 (BEGIN) 0 (END)	BRIDGE ARCHED CULVERT 18' WIDE X 13' TALL OPENING AT CENTER OF ARCH N CL CREEK EL=2.1 S CL CREEK EL=1.9

NUMBER	STATION	OFFSET	DESCRIPTION
ES-152	209+98.6	38.5 LT	CURB INLET TOP EL=53.61 GRATE EL=52.84 N 36"RCP INV EL=47.45 S 42"RCP INV EL=46.59 E 24"RCP INV EL=47.63
ES-154	209+97.3	38.2 RT	CURB INLET TOP EL=53.52 GRATE EL=52.80 N 42"RCP INV EL=46.12 S 42"RCP INV EL=46.12
ES-157	211+73.7	36.4 RT	CURB INLET TOP EL=54.06 GRATE EL=53.37 N 15"RCP INV EL=48.26 SE 6"PVC INV EL=51.55

American Consulting Engineers of Florida, LLC

Pinellas County PUBLIC WORKS

SOURCE: McKIM & CREED

SUNSET POINT ROAD
US ALT 19 TO KEENE ROAD

FIGURE 3-5
EXISTING DRAINAGE STRUCTURES

3.1.8 Intersections & Signalization

Six signalized intersections and one crossing signal are present in the study area. Several unsignalized intersections also exist within the project limits. The major intersections with Sunset Point Road include:

- US Alt. 19/Edgewater Drive (Signalized)
- Fred E. Marquis Pinellas Trail (Overhead Caution Light)
- Douglas Avenue (Signalized)
- North Betty Lane (Signalized)
- Kings Highway (Signalized)
- Highland Avenue (Signalized)
- North Keene Road (Signalized)

3.1.9 Lighting

Lighting along Sunset Point Road is provided by lights mounted to overhead utility poles intermittently spaced along the project corridor. Beginning at Edgewater Drive, the lights are mounted to utility poles on the north side of the road. The overhead wires and lights cross to the south side of Sunset Point Road approximately 800 feet east of Edgewater Drive. From there, the lights continue along the south side of the road until 1000 feet east of Highland Avenue, where the overhead wires and lights cross to the north side of the road again. The lights continue along the north side of the road for approximately 1400 feet before crossing again to the south side of the road. The lights continue on the south side of the road until Keene Road.

3.1.10 Utilities

The following utility owners have facilities within the project limits:

- Progress Energy
- Brighthouse Networks
- Verizon
- City of Clearwater Gas
- City of Clearwater Water
- City of Clearwater Sewer

Existing utility information has been obtained and is included in the topographic survey in **Appendix K** and is shown in the Schematic Plans in **Appendix H**. Coordination will continue during the Preliminary and Final Design phases.

3.1.11 Pavement

Five (5) pavement cores were collected along Sunset Point Road between Edgewater Drive (US Alt. 19) and Douglas Avenue. The existing pavement structure in this segment varies and consists of 1.0 – 2.8 inches of asphaltic base material, 1.0 – 2.0 inches of structural course, and 0.5 – 0.8 inches of friction course (where present, see photo below). Transverse and longitudinal cracks were observed along the majority of this segment and major patch work was observed near the west end (see photo below). For detailed information on these cores and the existing pavement condition, see the attached Final Geotechnical Report (Draft) in **Appendix D**.

The existing pavement on Sunset Point Road in the eastern portion of the corridor between Douglas Avenue and Keene Road appears to be in fair condition with minimal transverse and longitudinal cracks and no observed patching.

Friction course worn away near intersection at Edgewater Drive

Pavement cracking on Sunset Point Road west of the Fred E. Marquis Pinellas Trail

3.2 Bridge

Sunset Point Road (CR 576) crosses over the Spring Branch of Stevenson Creek within the limits of this project. A reinforced concrete arch culvert bridge is used to traverse this waterway. This existing bridge is located approximately 170' west of North Betty Lane and 3700' east of Alternate US 19. The existing bridge has been assigned the identification number of BR0003.

This existing arch culvert bridge has a span length of 19' and is approximately 22' wide. The typical section of the existing bridge consists of 9" thick barrier walls on each side and carries two 10'-3" lanes.

The existing bridge is too narrow to accommodate pedestrian traffic but a steel prefabricated bridge is located to the south of the vehicular bridge. This bridge has been designated as PB0015 and is approximately 110' long and 7'-7" wide. The current vehicular bridge and this pedestrian bridge are separated by approximately 21'.

The photographs below further illustrate the conditions of the existing bridge:

Pedestrian Bridge Adjacent to Sunset Point Road Bridge Looking West.

Existing Bridge at Spring Branch Creek, South Side.

Existing Bridge at Spring Branch Creek, South Side.

Existing Bridge at Spring Branch Creek, North Side.

3.2.1 Bridge Inspection Report

The latest inspection report on the vehicular bridge, dated February 24, 2006, was located and examined. The structural components of the bridge were given the following Numerical Conditional Ratings (NCR):

Approach Roadway Major Features		
BMIS No.	**Element Title**	**NCR**
G4.00	Approach Roadway Overall Rating	7
G4.02	Retaining Walls/Approach Slopes/Embankments/Shoulders	6
G4.03	Roadway – Transition	7
G4.04	Guardrails	6
G4.05	Roadway Alignment	8

Channel Major Features		
BMIS No.	**Element Title**	**NCR**
G5.00	Channel and Channel Protection Overall Rating	7
G5.03	Embankments/Slopes	7
G5.04	Degradation/Aggradation	6
G5.05	Alignment	7
G5.06	Flow	7

Non-Structural Features		
BMIS No.	**Element Title**	**NCR**
G6.03	Striping (Roadway Reflective)	3
G6.04	Reflectors	3
G6.09	Deck Cleanness	4

Culvert		
BMIS No.	**Element Title**	**NCR**
G7.00	Culvert Overall Rating	7
G7.01	Deck Slab (Top)	7
G7.02	Deck Slab (Underside)	6
G7.05	Wing Walls	7
G7.06	Floor Slabs	6
G7.07	Handrails/Bridge Rails/Sidewalks	7

These NCR values are given on a range from 0 (Failed Condition) to 9 (Excellent Condition). As can be seen above, the overall state of the structure is in relatively satisfactory to good condition. Several deficiencies in the structure are noted below:

1. Element G4.02 – Retaining Walls, Approach Slopes, Embankments and/or Shoulders: There are voids up to 12” x 6” x 4” deep around posts 3 and 4 located in the southwest approach shoulder. A 4” diameter by 12” deep void exists below the southeast guardrail to bridge rail transition. The approach shoulder and the backfill material behind the wing wall has collapsed and undermined an area measuring 12’ x 6’ x 3’ deep.
2. Element G4.04 – Guardrails: The southeast guardrail panel has a sheared bolt and there is heavy decay of the wooden post in post 1. There is minor impact damage to the southeast end terminal. The northwest guardrail connection is damaged with one bent bolt, one missing bolt and one missing nut. There is a missing panel attachment bolt on the northwest guardrail between posts 2 and 3. The northwest end terminal lower assembly is missing a lock nut.
3. Element G5.04 – Degradation/Aggradation: Concrete debris is present below the structure and throughout the south channel.
4. Element G6.04 – Reflectors: There are four missing or broken guardrail mounted reflectors.

5. Element G7.02 – Deck Slab (Underside): The underside of the concrete culvert has a 6" x 3" x ¼" spall with exposed and corroded reinforcing resulting minor section loss. The longitudinal construction joints at the centerline of the bridge and both the north and south faces are cracked up to $^{1}/_{16}$" in the lower 2' portion allowing minor water seepage. The underside of the culvert has heavy graffiti.
6. Element G7.06 – Floor Slabs: The channel bottom has concrete debris that appears to be the floor slab that once lined the bottom. Possible scour or other unknown events appear to have caused the floor slab to collapse and be displaced. The footings are exposed up to 2'-6" high.
7. Element G7.07 – Handrails/Bridge Rails/Sidewalks: The right bridge rail has spalls up to 2' x 9" x 2½" with no exposed reinforcing above and behind the southwest guardrail connection. Both the north and south bridge rails have numerous spalls up to 10" x 5" x 2" with no exposed steel.

There is no information on when the bridge culvert was constructed and no existing plans were able to be located. It is impossible to calculate the load rating for this structure since there is no way of accurately determining the amount of reinforcing steel in the concrete culvert without destroying the structure. The existing barriers do not meet current crash load requirements and are considered to be substandard and obsolete.

Section 4

Traffic

4.1 Existing Conditions

An existing conditions technical memorandum has been prepared and was submitted to Pinellas County Public Works in May 2008. American Consulting Engineers of Florida, LLC performed and prepared the technical memorandum. Please refer to *Sunset Point Road (County Road 576) From U.S. Alt. 19 (Edgewater Drive) to Keene Road, Traffic Technical Memorandum* (TTM) for full detail and analysis of the traffic along the corridor.

The existing conditions were determined by performing bi-directional traffic volume counts over a 72-hour period along Sunset Point Road during the week of January 14, 2008. Traffic volumes were collected during the peak season on a Tuesday, Wednesday, and Thursday. The characteristics on this 3-day period were similar and averaged as Peak Season Weekday Average Daily Traffic (PSWADT). The PSWADT to Annual Average Daily Traffic (AADT) factor during the time period these counts were conducted is according to the latest FDOT Traffic Information CD. The PSWADT volumes collected are equivalent to the Annual Average Daily Traffic (AADT) volumes. The AADT along Sunset Point Road is provided in **Table 4-1**.

Table 4-1:
Existing 2008 Daily Traffic Counts (Two-way)
Sunset Point Road – Edgewater Drive to Keene Road

Count Location	15-Jan-08	16-Jan-08	17-Jan-08	3-Day Average (AADT)
Sunset Point Rd. East of Edgewater Drive	6,876	6,710	6,747	6,778
Sunset Point Rd. West of North Betty Ln.	8,411	8,587	8,543	8,514
Sunset Point Rd. West of Highland Ave.	12,155	12,038	12,628	12,274
Sunset Point Rd. West of Keene Rd.	17,290	17,023	17,064	17,126

With these determined traffic volumes and with the current two-lane configuration, the overall LOS along the corridor is an acceptable LOS "C," however; the LOS of the individual segments analyzed varies from "B" to "E." The acceptable level of service established by Pinellas County is LOS "D" for signalized intersections. All of the signalized intersections are currently operating at an acceptable LOS with the exception of Keene Road which is currently operating at LOS "E" during the AM and PM peak hours. Roadway segments operations along the corridor were analyzed using procedures in the SYNCHRO (version 7) software program for arterial analysis.

4.2 Proposed Conditions

A Traffic Technical Memorandum (TTM) has been prepared and was submitted to Pinellas County Public Works in May 2008. American Consulting Engineers of Florida, LLC performed and prepared the technical memorandum. Please refer to *Sunset Point Road (County Road 576) From U.S. Alt. 19 (Edgewater Drive) to Keene Road, Traffic Technical Memorandum* for full detail and preliminary engineering analysis of the traffic along the corridor.

4.2.1 Preliminary Design Concept

The proposed improvements to Sunset Point Road will consist of three different segments, each with its own configuration. From Edgewater Drive to Douglas Avenue, the proposed roadway will be a two-lane undivided urban section with curb and gutter and sidewalk on the north side. From Douglas Avenue to Highland Avenue, the proposed roadway will be a three-lane urban section with a continuous two-way left turn lane, bicycle lanes, curb and gutter, and sidewalk. From Highland Avenue to Keene Road the proposed roadway will be a four-lane urban section with a raised median, bicycle lanes, curb and gutter, and sidewalk. Travel lanes are recommended to be 11 ft wide with 4-ft bike lanes and 5 to 8 ft wide sidewalks depending on the proximity to the road. The existing posted speed of 35 mph will remain on the segment between Edgewater Drive and Douglas Avenue, and the design speed between Douglas Avenue and Keene Road will be 45 mph.

4.2.2 Future Traffic Projections

The existing traffic volumes were project to year 2025 and LOS conditions were analyzed at the intersections as well as the individual segments along the corridor. With the recommended improvements included in the TTM, an acceptable LOS meeting County standards would result for future year 2025.

4.2.3 Recommendations and Conclusions

The existing and future overall roadway capacity and Level of Service (LOS) for the study corridor for the link from Edgewater Drive to Keene Road meets Pinellas County LOS “C”. The intersection of Sunset Point Road and Keene Road is over capacity presently and is expected in the future and requires improvements. The following are the proposed improvements which are consistent with the recommendations in the Traffic Technical Memorandum (TTM):

- Provide a 4 lane divided roadway between Highland Avenue and Keene Road.
- Add an additional eastbound and westbound left turn lane along Sunset Point Road at Keene Road to provide dual left turns in both eastbound and westbound directions.

- Add an eastbound right-through lane at the intersection of Sunset Point Road and Highland Avenue.
- Optimize all traffic signals by interconnection to obtain progression along the roadway segments and update signal phasing as shown in the analysis.
- Extend the southbound left turn lane on Highland Avenue.
- Add sidewalks and/or bike lanes to better accommodate pedestrian and bicycle travel throughout the corridor.
- Provide and upgrade pedestrian features, at the traffic signals, at the intersections of Douglas Avenue, Betty Lane, Kings Highway, Highland Avenue, and Keene Road.
- Provide a 3-lane (2 lane with a continuous center left turn lane) typical section between Douglas Avenue and Highland Avenue to improve safety.

The TTM also recommended providing an additional northbound and southbound through lane along Keene Road at the intersection of Sunset Point Road, in order to meet LOS requirements. However, Pinellas County has determined to not include these improvements at this time with the Sunset Point improvements due to the anticipated right-of-way costs and impacts that would result.

Section 5

Design Controls and Standards

The proposed improvements for Sunset Point Road follow the latest Pinellas County and Florida Department of Transportation design standards. The design criteria to be utilized in this project are documented and contained in the *Design Criteria Memorandum for Improvements to Sunset Point Road.*

The standards, manuals, and guidelines to be used in this project include:

- "Manual of Uniform Minimum Standards for Design Construction and Maintenance for Streets and Highways", May 2007
- Project Scope-of-Services
- "A Policy on Geometric Design of Highways and Streets", AASHTO, 2004
- "Florida Intersection Design Guide", FDOT 2007
- "Drainage Manual", FDOT, January 2008
- "Drainage Manual", Volume II, FDOT 1987
- "Design Standards", FDOT 2008, a.k.a. "Standard Indices"
- Pinellas County Land Development Code (LDC)
- "Drainage Manual", FDOT, January 2008: Chapter 3
- "TR-55" Technical Release – 55, United States Department of Agriculture, Natural Resources Conservation Service (Urban Hydrology for Small Watersheds)
- Pinellas County Department of Public Works Standard Technical Specifications for Roadway and Related Construction
- Southwest Florida Water Management District (SWFWMD) Environmental Resource Permit (ERP) Basis of Review (BOR)
- Pinellas County Department of Public Works Secs. 154-17—154-50, Drainage Requirements
- "Drainage Manual", FDOT, January 2008: Chapter 5
- "Stormwater Management Facility" (SMF) Handbook, January 2004, Chapter 5
- LRFD Bridge Design Specifications, 4th Edition (2007)

- Manual for Condition Evaluation and Load and Resistance Factor Rating (LRFR) of Highway Bridges, 2003 edition with 2005 interim
- Structures Design Guidelines (SDG), January 2008
- Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 4th Edition (2001) with 2003 Interim
- FDOT Modifications to Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, January 2008
- FDOT Plans Preparation Manual, Volume 1, January 2008

Section 6

Preliminary Design Analysis

6.1 Typical Section

6.1.1 Description

Upon completion of the *Traffic Technical Memorandum*, the determination was made to divide the project into three sections, each with its own "urban" typical section as shown in **Figures 6-1, 6-2, and 6-3**. In each case, the travel lane widths are set at 11 ft with FDOT Type F curb and gutter. Bike lanes of 4 ft width and sidewalk will also be provided in 5 ft, 6 ft, and 8 ft widths depending on location.

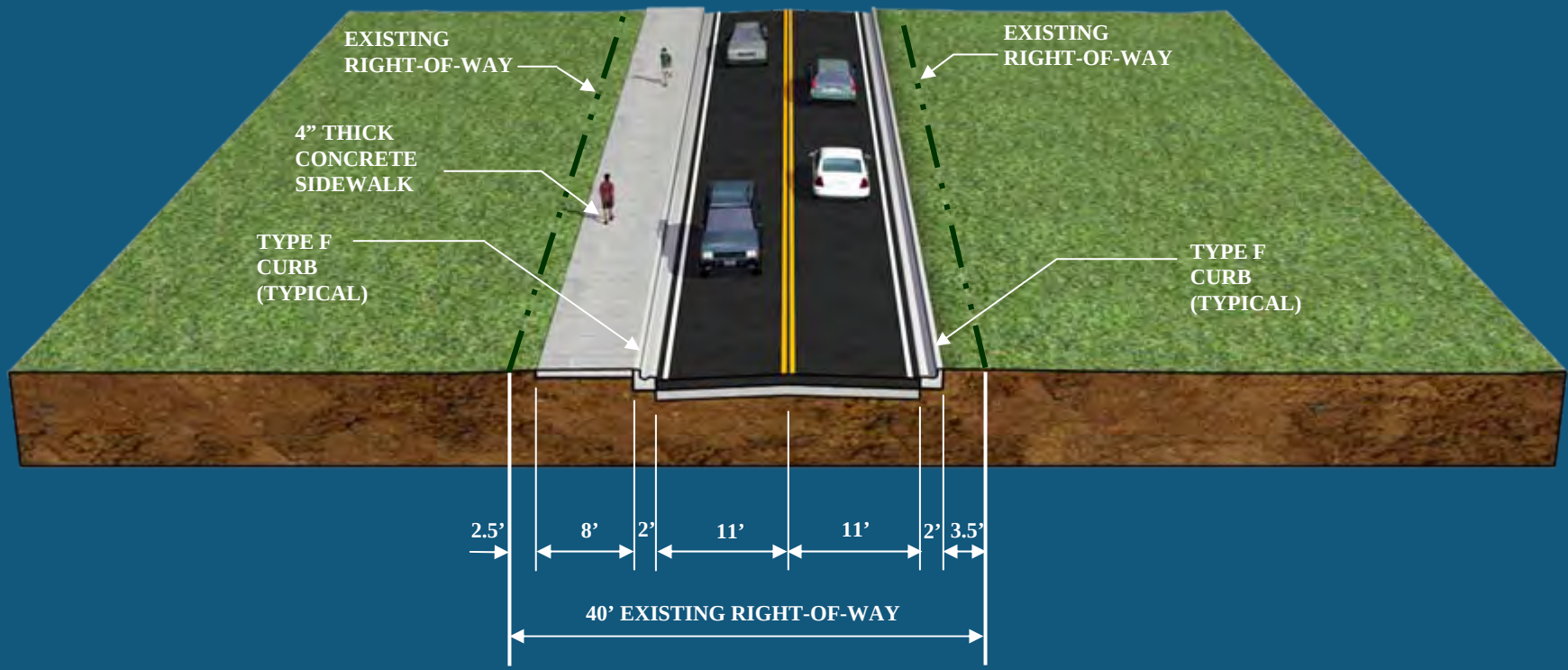
6.1.2 Turn Lanes

6.1.2.1 Left Turn Lanes

Separate left turn lanes will be provided along Sunset Point Road for turning movements at major intersections, minor intersections, and exclusive left turns. The following locations along Sunset Point Road will have left turn lanes:

- Edgewater Drive – Westbound
- Douglas Avenue – Westbound
- Cole's Road – Eastbound
- Chenango Avenue- Eastbound
- Betty Lane – Eastbound and Westbound
- Kings Highway – Eastbound and Westbound
- Highland Avenue – Eastbound and Westbound
- Souvenir Drive – Eastbound
- West Drive – Westbound
- Nugget Drive – Eastbound
- Clearview Lake Drive – Eastbound
- Keene Road – Eastbound and Westbound

SUNSET POINT ROAD – ALTERNATE C
FROM EAST OF US ALT. 19 TO DOUGLAS AVE.

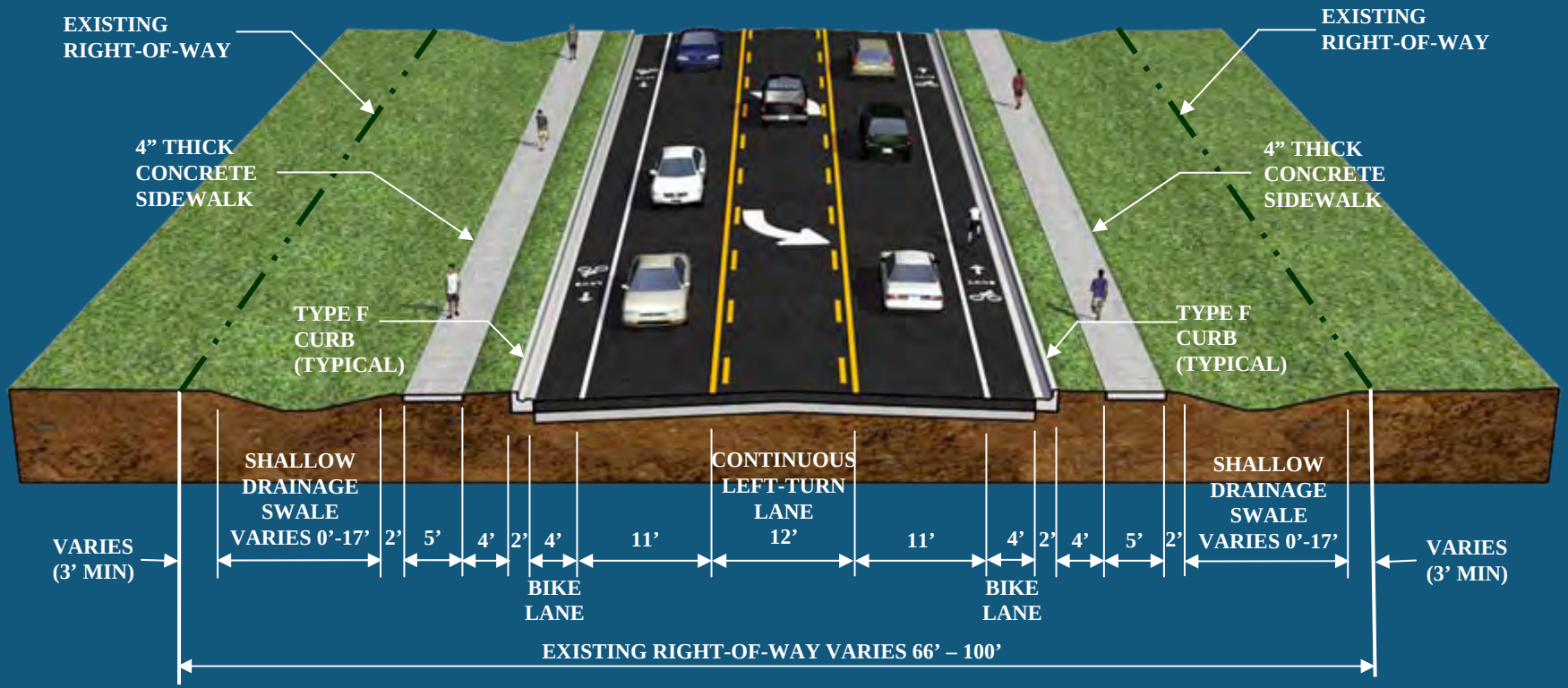


PROPOSED 2-LANE ROADWAY
DESIGN SPEED = 35 MPH
ALTERNATE C (40 ft. EXISTING RIGHT-OF-WAY, NO BIKE LANE, 8 ft. SIDEWALK)
TYPICAL SECTION (N.T.S.)

American Consulting Engineers of Florida, LLC

Figure 6-1

PROPOSED SUNSET POINT ROAD
FROM DOUGLAS AVE TO WEST OF HIGHLAND AVE

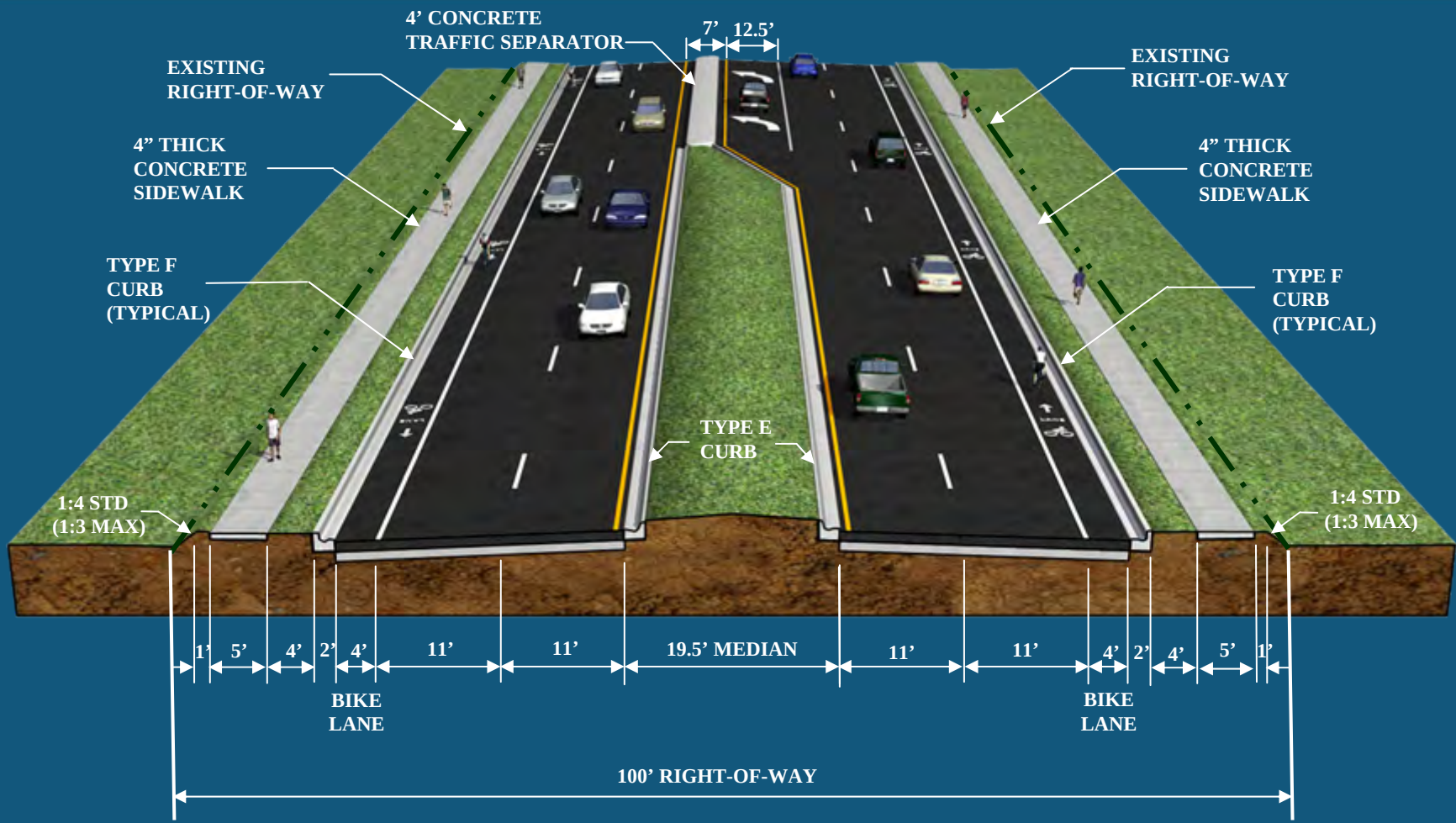


PROPOSED 3-LANE ROADWAY
DESIGN SPEED = 45 MPH
TYPICAL SECTION (N.T.S.)

American Consulting Engineers of Florida, LLC

Figure 6-2

PROPOSED SUNSET POINT ROAD
FROM HIGHLAND AVE TO KEENE RD



PROPOSED 4-LANE DIVIDED ROADWAY
DESIGN SPEED = 45 MPH
TYPICAL SECTION (N.T.S.)

American Consulting Engineers of Florida, LLC

Figure 6-3

6.1.2.2 Right Turn Lanes

Separate right turn lanes along Sunset Point Road will provide the necessary lane drops for transitioning between typical sections and separate turning traffic from adjacent through lanes. The following locations along Sunset Point Road will have right turn lanes:

- Edgewater Drive – Westbound
- Highland Avenue – Westbound
- Keene Road - Westbound

6.1.3 Pavement Design

Pavement design along Sunset Point Road from Douglas Avenue to Keene Road will be based on criteria from Pinellas County Public Works Roadway Pavement Guidelines (Arterial). In this area, the pavement will receive full depth reconstruction. Per Pinellas County's request, the pavement between U.S. Alt 19 and Douglas Avenue and east of Keene Road is to be milled and resurfaced and widened in lieu of full depth reconstruction. This measure will significantly reduce construction costs in those segments. The proposed pavement structure for areas of roadway reconstruction will follow the guidelines stated below:

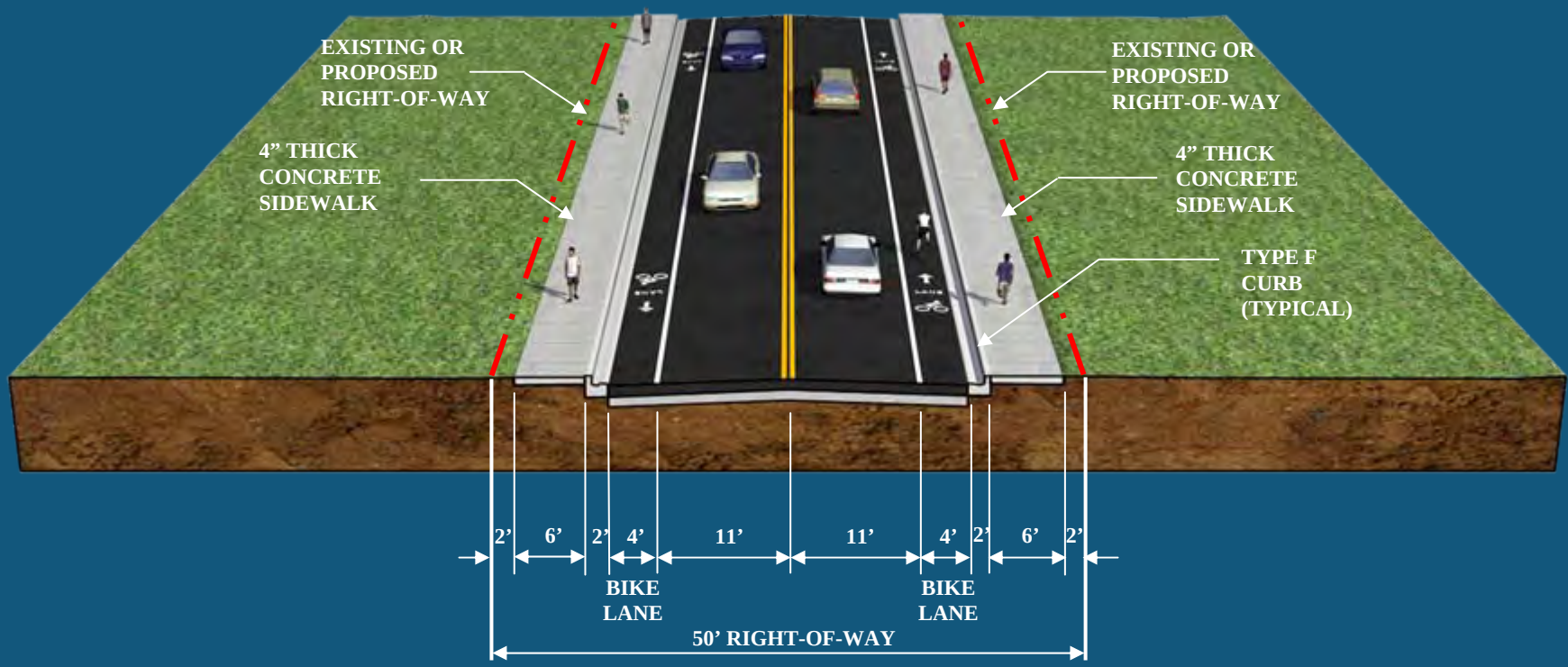
- Structural Coefficient – 4.17
- Asphalt Superpave Surface – Type SP – 12.5 Fine, Traffic Level "C" 3" min. thick (2 lifts) (0.44) (1.32 Total)
- Base – Limerock 10 ½" Min. Thickness (Min. 100 LBR) (0.18) (1.89 Total)
- Sub-Base (Compacted 98% of AASHTO T-180) – 12" Min. Thickness (Stab. w/min. 40 LBR) (0.08) (0.96 Total)

Pavement for the segment between Edgewater Drive and Douglas Avenue will be milled at an average depth of 1 inch and will have a minimum of 3 inches of asphalt superpave surface course (SP 12.5 Traffic Level "C") added. Pavement widening within this segment will consist of 4.5 inches of asphalt superave surface course (SP 12.5 Traffic Level "C") and 4.5 inches of asphaltic base course (SP 12.5) to match the resurfaced main line. The project area east of Keene Road will be milled and resurfaced to an average depth of 1 inch. Pavement widening in this area will match the proposed pavement structure for roadway reconstruction.

6.1.4 Alternatives

Alternatives to the recommended changes to Sunset Point Road from Edgewater Drive to Douglas Avenue were considered. **Figures 6-4** and **6-5** show typical sections of these alternative designs. These alternatives would require additional right-of-way along the entire segment, which would result in additional cost and impacts. These alternatives were not recommended due to the additional cost for right-of-way required for their construction and were removed from further consideration.

SUNSET POINT ROAD – ALTERNATE A
FROM EAST OF US ALT. 19 TO DOUGLAS AVE.

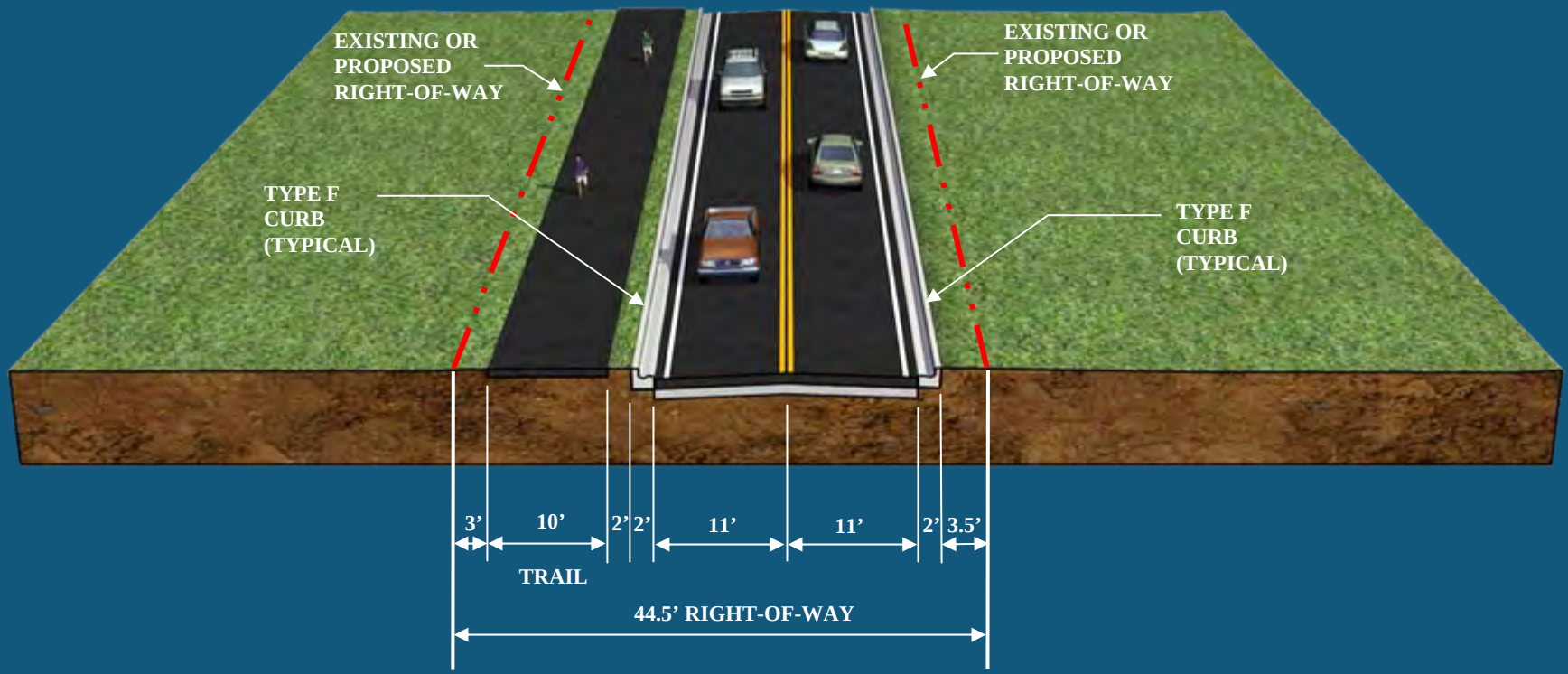


PROPOSED 2-LANE ROADWAY
DESIGN SPEED = 35 MPH
ALTERNATE A (50 ft. RIGHT-OF-WAY WITH BIKE LANES AND SIDEWALKS ON BOTH SIDES)
TYPICAL SECTION (N.T.S.)

American Consulting Engineers of Florida, LLC

Figure 6-4

SUNSET POINT ROAD – ALTERNATE B
FROM EAST OF US ALT. 19 TO DOUGLAS AVE.



PROPOSED 2-LANE ROADWAY
DESIGN SPEED = 35 MPH
ALTERNATE B (44.5 ft. RIGHT-OF-WAY WITH 10 ft. TRAIL, NO BIKE LANES)
TYPICAL SECTION (N.T.S.)

American Consulting Engineers of Florida, LLC

Figure 6-5

6.2 Alignment

6.2.1 Geometric Analysis

6.2.1.1 Horizontal

The proposed alignment of Sunset Point Road begins at the centerline of Edgewater Drive (Sta. 1100+00) and extends eastward at a bearing of S 87°11'16" E for 580 ft. From the end of this tangent segment (Sta. 1105+80), the alignment shifts to the south through a 600 ft curve (RT) followed by a 550 ft curve (LT) and joined in the middle by a 99 ft tangent segment. From the end of the second curve (Sta. 1109+09.97), the baseline extends tangent until making an angle break of 1 degree to the north, 100 ft west of the Pinellas Trail (Sta. 1114+96). This angle break is followed by a series of four tangent segments with angle breaks of 1 degree or less alternating from south to north at stations 1116+97, 1118+36, 1120+40, and 1125+20 (center line of Douglas Avenue). The minor angle breaks are proposed in order to keep improvements within the constrained 40 ft. existing right-of-way where possible. Throughout this section, the proposed construction will consist of two 11 ft lanes with curb and gutter, and an 8 ft sidewalk on the north side of the road to provide connections to the Pinellas Trail and the City of Clearwater's Edgewater Park on the west end, and the improvements east of Douglas Avenue.

At Douglas Avenue (Sta. 1125+20) the proposed alignment ties into the existing baseline of survey. The proposed alignment matches the existing baseline from Douglas Avenue to Keene Road. In the section between Douglas Avenue and Highland Avenue, the proposed construction will consist of two 11 ft lanes with curb and gutter a 12 ft continuous two-way left turn lane, 4 ft bike lanes and 5 ft sidewalk. In the section between Highland Avenue and Keene Road, the proposed construction will consist of four 11 ft lanes with curb and gutter, a 19.5 ft raised median, 4 ft bike lanes, and 5 ft sidewalk.

6.2.1.2 Vertical

The proposed profile approximately follows the grades of the existing roadway in order to keep side slopes within the limited right-of-way available. Proposed fills range from 0 ft to 3 ft above the existing roadway elevations. Between stations 1139+00 and 1152+00, the proposed profile has been adjusted to elevate the roadway above the 25 year floodplain for consistency with the proposed stormwater pond design criteria. Vertical grades range between 0.3 percent and 4.08 percent due to the semi-rolling terrain of this corridor. All vertical grade-breaks greater than 0.7 percent (45 mph design speed) and 0.9 percent (35 mph design speed) include vertical curves.

6.2.2 Environmental Impacts

Staff scientists have field-delineated the wetlands and surface waters located along the project corridor; these wetlands have been surveyed. The wetlands were delineated using the U.S. Army Corps of Engineers' (USACE) *Wetland Delineation Manual* (1987), and the *Florida Wetlands Delineation Manual*, Chapter 62-340, Florida Administrative Code (FAC). There are a total of four wetlands and surface waters that were delineated along the project corridor, which are labeled as SW1, W1, W2 and W3. It is anticipated that there will be 0.01 acres of impact to SW1, 0.06 acres of impact to W1, 0.25 acres of impact to W2, and no impact to W3, for a total of 0.32 acres of impact. If the impacts to SW1, W1 and W2 were evaluated as impacts to wetlands, no more than 1-acre of mitigation is likely to be needed to offset the impacts. Detailed wetland information can be found in section 7.1. Wetland mitigation will be created on-site in conjunction with the proposed floodplain compensation areas.

American has also coordinated with the County's permit coordinator relative to the existing County-owned Wetland Mitigation Site located on the north side of Sunset Point Road between N. Betty Lane and Kings Highway. This existing site was previously permitted by the County for wetland mitigation for a project call the Mall and according to the County, there are available credits which could potentially be withdrawn to meet some of the Sunset Point Road project requiremets. See further information in section 7.1.

6.2.3 Maintenance of Traffic

From Edgewater Drive to Douglas Avenue, the proposed two lane roadway will have a similar alignment to that of the existing two lane roadway. The width of existing right-of-way in most of this segment is 40 ft and will limit the available work zone width. Due to these factors, Sunset Point Road will need to be reduced to a single lane open to local traffic only. Temporary asphalt will be used to widen the north side of the westbound lane in this area prior to the first phase of construction. After this temporary asphalt is placed, flagmen, temporary striping, and barricades should be used to divert all traffic onto the newly widened westbound lane using a single lane condition. This scheme is to be applied over the duration of construction of the new eastbound lane. Temporary slopes will be used to transition any elevation difference between the existing road and the proposed lane. Traffic should be diverted onto the new eastbound lane after the first phase of construction is completed. For the second phase, a maintenance of traffic scheme similar to the one mentioned previously should be applied during construction of the new westbound lane.

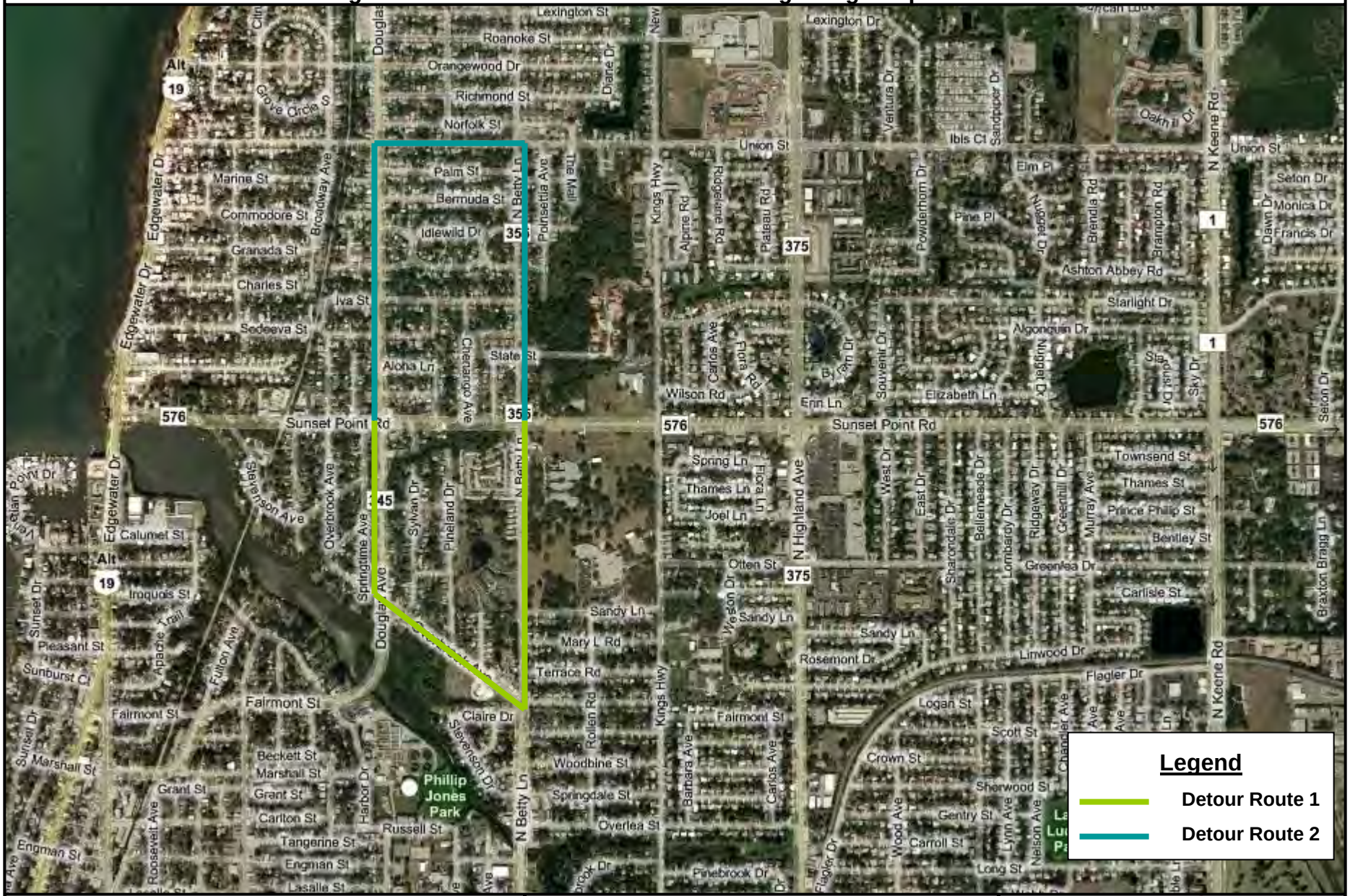
From Douglas Avenue to Highland Avenue, the proposed roadway will consist of two 11 ft lanes with a 12 ft continuous two-way left turn lane. The existing right-of-way width is 66 ft at its narrowest point along this segment and will provide sufficient space to allow two traffic lanes to remain open during construction. Because the proposed roadway alignment is similar to that of the existing road, temporary asphalt will be necessary to provide travel lanes outside of the work zone. Temporary asphalt will be placed along

the north side of the westbound lane prior to the first phase of construction in order to match any temporary lanes being used for the previous segment. After this temporary asphalt is placed, temporary striping and barricades should be used to divert all traffic onto the temporary lanes. This scheme is to remain in place until construction of the new eastbound lane and center left turn lane is complete. Temporary slopes will be used to transition any elevation difference between the existing road and the proposed lanes. After completion of construction in the first phase, the new lanes will be used temporarily as eastbound and westbound lanes. During this second phase the new westbound lane will be completed. Traffic will be controlled through the use of temporary striping and barricades.

From Highland Avenue to Keene Road, the proposed roadway will consist of four 11 ft lanes and a 19.5 ft raised center median. The existing right-of-way width for this segment is 100 ft and will provide sufficient space to allow two traffic lanes to remain open during construction. Because the proposed roadway alignment is similar to that of the existing road, temporary asphalt will be necessary to provide travel lanes outside of the work zone. Temporary asphalt will be placed along the north side of the westbound lane prior to the first phase of construction in order to match any temporary lanes being used for the previous segments. After this temporary asphalt is placed, temporary striping and barricades should be used to divert all traffic onto the temporary lanes. This scheme is to remain in place until construction of the new eastbound lanes and part of the median is complete. Temporary slopes will be used to transition any elevation difference between the existing road and the proposed lanes. After completion of construction in the first phase, the new lanes will be used temporarily as eastbound and westbound lanes. During this second phase the new westbound lanes and the remainder of the median will be completed. Traffic will be controlled through the use of temporary striping and barricades.

The proposed improvements to Sunset Point Road also include replacement of the bridge over Spring Branch Creek. During this bridge replacement, Sunset Point Road will be closed at the bridge location (between Macomber Avenue and N. Betty Lane). As a result of this closure, traffic will need to be re-routed in the segment between N. Betty Lane and Douglas Avenue. The two potential detour routes depicted in **Figure 6-6** were determined to have the least amount of impact to the surrounding neighborhoods with the shortest travel distance, though other alternatives exist. Detour Route 1 diverts traffic between the intersections of Douglas Avenue and Betty Lane onto Overbrook Drive. Detour Route 2 diverts traffic between the intersections of Douglas Avenue and Betty Lane onto Union Street. In order to minimize road closure time on this section of Sunset Point Road, the box culvert bridge option is recommended. It is likely that the contractor can use precast box culvert sections to expedite the construction of the bridge, thereby minimizing the amount of time in which the road will need to be closed.

Figure 6-6: Recommended Detours During Bridge Replacement



Sunset Point Road – From Edgewater Drive to Keene Road

Pinellas County, Florida

American Consulting Engineers of Florida, LLC

Pinellas County

6.2.4 Right-of-Way Impacts

The majority of the roadway improvements will be contained within the existing right-of-way. In some areas, concrete gravity walls near the right-of-way will be needed to minimize impacts to adjacent Properties. It is anticipated that 11 parcels will be partially impacted at intersection corners to allow sufficient turning radii for service vehicles onto and from side streets. No buildings will be impacted by these requirements. Additional right-of-way will also be required in the curvilinear alignment area west of Stevenson Avenue. The existing right-of-way width in this area is particularly narrow and additional width will be required in order for the radii and curvature of the proposed roadway to meet urban highway design standards. It is anticipated that five partial parcels will be impacted for this additional right-of-way along the north side of the road. No buildings will be impacted by this acquisition. The Schematic Plans in **Appendix H** show the locations where additional right-of-way will be required for the proposed roadway improvements.

Connections to driveways will be required in some areas outside of the existing right-of-way for this project. Permission will be obtained from property owners to make these connections on their property.

The primary need for right-of-way would be associated with stormwater facilities, floodplain compensation sites, and wetland mitigation. The *Alternative Stormwater Management Pond Siting Report (dated August 2008)* identifies two stormwater pond alternatives (A and B) per drainage basin within the limits of this project. All potential ponds are located between Douglas Avenue and Kings Highway. For each drainage basin, the lowest-cost alternative pond was recommended. In addition to the ponds, multiple floodplain compensation sites are proposed between Douglas Avenue and Kings Highway required to provide the necessary floodplain storage. Wetland mitigation sites will be created in conjunction with these floodplain compensation sites. The Schematic plans in **Appendix H** show the locations of the recommended stormwater pond alternatives and recommended floodplain compensation site alternatives.

The estimated right-of-way costs associated with this project are based on estimates from the Pinellas County Real Estate Department, and are broken down as follows:

Table 6-1: Right-of-Way Costs

Preliminary Right-of-Way Costs	
Roadway	$300,000
Stormwater Pond Sites	$346,250
Floodplain Compensation Sites	$243,000
Total	$889,250

6.2.5 Utility Impacts

Existing utilities within the corridor are listed in section 3.1.10. With the proposed typical section filling the available right-of-way, relocation of the existing utilities within the right-of-way is expected. All relocation costs are expected to be borne by the respective utility owners. Existing utilities are shown in the Schematic Plans in **Appendix H** and the Topographic Survey in **Appendix K.** These utilities are shown with respect to the proposed improvements along Sunset Point Road.

6.3 Access Management – Highland Avenue to Keene Road

Good access management strives to reduce the number of conflict points between vehicles by limiting the number of turning movements. A lower number of conflicts are created which increases the level of safety. A review of the crash history between Highland Avenue and Keene Road reveals the need for safety improvements. The proposed access management adheres to standards from FDOT and Pinellas County. Access management recommendations reflect the proximity of intersecting streets and maintaining minimum distances between access points. The proposed typical section includes a raised median between Highland Avenue and Keene Road. Therefore, intersecting streets were evaluated for median openings. The minimum spacing for access openings per Pinellas County Land Development Code Sec. 170-98 (Access Class 3) was utilized to develop the preliminary plans. The preliminary access management plan for Sunset Point Road can be found in **Appendix I**. The median opening recommendations between Highland Avenue and Keene Road are summarized in the following sections.

6.3.1 Full Median Openings: Signalized

The following signalized intersections along Sunset Point Road are recommended for full median openings:

- Highland Avenue
- Keene Road

6.3.2 Full Median Openings: Unsignalized

The following unsignalized intersections along Sunset Point Road are recommended for full median openings:

- Nugget Drive
- Clearview Lake Drive

6.3.3 Directional Median Openings: Unsignalized

The following unsignalized intersections along Sunset Point Road are recommended for directional median openings:

- Souvenir Drive – Eastbound Left Turn
- West Drive – Westbound Left Turn

6.3.4 Right-In/Out Intersections

The remaining intersections will not have direct "left turn" access but will have right-in/right-out access. A study was performed to qualify the access to these intersections. **Appendix I** illustrates the access movements for the following intersections:

- Flora Road
- East Drive
- Sharondale Drive
- Bellemeade Drive
- Lombardy Drive
- Ridgeway Drive
- Greenhill Drive
- Murray Avenue

6.4 Multi-modal Considerations

6.4.1 Pedestrian Features

The proposed design incorporates sidewalk throughout the entire length of the project limits. Pedestrians along this corridor will have designated walking areas where none were previously available. From Edgewater Drive to Douglas Avenue, an 8 ft. sidewalk along the north side of the road will allow pedestrians access to side streets, bus routes, and the Fred E. Marquis Pinellas Trail. From Douglas Avenue to Keene Road, 5 ft. sidewalk (6 ft. wide where against the curb) will be constructed on the north and south sides of the road, allowing pedestrian access to side streets, bus routes, and local businesses.

6.4.2 Bicycle Features

Designated 4 ft. bicycle lanes are incorporated into the proposed design from Douglas Avenue to Keene Road on both the north and south sides of Sunset Point Road. These lanes will provide cyclists with separation from vehicular traffic and access to side streets and businesses along the corridor. From Edgewater Drive to Douglas Avenue, the proposed 8 ft. sidewalk will have adequate width to allow bicycle and pedestrian traffic at once. This sidewalk will allow access from local side streets to the Fred E. Marquis Pinellas Trail where none was previously available.

6.4.3 Fred E. Marquis Pinellas Trail

The proposed bike lanes and sidewalks will improve access to the Fred E. Marquis Pinellas Trail. It is recommended that the existing crossing configuration with Sunset Point Road remains in place. Currently, Trail users must stop at the crossing. The yellow flashing caution beacon warns motorists of the Trail crossing but does not require motorists to stop. Traffic data has not shown pedestrian or bicycle related crashes in the immediate area to warrant considerations for a change in operations or control. The photograph below depicts the existing crossing as seen from the eastbound lane of Sunset Point Road.

Pinellas Trail Crossing

6.4.4 Bus Services

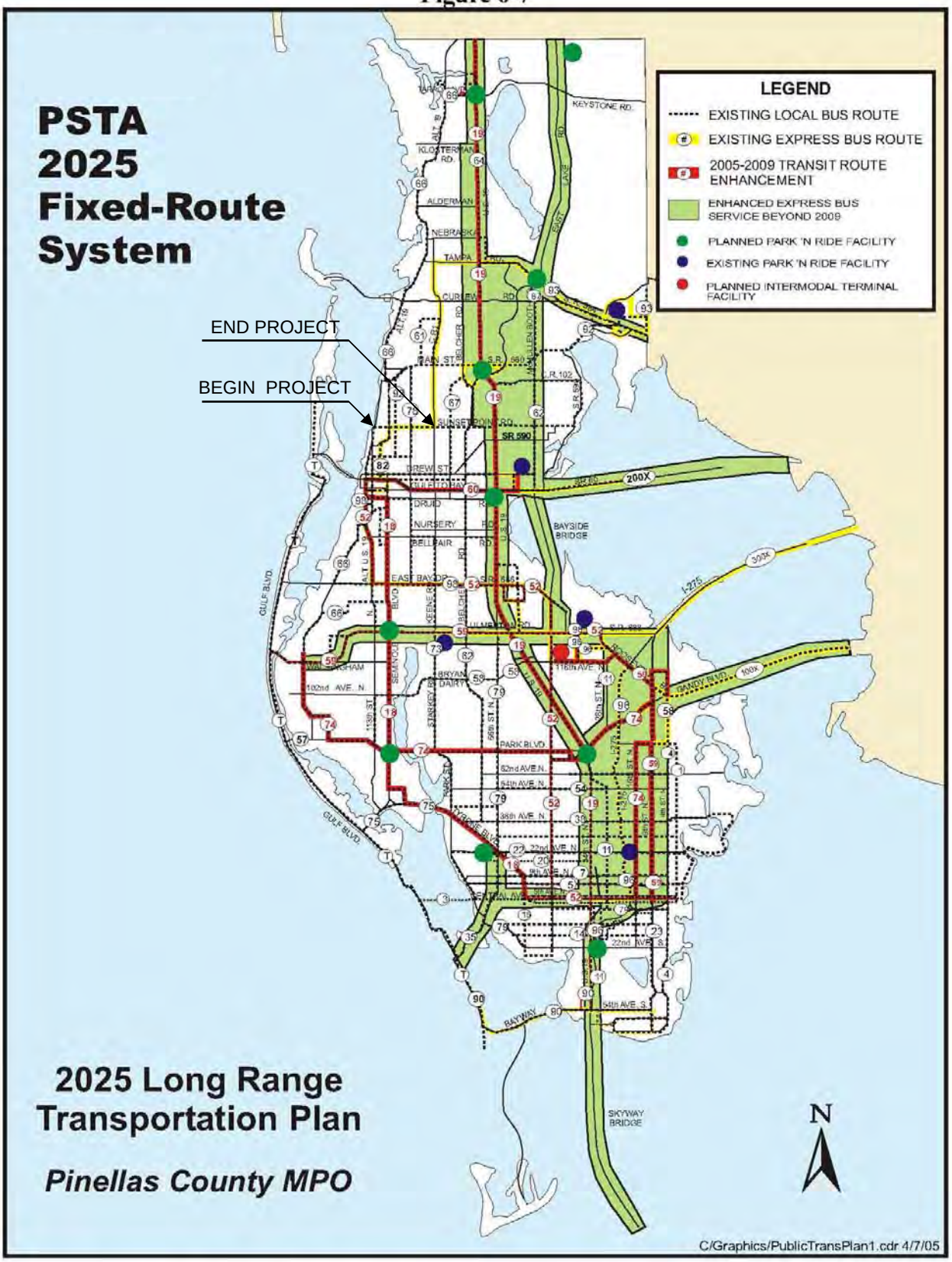
Pinellas Suncoast Transit Authority (PSTA) has bus service within the project limits of Sunset Point Road that includes several stops and shelters. **Figure 6-7** shows the PSTA 2025 fixed route system for Pinellas County. As can be seen in the photograph below, the proposed improvements along this corridor may involve relocation of these shelters. Coordination efforts will be made with PSTA during final design to provide appropriate pads and shelters along the roadway design.

PSTA Bus Shelter West of Highland Avenue

6.4.5 Accessibility

All features will comply with the Americans with Disabilities Act (ADA). The ADA sets forth minimum criteria for accessibility.

Figure 6-7


PSTA
2025
Fixed-Route
System
LEGEND
EXISTING LOCAL BUS ROUTE
EXISTING EXPRESS BUS ROUTE
2005-2009 TRANSIT ROUTE ENHANCEMENT
ENHANCED EXPRESS BUS SERVICE BEYOND 2009
PLANNED PARK 'N RIDE FACILITY
EXISTING PARK 'N RIDE FACILITY
PLANNED INTERMODAL TERMINAL FACILITY
END PROJECT
BEGIN PROJECT
2025 Long Range
Transportation Plan
Pinellas County MPO
N
C/Graphics/PublicTransPlan1.cdr 4/7/05

6.5 Maintenance Issues

Maintenance is an important part of providing properly functioning facilities to the traveling public. Without proper maintenance, the facilities will degrade and result in limiting the initial benefit desired. The design of the facility must enable the county to maintain the facility in the most cost-effective way. Components should be easily accessible and maintained with a minimum of manpower and cost. A field meeting with the Pinellas County Highway Division was held in late 2007 prior to beginning this Study. During the meeting, there were several areas which were a concern. The areas included:

- Lack of inlets from Keene Road to Highland Avenue – it was pointed out that erosion occurs outside of the existing curbs due to high flows of runoff.
- Existing low point east of Highland Avenue – periodic flooding occurs on the south side of Sunset Point Road.
- Bridge at Spring Branch – numerous repairs required on a frequent basis.
- Pavement repairs between US Alt. 19 and Stevenson Avenue.

These concerns will be addressed in the proposed design of the project.

6.5.1 Storm Sewers

This project will collect drainage in a closed drainage system which will discharge to the proposed ponds. All roadway inlets will be standard FDOT inlets and accessible from the edge of the roadway. This will ensure that the inlet structure will be readily accessible and large enough to enter for cleaning and inspection. Ditch bottom inlets used to collect overland flow will also be standard FDOT inlets and placed within areas easily accessible from the roadway. Ditch slopes will be 4:1 (horizontal to vertical) or flatter to allow vehicles to safely traverse the slope and ease of maintenance. Slope of drainage pipe will be designed at no less than the minimal slope to allow self-cleansing and have a minimum diameter of 18-inches to allow cleaning in the event sediment collects within the system. The drainage design will allow the County to use standard maintenance procedures for upkeep of the system.

6.5.2 Drainage Ponds

Drainage ponds will be utilized on this project to provide retention/detention. The "*Alternative Stormwater Management Draft Pond Siting Report*" (August 2008 by American Consulting Engineers of Florida, LLC) (aka Pond Siting Report) has been prepared and accompanies this Preliminary Engineering Report. The Pond Siting Report has provided possible locations for ponds within each drainage basin. In proposing these pond sites, maintenance and access were considered as well as the ability to provide the needed drainage functions. Pond sites are adjacent to public streets or access and will be fenced in accordance with County specifications. A gate will be provided in the fence to allow the County maintenance personnel to gain access to the pond. A minimum 20-foot

berm width will be provided to allow vehicular access around the entire pond. Slopes will be 4:1 (horizontal to vertical) or flatter to allow vehicles to safely traverse and maintain the slope.

6.5.3 Erosion Protection

6.5.3.1 Temporary Erosion Protection

Temporary erosion protection placed during construction will be maintained by the contractor as required by the plans and specifications for the duration of the project. This temporary erosion protection will be removed at the completion of construction. Typical features to be utilized include silt fences, turbidity barriers, rock bags, etc.

6.5.3.2 Permanent Erosion Protection

Permanent erosion protection required as part of the design of this project will be in accordance with the requirements of Pinellas County and FDOT design standards. This will ensure the use of products or erosion systems for which County maintenance personnel have the equipment and materials to maintain, repair, or replace over time. Typical erosion protection includes sodding, rubble riprap, and concrete lining.

6.5.4 Mowing

Mowing to maintain grassed areas is important to maintain the aesthetic component of the corridor. Roadside areas will be graded with 1V to 4H slopes where possible, allowing easy access and rideability during mowing operations. Access to grassed roadside areas will be adjacent to the roadway.

Pond areas will contain gated access points from public property. Berms, in accordance with County and SWFWMD criteria, will be provided around each pond, allowing access for mowing. Slopes will be 4:1 (horizontal to vertical) where possible to facilitate maintenance.

6.5.5 Landscaping/Clear Zone Maintenance

Maintaining landscaped areas and clear zone areas immediately adjacent to the roadway is also an important aspect of the aesthetics of the roadway. The project's location in a predominantly residential area increases the need to maintain the aesthetic quality of the roadway. Landscaping will be limited to the roadway right-of-way and will be accessible from the roadway itself. See Section 6.8 for landscaping opportunity areas. Grassed areas adjacent to the roadway will provide locations outside the travel lanes for maintenance vehicles. In cases of maintenance in clear zone areas, proper traffic control devices and procedures must be followed to provide maximum safety for workers and motorists.

6.6 Drainage

In general, the stormwater management facilities will be composed of a series of on-site closed curb inlet collection systems designed to convey roadway runoff into the stormwater management ponds. Offsite runoff will be continue to be collected and conveyed to the existing collection systems and discharged through outfall structures with to treatment or attenuation. Some modifications to the existing collection systems will be required due to the proposed roadway improvements. This concept will allow minimization of the proposed pond sites and will also maintain the historic flow patterns of the offsite contributing areas.

Identification of drainage basins within the project corridor, identification and evaluation of feasible alternative pond sites and treatment methods, and identification of specific infrastructure requirements necessary to implement a stormwater management plan as part of this Preliminary Engineering Report is detailed in the supplementary *Alternative Stormwater Management Pond Siting Report* dated August 2008. Methods from the 1999 FDOT Stormwater Management Facility handbook, the Southwest Florida Water Management District (SWFWMD) permit manual, and the preferences of Pinellas County were utilized as a basis for the information contained therein.

The existing conveyance ditch located along the southern edge of the roadway frontage approximately between stations 1146+30 and 1151+50, will be impacted as a result of the proposed roadway improvements. A more detailed analysis of the drainage basin contributing to the ditch and a review of the ditch section will be required in order to size the appropriate system required to provide sufficient capacity.

Additionally, the existing bridge traversing Spring Branch Tributary has been identified as a major crossdrain within the Sunset Point Road corridor study area. As part of the proposed roadway improvements, the existing bridge must be widened and raised. In an effort to identify any increased velocities upstream or downstream and any potential flooding impacts as a result of the bridge replacement, a bridge hydraulic analysis will be conducted prior to the design phase.

The proposed stormwater management facilities will be constructed in accordance with the overall project phasing and will not require separate maintenance of traffic.

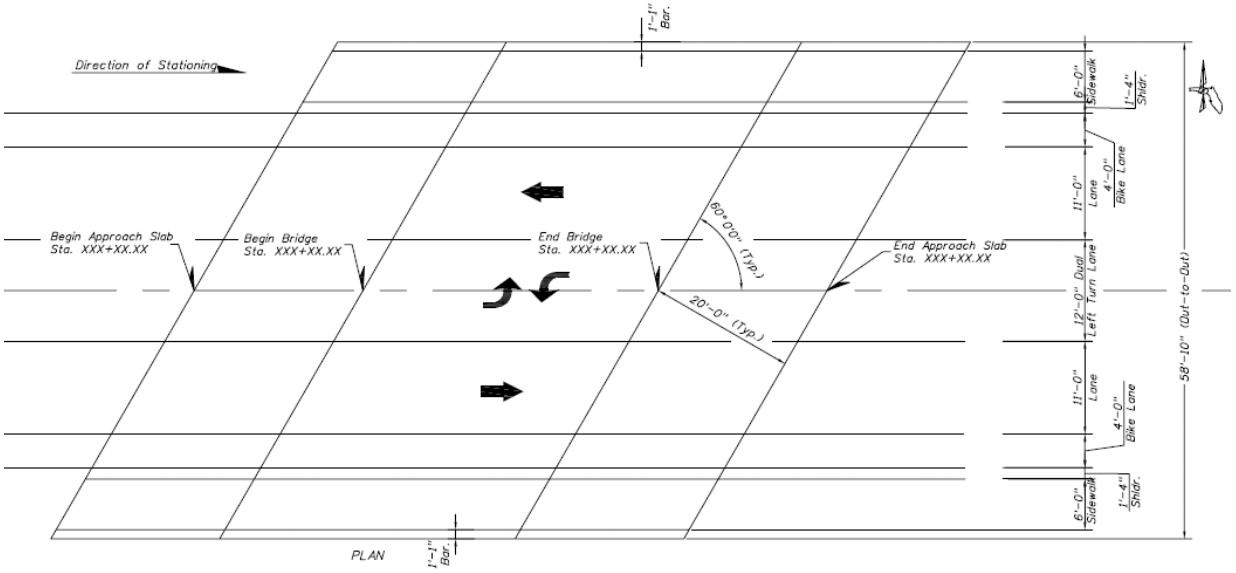
6.7 Bridge

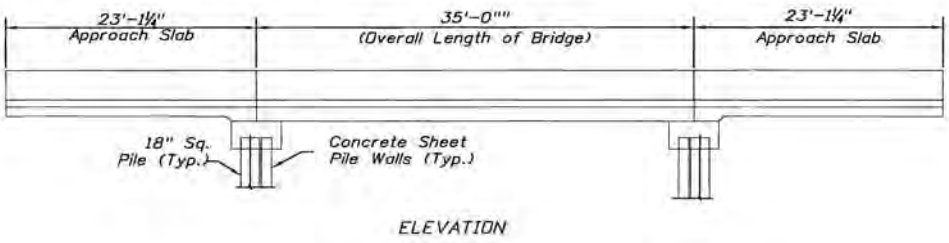
The examination of the available information on the Sunset Point Road (CR 576) bridge over Spring Branch Tributary of Stevenson Creek revealed a structure that appears to be functionally obsolete since the structure has inadequate lane widths, no shoulders and substandard traffic railing. The bridge could be widened since it is in generally satisfactory to good condition with a few repairs being required except that there is no way to determine the load carrying capacity of this structure. Without existing plans, the load ratings cannot be determined so major widening of an older structure such as this one is not recommended. For the above reason, a replacement of this structure is recommended to ensure that the final structure is structurally capable of carrying the vehicular traffic well into the future.

The proposed typical section for the new bridge structures will match the approach roadway with one 11’ lane in each direction separated by a 12’ continuous left turn lane. 4’ bike lanes, 1’-4” shoulders, 6’ raised sidewalks and 1’-1” wide vertical face barriers located on both sides of the bridge. The proposed typical sections are shown in later in the report when the different structure options are discussed.

The existing pedestrian bridge (PB0015) may be removed without impacting the pedestrian traffic since the proposed bridge includes sidewalks on both the north and south sides of Sunset Point Road. This existing pedestrian bridge must be removed since it conflicts with the widened roadway typical section.

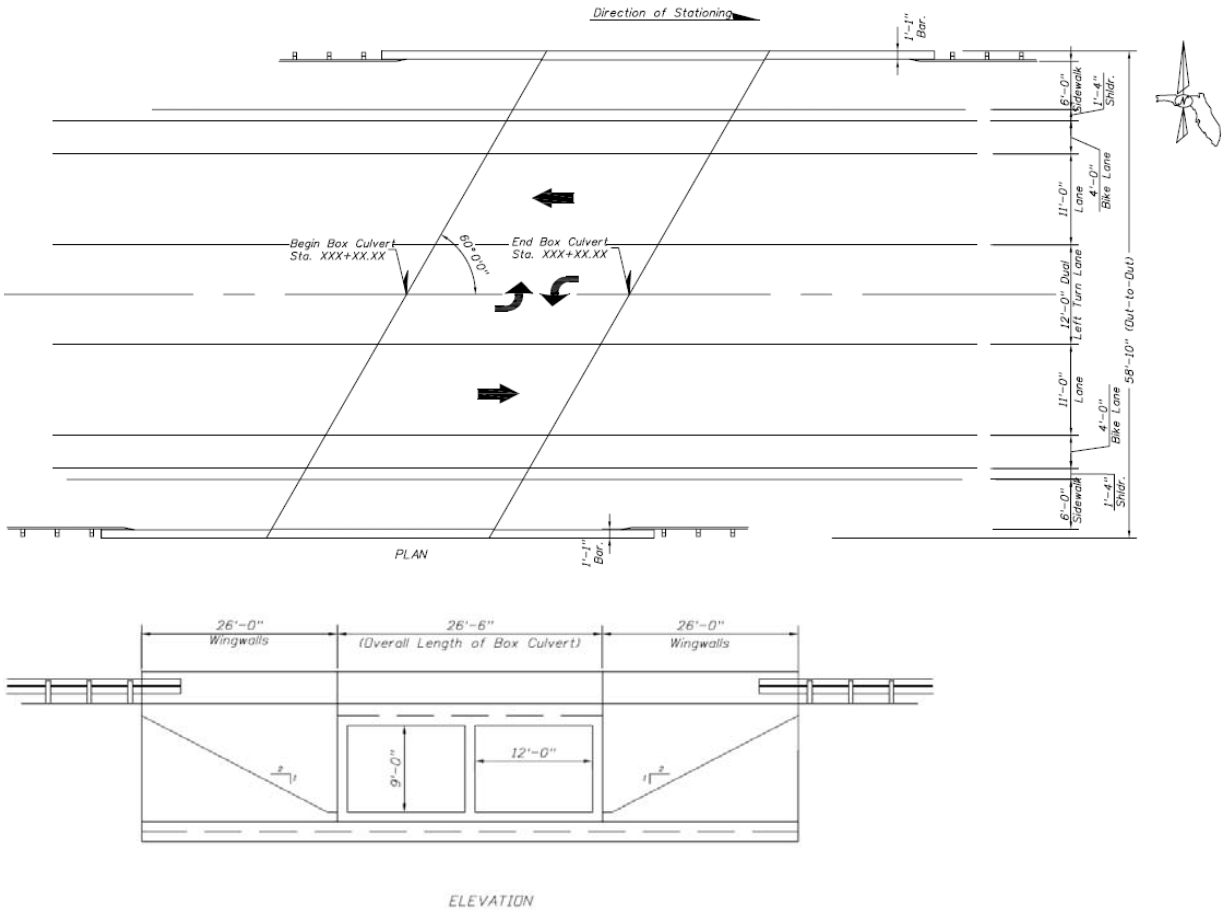
The proposed bridge layout is based on the preliminary roadway and creek layout as shown in the Plan and Elevation view below:





Bridge Options 1, 2 & 3

and



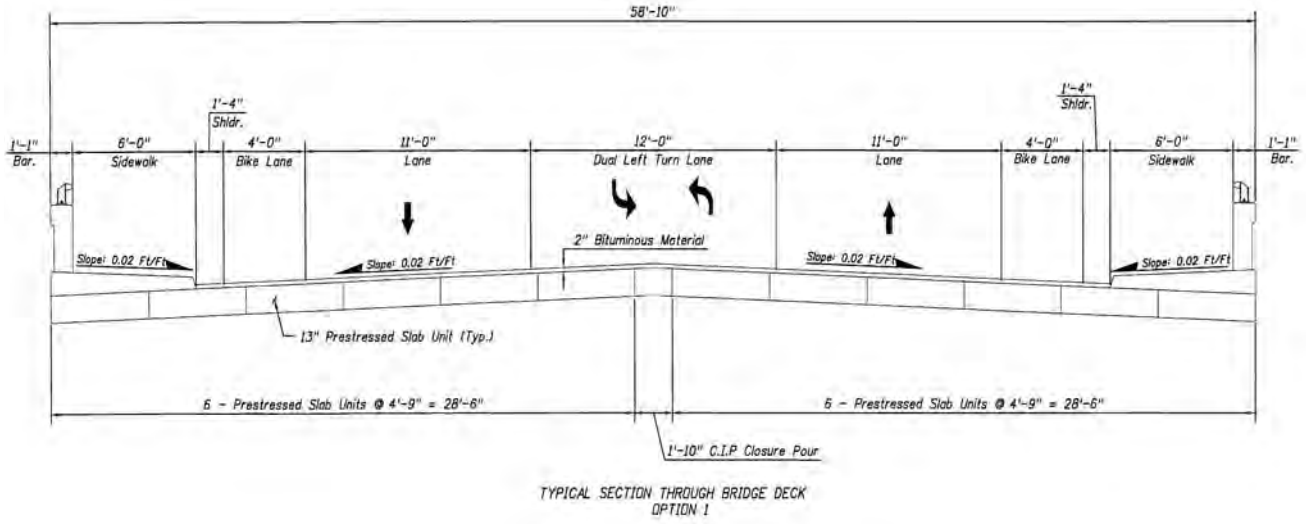
Bridge Culvert Option 4

Notice that a skew angle between the creek and Sunset Point Road is shown as 30˚ in the above drawing. This has not been finalized yet and may change based on the final results of the hydraulic analysis of Spring Branch. The span length of 35'-0" is also based on the preliminary skew angle of 30˚ and the maximum required hydraulic opening of 27'-0" (27'/cos(30˚) + 2 * [½ * 4'-0" cap width – 10" sheet pile wall width] = 33.51' roundup to 35'-0"). These conservative span length and skew angle were assumed to ensure that the values used in design would cover the worse case – these values will be revised in

final design to match the approved hydraulic recommendations which will result in lower construction costs. Based on this information, a single span bridge with a span length of 35'-0" is assumed for the proposed structure.

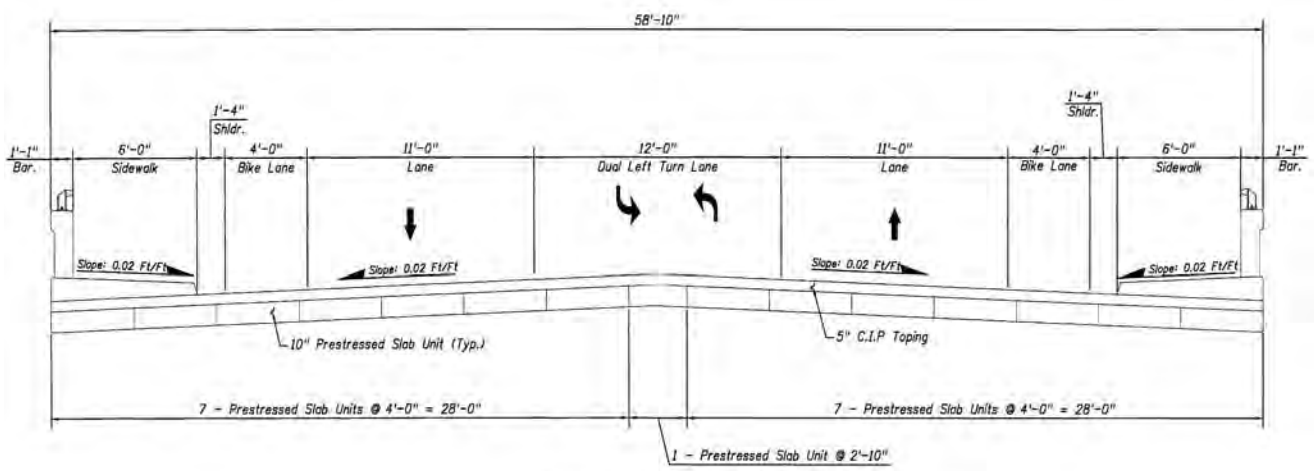
Another hydraulic consideration that limited the structure alternatives was the design high water elevation (DHW). The profile of the proposed Sunset Point Road is to remain approximately the same as the existing so that unnecessary work will not be needed to tie-in the nearby side streets and driveways. These two elevations restrict the available depth for the superstructure. The preliminary DHW is set at elevation 10.89 (NAVD). The existing Sunset Point Road has an approximate elevation of 16.60 (NAVD) at the centerline of the bridge over Spring Branch. The resulting structure depth available is 3.12' (16.60' – ½ * (58'-10" bridge width) * 2% cross slope – 2' freeboard clearance – 10.89') after providing 2' of freeboard between the DHW and bottom of bridge to prevent floating debris from collection at the bridge. This limited superstructure depth eliminates many types of structures from further consideration.

One structure type that meets this depth criterion and can span the 35'-0" required is a precast, prestressed slab. Superstructure Option 1 consists of prestressed concrete slab units that are 13" thick and transversely post-tensioned. A 2" thick bituminous/asphalt overlay is added to provide a smooth riding surface for the vehicular user. This superstructure depth of 15" meets the AASHTO span-to-depth limits of 12.6" (0.030 * (35'-0" span)) required to limit excessive deflections of the structure and results in a low member elevation that provides 3.87' of vertical clearance above the DHW elevation. The typical section for this option is shown below.



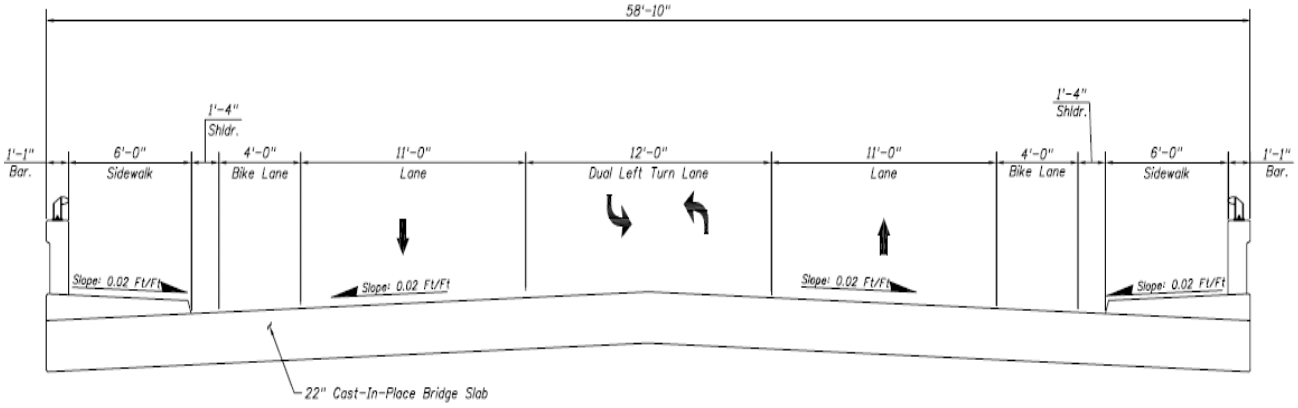
TYPICAL SECTION THROUGH BRIDGE DECK
OPTION 1

Option 2 is similar to Option 1 in that it is composed of prestressed concrete slab units that are 10" thick. A 5" cast-in-place concrete topping is used to tie the individual slab units together in place of the transverse post-tensioning that was required in Option 1. The superstructure depth for this option is 15" which meets the required AASHTO span-to-depth limit of 12.6" and provides 3.87' of vertical clearance above DHW elevation similar to Option 1. This superstructure typical section is provided below.



TYPICAL SECTION THROUGH BRIDGE DECK
OPTION 2

A 22" cast-in-place slab is used to cross the 35'-0" span over Spring Branch in Option 3. The thickness of the deck has been sized to meet the 21.6" (1.2 * ((35'-0" span length) – 10) / 30) minimum deck thickness as required in AASHTO to prevent excessive deflections. A vertical clearance of 3.29' results from this superstructure option. Typical section of Option 3 is included below.



TYPICAL SECTION THROUGH BRIDGE DECK

OPTION 3

Options 1 through 3 utilize concrete sheet pile walls to reduce the span length while maximizing hydraulic opening provided. This allows shorter spans that permit the use of shallower superstructure types. The exposed height of the concrete sheet pile walls is assumed to be 11'-0" which requires 12" thick walls. No dead man or soil anchors are required. While these are more expensive than permanent steel sheet pile walls, they require less future maintenance. Using steel sheet piling would reduce the total construction cost by an estimated $194,000. This alternative is not considered further because of the increased maintenance costs and the difficulty of repairing when needed.

Pile bents are used for the substructures on Options 1 through 3. Six 18" square prestressed concrete piles spaced at approximately 11'-0" will be used to support the superstructure. A 4'-0" wide by 2'-6" tall cap is proposed to encase both the 18" piles and the sheet pile wall. The preliminary geotech report uncovered weathered limestone located at a depth 35' until the boring was terminated at a 75' depth. One location of the 9 SPT blow counts that were taken within this 40'-0" thick limestone layer indicated a weak or voided section where the rod fell due to its own weight. This occurred at a depth of about 50'. The lowest of the other 8 blow counts was 96 blows for a penetration of 12" indicated very hard material.

Option 4 uses a twin 12' x 9' box culverts (depending on hydraulic analysis) to permit the flow of water under Sunset Point Road. These structures are similar to what was recommended downstream under Douglas Avenue and Springtime Avenue in the *City of Clearwater Stevenson Creek Study* dated August 2001. Wingwalls running parallel to Sunset Point Road are used to retain the fill allowing a bridge culvert length of 58'-10". The typical section for this would be similar to the bridge options.

Estimated quantities were calculated for each of these 4 structure options and the unit prices were used to determine the estimated construction costs. Where available, the unit costs for the structural items are taken from Chapter 9 of the 2008 FDOT Structures Design Guidelines. The 2007 FDOT annual statewide pay item averages were used for items not found in the Structures Design Guidelines. There was no specific pay item and therefore cost information for the 13" prestressed slab units so the unit cost for the 15" slab was reduced by the ratio of the thicknesses.

The costs for the bridges in Options 1 through 3 are broken down into 4 categories: Superstructure, Substructure, Miscellaneous and Conditional Variables. The Superstructure cost consists of the costs for the approach slabs, the prestressed or cast-in-place deck, barriers and expansion joints. The Substructure cost includes the prestressed piles and pile cap while the Miscellaneous cost account for the concrete sheet piling. The Conditional Variable cost is a markup to account for the increased costs of construction over water.

The cost of the bridge culvert in Option 4 is split into 2 categories: Substructure and Conditional Variable. The substructure cost consists of the concrete and reinforcing steel needed to construct the box culverts. The cost of the barrier and the roadway over the bridge culvert is included to ensure that the Total Structure Cost of Option 4 can be fairly compared to the Total Structure Costs of Options 1 through 3 on an "apple-to-apple" basis. The unit cost for construction of the 3-lane roadway was taken as the average of the construction costs of a 2-lane and a 4-lane roadway from the August 2007 FDOT Construction Cost Tables. The Conditional Variable cost for the bridge culvert is to include the cost of dewatering as well as maintaining the flow of water in Spring Branch during construction.

A summary of these costs for all four options in included in the table below:

Table 6-2: Bridge Structure Options – Costs

	SUPERSTRUCTURE OPTIONS			
	ONE - Prestressed Slab Units, Transversely P/T w/ 2" Asphalt Overlay	TWO - Prestressed Slab Units w/ 5" CIP Topping	THREE - CIP Concrete Flat Slab	FOUR - Dual Cell 12' x 9' CIP Concrete Box Culvert
SUPERSTRUCTURE	$250,542	$242,101	$276,299	$0
MISCELLANEOUS	$405,625	$405,625	$405,625	$0
SUBSTRUCTURE	$77,479	$77,479	$77,479	$541,054
CONDITIONAL VARIABLES	$22,009	$21,756	$22,782	$100,000
TOTAL STRUCTURE COST	**$755,656**	**$746,961**	**$782,185**	**$641,054**
MINIMUM COST PER SQUARE FOOT	**$170**	**$166**	**$183**	**N/A**
% ABOVE MIN. ALTERNATIVE	**18%**	**17%**	**22%**	**0%**

As can be seen above, the construction cost of Option 4 with the dual 12’ x 9’ Bridge Culvert is the overall least expensive alternative. This option is approximately $106,000 less then the least expensive bridge option with concrete sheet piling. However, if steel sheet piling is used then the Total Structure Cost for Option 2 is reduced to $553,000 or $88,000 less than the box culvert. The risk of increase future maintenance costs of the steel sheet piling and the difficulty of repairing makes the dual 12’ x 9’ Bridge Culvert of Option 4 the optimal choice.

Additional bridge information is located in **Appendix B**.

6.8 Landscaping

The location of Sunset Point Road presents many challenges and opportunities for landscape areas along the corridor. There are historic trees within the right-of-way that make the proposed widening more of a challenge. From Edgewater Drive to Douglas Avenue the narrow space does not allow for trees. The proposed cross section takes up the available space with only the addition of one sidewalk on the north side. Depending on how the stormwater management facilities are constructed, there may be opportunities for trees along the edges along the roadside. Further east, the right-of-way allows for sidewalks on both sides, however the available green space will be outside the back of sidewalk. For the majority of the corridor, this will likely limit landscaping to median areas due to utility and signage conflicts.

Existing Trees

In specific areas of the project, there are historic sabal palms approximately 50-feet in height. The cross sections and grading should be evaluated to save these palms in place where possible. Sabals normally transplant quite easily, however the extreme height for these trees will require special attention and equipment if they are to be saved and relocated. A standard tree spade will not be enough due to the slender and weathered trunks. Evaluations should be completed to inventory the trees and their health for the best potential transplants. Though there are a few in other areas, the segments of the corridor with groups of the taller Sabals are as follows:

- Between Kings Highway and Highland Avenue
- Between East Drive and Ridgeway Drive

Mature live oaks are also present in some areas. These mature live oaks occur both within the right-of-way and on the adjoining properties. The overhead power lines on the south side of the road have required line-clearance pruning over the years. This has resulted in some trees having irregular canopies. Other trees appear to have partial die-back, probably due to root zone disturbance. Some may have to be removed, while others may survive with special attention prior to and during construction of the roadway improvements. This attention includes protection measures, watering, fertilizing and pruning. Each tree within 25 feet of the limits of work should be inspected to determine potential impacts and existing health. This is important for the County to have a record of the pre-construction condition of existing trees.

Planting Areas

The preliminary design provides two types of potential planting areas for the corridor: medians and stormwater facility edges. The medians will need to be reviewed for adequate sight distance for intersections and horizontal clearance for the driving lanes. Moving from the beginning of the project to the east, the first available median is a small teardrop-shaped island just west of Flora Road that may accommodate a palm due to the available space. Then between Highland Avenue and West Drive two diamond-shaped medians allow larger trees. The first median that will accommodate more than one tree is between East Drive and Sharondale Drive. From there to Keene Road, the median continues with a series of median cuts and turn lanes included.

The required stormwater facilities, whether ponds or large swales adjacent to the roadway, could accommodate landscaping if desired. These facilities need to be configured to determine the extent of the potential landscape areas. In either location, the existing conditions and the proposed improvements will need to be considered to provide functional landscape improvements that provide shade and other benefits while keeping maintenance costs low, improving aesthetics, maintaining accessibility and maximizing safety.

6.9 Cost Estimate

Construction costs were estimated using FDOT pay items and 2008 average cost history (11-07-07 to 11-30-08) for Area 08 which includes Pinellas County. With the exception of the unknown drainage items, these pay items are equivalent or closest matches with Pinellas County pay items. These preliminary costs are estimated for the year 2008.

Costs for the proposed improvements to Sunset Point Road have been approximated and are broken down in the table below. For more detailed cost information see **Appendix A and Appendix B**.

Table 6-3: Project Costs

Roadway Construction	$6,422,490
Bridge Culvert	$641,054
Signing and Pavement Marking	$189,923
Signalization	$1,500,000
Construction Subtotal	$8,753,467
20% Contingency	$1,750,693
Roadway Right-of-Way*	$300,000
Ponds, Floodplain Compensation and Mitigation - Right-of-Way*	$589,250
Project Grand Total Cost	**$11,393,410**

**Based upon estimated costs by the Pinellas County Real Estate Department.*

Section 7

Permitting and Environmental Assessment

7.1 Wetlands and Surface Waters

Staff scientists have field-delineated the wetlands and surface waters located along the project corridor; these wetlands have been surveyed. The wetlands were delineated using the U.S. Army Corps of Engineers' (USACE) *Wetland Delineation Manual* (1987), and the *Florida Wetlands Delineation Manual*, Chapter 62-340, Florida Administrative Code (FAC). There are a total of four wetlands and surface waters that were delineated along the project corridor, which are labeled as SW1, W1, W2 and W3. It is anticipated that there will be 0.01 acres of impact to SW1, 0.06 acres of impact to W1, 0.25 acres of impact to W2, and no impact to W3, for a total of 0.32 acres of impact.

SW1 is a small tributary to Stevenson Creek, which flows out to St. Joseph's Sound. The portion of this surface water that is proposed to be impacted has side slopes of approximately 1:1, and has concrete/sand bags along the bank on the north side of Sunset Point Rd and has poured concrete, pieces of concrete, and some vegetated banking on the south side of Sunset Point Rd. W1 is a Pinellas County mitigation site with a ditch that runs parallel to the road and flows into the wetland system. The only portion of the wetland that would be impacted is the ditch that runs parallel to the road. This portion of the wetland appears to be a manmade ditch and could be labeled as a surface water. W2 is also a manmade ditch that runs parallel to the road. This ditch could also be considered a surface water and is connected to W1 via a culvert that runs under the roadway. W3 is located just to the south of W2 and is separated by a small berm. W3 is a low-lying open grass area that is located within Basinger fine sand, depressional soil map unit according to the NRCS Soil Survey of Pinellas County. Dark soils were observed in this location that indicated hydric conditions. W3 appears to be mowed on a regular basis so vegetation was hard to determine. There was one pocket that was not mowed that consisted mainly of Carolina willow.

If the impacts to SW1, W1 and W2 were evaluated as impacts to wetlands, no more than 1-acre of mitigation is likely to be needed to offset the impacts. Although vegetation is minimal in the ditches and at the creek crossing, an emergent herbaceous system would be created to offset the impacts to wetlands and to potential impacts to wood stork foraging area. It is anticipated that the wetland mitigation will coincide with the proposed floodplain compensation areas. If the identified impact areas are evaluated as surface waters, then no mitigation should be required to offset the impacts. Any loss of water storage and wood stork foraging area would be compensated for by the creation of the floodplain compensation areas.

Wetland mitigation, if needed, could be created on-site in conjunction with the proposed floodplain compensation areas, if possible. One viable option would be the area located to the east of the Calvin A. Hunsinger School, shown as FPC-3 site in the Pond Siting Report. This property is a large open field that is located within a Basinger fine sand,

depressional soil map unit according to the NRCS Soil Survey of Pinellas County. There is one small pocket with wetland vegetation, but the remainder of the site is mowed and appears to consist of mainly Bahia grass. Based on a field review, it appears that hydric soil conditions exist within this property. Mitigation at this site would require minimal scraping of the substrate at existing conditions to support wetland function. If this site were to be used as a mitigation and floodplain compensation site, a large pond with a wetland fringe or large littoral zone could be created. Either using this site solely for mitigation or as a mitigation and floodplain compensation site would both be viable options. Since this site is mainly open field, there would be minimal impacts to any existing vegetation and would be easy to do any excavation and/or grading work

Another option which could be utilized could be to utilize the existing wetland mitigation credits which have been created and permitted within the County owned wetland mitigation system was permitted under SWFWMD ERP No. 10228004 (The Mall – Sunset Point Mitigation Area). This site is located adjacent to Sunset Point Road on the north side between N Betty Lane and Kings Highway. According to County records, there is 1.43 acres available for mitigation credit within the site. However; the County indicated that some of the acreage would be necessary for another project, Bee Branch Phase 1. Further coordination with County personnel will be performed during the final design phase to determine if utilization of this site is desired to meet project requirements.

With any of the wetland mitigation alternatives considered, it does not appear that any additional property would be required to meet the needs of the Sunset Point Road project.

7.2 Permitting

A General Environmental Resource Permit (ERP) is required for the impacts to the Spring Branch Tributary and ditches located within the existing right-of-way. SWFWMD will require mitigation to be provided for the filling in of these ditches. A pre-application meeting has been held to discuss permitting requirements. See **Appendix E**.

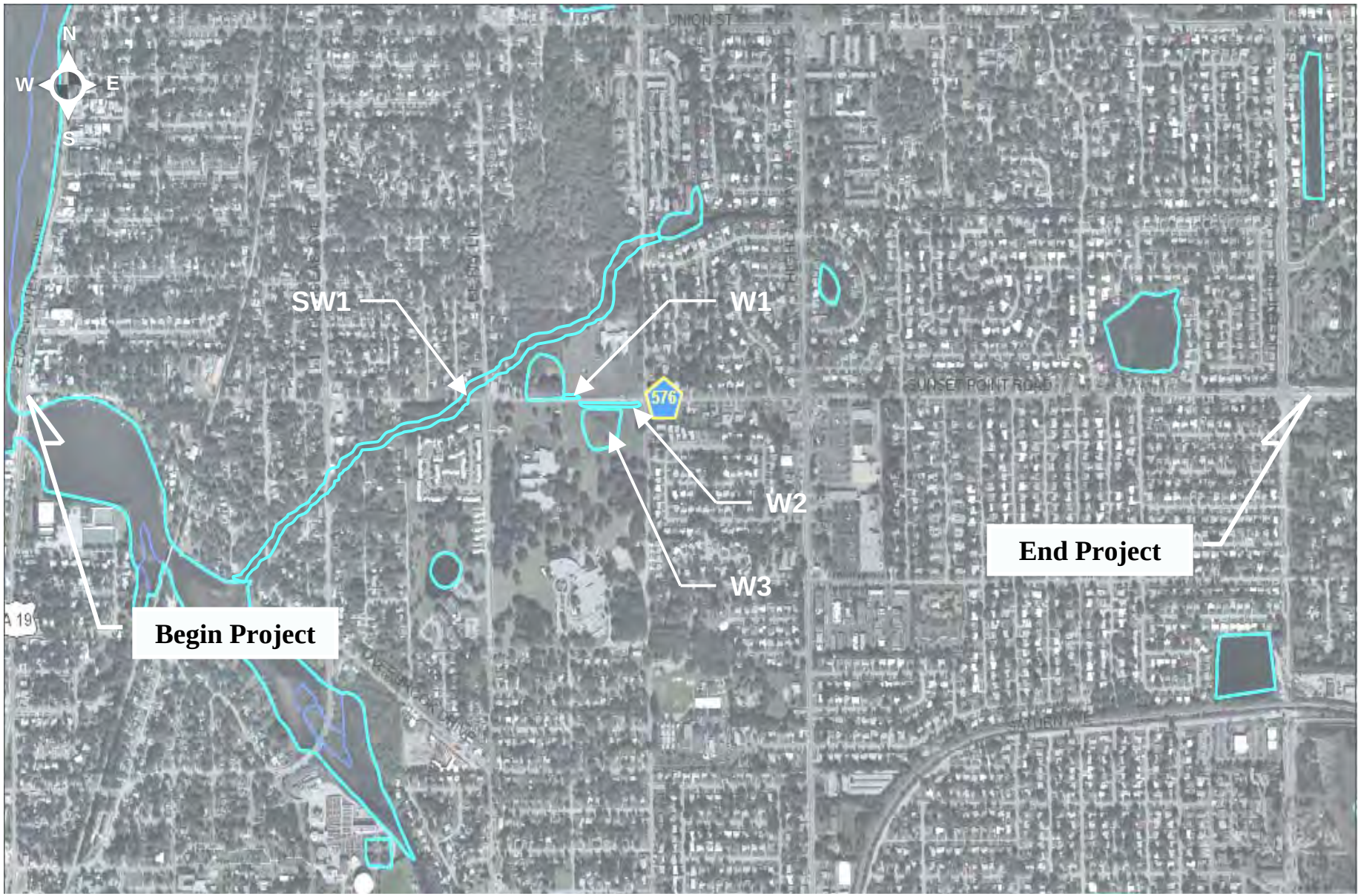
Correspondence with the FDEP indicates that the Spring Branch Tributary in the vicinity of Sunset Point Road is not sovereign submerged land. As such, bridge widening will not require sovereign submerged land authorization for the Florida Board of Trustees. Please see **Appendix E** for correspondence.

The US Army Corps of Engineers (USACE) issues a Nationwide 14 for linear transportation projects impacting less than 0.50 acres of jurisdictional wetlands. If the jurisdictional impacts exceed 0.50 acres, the USACE may require an individual permit with a public notice period. Mitigation for surface water impacts is calculated using the Uniform Mitigation Assessment Method (UMAM) and is anticipated to be minimal.

Florida's NPDES stormwater program requires a Generic Permit for stormwater discharge from construction activities that disturb more than 5 acres of land. Discharges

to surface waters of the state or municipal separate stormwater system via a point source are allowed under the Generic Permit. The construction plans will include preparation of a Stormwater Pollution Prevention Plan (SPPP) which will outline guidelines for the Contractor and can be used by the Contractor to apply for the Notice-of-Intent (NOI) to utilize the State of Florida's Generic Permit.

Figure 7-1: Existing Wetlands



Sunset Point Road – From Edgewater Drive to Keene Road

Pinellas County, Florida

American Consulting Engineers of Florida, LLC

Pinellas County

Section 8

Hazardous Material Evaluation

A *Phase I Level I Environmental Assessment Hazardous Materials Evaluation Report* (HMER) has been previously prepared (American Consulting Engineers of Florida, LLC, March 2008) and approved the County.

A total of nine (9) sites were identified within the project boundary, and the following conclusions and recommendations were made regarding the proposed project:

- Of the nine (9) sites reviewed, 1 site received rankings of "No" risk, 5 sites received rankings of "Low" risk, 2 sites received a ranking of "Medium" risk, and 1 site received a ranking of "High" risk.

- The two (2) sites ranked "Medium" risk and the one (1) site rank "High" risk were recommended for further environmental assessment pending the final roadway design and construction activities that may take place within or near these sites. It is not anticipated that any right-of-way acquisition would be required from those properties.

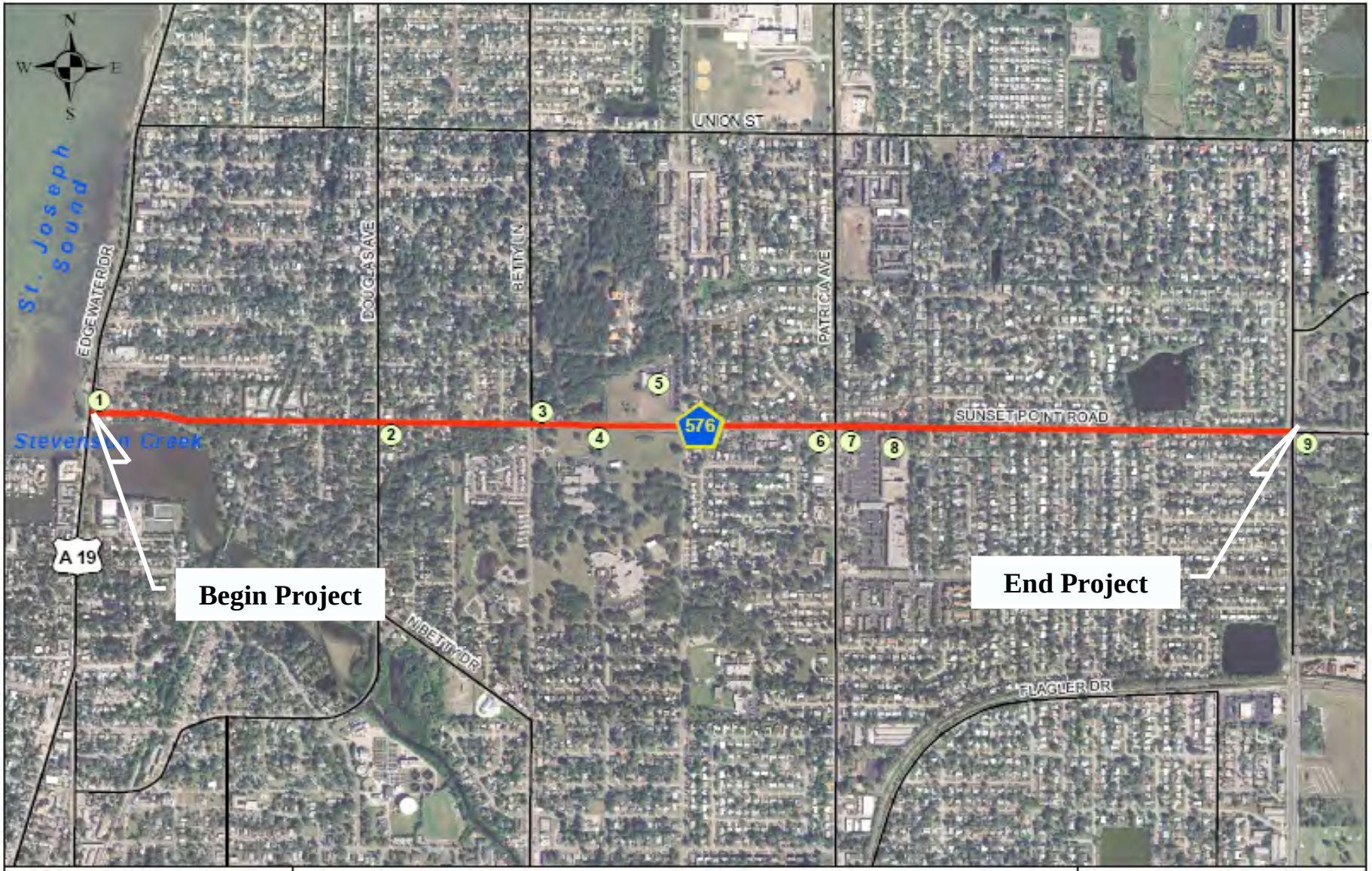
The nine (9) sites identified are included in **Table 8-1**. The Map ID numbers correspond to **Figure 8-1**.

Table 8-1
Summary of Potential Contamination Sites

Map ID	Site Name	Site Address	Risk Rating	Government Database
1	Chevron 2	1901 Edgewater Drive	Medium	Spills80, UST
2	XCEL 825	1201 Sunset Point Rd	Low	LUST, Spills80, UST
3	John's Auto Body	1300 Sunset Point Rd	Low	FINDS, RCRAGN
4	City of Clearwater Lift Station 24	1351 Sunset Point Rd	Low	LUST, Spills80, UST
5	Sunset Point Baptist School	1390 Sunset Point Rd	No	FINDS
6	Texaco Gas Station – Closed	1898 N. Highland Ave	Medium	LUST, UST, FINDS, Spills80
7	Chevron USA	1899 N. Highland Ave	High	FINDS, LUST, UST, Spills80
8	Tux Cleaners	1893 N. Highland Ave	Low	FINDS
9	BP Gas Station	1801 Sunset Point Rd	Low	UST, LUST

The assignment of a risk rating was based on the current and past existence of hazardous materials or petroleum products and the potential of the material/product to be encountered during proposed roadway construction activities. The rating system expresses the likelihood that hazardous material or petroleum products exist and the potential impact on roadway construction.

Pinellas County is proceeding with further environmental assessment activities based on the recommendations of the HMER.



Section: 02, 03
Township: 29S
Range: 15E

Source: FGDL

Sunset Point Road

US Alt 19 to Keene Road

Potential Contaminaton Sites Map: Figure 8-1

American Consulting Engineers of Florida, LLC

Section 9

Soils/Geotechnical Investigation and Analysis

The geotechnical work as described in the *Preliminary Geotechnical Report, Sunset Point Road (CR 576), Improvements Between Edgewater Drive (US Alt. 19) and Keene Road* and the *Final Geotechnical Report (Draft), Sunset Point Road (CR 576), Improvements Between Edgewater Drive (US Alt. 19) and Keene Road*, (prepared by PSI,) included performing field reconnaissance, a roadway soil survey, ground water table measurements, laboratory classification testing, and engineering evaluations and design recommendations. Published information was obtained from the *Soil Survey of Pinellas County, Florida*, published by the U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS) and the "Clearwater, Florida" Quadrangle Map produced by the USGS. All investigative services were performed in general accordance with Pinellas County and FDOT guidelines. See **Appendix D** for a copy of these reports.

To explore subsurface conditions along the proposed alignment, hand auger borings were performed to a depth of 5 feet below the existing grade. Based upon the exploratory borings and results of the laboratory testing, the near surface soils along the project alignment have been grouped into four (4) categories/strata. In general, the auger borings performed encountered the following strata:

Table 9-1: Project Soil Stratums

STRATUM	SOIL DESCRIPTION	AASHTO SOIL CLASSIFICATION
1	Clean to Slightly Silty Fine SAND	A-3
2	Silty to Clayey Fine SAND	A-2-4
3	Sand CLAY	A-6
4	Silty Fine SAND with organics (Muck)	A-8

Five (5) LBR tests were performed on near surface soils at various locations along the existing roadway. The LBR tests yielded values ranging from 26 to 49 percent. Using the FDOT 90 percentile method, a design LBR of 29 percent is recommended for the existing project soils for soil support for use in pavement design.

To supplement collected roadway data to be used in evaluation of seasonal high groundwater levels and to provide recommendations for possible milling and resurfacing, five (5) pavement cores were collected along Sunset Point Road from U.S. Alternate 19 to Douglas Avenue. A summary of the collected pavement cores is included on *Table 6* in *Appendix A* of the *Final Geotechnical Report (Draft).* It was determined that, if the design engineer and the County decide that the use of a moisture resistant base material such as ABC is acceptable under the expected shallow groundwater conditions, milling and resurfacing can be used for pavement rehabilitation.

When encountered, groundwater was observed at depths ranging from 2 ½ ft. to greater than 5 ft. below the existing ground surface in the borings performed at the project site. Groundwater levels will fluctuate seasonally and groundwater conditions will change with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, tidal influences, as well as man-made influences, such as existing swales, drainage ponds, and underdrains. A summary of estimated seasonal high groundwater table (SHGWT) levels at the boring locations is presented in *Table 3* in *Appendix A* of the *Preliminary Geotechnical Report*.

Section 10

Public Involvement

A public involvement program is included in the development of this project. An introductory public information was held on March 5, 2008. See **Appendix G** for information on the public meeting and materials that were on display at that time. There were no proposed improvements displayed at that introductory meeting as the purpose was to obtain general feedback from the public on their local knowledge of the corridor and to obtain comments on the project.

A public notice was placed in the local newspaper and a letter notice was sent to property owners (450 letters were sent) within 300 feet from both sides of the corridor. See Appendix G for the notices that were provided.

A summary of the comments received is included in Appendix G. In general, the comments received indicated a desire to see improvements made along the corridor and the proposed improvements are in-line with a majority of the requests and concerns.

A second public workshop was held on May 28, 2009, to obtain public feedback on the recommended improvements contained in this report. At this meeting, graphics of the proposed improvements were on display for review and comment. Public notices and 451 letters were sent out similar to the previous meeting (see Appendix G for the notices sent out). 69 people attended the workshop and 28 provided comments. A summary of the comments received is also included in Appendix G. The comments were mixed in regards to the proposed improvements recommended in this report. There was general support (7 supported the design as proposed, 10 supported the addition of sidewalks, 7 supported the addition of bike lanes) that improvements should be made along the corridor; however, there was some disagreement in the proposed improvements between Highland Avenue and Keene Road. There were 7 comments received from property owners along this segment that objected to the proposed 4-lane divided typical section. 5 of these property owners thought that a 3-lane urban typical section (2-lane divided with center left-turn lane) should be used. There were 10 comments/concerns about impacts to property values.

A third public meeting was held on August 18, 2009 at the Board of County Commissioners regularly scheduled public hearing. American presented the results and recommendations contained in this preliminary engineering report. Following the presentation, the public was permitted to provide verbal comments to this report. The comments made were similar to those received at the second public workshop. The BCC then directed the County staff to consider revising the proposed improvements (possible phasing of improvements and/or reductions in scope) to reduce costs. This directive was based on overall County budget concerns due to current economic conditions and overall impacts to the community.

This re-evaluation is being performed by Public Works Traffic Division personnel.

Appendix A

Roadway Construction Cost Estimate

Preliminary Construction Cost Estimate

SUNSET POINT ROAD - US ALT. 19 TO KEENE ROAD - APPROX. 1.5 MILES RECONSTRUCTION, 0.5 mi MILLING/RESURFACING

January 2009 (FINAL PER)

F.D.O.T. Pay Item No.	BID ITEM NO.	Description	Quantity	Units	Unit price	Amount
101-1	1	MOBILIZATION	1	LS	$635,652.44	$635,652.44
102-1	2	MAINTENANCE OF TRAFFIC	1	LS	$355,798.12	$355,798.12
104-13-1	3	STAKED SILT FENCE, TYPE III	21,000	LF	$0.98	$20,580.00
104-16	4	ROCK BAGS	2,100	EA	$5.76	$12,096.00
110-1-1	5	CLEARING & GRUBBING	20	LS/AC	$8,282.05	$165,069.54
120-1	6	REGULAR EXCAVATION	16,409	CY	$3.25	$53,329.25
120-6	7	EMBANKMENT	16,580	CY	$5.32	$88,205.60
160-4	8	STABILIZATION TYPE B	57,065	SY	$2.92	$166,629.80
285-709	9	OPTIONAL BASE, BASE GROUP 09	50,399	SY	$13.08	$659,218.92
327-70-01	10	MILLING EXISTING ASPHALT (1")	7,310	SY	$0.97	$7,090.70
334-1-13	11	SUPERPAVE ASPHALTIC CONC, TRAFFIC C (SP 12.5)	9,522	TN	$91.78	$873,929.16
339-1	12	MISCELLANEOUS ASPHALT PAVEMENT	17	TN	$177.26	$3,031.15
DRAINAGE	13	DRAINAGE STRUCTURES	105	EA	$5,000.00	$525,000.00
DRAINAGE	14	PIPES	13,565	LF	$100.00	$1,356,500.00
400-1-11	15	CONCRETE CLASS I, RETAINING WALLS (GRAVITY WALLS)	27	CY	$606.48	$16,374.96
515-1-1	16	PIPE HANDRAIL - GUIDERAIL, STEEL	1,892	LF	$63.10	$119,385.20
515-22-1	17	PEDESTRIAN / BICYCLE RAILING, STEEL ONLY, 42" PICKET RAIL	300	LF	$63.25	$18,975.00
520-1-7	18	CONCRETE CURB & GUTTER, TYPE E	2,053	LF	$14.02	$28,783.06
520-1-10	19	CONCRETE CURB & GUTTER, TYPE F	21,000	LF	$14.00	$294,000.00
520-5-41	20	TRAFFIC SEPARATOR CONCRETE- TYPE IV, 4' WIDE	1,877	LF	$40.00	$75,080.00
522-1	21	SIDEWALK CONCRETE, 4" THICK	11,667	SY	$32.01	$373,460.67
522-2	22	SIDEWALK CONCRETE, 6" THICK	1,315	SY	$40.76	$53,599.40
536-1-1	23	GUARDRAIL -ROADWAY	325	LF	$19.99	$6,496.75
536-85-22	24	GUARDRAIL END ANCHORAGE ASSEMBLY - FLARED	4	EA	$1,717.15	$6,868.60
570-1-2	25	PERFORMANCE TURF, SOD	19,109	SY	$1.75	$33,440.75
999-1	26	STORMWATER PONDS AND FLOODPLAIN COMP. SITES	1	LS	$473,895.00	$473,895.00

ROADWAY SUBTOTAL	**$6,422,490**
BRIDGE OR BOX CULVERT	**$641,054**
SIGNING/PAVEMENT MARKINGS	**$189,923**
TRAFFIC SIGNALIZATION	**$1,500,000**
CONSTRUCTION SUBTOTAL	**$8,753,467**
20% CONTINGENCY	**$1,750,693**
GRAND TOTAL	**$10,504,160**

Note: Costs are based on FDOT area 08 Average (11-07-07 to 11-30-08).

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Appendix B

Bridge Alternative Calculations and Schematic Plans

COMPARATIVE COST TABLE

	SUPERSTRUCTURE ALTERNATIVE			
	ONE - Presstressed Slab Units, Transversely P/T w/ 2" Asphalt Overlay	TWO - Prestressed Slab Units w/ 5" CIP Toping	THREE - CIP Concrete Flat Slab	FOUR - Dual Cell 12' x 9' CIP Concrete Box Culvert
SUPERSTRUTURE	$250,542	$242,101	$276,299	$0
MISCELLANEOUS	$405,625	$405,625	$405,625	$0
SUBSTRUCTURE	$77,479	$77,479	$77,479	$517,037
CONDITIONAL VARIABLES	$22,009	$21,756	$22,782	$100,000
TOTAL STRUCTURE COST	**$755,656**	**$746,961**	**$782,185**	**$617,037**
MINIMUM COST PER SQUARE FOOT	**$170**	**$166**	**$183**	**N/A**
% ABOVE MIN. ALTERNATIVE	**22%**	**21%**	**27%**	**0%**

Unit Costs Used in Concept Report

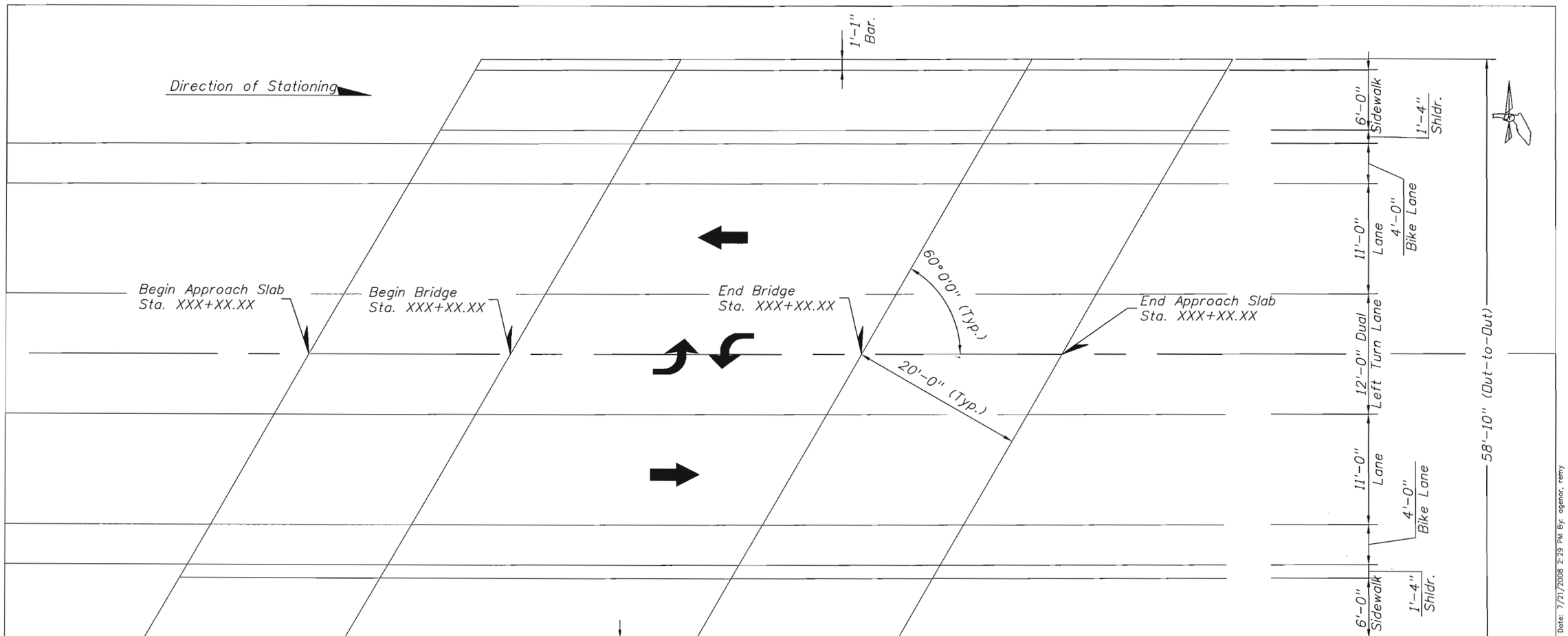
Number	Item	Description	Cost	Units
110-3	*Removal of Existing Structure		$50.00	SF
334-1-13	*Superpave Asphaltic Concrete	Traffic C	$90.24	TON
400-2-4	**Concrete Class II	(Superstructure)	$850.00	CY
400-4-5	**Concrete Class IV	(Substructure)	$1,100.00	CY
400-2-10	*Concrete Class II	(Approach Slab)	$528.00	CY
415-1-4	**Reinforcing Steel	(Superstructure)	$1.00	LB
415-1-5	**Reinforcing Steel	(Substructure)	$1.12	LB
415-1-9	*Reinforcing Steel	(Approach Slab)	$1.07	LB
450-88-13	***Prestressed Slab Units Transversely Post-Tensioned	(13" Slab Units)	$61.00	SF
450-3-13	***Prestressed Slab Units	(48"x10" Slab Units)	$162.60	LF
455-14-4	**Concrete Sheet Piling	(12"x30" Sheet Piles)	$125.00	LF
455-34-3	**Prestressed Concrete Piling	(Furnish & Driven) (18" Sq.)	$80.00	LF
458-1-11	*Bridge Deck Expansion Joint	(Poured Joint with Backer Rod)	$154.00	LF
521-5-4	**Concrete Traffic Railing Barrier (Bridge)	(32" Vertical Face)	$115.00	LF
000-0-0	****Roadway Cost (3-Lane Roadway)	New Construction	$13,099,203.50	MI

* Unit Prices taken from 2007 FDOT Annual Statewide Pay Item Average.

** Unit Prices taken from FDOT BDR Cost Estimating in the Structures Manual.

*** Since no information was available for this specific pay item, a ratio of a 48" x 15" Prestressed Slab was taken.

**** Unit Price taken from August 2007 Construction Cost Tables - use average of 2-Lane and 4-Lane Roadway Section



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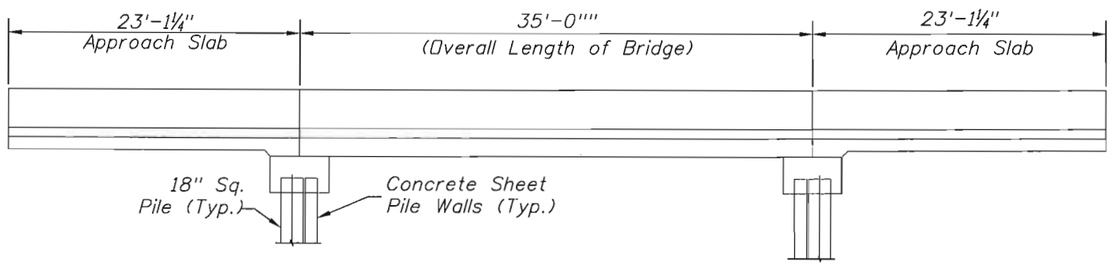

ELEVATION

REVISIONS					REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

PREPARED BY:

American
Consulting Engineers of Florida, LLC
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Certificate of Authorization No. 9302
Richard A. Hunter, P.E. No. 50601

Pinellas County PUBLIC WORKS

	NAME	DATE
DESIGNED	RA	5/08
DRAWN	RA	5/08
CHECKED	RH	5/08
SUPERVISED:	R. HUNTER, P.E.	

APPROVED BY:

SUNSET POINT ROAD

PLAN AND ELEVATION

SHEET NO.

OF SHEETS

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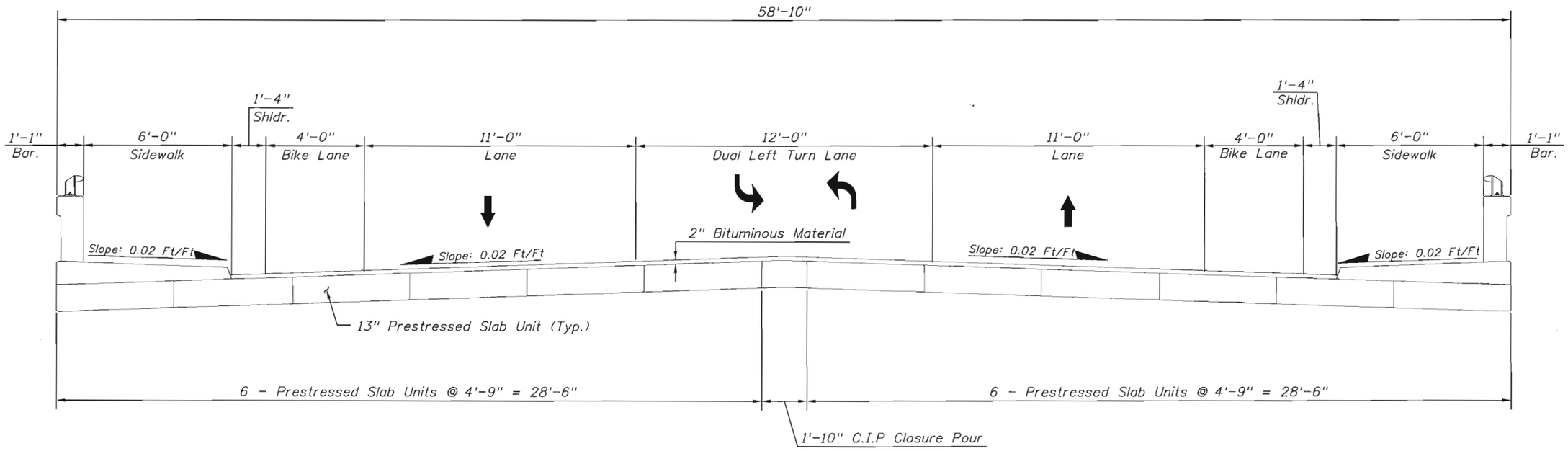

TYPICAL SECTION THROUGH BRIDGE DECK
OPTION 1

XREF: BORDER

REVISIONS					REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

PREPARED BY:

American Consulting Engineers of Florida, LLC
2818 Cypress Ridge Blvd, Suite 200
Wesley Chapel, FL 33544
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SUNSET POINT ROAD
TYPICAL SECTION
THROUGH BRIDGE DECK

SHEET NO.
OF SHEETS

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Sunset P Road

BRIDGE SUPERSTRUCTURE ALTERNATIVE ONE (13" Prestressed Slab Units)

PAY ITEM NUMBER	ITEM	DESCRIPTION	UNITS	TOTAL QUANTITY	UNIT PRICE	COST
334-1-13	*Superpave Asphaltic Concrete	Traffic C	TON	41	$90.24	$3,695.33
400-2-4	**Concrete Class II	(Superstructure)	CY	25	$850.00	$21,250.00
400-2-10	*Concrete Class II	(Approach Slab)	CY	101	$528.00	$53,169.60
415-1-4	**Reinforcing Steel	(Superstructure)	LB	5,133	$1.00	$5,133.00
415-1-9	*Reinforcing Steel	(Approach Slab)	LB	19,131	$1.07	$20,470.17
450-88-13	***Prestressed Slab Units Transversely Post-Tensioned	(13" Slab Units)	SF	1,952	$61.00	$119,087.86
458-1-11	*Bridge Deck Expansion Joint	(Poured Joint with Backer Rod)	LF	59	$154.00	$9,060.28
521-5-4	**Concrete Traffic Railing Barrier (Bridge)	(32" Vertical Face)	LF	162	$115.00	$18,676.00
					SUPERSTRUCTURE COST =	$250,542.24

BRIDGE SUBSTRUCTURE

PAY ITEM NUMBER	ITEM	DESCRIPTION	UNITS	TOTAL QUANTITY	UNIT PRICE	COST
400-4-5	**Concrete Class IV	(Substructure)	CY	39	$1,100.00	$42,790.00
415-1-5	**Reinforcing Steel	(Substructure)	LB	5,258	$1.12	$5,888.96
455-34-3	**Prestressed Concrete Piling	(Furnish & Driven) (18" Sq.)	LF	360	$80.00	$28,800.00
					SUBSTRUCTURE COST =	$77,478.96

MISCELLANEOUS ITEMS

PAY ITEM NUMBER	ITEM	DESCRIPTION	UNITS	TOTAL QUANTITY	UNIT PRICE	COST
455-14-4	**Concrete Sheet Piling	(12"x30" Sheet Piles)	LF	3,245	$125.00	$405,625.00
					MISCELLANEOUS COST =	$405,625.00

PROPOSED BRIDGE GEOMETRY

DIMENSIONS	Total
Bridge Width (FT)	58.83
Length of Bridge (FT)	35.00
Surface Area of Proposed Superstructure (SF)	2059.16

Sunset P Road

UNADJUSTED BRIDGE COST

COMPONENTS	Total
Superstructure Cost	$250,542.24
Substructure Cost	$77,478.96
Miscellaneous Cost	$ 405,625.00
Unadjusted Cost	$733,646.20

CONDITIONAL VARIABLES

CONDITIONAL VARIABLES	% +/-	Total
Rural construction, decrease by 6%	0.0%	$ -
Urban construction, increase by 6%	0.0%	$ -
For construction over water, increase by 3%	3.0%	$ 22,009.39
Phased construction or widening, increase by 20%	0.0%	$ -

ADJUSTED BRIDGE COST

COMPONENTS	Total
Superstructure Cost	$250,542.24
Substructure Cost	$77,478.96
Conditional Variables Cost	$22,009.39
Adjusted Cost	$350,030.59

BRIDGE COST

BREAKDOWN	Total
Square Foot Cost	$366.97
Total Cost	$350,030.59
Miscellaneous Cost	$405,625.00
BDR Comparative Cost	$755,655.59

Design Parameters:

Number of Spans: Let $i := 1 .. N_{span}$ $N_{span} := 1$

Out to Out Bridge Width: $b_w := 58ft + 10in$

Outside Sidewalk Width: (note that sidewalks are assumed on both sides of bridge) $sw := 6 \cdot ft$

Outside Sidewalk plus Barrier(s) Width: $sww := sw + (1 \cdot ft + 1 \cdot in)$ $sww = 7.083 \cdot ft$

Sidewalk Thickness: $swt := mean[6in, (6in + sww \cdot 0.02)]$ $swt = 6.85 \cdot in$

Median: - Width: $mw := 0 \cdot ft + 0 \cdot in$

- Thickness: $mt := 0 \cdot in$

Width of Closure Pour: $cp := 1.833ft$

Span	Number of Beams:	Beam Dimensions: (1)	(2)	(3)	(4)	Span Lengths: (5)	(6)
$i =$	$N_{beam_i} := 12$	$J_i := 5 \cdot in$	$k_{b_i} := J_i + 4.5 \cdot in$	$k_{a_i} := J_i + 4.5 \cdot in$	$L_{c_c_i} := 35 \cdot ft + 0in$	$L_{b_b_i} := L_{c_c_i} - k_{b_i} - k_{a_i}$	$L_{pc_i} := L_{b_b_i} + 2 \cdot J_i$
1			$k_b = (9.5) \cdot in$	$k_a = (9.5) \cdot in$		$L_{b_b} = (33.417) ft$	$L_{pc} = (34.25) ft$

Beam Width:

$$S_i := \frac{b_w - cp}{N_{beam_1}}$$

$S = (4.75) \cdot ft$

Note: (1) J is the Distance from the Centerline of the Bearing Pad to the End of the Beam
(2) k_b is the is Distance from the Centerline of the Back Cap or FFBW to the Centerline of the Bearing Pad
(3) k_a is the is Distance from the Centerline of the Ahead Cap or FFBW to the Centerline of the Bearing Pad
(4) L_{c_c} is the Distance from Centerline of Cap or FFBW to Centerline of Cap or FFBW
(5) L_{b_b} is the Distance from the Centerline of Bearing to the Centerline of Bearing
(6) L_{pc} is the Precast/Release Length of Beam

Total Bridge Length: $L_t := \sum_i L_{c_c_i}$ $L_t = 35ft$

Slab Thickness: - Sacrificial: $h_{ss} := 0.0in$ $h_{ss} = 0 \cdot in$

- Effective
AASHTO Minimum Span-to-Depth Ratio: $h_e := Ceil\left(\frac{0.030 \cdot L_{c_c_1}}{in}, 1\right) \cdot in$

- Total: $h_s := h_e + h_{ss}$ $h_s = 13 \cdot in$

Material Properties:

Unit Weight of Concrete: $w_c := 150 \cdot pcf$

Beam Concrete at Release: Compressive Strength: $f_r := 6.0 \cdot ksi$

Modulus of Elasticity: $E_r := 90\% \cdot 1820 \cdot \sqrt{f_r \cdot ksi}$ $E_r = 4012.3 \cdot ksi$

Beam Concrete at Final: Compressive Strength: $f_c := 8.5ksi$

Modulus of Elasticity: $E_c := 90\% \cdot 1820 \cdot \sqrt{f_c \cdot ksi}$ $E_c = 4775.5 \cdot ksi$

Slab Concrete at Final: Compressive Strength: $f_{c_slab} := 4.5ksi$

Modulus of Elasticity: $E_{c_slab} := 90\% \cdot 1820 \cdot \sqrt{f_{c_slab} \cdot ksi}$ $E_{c_slab} = 3474.7 \cdot ksi$

Yield Strength of Reinforcing Steel: $f_y := 60ksi$

Beam Properties:

Span: i =	Width of Slab Unit:	Cross Sectional Area of Each Slab:	Bearing Pad Volume:
1	$btf_i := S_i$	$Ab_i := (hs \cdot btf_i)$	$Vbear_i := 6in \cdot bw \cdot \frac{1}{4}in$
		$Ab = (5.15)ft^2$	$Vbear = (0.61) \cdot ft^3$

Non-Composite/Precast Loading on Interior Beams:

SIP Forms and Sacrificial Slab -
(This load must be inputted into CONSPAN as a Line Load in terms of "per beam") -

$DCnc_i1_i := wc \cdot (hss) \cdot S_i$ $DCnc_i1 = (0) \cdot klf$

Beam, Buildup and Effective Slab -
(These loads are calculated in CONSPAN internally as a Line Load in terms of "per beam") -

$DCnc_i2_i := wc \cdot (Ab_i)$ $DCnc_i2 = (0.772) \cdot klf$

Total Non-Composite Dead Load:

$DCnc_i_i := DCnc_i1_i + DCnc_i2_i$ $DCnc_i = (0.772) \cdot klf$

Non-Composite/Precast Loading on Exterior Beams:

SIP Forms and Sacrificial Slab -
(This load must be inputted into CONSPAN as a Line Load in terms of "per beam") -

$DC_{nc_e1_i} := w_c \cdot (h_{ss}) \cdot S_i$ $DC_{nc_e1} = (0) \cdot klf$

Beam, Buildup and Effective Slab -
(These loads are calculated in CONSPAN internally as a Line Load in terms of "per beam") -

$DC_{nc_e2_i} := w_c \cdot (Ab_i)$ $DC_{nc_e2} = (0.772) \cdot klf$

Total Non-Composite Dead Load:

$DC_{nc_e_i} := DC_{nc_e1_i} + DC_{nc_e2_i}$ $DC_{nc_e} = (0.772) \cdot klf$

Composite Loadings:

Barriers, Sidewalk, and Raised Median -
(This load must be inputted into CONSPAN as a Line Load in terms of "per span") -

$DC_{c_i} := 2 \cdot (385 \cdot plf + 10plf) + w_c \cdot (mw \cdot mt) + 2 \cdot w_c \cdot (sww \cdot swt)$ $DC_c = (2.003) \cdot klf$

Future Wearing Surface -
(This load must be inputted into CONSPAN as a Line Load in terms of "per span") -

$DW_{c_i} := 15psf \cdot (b_w - 2sww - mw)$ $DW_c = (0.67) \cdot klf$

Pedestrian Loadings: (This load must be inputted into CONSPAN as a Line Load in terms of "per span") -

$PL := 85 \cdot psf \cdot 2 \cdot sw$ $PL = 1020 \cdot plf$

Determine Vertical Loading on Substructure: Let $j := 1 .. N_{span} + 1$

Total Dead Load of Components and Attachments on Substructure (Superstructure Only, do not include Cap):

Interior Beam Reaction per Beam:

$$P_{DC_i_i} := \left(DC_{nc_i_i} + \frac{DC_{c_i}}{N_{beam_i}} \right) \cdot \frac{L_{c_c_i}}{2} \qquad P_{DC_i} = (16.4) \cdot kip$$

Exterior Beam Reaction per Beam:

$$P_{DC_e_i} := \left(DC_{nc_e_i} + \frac{DC_{c_i}}{N_{beam_i}} \right) \cdot \frac{L_{c_c_i}}{2} \qquad P_{DC_e} = (16.4) \cdot kip$$

Total Reaction per Bent:

$$P_{DC_j} := if\left[j \le N_{span}, \left(N_{beam_j} - 2 \right) \cdot P_{DC_i_j} + 2 \cdot P_{DC_e_j}, 0 \cdot kip \right] + if\left[j \ge 2, \left(N_{beam_{j-1}} - 2 \right) \cdot P_{DC_i_{j-1}} + 2 \cdot P_{DC_e_{j-1}}, 0 \cdot kip \right] \qquad P_{DC} = \begin{pmatrix} 197.1 \\ 197.1 \end{pmatrix} \cdot kip$$

Total Dead Load of Wearing Surface and Utilities:

Reaction per Beam:

$$P_{DW_ie_i} := \left(\frac{DW_{c_i}}{N_{beam_i}} \right) \cdot \frac{L_{c_c_i}}{2} \qquad P_{DW_ie} = (1) \cdot kip$$

Total Reaction per Bent:

$$P_{DW_j} := if\left(j \le N_{span}, N_{beam_j} \cdot P_{DW_ie_j}, 0 \cdot kip \right) + if\left(j \ge 2, N_{beam_{j-1}} \cdot P_{DW_ie_{j-1}}, 0 \cdot kip \right) \qquad P_{DW} = \begin{pmatrix} 11.7 \\ 11.7 \end{pmatrix} \cdot kip$$

Live Load - Pedestrian:

Reaction per Beam:

$$P_{PL_ie_i} := \left(\frac{PL}{N_{beam_i}} \right) \cdot \frac{L_{c_c_i}}{2} \qquad P_{PL_ie} = (1.5) \cdot kip$$

Total Reaction per Bent:

$$P_{PL_j} := if\left(j \le N_{span}, N_{beam_j} \cdot P_{PL_ie_j}, 0 \cdot kip \right) + if\left(j \ge 2, N_{beam_{j-1}} \cdot P_{PL_ie_{j-1}}, 0 \cdot kip \right) \qquad P_{PL} = \begin{pmatrix} 17.9 \\ 17.9 \end{pmatrix} \cdot kip$$

Live Load - Vehicular:

Longitudinal Load Distribution Formula:

$$df(a, j) := if\left(a > 0 \cdot ft, if\left(j \le N_{span}, \frac{\max\left(L_{c_c_j} - a, 0ft \right)}{L_{c_c_j}}, 0 \right), if\left(j > 1, \frac{\max\left(L_{c_c_{j-1}} - a, 0ft \right)}{L_{c_c_{j-1}}}, 0 \right) \right)$$

Truck Load (HL93 Design Live Load) per Lane:

$P_{truck_j} :=$
- $P \leftarrow 0 \cdot kip$
- for $x \in -50 \cdot ft, -49.95 \cdot ft .. 50 \cdot ft$
  - $P1 \leftarrow 32 \cdot kip \cdot df(x + 0 \cdot ft, j) + 32 \cdot kip \cdot df(x + 14 \cdot ft, j) + 8 \cdot kip \cdot df(x + 28 \cdot ft, j)$
  - $P2 \leftarrow 8 \cdot kip \cdot df(x + 0 \cdot ft, j) + 32 \cdot kip \cdot df(x + 14 \cdot ft, j) + 32 \cdot kip \cdot df(x + 28 \cdot ft, j)$
  - $P \leftarrow P1$ if $P1 > P$
  - $P \leftarrow P2$ if $P2 > P$
- P

$$P_{truck} = \begin{pmatrix} 52.7 \\ 52.8 \end{pmatrix} \cdot kip$$

Tandem Load (HL93 Design Live Load) per Lane:

$$P_{tandem_j} := \left| \begin{array}{l} P \leftarrow 0 \cdot kip \\ \text{for } x \in -10 \cdot ft, -9.95 \cdot ft .. 10 \cdot ft \\ \quad \left| \begin{array}{l} P1 \leftarrow 25 \cdot kip \cdot df(x + 0 \cdot ft, j) + 25 \cdot kip \cdot df(x + 4 \cdot ft, j) \\ P \leftarrow P1 \text{ if } P1 > P \end{array} \right. \\ P \end{array} \right.$$

$$P_{tandem} = \begin{pmatrix} 47.1 \\ 47.1 \end{pmatrix} \cdot kip$$

Truck Combination Load (HL93 Design Live Load) per Lane:

$$P_{truck_combo_j} := \left| \begin{array}{l} P \leftarrow 0 \cdot kip \\ \text{for } x \in -110 \cdot ft, -109.95 \cdot ft .. 110 \cdot ft \quad \text{if } j > 1 \wedge j \leq N_{span} \\ \quad \left| \begin{array}{l} P1 \leftarrow 32 \cdot kip \cdot df(x + 0 \cdot ft, j) + 32 \cdot kip \cdot df(x + 14 \cdot ft, j) + 8 \cdot kip \cdot df(x + 28 \cdot ft, j) \ldots \\ \qquad + 32 \cdot kip \cdot df(x + 78 \cdot ft, j) + 32 \cdot kip \cdot df(x + 92 \cdot ft, j) + 8 \cdot kip \cdot df(x + 106 \cdot ft, j) \\ P2 \leftarrow 8 \cdot kip \cdot df(x + 0 \cdot ft, j) + 32 \cdot kip \cdot df(x + 14 \cdot ft, j) + 32 \cdot kip \cdot df(x + 28 \cdot ft, j) \ldots \\ \qquad + 8 \cdot kip \cdot df(x + 78 \cdot ft, j) + 32 \cdot kip \cdot df(x + 92 \cdot ft, j) + 32 \cdot kip \cdot df(x + 106 \cdot ft, j) \\ P \leftarrow P1 \text{ if } P1 > P \\ P \leftarrow P2 \text{ if } P2 > P \end{array} \right. \\ P \end{array} \right.$$

$$P_{truck_combo} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \cdot kip$$

Lane Load (HL93 Design Live Load) per Lane:

$$P_{lane_j} := 640 plf \cdot \left(if\left(j \leq N_{span}, L_{c_c_j}, 0 \cdot ft\right) + if\left(j \geq 2, L_{c_c_{j-1}}, 0 \cdot ft\right) \right)$$

$$P_{lane} = \begin{pmatrix} 22.4 \\ 22.4 \end{pmatrix} \cdot kip$$

Total Vehicular Live Load on Substructure (Not Including Impact Factor):

$$P_{LL_j} := \max\left(\max\left(P_{truck_j}, P_{tandem_j} \right) + P_{lane_j}, 0.9 \cdot P_{truck_combo_j} \right)$$

$$P_{LL} = \begin{pmatrix} 75.1 \\ 75.2 \end{pmatrix} \cdot kip$$

Multiple Presence Factor:

Maximum Number of Lanes on Bridge: $NL := floor\left[\frac{b_w - (2 \cdot sww + mw)}{12 \cdot ft} \right]$ $NL = 3$

No Sidewalk Loading: $m1 := if(NL > 3, 0.65, if(NL > 2, 0.85, if(NL > 1, 1.0, 1.2)))$ $m1 = 0.85$

Sidewalk Loading Included $m2 := if(NL + 1 > 3, 0.65, if(NL + 1 > 2, 0.85, if(NL + 1 > 1, 1.0, 1.2)))$ $m2 = 0.65$

Vehicular: $mp_j := if\left(m1 \cdot NL \cdot P_{LL_j} > m2 \cdot NL \cdot P_{LL_j} + m2 \cdot P_{PL_j}, NL \cdot m1, NL \cdot m2\right)$

$$mp = \begin{pmatrix} 2.55 \\ 2.55 \end{pmatrix}$$

Sidewalk: $ms_j := if\left(mp_j = NL \cdot m2, m2, 0\right)$

$$ms = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

Total Factored Loads on Substructure:

$P_{tu_j} := 1.25 \cdot P_{DC_j} + 1.50 \cdot P_{DW_j} + 1.75 \cdot \left(mp_j \cdot P_{LL_j} + ms_j \cdot P_{PL_j}\right)$ $\quad P_{tu} = \begin{pmatrix} 599.1 \\ 599.6 \end{pmatrix} \cdot kip$

Factored Design Load (used to size typical Substructure Unit for Cost Estimating):

$P_u := \max(P_{tu})$ $\quad P_u = 599.6 \cdot kip$

Substructure Geometry: $ton := 2kip$

Substructure Concrete Compressive Strength: $f_{c_sub} := 5.5ksi$

Number of Alternatives, $N_{sub} := 1$ $\quad p := 1 .. N_{sub}$

Foundation Type: Pile Width

$Type_p := "Piles"$ $\quad b_{df_p} := 18in$

Estimated Pile Length at Abutment, $L_{df_p} := 30ft$

Width of Cap, $W_{cap_p} := 4ft + 0in$

Assumed Area of Tension Steel in Cap, $A_{s_p} := 2 \cdot \frac{W_{cap_p} - 2.5 \cdot in}{8 \cdot 1.000 \cdot in} \cdot 0.79 \cdot in^2$

Estimated Pile Spacing @ Abutment, $S_{df_p} := 11.00ft$

Number of Beams between Piles, $n_p := ceil\left(\frac{S_{df_p}}{S_1}\right) - 1$

Estimated Moment on Cap (use factors from AISC's Manual of Steel Construction):

$$M_{cap_p} := \frac{P_u \cdot S_{df_p}}{N_{beam_1}} \cdot if\left(n_p < 1, 0, if\left(n_p = 1, 0.188, if\left(n_p = 2, 0.278, if\left(n_p = 3, 0.375, if\left(n_p = 4, 0.480, 0.096 \cdot N_{beam_1}\right)\right)\right)\right)\right)$$

Estimated Depth of Cap:

Guess Depth: $D_{cap} := 2.5ft$

Given $\quad \max(M_{cap}) = A_s \cdot 60ksi \cdot \left(D_{cap} - \frac{A_s \cdot 60ksi}{2 \cdot 0.85 \cdot f_{c_sub} \cdot W_{cap}}\right)$ $\quad H_{cap_p} := \max\left[\left(Ceil\left(\frac{Find(D_{cap})}{ft} + 0.5, 0.5\right)\right) \cdot ft, 30in\right]$

Number of Piles Required at Abutment, $N_{df_p} := \frac{b_w - 2 \cdot (1ft + 11in)}{S_{df_p}} + 1$ $\quad N_{df_p} =$ 6

Foundation Type	Pile Width	Width of Cap	Height of Cap	Pile Length at Abutment	Piles Required at Abutment	Pile Spacing at Abutment
$Type_p$ =	b_{df_p} =	W_{cap_p} =	H_{cap} =	L_{df_p} =	N_{df} =	S_{df} =
"Piles"	18 in	48 in	30 in	30 ft	6	11 ft

Preliminary Pile Loads $P_{pl} := \frac{P_u}{0.65 \cdot N_{df}}$ $P_{pl} = (76.87)\,ton$

Estimated Quantities: Bridge Length: $L_t = 35\,ft$ Bridge Width: $b_w = 58.83\,ft$ Deck Area: $L_t \cdot b_w = 2059.2\,ft^2$

334-1-XX Superpave Asphaltic Concrete

$W_{sup_as} := 110 \cdot \frac{lbf}{yd^2 \cdot in} \cdot (2in) \cdot (L_t + 2 \cdot 20ft) \cdot (b_w - 2 \cdot sww)$ $W_{sup_as} = 40.94\,ton$

400-X-4 Superstructure Concrete

$V_{sup_conc} := 2 \cdot [sww \cdot swt \cdot (L_t + 2 \cdot 20ft)] + mw \cdot mt \cdot L_t + cp \cdot h_s \cdot L_t$ $V_{sup_conc} = 25\,yd^3$

400-X-5 Substructure Concrete

$V_{sub_conc} := (N_{span} + 1) \cdot [W_{cap} \cdot H_{cap} \cdot b_w - N_{df_1} \cdot (18in)^2 \cdot 1ft - b_w \cdot 1ft \cdot 10in]$ $V_{sub_conc} = 38.9\,yd^3$

400-X-10 Approach Slab Concrete

$V_{app_conc} := 2 \cdot (23.104ft \cdot b_w \cdot 1ft)$ $V_{app_conc} = 100.7\,yd^3$

415-1-4 Superstructure Reinforcing Steel

$W_{sup_rebar} := V_{sup_conc} \cdot 205 \cdot \frac{lbf}{yd^3}$ $W_{sup_rebar} = 5133\,lbf$

415-1-5 Substructure Reinforcing Steel

$W_{sub_rebar} := V_{sub_conc} \cdot 135 \cdot \frac{lbf}{yd^3}$ $W_{sub_rebar} = 5258\,lbf$

415-1-9 Approach Slab Reinforcing Steel

$W_{app_rebar} := V_{app_conc} \cdot 190 \cdot \frac{lbf}{yd^3}$ $W_{app_rebar} = 19131\,lbf$

450-88-XX Area of Prestressed Beams

$A_{beam} := (L_{pc_1}) \cdot (b_w - 1.833ft)$ $A_{beam} = 1952.26\,ft \cdot ft$

455-XX-X Deep Foundation (Prestressed Concrete Piles)

$L_{ps} := 2 \cdot (N_{df} \cdot L_{df})$ 18" Piles - 455-34-3 $L_{ps} = 360\,ft$

458-1-11 Expansion Joint

$L_{joint} := b_w \cdot \max\left(round\left(\frac{L_t}{250 \cdot ft}\right), 1\right)$ $L_{joint} = 58.83\,ft$

521-5-1 Concrete Traffic Railing Barrier (Bridge) (32" Vertical Shape)

$L_{barrier} := 2 \cdot (L_t + 2 \cdot 23.104ft)$ $L_{barrier} = 162.4\,ft$

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1-800-451-5327

PROJECT DATA

Project:	Sunset Point
Designer:	Remy Agenor
Date:	Jun/24/2008
User job number:	5079576
State:	Florida, State Job #:
State Specification:	None
Design Mode:	AASHTO LRFD - US Units [4th Edition, including 2008 Interims]
Flared Girder:	No
File Name:	F:\PROJECT\5079576\920476\struct\Alternatives\Prestressed Slab\Alternative1.csl

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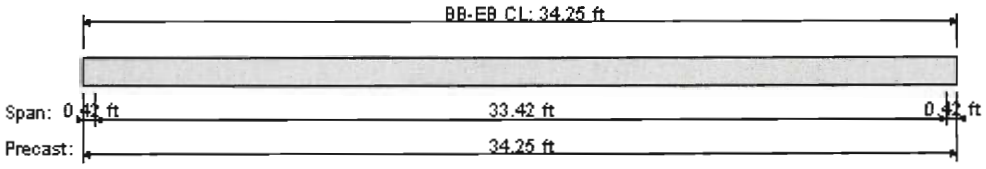
GEOMETRY DATA

BRIDGE LAYOUT

Overall Width (ft)	58.833
Left curb (ft)	7.083
Right curb (ft)	7.083
curb-to-curb width (ft)	44.666
Number of spans	1
Number of lanes	3
Lane width (ft)	12.000
Topping thickness (in)	0.000
Haunch thickness (in)	0.000
Haunch width (in)	0.000
Bridge c/s,MI(Ixx) (in4)	128881.00

SPAN DATA

Precast length,	ft =	34.250
Bearing-to-bearing,	ft =	33.417
Release span,	ft =	34.250

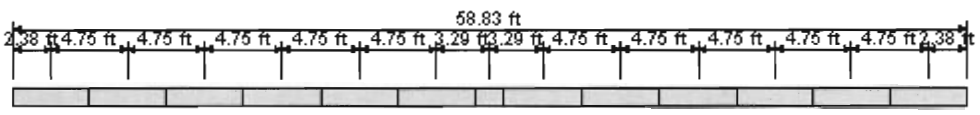


Bridge elevation section for all spans

BEAM DATA

No	ID	Loc-prev ft	Area in2	MI(Ixx) in4	Height in	Yb in	B-topg in	B-trib ft
1	Sunset Point Slabs	2.380	741.0	10435.0	13.00	6.50	57.00	4.755
2	Sunset Point Slabs	4.750	741.0	10435.0	13.00	6.50	57.00	4.750
3	Sunset Point Slabs	4.750	741.0	10435.0	13.00	6.50	57.00	4.750
4	Sunset Point Slabs	4.750	741.0	10435.0	13.00	6.50	57.00	4.750

No	ID	Loc-prev ft	Area in2	MI(Ixx) in4	Height in	Yb in	B-topg in	B-trib ft
5	Sunset Point Slabs	4.750	741.0	10435.0	13.00	6.50	57.00	4.750
6	Sunset Point Slabs	4.750	741.0	10435.0	13.00	6.50	57.00	4.792
7	Sunset Point Closure	3.292	260.0	3661.0	13.00	6.50	20.00	1.750
8	Sunset Point Slabs	3.292	741.0	10435.0	13.00	6.50	57.00	4.792
9	Sunset Point Slabs	4.750	741.0	10435.0	13.00	6.50	57.00	4.750
10	Sunset Point Slabs	4.750	741.0	10435.0	13.00	6.50	57.00	4.750
11	Sunset Point Slabs	4.750	741.0	10435.0	13.00	6.50	57.00	4.750
12	Sunset Point Slabs	4.750	741.0	10435.0	13.00	6.50	57.00	4.750
13	Sunset Point Slabs	4.750	741.0	10435.0	13.00	6.50	57.00	4.745



Bridge cross section

MATERIAL DATA

CONCRETE PROPERTIES

	Precast	C.I.P
f'c (ksi)	8.500	4.500
Wc (pcf)	150.000	150.000
Ec (ksi)	4775.500	3474.700
K1	1.000	1.000
f'ci (ksi)	6.000	
Eci (ksi)	4012.300	
K1	1.000	

STRAND AND REBAR PROPERTIES

PRESTRESSED STEEL:

6/10-270K-LL, Low relaxation strands
Straight Pattern
Strand Diameter = 0.600 in
Tensile Strength(fpu) = 270.0 ksi
Use transformed strand and rebar: Strand Only

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REINFORCING STEEL:

Tension/Shear steel: fy = 60.0 ksi Es = 29000 ksi fs = 24.0 ksi

LOADS DATA

LOADS ON PRECAST - NONE

DIAPHRAGM LOADS - NONE

LOADS ON COMPOSITE

UNITS: (Point: kips, Location: ft, Line: klf, Area: ksf, Width: ft)

Span	DC/DW	Type	Mag1.	Loc1.	Mag2.	Loc2.	Description
1	DC	Line	2.000	0.000	2.000	33.417	Barriers and Sidewalks
1	DW	Line	0.670	0.000	0.670	33.417	Future Wearing Surface

LIVE LOADS

Live load deflection: included.

ID	Type
Design Lane	Design Lane
Design Tandem	Design Tandem
Design Truck	Design Truck

Pedestrian Load: 1020.00 plf

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PROPERTIES

Span: 1, Beam: 1

PRECAST DATA:

Section Id	Sunset Point Slabs						
Type	Non-Voided Rectangular						
Flng width	Top	57.000	in	Bot	57.000	in
thick	Top	13.000	in	Bot	13.000	in
Stems	No	0				
	Top	N/A				
	Bot	N/A				
Shear width		57.000	in			

GENERAL BRIDGE DATA:

Bridge Width	58.83	ft
Curb-to-curb	44.67	ft
Beam Spac. Lt./Rt	2.38/ 4.75	ft
Lane width	12.00	ft
Number of lanes	3	
Interior/Exterior	Exterior	
Start Skew Angle	30.00	degrees
End Skew Angle	30.00	degrees

TOPPING DATA:

Deck Haunch:	Thickness	0.000	in	
	Thickness	0.000	in	
	Width	0.000	in	
Effective	width	57.060	in	(Art. 4.6.2.6.1)

GENERAL LOAD DATA:

Dead loads on composite: See Project info for composite loads

GENERAL SPAN DATA:

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Overall length	34.250	ft
Release length	34.250	ft
Design length	33.417	ft

KERN POINTS:

Upper	8.67	in
Lower	4.33	in

DISTRIBUTION FACTORS (Art. 4.6.2.2):

Live Moment	(2+ lanes loaded)	0.393	(Calculated)
Live Moment	(1 lane loaded)	0.384	(Calculated)
Live Shear	(2+ lanes loaded)	0.000	(Calculated)
Live Shear	(1 lane loaded)	0.000	(Calculated)

Dead Loads and Pedestrian Load distributed equally to all beams (Art. 4.6.2.2.1)

Pedestrian	0.077	(Calculated)
Comp. DC	0.077	(Calculated)
Comp. DW	0.077	(Calculated)

RESISTANCE FACTORS (Art. 5.5.4.2):

Flexure Reinforced	
Compression controlled sections	0.75
Tension controlled sections	0.90
Flexure Prestressed	
Compression controlled sections	0.75
Tension controlled sections	1.00
Shear	0.90

Span: 1, Beam: 1

SECTION PROPERTIES:

	PRECAST		COMPOSITE		
Area	741.0	in2	741.0	in2	#
Total Height	13.00	in	13.00	in	
Mom. of Inertia (Ixx)	10435	in4	10435	in4	#
Ht. of c.g.	6.50	in	6.50	in	#
Density	150.00	pcf	150.00	pcf	
Self-weight	771.9	plf	771.9	plf	
Mom. of Inertia (Iyy)	200626.0	in4			
Poisson's Ratio	0.2				

(#) Of Total Section using Ect/Ec = 0.7276

Use transformed strand and rebar: Strand Only

Location,	ft	Bearing 0.00	Trans 2.58	H/2 0.54	0.10L 3.01	0.20L 6.43	0.30L 9.86	0.40L 13.28	Midspan 16.71
Precast:(At Release, using	Ec =	4012.3ksi)							
Area,	in2	743.8	760.9	747.3	760.9	760.9	760.9	760.9	760.9
Yb,	in	6.49	6.41	6.47	6.41	6.41	6.41	6.41	6.41
MI(Ixx),	in4	10469	10672	10512	10672	10672	10672	10672	10672
Composite:(At Final, using	Ec =	4775.5ksi)							
Area,	in2	743.2	757.2	746.2	757.2	757.2	757.2	757.2	757.2
Yb,	in	6.49	6.43	6.48	6.43	6.43	6.43	6.43	6.43
MI(Ixx),	in4	10462	10629	10498	10629	10629	10629	10629	10629

Span: 1, Beam: 1
STRESS LIMITS (Art. 5.9.4):

STRESS LIMITS AT RELEASE BEFORE LOSSES (Using Advanced Settings):

		PRECAST	
Strength		6.00	ksi
Elasticity		4012.3	ksi
Max comp		3.60	ksi
Outer	15.00 %		
Max tens		-0.23	ksi
Max tens,	w/reinf	-0.93	ksi
Center	70.00 %		
Max tens		-0.23	ksi
Max tens,	w/reinf	-0.47	ksi

STRESS LIMITS AT FINAL AFTER LOSSES:

	PRECAST		DECK	
Strength	8.50	ksi	4.50	ksi
Elasticity	4775.50	ksi	3474.70	ksi

STRESS LIMITS AT FINAL 1 (P/S + DL + LL):

	PRECAST		DECK	
Max comp	5.10	ksi	2.70	ksi

STRESS LIMITS AT FINAL 2 (P/S + DL):

	PRECAST		DECK	
Max comp	3.82	ksi	2.02	ksi

STRESS LIMITS AT FINAL 3 (50% P/S + 50% DL + LL):

	PRECAST		DECK	
Max comp	3.40	ksi	1.80	ksi

SERVICE III (Tension):

	PRECAST		DECK	
Max tens	-0.55	ksi	-0.40	ksi

Span: 1, Beam: 1

PRESTRESSED STEEL:

15 strands, 6/10-270K-LL, Low relaxation strands
Straight Pattern

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END PATTERN (Ycg = 3.00 in):

15 @ 3.000 in

Strand Diameter	0.600	in
Strand Area	0.217	in2
Total Strand Area	3.255	in2
Trans. Len,bonded	3.000	ft
Trans. Len,debonded	3.000	ft
Dev. Len, bonded	6.981	ft
Dev. Len, debonded	13.961	ft
Holddown Force	0.000	kips
Tensile Strength(fpu)	270.0	ksi
Initial Prestress = 0.75fpu	202.5	ksi
Initial Pull	659.1	kips
Beam Shrtng (PL/AE)	0.090	in

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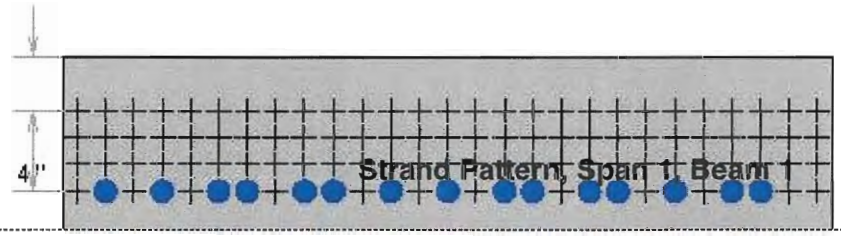
No. Strands	Distance from bottom(in)
15	3



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3"

REI

NOTE: Debonded/Shielded strands or strands with reduced pull not marked.

Tension	/Shear	steel:
fy	60.0	ksi
Es	29000	ksi
fs	24.0	ksi

LOSSES

Note: Values are calculated at Midspan

Str. area	3.2550	in2
Ycg	3.00	in
P_init	659.1	kips
Ecc	3.50	in
Days to release	0.75	
Rel. Humid.(RH)	75.0	%
Es	28500.0	ksi
Eci	4012	ksi

AASHTO LOSSES

Elastic Shortening ** 8.31 ksi (Eq 5.9.5.2.3a-1), (fcgp= 1.170 ksi)

Elastic Gains		Gains		Adjustment	
due	to Precast Loads	-0.00	ksi	0.00	ksi
due	to Composite Loads	-0.66	ksi	0.00	ksi
due	to Live Loads	-4.19	ksi	0.00	ksi

Time Dependent Losses (Approximate Method (Art.5.9.5.3))

	Initial			Final		
Steel relaxation	0.00	ksi		2.40	ksi	(Eq 5.9.5.3-1)
Concrete shrinkage	0.00	ksi		8.14	ksi	(Eq 5.9.5.3-1)
Concrete creep	0.00	ksi		6.04	ksi	(Eq 5.9.5.3-1)
Sub-total	8.31	ksi	(4.11 %)	11.72	ksi	(5.79 %)
Total Prestress Losses				20.04	ksi	(9.90 %)

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Prestressing Stress Limit Check (Table 5.9.3.1)
initial fpi = 202.5 ksi < 0.75 fpu, OK
initial fpe = 182.5 ksi < 0.80 fpy, OK

** Since the transformed section properties option has been selected, even though ES losses have been calculated explicitly here, they are not included as a part of stress calculations. Please see theory section for complete explanation.

DESIGN SUMMARY

Span: 1, Beam: 1, Exterior beam

Beam type:	Non-Voided Rectangular,	Sunset Point Slabs
Precast Length,	ft	34.25
Release Length,	ft	34.25
Strand Pattern:	Straight	
Strand:	6/10-270K-LL	
Strand Es,	ksi:	28500.0
No. of strands:	15	
	Draped:	0
	Straight:	15
Concrete Strength:		
	f'ci:	6.0
	f'c:	8.5
	f'ct:	4.5
Initial losses:	4.11 %	
Final losses:	9.90 %	

Specification	Allowable	Computed	Status
Release Stresses (ksi) (Art. 5.9.4.1) (Using Advanced Settings)			
Precast Bot (compression)	3.60	1.95	OK
Outer	15.00 %		
Precast Top w/ no reinf. (tension)	-0.23	-0.25	
Precast Top w/ reinf. (tension)	-0.93		
Center	70.00 %		
Precast Top w/ no reinf. (tension)	-0.23	0.02	
Precast Top w/ reinf. (tension)	-0.47		
Strength I (Art. 3.4.1, 5.7.3.1.1)	Provided	Required	
Ult. Moment (k.ft)	640.44	588.92	OK
Debonding Limits (Art. 5.11.4.3)	Allowable	Computed	
Max. Debond per Row	40.00 %	0.00 %	OK
Max. Debond Total	25.00 %	0.00 %	OK

Positive Moment Envelope Stresses (ksi) (Art. 3.4.1 and 5.9.4.2)

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Specification	Final 1 Allow	Comp	Final 2 Allow	Comp	Final 3 Allow	Comp
Service I Limit State - Compressive	Stresses	Only				
Precast Top	5.10	2.30	3.82	0.53	3.40	2.03
Precast Bot	5.10	1.21	3.82	1.75	3.40	0.34
Service III Limit State - Tensile	Stresses	Only				
Precast Top	-0.55	-0.07				
Precast Bot	-0.55	-0.33				

CAMBER / DEFLECTION: (PCI Design Handbook - 4th Ed.- Table 4.6.2)
0.5 x L = 16.71 ft

	Release	Mult	Erection	Mult	Final
Prestress	1.097	1.80	1.974	2.45	2.687
Self Wt.	-0.558	1.85	-1.033	2.70	-1.507
Deck + Haunch			0.000	2.30	0.000
DL-Prec. (DC)			0.000	3.00	0.000
Diaphragm			0.000	3.00	0.000
DL-Prec. (DW)			0.000	3.00	0.000
DL-Comp. (DC)			-0.089	3.00	-0.267
DL-Comp. (DW)			-0.030	3.00	-0.090
Live Load					-0.681
Pedestrian Load					-0.003
Total	0.538		0.822		0.138

Positive values indicate upward deflection.

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Load Rating Summary for Prestressed Concrete Bridges

Span:1, Beam:1

Design Load Rating

Limit State	Vehicle	Weight (tons)	LF LL	LF DC	LF DW	Min. RF	Moment DF	Mom or Str RF	Mom or Str Tons	Mom or Str Location	Mom or Str Dim	Shear DF	Shear RF	Shear Tons	Shear Location	Shear Dim
Strength I (Inv)	HL93 Design Load	-	1.75	1.25	1.50	1.00	0.39	1.18	-	0.5L	16.71	-	-	-	-	-
Strength I (Op)	HL93 Design Load	-	1.35	1.25	1.50	1.00	0.39	1.53	-	0.5L	16.71	-	-	-	-	-
Service III (Inv)	HL93 Design Load	-	0.80	1.00	1.00	1.00	0.39	1.22	-	0.5L	16.71	-	-	-	-	-
Service III (Op)	HL93 Design Load	-	0.80	1.00	1.00	1.00	0.39	1.33	-	0.5L	16.71	-	-	-	-	-

Permit Load Rating

Limit State	Vehicle	Weight (tons)	LF LL	LF DC	LF DW	Min. RF	Moment DF	Mom or Str RF	Mom or Str Tons	Mom or Str Location	Mom or Str Dim	Shear DF	Shear RF	Shear Tons	Shear Location	Shear Dim
Strength II	FL T160	80.00	1.35	1.25	1.50	1.00	0.39	1.41	113.01	0.5L	16.71	-	-	-	-	-
Strength II	FL120	60.00	1.60	1.25	1.50	1.00	0.39	1.03	61.68	0.6L	20.13	-	-	-	-	-
Service III	FL T160	80.00	0.70	1.00	1.00	1.00	0.39	1.40	112.28	0.5L	16.71	-	-	-	-	-
Service III	FL120	60.00	0.70	1.00	1.00	1.00	0.39	1.22	73.23	0.6L	20.13	-	-	-	-	-

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Load Rating of Prestressed Concrete Girder Bridges (Manual for Condition Evaluation and Load and Resistance Factor Rating (LRFR) of Highway Bridges 1st Edition 2003, incl. 2005 Interim)

Span:1, Beam:1
Rating Summary

Design Live Load Inventory

Load Type	Weight (tons)	Controlling Location	RF	Type	Based on	RT (tons)
HL93 Design Load	-	0.5L : 16.7	1.18	Positive	Moment	-

Design Live Load Operating

Load Type	Weight (tons)	Controlling Location	RF	Type	Based on	RT (tons)
HL93 Design Load	-	0.5L : 16.7	1.33	Positive	CTens-B	-

Permit Live Load

Load Type	Weight (tons)	Controlling Location	RF	Type	Based on	RT (tons)
FL T160	80.00	0.5L : 16.7	1.40	Positive	CTens-B	112

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Load Type	Weight (tons)	Controlling Location	RF	Type	Based on	RT (tons)
FL120	60.00	0.6L : 20.1	1.03	Positive	Moment	62

Rating Factors

Rating Factors	References	Values
Condition Factor	LRFR - Table 6-2	1.00
System Factor for Flexural Effect	LRFR - Table 6-3	1.00
System Factor for Shear Effect	LRFR - Art. 6.4.2.4	1.00
ADTT	LRFD - Section C3.6.1.1.2	5000
Dynamic Load Factor for Design Level	LRFR - Art. 6.4.3.3	0.33
Dynamic Load Factor for Legal and Permit Level	LRFR - Table C6-3	0.33

For Flexural Effect: Condition Factor * System Factor = 1.00 >= 0.85 LRFR (Art. 6.4.2.1) OK
For Shear Effect: Condition Factor * System Factor = 1.00 >= 0.85 LRFR (Art. 6.4.2.1 and 6.4.2.4) OK

Dead Load Factors (Table 6-1)

Limit State	DC	DW
Strength I	1.25	1.50
Strength II	1.25	1.50
Service I	1.00	1.00
Service III	1.00	1.00

Design Live Load Factors (Table 6-4)

Limit State	Inventory	Operating
Strength I	1.75	1.35
Service I	1.00	-
Service III	0.80	-

Permit Live Load Factors (Table 6-6)

Load	Type	Frequency	Loading Condition	Permit Factor
FL T160	Routine	Unlimited	Mix with traffic	1.35
FL120	Routine	Unlimited	Mix with traffic	1.60

Permit Live Load Stresses Factors

Limit State	Values
Service I	1.00
Service III	0.70

Limiting Stress (ksi)

Rating Level	Concrete Compression	Concrete Tension	Steel
Design Inventory	0.60 x f'c = 5.10	0.19 x sqrt(f'c) = 0.55	0.90 x f'y = 218.70
Design Operating	0.60 x f'c = 5.10	0.24 x sqrt(f'c) = 0.70	0.90 x f'y = 218.70
Legal	0.60 x f'c = 5.10	0.24 x sqrt(f'c) = 0.70	-
Permit	0.60 x f'c = 5.10	0.24 x sqrt(f'c) = 0.70	0.90 x f'y = 218.70

Consider shear reinf. across plane (FDOT alternative): No

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A) Design Live Load Rating

Inventory Rating Level

Moment RF's are for Strength I Limit State
Compression Stress RF's are for Service I Limit State
Tension Stress RF's are for Service III Limit State
Prestress tendon RF is for Service I Limit Concrete State

HL93 Design Load Positive Live Load

Location	Moment	K	Mom-K	Long. Reinf	CComp-T	CComp-B	CTens-T	CTens-B	PSStT
Bearing : 0.0	N.A.	N.A.	N.A.	2.26	N.A.	N.A.	N.A.	N.A.	N.A.
Transfer : 2.6	1.99	1.00	1.99	2.41	9.97	-	-	5.56	15.39
Critical : 0.8	-	-	-	6.21	-	-	-	-	-
0.1L : 3.0	1.97	1.00	1.97	2.23	8.65	-	-	4.78	13.45
0.2L : 6.4	2.01	1.00	2.01	1.75	4.48	-	-	2.29	7.39
0.3L : 9.9	1.46	1.00	1.46	1.39	3.29	-	-	1.57	5.67
0.4L : 13.3	1.23	1.00	1.23	1.25	2.81	-	-	1.28	4.98
0.5L : 16.7	1.18	1.00	1.18	1.24	2.71	-	-	1.22	4.84
0.6L : 20.1	1.23	1.00	1.23	1.25	2.81	-	-	1.28	4.98
0.7L : 23.6	1.46	1.00	1.46	1.39	3.29	-	-	1.57	5.67
0.8L : 27.0	2.01	1.00	2.01	1.75	4.48	-	-	2.29	7.39
0.9L : 30.4	1.97	1.00	1.97	2.23	8.65	-	-	4.78	13.45
Critical : 32.6	-	-	-	6.21	-	-	-	-	-
Transfer : 30.8	1.99	1.00	1.99	2.41	9.97	-	-	5.56	15.39
Bearing : 33.4	N.A.	N.A.	N.A.	2.26	N.A.	N.A.	N.A.	N.A.	N.A.

Operating Rating Level

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Moment RF's are for Strength I Limit State

HL93 Design Load Positive Live Load

Location	Moment	K	Mom-K	Long. Reinf	CComp-T	CComp-B	CTens-T	CTens-B	PSStT
Bearing : 0.0	N.A.	N.A.	N.A.	2.26	N.A.	N.A.	N.A.	N.A.	N.A.
Transfer : 2.6	2.58	1.00	2.58	2.41	9.97	-	-	5.92	15.39
Critical : 0.8	-	-	-	6.21	-	-	-	-	-
0.1L : 3.0	2.55	1.00	2.55	2.23	8.65	-	-	5.09	13.45
0.2L : 6.4	2.60	1.00	2.60	1.75	4.48	-	-	2.46	7.39
0.3L : 9.9	1.90	1.00	1.90	1.39	3.29	-	-	1.70	5.67
0.4L : 13.3	1.59	1.00	1.59	1.25	2.81	-	-	1.40	4.98
0.5L : 16.7	1.53	1.00	1.53	1.24	2.71	-	-	1.33	4.84
0.6L : 20.1	1.59	1.00	1.59	1.25	2.81	-	-	1.40	4.98
0.7L : 23.6	1.90	1.00	1.90	1.39	3.29	-	-	1.70	5.67
0.8L : 27.0	2.60	1.00	2.60	1.75	4.48	-	-	2.46	7.39
0.9L : 30.4	2.55	1.00	2.55	2.23	8.65	-	-	5.09	13.45
Critical : 32.6	-	-	-	6.21	-	-	-	-	-
Transfer : 30.8	2.58	1.00	2.58	2.41	9.97	-	-	5.92	15.39
Bearing : 33.4	N.A.	N.A.	N.A.	2.26	N.A.	N.A.	N.A.	N.A.	N.A.

C) Permit Live Load Rating

Moment RF's are for Strength II Limit State
Compression Stress RF's are for Service I Limit State
Tension Stress RF's are for Service III Limit State
Prestress tendon RF is for Service I Limit Concrete State

FL T160 Positive Live Load

Location	Moment	K	Mom-K	Long. Reinf	CComp-T	CComp-B	CTens-T	CTens-B	PSStT

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Location	Moment	K	Mom-K	Long. Reinf	CComp-T	CComp-B	CTens-T	CTens-B	PSStT
Bearing : 0.0	N.A.	N.A.	N.A.	2.26	N.A.	N.A.	N.A.	N.A.	N.A.
Transfer : 2.6	2.40	1.00	2.40	2.70	9.29	-	-	6.30	14.34
Critical : 0.8	-	-	-	6.21	-	-	-	-	-
0.1L : 3.0	2.37	1.00	2.37	2.50	8.06	-	-	5.42	12.54
0.2L : 6.4	2.42	1.00	2.42	1.93	4.17	-	-	2.61	6.87
0.3L : 9.9	1.75	1.00	1.75	1.55	3.04	-	-	1.80	5.24
0.4L : 13.3	1.45	1.00	1.45	1.44	2.56	-	-	1.45	4.54
0.5L : 16.7	1.41	1.00	1.41	1.47	2.51	-	-	1.40	4.48
0.6L : 20.1	1.45	1.00	1.45	1.44	2.56	-	-	1.45	4.54
0.7L : 23.6	1.75	1.00	1.75	1.55	3.04	-	-	1.80	5.24
0.8L : 27.0	2.42	1.00	2.42	1.93	4.17	-	-	2.61	6.87
0.9L : 30.4	2.37	1.00	2.37	2.50	8.06	-	-	5.42	12.54
Critical : 32.6	-	-	-	6.21	-	-	-	-	-
Transfer : 30.8	2.40	1.00	2.40	2.70	9.29	-	-	6.30	14.34
Bearing : 33.4	N.A.	N.A.	N.A.	2.26	N.A.	N.A.	N.A.	N.A.	N.A.

FL120 Positive Live Load

Location	Moment	K	Mom-K	Long. Reinf	CComp-T	CComp-B	CTens-T	CTens-B	PSStT
Bearing : 0.0	N.A.	N.A.	N.A.	2.26	N.A.	N.A.	N.A.	N.A.	N.A.
Transfer : 2.6	1.52	1.00	1.52	2.26	6.96	-	-	4.72	10.74
Critical : 0.8	-	-	-	6.21	-	-	-	-	-
0.1L : 3.0	1.50	1.00	1.50	2.10	6.04	-	-	4.06	9.40
0.2L : 6.4	1.54	1.00	1.54	1.61	3.15	-	-	1.97	5.20
0.3L : 9.9	1.15	1.00	1.15	1.29	2.37	-	-	1.40	4.08
0.4L : 13.3	1.03	1.00	1.03	1.19	2.15	-	-	1.22	3.80
0.5L : 16.7	1.05	1.00	1.05	1.25	2.20	-	-	1.23	3.93
0.6L : 20.1	1.03	1.00	1.03	1.19	2.15	-	-	1.22	3.80
0.7L : 23.6	1.15	1.00	1.15	1.29	2.37	-	-	1.40	4.08
0.8L : 27.0	1.54	1.00	1.54	1.61	3.15	-	-	1.97	5.20
0.9L : 30.4	1.50	1.00	1.50	2.10	6.04	-	-	4.06	9.40
Critical : 32.6	-	-	-	6.21	-	-	-	-	-
Transfer : 30.8	1.52	1.00	1.52	2.26	6.96	-	-	4.72	10.74
Bearing : 33.4	N.A.	N.A.	N.A.	2.26	N.A.	N.A.	N.A.	N.A.	N.A.

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Notation:
CComp-T/ CComp-B - Concrete Compression at Top/Bottom;
CTens-T/ CTens-B - Concrete Tension at Top/Bottom;
PSStT - Prestress Steel Tension.

Units: U.S. Units

Design Code: AASHTO LRFD

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Load Rating Summary for Prestressed Concrete Bridges

Span:1, Beam:2

Design Load Rating

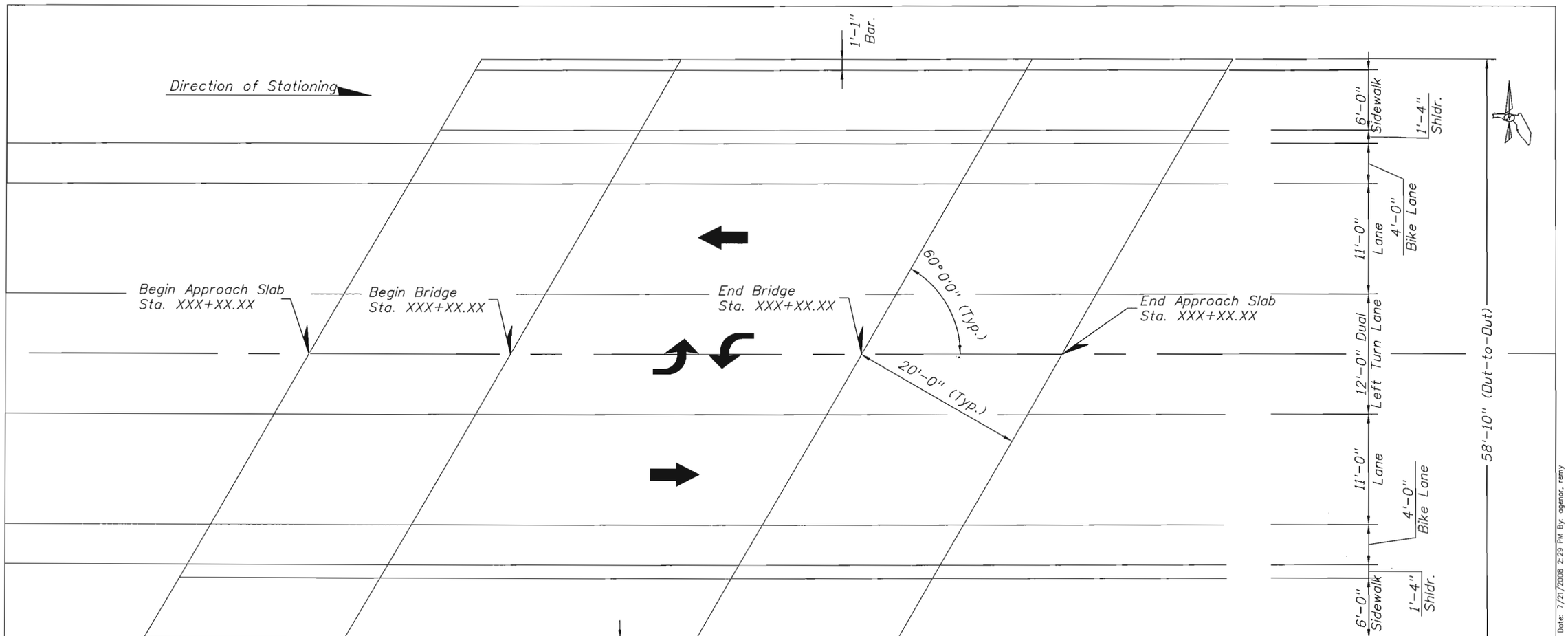
Limit State	Vehicle	Weight (tons)	LF LL	LF DC	LF DW	Min. RF	Moment DF	Mom or Str RF	Mom or Str Tons	Mom or Str Location	Mom or Str Dim	Shear DF	Shear RF	Shear Tons	Shear Location	Shear Dim
Strength I (Inv)	HL93 Design Load	-	1.75	1.25	1.50	1.00	0.39	1.18	-	0.5L	16.71	-	-	-	-	-
Strength I (Op)	HL93 Design Load	-	1.35	1.25	1.50	1.00	0.39	1.53	-	0.5L	16.71	-	-	-	-	-
Service III (Inv)	HL93 Design Load	-	0.80	1.00	1.00	1.00	0.39	1.22	-	0.5L	16.71	-	-	-	-	-
Service III (Op)	HL93 Design Load	-	0.80	1.00	1.00	1.00	0.39	1.33	-	0.5L	16.71	-	-	-	-	-

Permit Load Rating

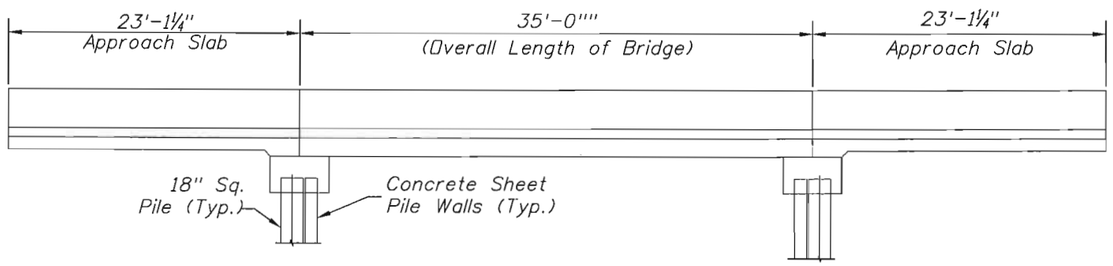
Limit State	Vehicle	Weight (tons)	LF LL	LF DC	LF DW	Min. RF	Moment DF	Mom or Str RF	Mom or Str Tons	Mom or Str Location	Mom or Str Dim	Shear DF	Shear RF	Shear Tons	Shear Location	Shear Dim
Strength II	FL T160	80.00	1.35	1.25	1.50	1.00	0.39	1.41	113.01	0.5L	16.71	-	-	-	-	-
Strength II	FL120	60.00	1.60	1.25	1.50	1.00	0.39	1.03	61.68	0.6L	20.13	-	-	-	-	-
Service III	FL T160	80.00	0.70	1.00	1.00	1.00	0.39	1.40	112.28	0.5L	16.71	-	-	-	-	-
Service III	FL120	60.00	0.70	1.00	1.00	1.00	0.39	1.22	73.23	0.6L	20.13	-	-	-	-	-

Units: U.S. Units

Design Code: AASHTO LRFD



PLAN



ELEVATION

REVISIONS					REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

PREPARED BY:

American
Consulting Engineers of Florida, LLC
2818 Cypress Ridge Blvd, Suite 200
Wesley Chapel, FL 33544
Phone: (813) 996-2600 Fax: (813) 996-1908
Certificate of Authorization No. 9302
Richard A. Hunter, P.E. No. 50601

Pinellas County PUBLIC WORKS

	NAME	DATE
DESIGNED	RA	5/08
DRAWN	RA	5/08
CHECKED	RH	5/08
SUPERVISED:	R. HUNTER, P.E.	

APPROVED BY:

SUNSET POINT ROAD

PLAN AND ELEVATION

SHEET NO.

OF SHEETS

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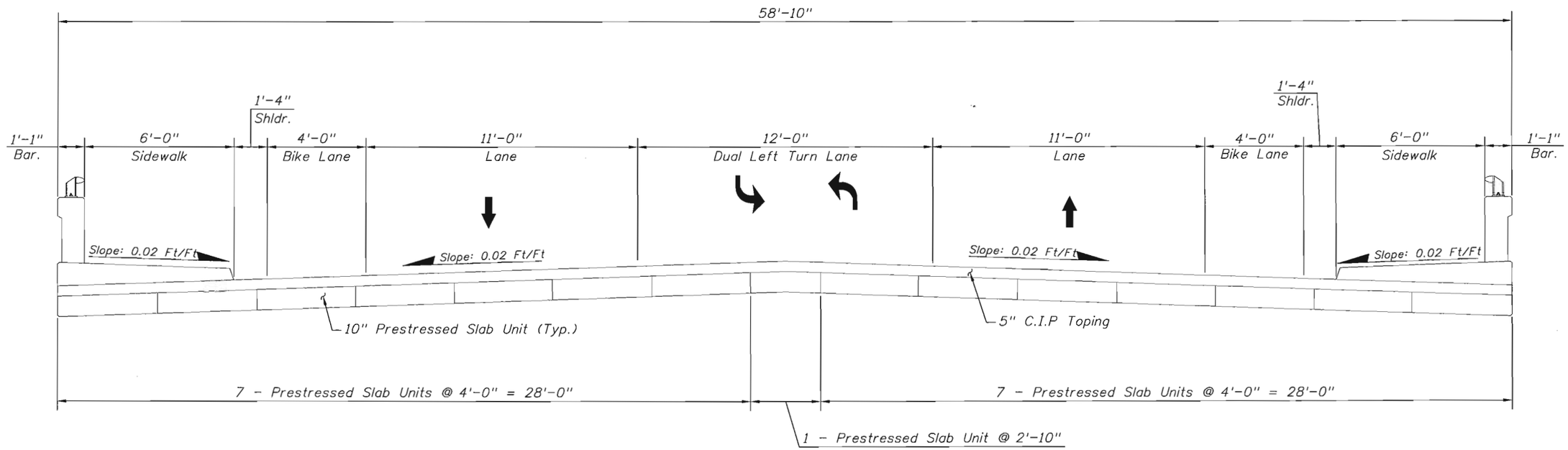

TYPICAL SECTION THROUGH BRIDGE DECK
OPTION 2

XREF: BORDER

REVISIONS					REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

PREPARED BY:

American Consulting Engineers of Florida, LLC
2818 Cypress Ridge Blvd, Suite 200
Wesley Chapel, FL 33544
Phone: (813) 996-2800 Fax: (813) 996-1908
Certificate of Authorization No. 9302
Richard A. Hunter, P.E. No. 50601

Pinellas County PUBLIC WORKS

	NAME	DATE
DESIGNED	RA	5/08
DRAWN	RA	5/08
CHECKED	RH	5/08
SUPERVISED:	R. HUNTER, P.E.	

APPROVED BY:

SUNSET POINT ROAD
TYPICAL SECTION
THROUGH BRIDGE DECK

SHEET NO.

OF SHEETS

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Sunset P Road

BRIDGE SUPERSTRUCTURE ALTERNATIVE TWO (10" Prestressed Slab Units)

PAY ITEM NUMBER	ITEM	DESCRIPTION	UNITS	TOTAL QUANTITY	UNIT PRICE	COST
400-2-4	**Concrete Class II	(Superstructure)	CY	54	$850.00	$46,070.00
400-2-10	*Concrete Class II	(Approach Slab)	CY	101	$528.00	$53,169.60
415-1-4	**Reinforcing Steel	(Superstructure)	LB	11,119	$1.00	$11,119.00
415-1-9	*Reinforcing Steel	(Approach Slab)	LB	19,131	$1.07	$20,470.17
450-3-13	***Prestressed Slab Units	(48"x10" Slab Units)	LF	514	$162.60	$83,535.75
458-1-11	*Bridge Deck Expansion Joint	(Poured Joint with Backer Rod)	LF	59	$154.00	$9,060.28
521-5-4	**Concrete Traffic Railing Barrier (Bridge)	(32" Vertical Face)	LF	162	$115.00	$18,676.00
					SUPERSTRUCTURE COST =	$242,100.80

BRIDGE SUBSTRUCTURE

PAY ITEM NUMBER	ITEM	DESCRIPTION	UNITS	TOTAL QUANTITY	UNIT PRICE	COST
400-4-5	**Concrete Class IV	(Substructure)	CY	39	$1,100.00	$42,790.00
415-1-5	**Reinforcing Steel	(Substructure)	LB	5,258	$1.12	$5,888.96
455-34-3	**Prestressed Concrete Piling	(Furnish & Driven) (18" Sq.)	LF	360	$80.00	$28,800.00
					SUBSTRUCTURE COST =	$77,478.96

MISCELLANEOUS ITEMS

PAY ITEM NUMBER	ITEM	DESCRIPTION	UNITS	TOTAL QUANTITY	UNIT PRICE	COST
455-14-4	**Concrete Sheet Piling	(12"x30" Sheet Piles)	LF	3,245	$125.00	$405,625.00
					MISCELLANEOUS COST =	$405,625.00

PROPOSED BRIDGE GEOMETRY

DIMENSIONS	Total
Bridge Width (FT)	58.83
Length of Bridge (FT)	35.00
Surface Area of Proposed Superstructure (SF)	2059.16

Sunset P Road

UNADJUSTED BRIDGE COST

COMPONENTS	Total
Superstructure Cost	$242,100.80
Substructure Cost	$77,478.96
Miscellaneous Cost	$ 405,625.00
Unadjusted Cost	$725,204.76

CONDITIONAL VARIABLES

CONDITIONAL VARIABLES	% +/-	Total
Rural construction, decrease by 6%	0.0%	$ -
Urban construction, increase by 6%	0.0%	$ -
For construction over water, increase by 3%	3.0%	$ 21,756.14
Phased construction or widening, increase by 20%	0.0%	$ -

ADJUSTED BRIDGE COST

COMPONENTS	Total
Superstructure Cost	$242,100.80
Substructure Cost	$77,478.96
Conditional Variables Cost	$21,756.14
Adjusted Cost	$341,335.90

BRIDGE COST

BREAKDOWN	Total
Square Foot Cost	$362.75
Total Cost	$341,335.90
Miscellaneous Cost	$405,625.00
BDR Comparative Cost	$746,960.90

Design Parameters:

Number of Spans: Let $i := 1 .. N_{span}$ $N_{span} := 1$

Out to Out Bridge Width: $b_w := 58ft + 10in$

Outside Sidewalk Width: (note that sidewalks are assumed on both sides of bridge) $sw := 6 \cdot ft$

Outside Sidewalk plus Barrier(s) Width: $sww := sw + (1 \cdot ft + 1 \cdot in)$ $sww = 7.083 \cdot ft$

Sidewalk Thickness: $swt := mean[6in, (6in + sww \cdot 0.02)]$ $swt = 6.85 \cdot in$

Median: - Width: $mw := 0 \cdot ft + 0 \cdot in$

- Thickness: $mt := 0 \cdot in$

Width Center Prestressed Beam: $cp := 2.833ft$

Span	Number of Beams:	Beam Dimensions: (1)	(2)	(3)	(4)	Span Lengths: (5)	(6)
$i =$	$N_{beam_i} := 15$	$J_i := 5 \cdot in$	$k_{b_i} := J_i + 4.5 \cdot in$	$k_{a_i} := J_i + 4.5 \cdot in$	$L_{c_c_i} := 35 \cdot ft + 0in$	$L_{b_b_i} := L_{c_c_i} - k_{b_i} - k_{a_i}$	$L_{pc_i} := L_{b_b_i} + 2 \cdot J_i$
1			$k_b = (9.5) \cdot in$	$k_a = (9.5) \cdot in$		$L_{b_b} = (33.417)ft$	$L_{pc} = (34.25)ft$

Beam Width:

$$S_i := \frac{b_w - cp}{N_{beam_1} - 1}$$

$S = (4) \cdot ft$

Note: (1) J is the Distance from the Centerline of the Bearing Pad to the End of the Beam
(2) k_b is the is Distance from the Centerline of the Back Cap or FFBW to the Centerline of the Bearing Pad
(3) k_a is the is Distance from the Centerline of the Ahead Cap or FFBW to the Centerline of the Bearing Pad
(4) L_{c_c} is the Distance from Centerline of Cap or FFBW to Centerline of Cap or FFBW
(5) L_{b_b} is the Distance from the Centerline of Bearing to the Centerline of Bearing
(6) L_{pc} is the Precast/Release Length of Beam

Total Bridge Length: $L_t := \sum_i L_{c_c_i}$ $L_t = 35ft$

Slab Thickness: - CIP Toping: $h_{ss} := 5in$ $h_{ss} = 5 \cdot in$

- Effective $h_e := 10 \cdot in$

- Total: $h_s := h_e + h_{ss}$ $h_s = 15 \cdot in$

Material Properties:

Unit Weight of Concrete: $w_c := 150 \cdot pcf$

Beam Concrete at Release: Compressive Strength: $f_r := 6.0 \cdot ksi$

Modulus of Elasticity: $E_r := 90\% \cdot 1820 \cdot \sqrt{f_r \cdot ksi}$ $E_r = 4012.3 \cdot ksi$

Beam Concrete at Final: Compressive Strength: $f_c := 8.5ksi$

Modulus of Elasticity: $E_c := 90\% \cdot 1820 \cdot \sqrt{f_c \cdot ksi}$ $E_c = 4775.5 \cdot ksi$

Slab Concrete at Final: Compressive Strength: $f_{c_slab} := 4.5ksi$

Modulus of Elasticity: $E_{c_slab} := 90\% \cdot 1820 \cdot \sqrt{f_{c_slab} \cdot ksi}$ $E_{c_slab} = 3474.7 \cdot ksi$

Yield Strength of Reinforcing Steel: $f_y := 60ksi$

Beam Properties:

Span: i =	Width of Slab Unit:	Cross Sectional Area of Each Slab:	Bearing Pad Volume:
1	$btf_i := S_i$	$A_{b_i} := \left(h_e \cdot btf_i\right)$	$V_{bear_i} := 6in \cdot b_w \cdot \frac{1}{4}in$
		$A_b = (3.33)\,ft^2$	$V_{bear} = (0.61) \cdot ft^3$

Non-Composite/Precast Loading on Interior Beams:

SIP Forms and CIP Toping -
(This load must be inputted into CONSPAN as a Line Load in terms of "per beam") -

$DC_{nc_i1_i} := w_c \cdot (h_{ss}) \cdot S_i$ $DC_{nc_i1} = (0.25) \cdot klf$

Beam, Buildup and Effective Slab -
(These loads are calculated in CONSPAN internally as a Line Load in terms of "per beam") -

$DC_{nc_i2_i} := w_c \cdot \left(A_{b_i}\right)$ $DC_{nc_i2} = (0.5) \cdot klf$

Total Non-Composite Dead Load:

$DC_{nc_i_i} := DC_{nc_i1_i} + DC_{nc_i2_i}$ $DC_{nc_i} = (0.75) \cdot klf$

Non-Composite/Precast Loading on Exterior Beams:

SIP Forms and CIP Toping -
(This load must be inputted into CONSPAN as a Line Load in terms of "per beam") -

$DC_{nc_e1_i} := w_c \cdot (h_{ss}) \cdot S_i$ $DC_{nc_e1} = (0.25)\cdot klf$

Beam, Buildup and Effective Slab -
(These loads are calculated in CONSPAN internally as a Line Load in terms of "per beam") -

$DC_{nc_e2_i} := w_c \cdot (A_{b_i})$ $DC_{nc_e2} = (0.5)\cdot klf$

Total Non-Composite Dead Load:

$DC_{nc_e_i} := DC_{nc_e1_i} + DC_{nc_e2_i}$ $DC_{nc_e} = (0.75)\cdot klf$

Composite Loadings:

Barriers, Sidewalk, and Raised Median -
(This load must be inputted into CONSPAN as a Line Load in terms of "per span") -

$DC_{c_i} := 2\cdot(385\cdot plf + 10plf) + w_c\cdot(mw\cdot mt) + 2\cdot w_c\cdot(sww\cdot swt)$ $DC_c = (2.003)\cdot klf$

Future Wearing Surface -
(This load must be inputted into CONSPAN as a Line Load in terms of "per span") -

$DW_{c_i} := 0psf$ $DW_c = (0)\cdot klf$

Pedestrian Loadings: (This load must be inputted into CONSPAN as a Line Load in terms of "per span") -

$PL := 85\cdot psf\cdot 2\cdot sw$ $PL = 1020\cdot plf$

Determine Vertical Loading on Substructure: Let $j := 1 .. N_{span} + 1$

Total Dead Load of Components and Attachments on Substructure (Superstructure Only, do not include Cap):

Interior Beam Reaction per Beam:

$$P_{DC_i_i} := \left(DC_{nc_i_i} + \frac{DC_{c_i}}{N_{beam_i}}\right) \cdot \frac{L_{c_c_i}}{2}$$

$P_{DC_i} = (15.5)\cdot kip$

Exterior Beam Reaction per Beam:

$$P_{DC_e_i} := \left(DC_{nc_e_i} + \frac{DC_{c_i}}{N_{beam_i}}\right) \cdot \frac{L_{c_c_i}}{2}$$

$P_{DC_e} = (15.5)\cdot kip$

Total Reaction per Bent:

$$P_{DC_j} := if\left[j \le N_{span}, \left(N_{beam_j} - 2\right)\cdot P_{DC_i_j} + 2\cdot P_{DC_e_j}, 0\cdot kip\right] + if\left[j \ge 2, \left(N_{beam_{j-1}} - 2\right)\cdot P_{DC_i_{j-1}} + 2\cdot P_{DC_e_{j-1}}, 0\cdot kip\right]$$

$$P_{DC} = \begin{pmatrix} 231.9 \\ 231.9 \end{pmatrix}\cdot kip$$

Total Dead Load of Wearing Surface and Utilities:

Reaction per Beam:

$$P_{DW_ie_i} := \left(\frac{DW_{c_i}}{N_{beam_i}}\right) \cdot \frac{L_{c_c_i}}{2}$$

$P_{DW_ie} = (0)\cdot kip$

Total Reaction per Bent:

$$P_{DW_j} := if\left(j \le N_{span}, N_{beam_j}\cdot P_{DW_ie_j}, 0\cdot kip\right) + if\left(j \ge 2, N_{beam_{j-1}}\cdot P_{DW_ie_{j-1}}, 0\cdot kip\right)$$

$$P_{DW} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}\cdot kip$$

Live Load - Pedestrian:

Reaction per Beam:

$$P_{PL_ie_i} := \left(\frac{PL}{N_{beam_i}}\right) \cdot \frac{L_{c_c_i}}{2}$$

$P_{PL_ie} = (1.2)\cdot kip$

Total Reaction per Bent:

$$P_{PL_j} := if\left(j \le N_{span}, N_{beam_j}\cdot P_{PL_ie_j}, 0\cdot kip\right) + if\left(j \ge 2, N_{beam_{j-1}}\cdot P_{PL_ie_{j-1}}, 0\cdot kip\right)$$

$$P_{PL} = \begin{pmatrix} 17.9 \\ 17.9 \end{pmatrix}\cdot kip$$

Live Load - Vehicular:

Longitudinal Load Distribution Formula:

$$df(a, j) := if\left(a > 0\cdot ft, if\left(j \le N_{span}, \frac{\max\left(L_{c_c_j} - a, 0ft\right)}{L_{c_c_j}}, 0\right), if\left(j > 1, \frac{\max\left(L_{c_c_{j-1}} - a, 0ft\right)}{L_{c_c_{j-1}}}, 0\right)\right)$$

Truck Load (HL93 Design Live Load) per Lane:

$P_{truck_j} :=$
- $P \leftarrow 0\cdot kip$
- for $x \in -50\cdot ft, -49.95\cdot ft .. 50\cdot ft$
  - $P1 \leftarrow 32\cdot kip\cdot df(x + 0\cdot ft, j) + 32\cdot kip\cdot df(x + 14\cdot ft, j) + 8\cdot kip\cdot df(x + 28\cdot ft, j)$
  - $P2 \leftarrow 8\cdot kip\cdot df(x + 0\cdot ft, j) + 32\cdot kip\cdot df(x + 14\cdot ft, j) + 32\cdot kip\cdot df(x + 28\cdot ft, j)$
  - $P \leftarrow P1$ if $P1 > P$
  - $P \leftarrow P2$ if $P2 > P$
- P

$$P_{truck} = \begin{pmatrix} 52.7 \\ 52.8 \end{pmatrix}\cdot kip$$

Tandem Load (HL93 Design Live Load) per Lane:

$$P_{tandem_j} := \left| \begin{array}{l} P \leftarrow 0 \cdot kip \\ \text{for } x \in -10 \cdot ft, -9.95 \cdot ft .. 10 \cdot ft \\ \quad \left| \begin{array}{l} P1 \leftarrow 25 \cdot kip \cdot df(x + 0 \cdot ft, j) + 25 \cdot kip \cdot df(x + 4 \cdot ft, j) \\ P \leftarrow P1 \text{ if } P1 > P \end{array} \right. \\ P \end{array} \right.$$

$$P_{tandem} = \begin{pmatrix} 47.1 \\ 47.1 \end{pmatrix} \cdot kip$$

Truck Combination Load (HL93 Design Live Load) per Lane:

$$P_{truck_combo_j} := \left| \begin{array}{l} P \leftarrow 0 \cdot kip \\ \text{for } x \in -110 \cdot ft, -109.95 \cdot ft .. 110 \cdot ft \quad \text{if } j > 1 \wedge j \le N_{span} \\ \quad \left| \begin{array}{l} P1 \leftarrow 32 \cdot kip \cdot df(x + 0 \cdot ft, j) + 32 \cdot kip \cdot df(x + 14 \cdot ft, j) + 8 \cdot kip \cdot df(x + 28 \cdot ft, j) \ldots \\ \qquad + 32 \cdot kip \cdot df(x + 78 \cdot ft, j) + 32 \cdot kip \cdot df(x + 92 \cdot ft, j) + 8 \cdot kip \cdot df(x + 106 \cdot ft, j) \\ P2 \leftarrow 8 \cdot kip \cdot df(x + 0 \cdot ft, j) + 32 \cdot kip \cdot df(x + 14 \cdot ft, j) + 32 \cdot kip \cdot df(x + 28 \cdot ft, j) \ldots \\ \qquad + 8 \cdot kip \cdot df(x + 78 \cdot ft, j) + 32 \cdot kip \cdot df(x + 92 \cdot ft, j) + 32 \cdot kip \cdot df(x + 106 \cdot ft, j) \\ P \leftarrow P1 \text{ if } P1 > P \\ P \leftarrow P2 \text{ if } P2 > P \end{array} \right. \\ P \end{array} \right.$$

$$P_{truck_combo} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \cdot kip$$

Lane Load (HL93 Design Live Load) per Lane:

$$P_{lane_j} := 640 plf \cdot \left(if\left(j \le N_{span}, Lc_c_j, 0 \cdot ft\right) + if\left(j \ge 2, Lc_c_{j-1}, 0 \cdot ft\right) \right)$$

$$P_{lane} = \begin{pmatrix} 22.4 \\ 22.4 \end{pmatrix} \cdot kip$$

Total Vehicular Live Load on Substructure (Not Including Impact Factor):

$$P_{LL_j} := \max\left(\max\left(P_{truck_j}, P_{tandem_j}\right) + P_{lane_j}, 0.9 \cdot P_{truck_combo_j} \right)$$

$$P_{LL} = \begin{pmatrix} 75.1 \\ 75.2 \end{pmatrix} \cdot kip$$

Multiple Presence Factor:

Maximum Number of Lanes on Bridge: $NL := floor\left[\frac{b_w - (2 \cdot sww + mw)}{12 \cdot ft} \right]$ $NL = 3$

No Sidewalk Loading: $m1 := if(NL > 3, 0.65, if(NL > 2, 0.85, if(NL > 1, 1.0, 1.2)))$ $m1 = 0.85$

Sidewalk Loading Included $m2 := if(NL + 1 > 3, 0.65, if(NL + 1 > 2, 0.85, if(NL + 1 > 1, 1.0, 1.2)))$ $m2 = 0.65$

Vehicular: $mp_j := if\left(m1 \cdot NL \cdot P_{LL_j} > m2 \cdot NL \cdot P_{LL_j} + m2 \cdot P_{PL_j}, NL \cdot m1, NL \cdot m2\right)$

$$mp = \begin{pmatrix} 2.55 \\ 2.55 \end{pmatrix}$$

Sidewalk: $ms_j := if\left(mp_j = NL \cdot m2, m2, 0\right)$

$$ms = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

Total Factored Loads on Substructure:

$P_{tu_j} := 1.25 \cdot P_{DC_j} + 1.50 \cdot P_{DW_j} + 1.75 \cdot \left(mp_j \cdot P_{LL_j} + ms_j \cdot P_{PL_j}\right)$ $\quad P_{tu} = \begin{pmatrix} 625 \\ 625.5 \end{pmatrix} \cdot kip$

Factored Design Load (used to size typical Substructure Unit for Cost Estimating):

$P_u := \max(P_{tu})$ $\quad P_u = 625.5 \cdot kip$

Substructure Geometry: $ton := 2kip$

Substructure Concrete Compressive Strength: $f_{c_sub} := 5.5ksi$

Number of Alternatives, $N_{sub} := 1$ $\quad p := 1 .. N_{sub}$

Foundation Type | Pile Width

$Type_p := "Piles"$ $\quad b_{df_p} := 18in$

Estimated Pile Length at Abutment, $L_{df_p} := 30ft$

Width of Cap, $W_{cap_p} := 4ft + 0in$

Assumed Area of Tension Steel in Cap, $A_{s_p} := 2 \cdot \frac{W_{cap_p} - 2.5 \cdot in}{8 \cdot 1.000 \cdot in} \cdot 0.79 \cdot in^2$

Estimated Pile Spacing @ Abutment, $S_{df_p} := 11.00ft$

Number of Beams between Piles, $n_p := ceil\left(\frac{S_{df_p}}{S_1}\right) - 1$

Estimated Moment on Cap (use factors from AISC's Manual of Steel Construction):

$$M_{cap_p} := \frac{P_u \cdot S_{df_p}}{Nbeam_1} \cdot if\left(n_p < 1, 0, if\left(n_p = 1, 0.188, if\left(n_p = 2, 0.278, if\left(n_p = 3, 0.375, if\left(n_p = 4, 0.480, 0.096 \cdot Nbeam_1\right)\right)\right)\right)\right)$$

Estimated Depth of Cap:

Guess Depth: $D_{cap} := 2.5ft$

Given $\quad \max(M_{cap}) = A_s \cdot 60ksi \cdot \left(D_{cap} - \frac{A_s \cdot 60ksi}{2 \cdot 0.85 \cdot f_{c_sub} \cdot W_{cap}}\right)$ $\quad H_{cap_p} := \max\left[\left(Ceil\left(\frac{Find(D_{cap})}{ft} + 0.5, 0.5\right)\right) \cdot ft, 30in\right]$

Number of Piles Required at Abutment, $N_{df_p} := \frac{b_w - 2 \cdot (1ft + 11in)}{S_{df_p}} + 1$ $\quad N_{df_p} = \boxed{6}$

Foundation Type	Pile Width	Width of Cap	Height of Cap	Pile Length at Abutment	Piles Required at Abutment	Pile Spacing at Abutment
$Type_p$ =	b_{df_p} =	W_{cap_p} =	H_{cap} =	L_{df_p} =	N_{df} =	S_{df} =
"Piles"	18 in	48 in	30 in	30 ft	6	11 ft

Preliminary Pile Loads $P_{pl} := \frac{P_u}{0.65 \cdot N_{df}}$ $P_{pl} = (80.19)\,ton$

Estimated Quantities: Bridge Length: $L_t = 35\,ft$ Bridge Width: $b_w = 58.83\,ft$ Deck Area: $L_t \cdot b_w = 2059.2\,ft^2$

400-X-4 Superstructure Concrete

$V_{sup_conc} := 2 \cdot \left[sww \cdot swt \cdot (L_t + 2 \cdot 20ft) \right] + (h_{ss} \cdot b_w \cdot L_t)$ $V_{sup_conc} = 54.2\,yd^3$

400-X-5 Substructure Concrete

$V_{sub_conc} := (N_{span} + 1) \cdot \left[W_{cap} \cdot H_{cap} \cdot b_w - N_{df_1} \cdot (18in)^2 \cdot 1ft - b_w \cdot 1ft \cdot 10in \right]$ $V_{sub_conc} = 38.9\,yd^3$

400-X-10 Approach Slab Concrete

$V_{app_conc} := 2 \cdot (23.104ft \cdot b_w \cdot 1ft)$ $V_{app_conc} = 100.7\,yd^3$

415-1-4 Superstructure Reinforcing Steel

$W_{sup_rebar} := V_{sup_conc} \cdot 205 \cdot \frac{lbf}{yd^3}$ $W_{sup_rebar} = 11119\,lbf$

415-1-5 Substructure Reinforcing Steel

$W_{sub_rebar} := V_{sub_conc} \cdot 135 \cdot \frac{lbf}{yd^3}$ $W_{sub_rebar} = 5258\,lbf$

415-1-9 Approach Slab Reinforcing Steel

$W_{app_rebar} := V_{app_conc} \cdot 190 \cdot \frac{lbf}{yd^3}$ $W_{app_rebar} = 19131\,lbf$

450-3-XX Linear Foot of Prestressed Beams

$L_{beam} := (L_{pc_1}) \cdot (N_{beam})$ $L_{beam} = (513.75)\,ft$

455-XX-X Deep Foundation (Prestressed Concrete Piles)

$L_{ps} := 2 \cdot (N_{df} \cdot L_{df})$ 18" Piles - 455-34-3 $L_{ps} = 360\,ft$

458-1-11 Bridge Deck Expansion Joint

$L_{joint} := b_w \cdot \max\left(round\left(\frac{L_t}{250 \cdot ft} \right), 1 \right)$ $L_{joint} = 58.83\,ft$

521-5-1 Concrete Traffic Railing Barrier (Bridge) (32" Vertical Shape)

$L_{barrier} := 2 \cdot (L_t + 2 \cdot 23.104ft)$ $L_{barrier} = 162.4\,ft$

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PROJECT DATA

Project:	Sunset Point
Designer:	Remy Agenor
Date:	Jun/24/2008
User job number:	5079576
State:	Florida, State Job #:
State Specification:	None
Design Mode:	AASHTO LRFD - US Units [4th Edition, including 2008 Interims]
Flared Girder:	No
File Name:	F:\PROJECT\5079576\920476\struct\Alternatives\Prestressed Slab\Alternative2.csl

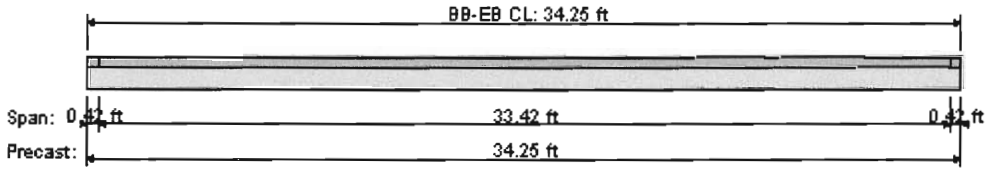
GEOMETRY DATA

BRIDGE LAYOUT

Overall Width (ft)	58.833
Left curb (ft)	7.083
Right curb (ft)	7.083
curb-to-curb width (ft)	44.666
Number of spans	1
Number of lanes	3
Lane width (ft)	12.000
Topping thickness (in)	5.000
Haunch thickness (in)	0.000
Haunch width (in)	0.000
Bridge c/s,MI(Ixx) (in4)	170119.47

SPAN DATA

Precast length,	ft =	34.250
Bearing-to-bearing,	ft =	33.417
Release span,	ft =	34.250



Bridge elevation section for all spans

BEAM DATA

No	ID	Loc-prev ft	Area in2	MI(Ixx) in4	Height in	Yb in	B-topg in	B-trib ft
1	SP 48	2.000	480.0	4000.0	10.00	5.00	48.00	4.000
2	SP 48	4.000	480.0	4000.0	10.00	5.00	48.00	4.000
3	SP 48	4.000	480.0	4000.0	10.00	5.00	48.00	4.000
4	SP 48	4.000	480.0	4000.0	10.00	5.00	48.00	4.000

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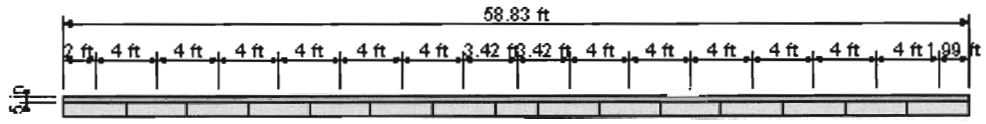
No	ID	Loc-prev ft	Area in2	MI(Ixx) in4	Height in	Yb in	B-topg in	B-trib ft
5	SP 48	4.000	480.0	4000.0	10.00	5.00	48.00	4.000
6	SP 48	4.000	480.0	4000.0	10.00	5.00	48.00	4.000
7	SP 48	4.000	480.0	4000.0	10.00	5.00	48.00	4.002
8	SP 34	3.420	340.0	2833.0	10.00	5.00	34.00	2.837
9	SP 48	3.420	480.0	4000.0	10.00	5.00	48.00	4.002
10	SP 48	4.000	480.0	4000.0	10.00	5.00	48.00	4.000
11	SP 48	4.000	480.0	4000.0	10.00	5.00	48.00	4.000
12	SP 48	4.000	480.0	4000.0	10.00	5.00	48.00	4.000
13	SP 48	4.000	480.0	4000.0	10.00	5.00	48.00	4.000
14	SP 48	4.000	480.0	4000.0	10.00	5.00	48.00	4.000
15	SP 48	4.000	480.0	4000.0	10.00	5.00	48.00	3.993



Bridge cross section

MATERIAL DATA

CONCRETE PROPERTIES

	Precast	C.I.P
f'c (ksi)	8.500	4.500
Wc (pcf)	150.000	150.000
Ec (ksi)	4775.500	3474.700
K1	1.000	1.000
f'ci (ksi)	6.000	
Eci (ksi)	4012.300	
K1	1.000	

STRAND AND REBAR PROPERTIES

PRESTRESSED STEEL:

6/10-270K-LL, Low relaxation strands
Straight Pattern
Strand Diameter = 0.600 in

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Tensile Strength(fpu) = 270.0 ksi
Use transformed strand and rebar: Strand Only

REINFORCING STEEL:

Tension/Shear steel: fy = 60.0 ksi Es = 29000 ksi fs = 24.0 ksi

LOADS DATA

LOADS ON PRECAST - NONE

DIAPHRAGM LOADS - NONE

LOADS ON COMPOSITE

UNITS: (Point: kips, Location: ft, Line: klf, Area: ksf, Width: ft)

Span	DC/DW	Type	Mag1.	Loc1.	Mag2.	Loc2.	Description
1	DC	Line	2.000	0.000	2.000	33.417	Barriers and Sidewalks

LIVE LOADS

Live load deflection: included.

ID	Type
Design Lane	Design Lane
Design Tandem	Design Tandem
Design Truck	Design Truck

Pedestrian Load: 1020.00 plf

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PROPERTIES

Span: 1, Beam: 1

PRECAST DATA:

Section Id	SP 48						
Type	Non-Voided Rectangular						
Flng width	Top	48.000	in	Bot	48.000	in
thick	Top	10.000	in	Bot	10.000	in
Stems	No	0				
	Top	N/A				
	Bot	N/A				
Shear width		48.000	in			

GENERAL BRIDGE DATA:

Bridge Width	58.83	ft
Curb-to-curb	44.67	ft
Beam Spac. Lt./Rt	2.00/ 4.00	ft
Lane width	12.00	ft
Number of lanes	3	
Interior/Exterior	Exterior	
Start Skew Angle	30.00	degrees
End Skew Angle	30.00	degrees

TOPPING DATA:

Deck	Thickness	5.000	in	
Haunch:				
	Thickness	0.000	in	
	Width	0.000	in	
Effective	width	48.000	in	(Art. 4.6.2.6.1)

GENERAL LOAD DATA:

Dead loads on composite: See Project info for composite loads

GENERAL SPAN DATA:

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Overall length	34.250	ft
Release length	34.250	ft
Design length	33.417	ft

KERN POINTS:

Upper	6.67	in
Lower	3.33	in

DISTRIBUTION FACTORS (Art. 4.6.2.2):

Live Moment	(2+ lanes loaded)	0.275	(Calculated)
Live Moment	(1 lane loaded)	0.206	(Calculated)
Live Shear	(2+ lanes loaded)	0.000	(Calculated)
Live Shear	(1 lane loaded)	0.000	(Calculated)

Dead Loads and Pedestrian Load distributed equally to all beams (Art. 4.6.2.2.1)

Pedestrian	0.067	(Calculated)
Comp. DC	0.067	(Calculated)
Comp. DW	0.067	(Calculated)

RESISTANCE FACTORS (Art. 5.5.4.2):

Flexure Reinforced	
Compression controlled sections	0.75
Tension controlled sections	0.90
Flexure Prestressed	
Compression controlled sections	0.75
Tension controlled sections	1.00
Shear	0.90

Span: 1, Beam: 1

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SECTION PROPERTIES:

	PRECAST		COMPOSITE		
Area	480.0	in2	654.6	in2	#
Total Height	10.00	in	15.00	in	
Mom. of Inertia (Ixx)	4000	in4	11566	in4	#
Ht. of c.g.	5.00	in	7.00	in	#
Density	150.00	pcf	150.00	pcf	
Self-weight	500.0	plf	750.0	plf	
Mom. of Inertia (Iyy)	92160.0	in4			
Poisson's Ratio	0.2				

(#) Of Total Section using Ect/Ec = 0.7276

Use transformed strand and rebar: Strand Only

Location,	ft	Bearing 0.00	Trans 2.58	H/2 0.63	0.10L 3.01	0.20L 6.43	0.30L 9.86	0.40L 13.28	Midspan 16.71
Precast:(At Release, using	Ec =	4012.3ksi)							
Area,	in2	482.8	499.9	486.9	499.9	499.9	499.9	499.9	499.9
Yb,	in	4.99	4.92	4.97	4.92	4.92	4.92	4.92	4.92
MI(Ixx),	in4	4011	4076	4027	4076	4076	4076	4076	4076
Composite:(At Final, using	Ec =	4775.5ksi)							
Area,	in2	656.9	670.8	660.2	670.8	670.8	670.8	670.8	670.8
Yb,	in	6.99	6.90	6.97	6.90	6.90	6.90	6.90	6.90
MI(Ixx),	in4	11602	11819	11655	11819	11819	11819	11819	11819

Span: 1, Beam: 1
STRESS LIMITS (Art. 5.9.4):

STRESS LIMITS AT RELEASE BEFORE LOSSES (Using Advanced Settings):

		PRECAST	
Strength		6.00	ksi
Elasticity		4012.3	ksi
Max comp		3.60	ksi
Outer	15.00 %		
Max tens		-0.23	ksi
Max tens,	w/reinf	-0.93	ksi
Center	70.00 %		
Max tens		-0.23	ksi
Max tens,	w/reinf	-0.47	ksi

STRESS LIMITS AT FINAL AFTER LOSSES:

	PRECAST		DECK	
Strength	8.50	ksi	4.50	ksi
Elasticity	4775.50	ksi	3474.70	ksi

STRESS LIMITS AT FINAL 1 (P/S + DL + LL):

	PRECAST		DECK	
Max comp	5.10	ksi	2.70	ksi

STRESS LIMITS AT FINAL 2 (P/S + DL):

	PRECAST		DECK	
Max comp	3.82	ksi	2.02	ksi

STRESS LIMITS AT FINAL 3 (50% P/S + 50% DL + LL):

	PRECAST		DECK	
Max comp	3.40	ksi	1.80	ksi

SERVICE III (Tension):

	PRECAST		DECK	
Max tens	-0.55	ksi	-0.40	ksi

Span: 1, Beam: 1

PRESTRESSED STEEL:

15 strands, 6/10-270K-LL, Low relaxation strands
Straight Pattern

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END PATTERN (Ycg = 3.00 in):

15 @ 3.000 in

Strand Diameter	0.600	in
Strand Area	0.217	in2
Total Strand Area	3.255	in2
Trans. Len,bonded	3.000	ft
Trans. Len,debonded	3.000	ft
Dev. Len, bonded	6.806	ft
Dev. Len, debonded	13.612	ft
Holddown Force	0.000	kips
Tensile Strength(fpu)	270.0	ksi
Initial Prestress = 0.75fpu	202.5	ksi
Initial Pull	659.1	kips
Beam Shrtng (PL/AE)	0.139	in

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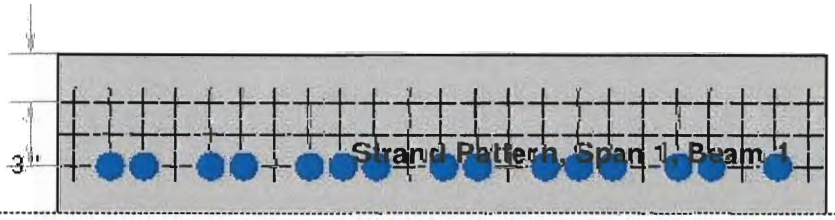
No. Strands	Distance from bottom(in)
15	3



REI

NOTE: Debonded/Shielded strands or strands with reduced pull not marked.

Tension	/Shear	steel:
fy	60.0	ksi
Es	29000	ksi
fs	24.0	ksi

LOSSES

Note: Values are calculated at Midspan

Str. area	3.2550	in2
Ycg	3.00	in
P_init	659.1	kips
Ecc	2.00	in
Days to release	0.75	
Rel. Humid.(RH)	75.0	%
Es	28500.0	ksi
Eci	4012	ksi

AASHTO LOSSES

Elastic Shortening ** 10.80 ksi (Eq 5.9.5.2.3a-1), (fcgp= 1.520 ksi)

	Elastic Gains		Gains		Adjustment	
due	to Precast Loads		-1.18	ksi	0.00	ksi
due	to Composite Loads		-0.44	ksi	0.00	ksi
due	to Live Loads		-3.01	ksi	0.00	ksi

Time Dependent Losses (Approximate Method (Art.5.9.5.3))

	Initial			Final		
Steel relaxation	0.00	ksi		2.40	ksi	(Eq 5.9.5.3-1)
Concrete shrinkage	0.00	ksi		8.14	ksi	(Eq 5.9.5.3-1)
Concrete creep	0.00	ksi		9.32	ksi	(Eq 5.9.5.3-1)
Sub-total	10.80	ksi	(5.33 %)	15.23	ksi	(7.52 %)
Total Prestress Losses				26.03	ksi	(12.85 %)

Prestressing Stress Limit Check (Table 5.9.3.1)
initial fpi = 202.5 ksi < 0.75 fpu, OK
initial fpe = 176.5 ksi < 0.80 fpy, OK

** Since the transformed section properties option has been selected, even though ES losses have been calculated explicitly here, they are not included as a part of stress calculations. Please see theory section for complete explanation.

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DESIGN SUMMARY

Span: 1, Beam: 1, Exterior beam

Beam type:	Non-Voided Rectangular,	SP 48
Precast Length,	ft	34.25
Release Length,	ft	34.25
Strand Pattern:	Straight	
Strand:	6/10-270K-LL	
Strand Es,	ksi:	28500.0
No. of strands:	15	
	Draped:	0
	Straight:	15
Concrete Strength:		
	f'ci:	6.0
	f'c:	8.5
	f'ct:	4.5
Initial losses:	5.33 %	
Final losses:	12.85 %	

Specification	Allowable	Computed	Status
Release Stresses (ksi) (Art. 5.9.4.1) (Using Advanced Settings)			
Precast Bot (compression)	3.60	2.51	OK
Outer	15.00 %		
Precast Top w/ no reinf. (tension)	-0.23	0.09	
Precast Top w/ reinf. (tension)	-0.93		
Center	70.00 %		
Precast Top w/ no reinf. (tension)	-0.23	0.44	
Precast Top w/ reinf. (tension)	-0.47		
Strength I (Art. 3.4.1, 5.7.3.1.1)	Provided	Required	
Ult. Moment (k.ft)	611.02	449.23	OK
Debonding Limits (Art. 5.11.4.3)	Allowable	Computed	
Max. Debond per Row	40.00 %	0.00 %	OK
Max. Debond Total	25.00 %	0.00 %	OK

Positive Moment Envelope Stresses (ksi) (Art. 3.4.1 and 5.9.4.2)

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Specification	Final 1 Allow	Comp	Final 2 Allow	Comp	Final 3 Allow	Comp
Service I Limit State - Compressive	Stresses	Only				
Topping Top	2.70	1.12	2.02	0.11	1.80	1.06
Precast Top	5.10	1.92	3.82	1.39	3.40	1.23
Precast Bot	5.10	1.73	3.82	2.10	3.40	0.68
Service III Limit State - Tensile	Stresses	Only				
Topping Top	-0.40	-0.00				
Precast Top	-0.55	-0.03				
Precast Bot	-0.55	-0.03				

CAMBER / DEFLECTION: (PCI Design Handbook - 4th Ed.- Table 4.6.2)
0.5 x L = 16.71 ft

	Release	Mult	Erection	Mult	Final
Prestress	1.618	1.80	2.912	2.20	3.559
Self Wt.	-0.947	1.85	-1.751	2.40	-2.272
Deck + Haunch			-0.360	2.30	-0.829
DL-Prec. (DC)			0.000	3.00	0.000
Diaphragm			0.000	3.00	0.000
DL-Prec. (DW)			0.000	3.00	0.000
DL-Comp. (DC)			-0.062	3.00	-0.185
DL-Comp. (DW)			0.000	3.00	0.000
Live Load					-0.394
Pedestrian Load					-0.002
Total	0.671		0.738		-0.123

Positive values indicate upward deflection.

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Load Rating Summary for Prestressed Concrete Bridges

Span:1, Beam:1

Design Load Rating

Limit State	Vehicle	Weight (tons)	LF LL	LF DC	LF DW	Min. RF	Moment DF	Mom or Str RF	Mom or Str Tons	Mom or Str Location	Mom or Str Dim	Shear DF	Shear RF	Shear Tons	Shear Location	Shear Dim
Strength I (Inv)	HL93 Design Load	-	1.75	1.25	1.50	1.00	0.28	1.64	-	0.5L	16.71	-	-	-	-	-
Strength I (Op)	HL93 Design Load	-	1.35	1.25	1.50	1.00	0.28	2.13	-	0.5L	16.71	-	-	-	-	-
Service III (Inv)	HL93 Design Load	-	0.80	1.00	1.00	1.00	0.28	1.65	-	0.5L	16.71	-	-	-	-	-
Service III (Op)	HL93 Design Load	-	0.80	1.00	1.00	1.00	0.28	1.82	-	0.5L	16.71	-	-	-	-	-

Permit Load Rating

Limit State	Vehicle	Weight (tons)	LF LL	LF DC	LF DW	Min. RF	Moment DF	Mom or Str RF	Mom or Str Tons	Mom or Str Location	Mom or Str Dim	Shear DF	Shear RF	Shear Tons	Shear Location	Shear Dim
Strength II	FL T160	80.00	1.35	1.25	1.50	1.00	0.28	1.97	157.41	0.5L	16.71	-	-	-	-	-
Strength II	FL120	60.00	1.60	1.25	1.50	1.00	0.28	1.43	85.81	0.6L	20.13	-	-	-	-	-
Service III	FL T160	80.00	0.70	1.00	1.00	1.00	0.28	1.92	153.57	0.5L	16.71	-	-	-	-	-
Service III	FL120	60.00	0.70	1.00	1.00	1.00	0.28	1.68	101.04	0.5L	16.71	-	-	-	-	-

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PROPERTIES

Span: 1, Beam: 2

PRECAST DATA:

Section Id	SP 48						
Type	Non-Voided Rectangular						
Flng width	Top	48.000	in	Bot	48.000	in
thick	Top	10.000	in	Bot	10.000	in
Stems	No	0				
	Top	N/A				
	Bot	N/A				
Shear width		48.000	in			

GENERAL BRIDGE DATA:

Bridge Width	58.83	ft
Curb-to-curb	44.67	ft
Beam Spac. Lt./Rt	4.00/ 4.00	ft
Lane width	12.00	ft
Number of lanes	3	
Interior/Exterior	Interior	
Start Skew Angle	30.00	degrees
End Skew Angle	30.00	degrees

TOPPING DATA:

Deck	Thickness	5.000	in	
Haunch:				
	Thickness	0.000	in	
	Width	0.000	in	
Effective	width	48.000	in	(Art. 4.6.2.6.1)

GENERAL LOAD DATA:

Dead loads on composite: See Project info for composite loads

GENERAL SPAN DATA:

Overall length	34.250	ft
Release length	34.250	ft
Design length	33.417	ft

KERN POINTS:

Upper	6.67	in
Lower	3.33	in

DISTRIBUTION FACTORS (Art. 4.6.2.2):

Live Moment	(2+ lanes loaded)	0.275	(Calculated)	
Live Moment	(1 lane loaded)	0.206	(Calculated)	
Live Shear	(2+ lanes loaded)	0.600	(Calculated)	(#)
Live Shear	(1 lane loaded)	0.600	(Calculated)	(#)

(#) Lever rule (C4.6.2.2.1)

Dead Loads and Pedestrian Load distributed equally to all beams (Art. 4.6.2.2.1)

Pedestrian	0.067	(Calculated)
Comp. DC	0.067	(Calculated)
Comp. DW	0.067	(Calculated)

RESISTANCE FACTORS (Art. 5.5.4.2):

Flexure Reinforced	
Compression controlled sections	0.75
Tension controlled sections	0.90
Flexure Prestressed	
Compression controlled sections	0.75
Tension controlled sections	1.00
Shear	0.90

Span: 1, Beam: 2

SECTION PROPERTIES:

	PRECAST		COMPOSITE		
Area	480.0	in2	654.6	in2	#
Total Height	10.00	in	15.00	in	
Mom. of Inertia (Ixx)	4000	in4	11566	in4	#
Ht. of c.g.	5.00	in	7.00	in	#
Density	150.00	pcf	150.00	pcf	
Self-weight	500.0	plf	750.0	plf	
Mom. of Inertia (Iyy)	92160.0	in4			
Poisson's Ratio	0.2				

(#) Of Total Section using Ect/Ec = 0.7276

Use transformed strand and rebar: Strand Only

Location,	ft	Bearing 0.00	Trans 2.58	H/2 0.63	0.10L 3.01	0.20L 6.43	0.30L 9.86	0.40L 13.28	Midspan 16.71
Precast:(At Release, using	Ec =	4012.3ksi)							
Area,	in2	482.8	499.9	486.9	499.9	499.9	499.9	499.9	499.9
Yb,	in	4.99	4.92	4.97	4.92	4.92	4.92	4.92	4.92
MI(Ixx),	in4	4011	4076	4027	4076	4076	4076	4076	4076
Composite:(At Final, using	Ec =	4775.5ksi)							
Area,	in2	656.9	670.8	660.2	670.8	670.8	670.8	670.8	670.8
Yb,	in	6.99	6.90	6.97	6.90	6.90	6.90	6.90	6.90
MI(Ixx),	in4	11602	11819	11655	11819	11819	11819	11819	11819

Span: 1, Beam: 2
STRESS LIMITS (Art. 5.9.4):

STRESS LIMITS AT RELEASE BEFORE LOSSES (Using Advanced Settings):

		PRECAST	
Strength		6.00	ksi
Elasticity		4012.3	ksi
Max comp		3.60	ksi
Outer	15.00 %		
Max tens		-0.23	ksi
Max tens,	w/reinf	-0.93	ksi

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		PRECAST	
Center	70.00 %		
Max tens		-0.23	ksi
Max tens,	w/reinf	-0.47	ksi

STRESS LIMITS AT FINAL AFTER LOSSES:

	PRECAST		DECK	
Strength	8.50	ksi	4.50	ksi
Elasticity	4775.50	ksi	3474.70	ksi

STRESS LIMITS AT FINAL 1 (P/S + DL + LL):

	PRECAST		DECK	
Max comp	5.10	ksi	2.70	ksi

STRESS LIMITS AT FINAL 2 (P/S + DL):

	PRECAST		DECK	
Max comp	3.82	ksi	2.02	ksi

STRESS LIMITS AT FINAL 3 (50% P/S + 50% DL + LL):

	PRECAST		DECK	
Max comp	3.40	ksi	1.80	ksi

SERVICE III (Tension):

	PRECAST		DECK	
Max tens	-0.55	ksi	-0.40	ksi

Span: 1, Beam: 2

PRESTRESSED STEEL:

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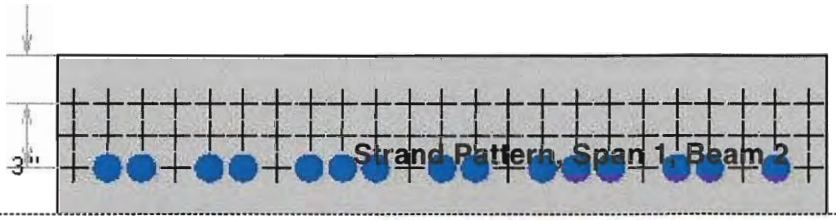
15 strands, 6/10-270K-LL, Low relaxation strands
Straight Pattern

END PATTERN (Ycg = 3.00 in):

15 @ 3.000 in

Strand Diameter	0.600	in
Strand Area	0.217	in2
Total Strand Area	3.255	in2
Trans. Len,bonded	3.000	ft
Trans. Len,debonded	3.000	ft
Dev. Len, bonded	6.806	ft
Dev. Len, debonded	13.612	ft
Holddown Force	0.000	kips
Tensile Strength(fpu)	270.0	ksi
Initial Prestress = 0.75fpu	202.5	ksi
Initial Pull	659.1	kips
Beam Shrtng (PL/AE)	0.139	in

No. Strands	Distance from bottom(in)
15	3



REI

NOTE: Debonded/Shielded strands or strands with reduced pull not marked.

Tension	/Shear	steel:
fy	60.0	ksi
Es	29000	ksi
fs	24.0	ksi

LOSSES

Note: Values are calculated at Midspan

Str. area	3.2550	in2
Ycg	3.00	in
P_init	659.1	kips
Ecc	2.00	in
Days to release	0.75	
Rel. Humid.(RH)	75.0	%
Es	28500.0	ksi
Eci	4012	ksi

AASHTO LOSSES

Elastic Shortening ** 10.80 ksi (Eq 5.9.5.2.3a-1), (fcgp= 1.520 ksi)

	Elastic Gains		Gains		Adjustment	
due	to Precast Loads		-1.18	ksi	0.00	ksi
due	to Composite Loads		-0.44	ksi	0.00	ksi
due	to Live Loads		-3.01	ksi	0.00	ksi

Time Dependent Losses (Approximate Method (Art.5.9.5.3))

		Initial			Final		
Steel relaxation	0.00	ksi		2.40	ksi	(Eq 5.9.5.3-1)
Concrete shrinkage	0.00	ksi		8.14	ksi	(Eq 5.9.5.3-1)
Concrete creep	0.00	ksi		9.32	ksi	(Eq 5.9.5.3-1)
Sub-total	10.80	ksi	(5.33 %)	15.23	ksi	(7.52 %)
Total Prestress Losses				26.03	ksi	(12.85 %)

Prestressing Stress Limit Check (Table 5.9.3.1)
initial fpi = 202.5 ksi < 0.75 fpu, OK
initial fpe = 176.5 ksi < 0.80 fpy, OK

** Since the transformed section properties option has been selected, even though ES losses have been calculated explicitly here, they are not included as a part of stress calculations. Please see theory section for complete explanation.

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DESIGN SUMMARY

Span: 1, Beam: 2, Interior beam

Beam type:	Non-Voided Rectangular,	SP 48
Precast Length,	ft	34.25
Release Length,	ft	34.25
Strand Pattern:	Straight	
Strand:	6/10-270K-LL	
Strand Es,	ksi:	28500.0
No. of strands:	15	
	Draped:	0
	Straight:	15
Concrete Strength:		
	f'ci:	6.0
	f'c:	8.5
	f'ct:	4.5
Initial losses:	5.33 %	
Final losses:	12.85 %	

Specification	Allowable	Computed	Status
Release Stresses (ksi) (Art. 5.9.4.1) (Using Advanced Settings)			
Precast Bot (compression)	3.60	2.51	OK
Outer	15.00 %		
Precast Top w/ no reinf. (tension)	-0.23	0.09	
Precast Top w/ reinf. (tension)	-0.93		
Center	70.00 %		
Precast Top w/ no reinf. (tension)	-0.23	0.44	
Precast Top w/ reinf. (tension)	-0.47		
Strength I (Art. 3.4.1, 5.7.3.1.1)	Provided	Required	
Ult. Moment (k.ft)	611.02	449.23	OK
Debonding Limits (Art. 5.11.4.3)	Allowable	Computed	
Max. Debond per Row	40.00 %	0.00 %	OK
Max. Debond Total	25.00 %	0.00 %	OK

Positive Moment Envelope Stresses (ksi) (Art. 3.4.1 and 5.9.4.2)

Specification	Final 1 Allow	Comp	Final 2 Allow	Comp	Final 3 Allow	Comp
Service I Limit State - Compressive	Stresses	Only				
Topping Top	2.70	1.12	2.02	0.11	1.80	1.06
Precast Top	5.10	1.92	3.82	1.39	3.40	1.23
Precast Bot	5.10	1.73	3.82	2.10	3.40	0.68
Service III Limit State - Tensile	Stresses	Only				
Topping Top	-0.40	-0.00				
Precast Top	-0.55	-0.03				
Precast Bot	-0.55	-0.03				

CAMBER / DEFLECTION: (PCI Design Handbook - 4th Ed.- Table 4.6.2)
0.5 x L = 16.71 ft

	Release	Mult	Erection	Mult	Final
Prestress	1.618	1.80	2.912	2.20	3.559
Self Wt.	-0.947	1.85	-1.751	2.40	-2.272
Deck + Haunch			-0.360	2.30	-0.829
DL-Prec. (DC)			0.000	3.00	0.000
Diaphragm			0.000	3.00	0.000
DL-Prec. (DW)			0.000	3.00	0.000
DL-Comp. (DC)			-0.062	3.00	-0.185
DL-Comp. (DW)			0.000	3.00	0.000
Live Load					-0.394
Pedestrian Load					-0.002
Total	0.671		0.738		-0.123

Positive values indicate upward deflection.

Load Rating Summary for Prestressed Concrete Bridges

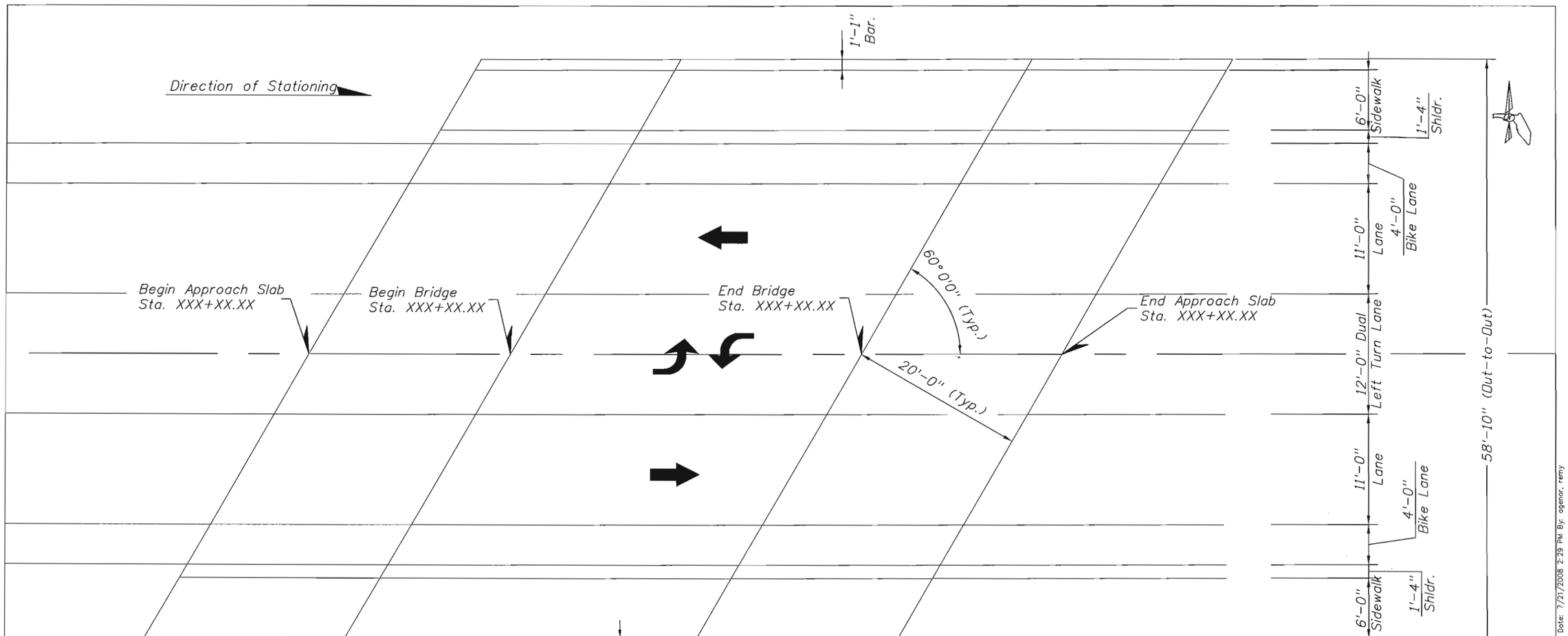
Span:1, Beam:2

Design Load Rating

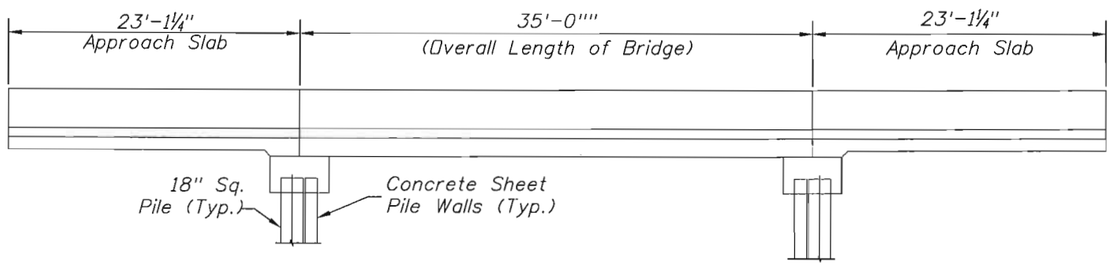
Limit State	Vehicle	Weight (tons)	LF LL	LF DC	LF DW	Min. RF	Moment DF	Mom or Str RF	Mom or Str Tons	Mom or Str Location	Mom or Str Dim	Shear DF	Shear RF	Shear Tons
Strength I (Inv)	HL93 Design Load	-	1.75	1.25	1.50	1.00	0.28	1.64	-	0.5L	16.71	-	-	-
Strength I (Op)	HL93 Design Load	-	1.35	1.25	1.50	1.00	0.28	2.13	-	0.5L	16.71	-	-	-
Service III (Inv)	HL93 Design Load	-	0.80	1.00	1.00	1.00	0.28	1.65	-	0.5L	16.71	-	-	-
Service III (Op)	HL93 Design Load	-	0.80	1.00	1.00	1.00	0.28	1.82	-	0.5L	16.71	-	-	-

Permit Load Rating

Limit State	Vehicle	Weight (tons)	LF LL	LF DC	LF DW	Min. RF	Moment DF	Mom or Str RF	Mom or Str Tons	Mom or Str Location	Mom or Str Dim	Shear DF	Shear RF	Shea Ton
Strength II	FL T160	80.00	1.35	1.25	1.50	1.00	0.28	1.97	157.41	0.5L	16.71	-	-	-
Strength II	FL120	60.00	1.60	1.25	1.50	1.00	0.28	1.43	85.81	0.6L	20.13	-	-	-
Service III	FL T160	80.00	0.70	1.00	1.00	1.00	0.28	1.92	153.57	0.5L	16.71	-	-	-
Service III	FL120	60.00	0.70	1.00	1.00	1.00	0.28	1.68	101.04	0.5L	16.71	-	-	-



PLAN



ELEVATION

REVISIONS					REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

PREPARED BY:

American
Consulting Engineers of Florida, LLC
2818 Cypress Ridge Blvd, Suite 200
Wesley Chapel, FL 33544
Phone: (813) 996-2600 Fax: (813) 996-1908
Certificate of Authorization No. 9302
Richard A. Hunter, P.E. No. 50601

Pinellas County PUBLIC WORKS

	NAME	DATE
DESIGNED	RA	5/08
DRAWN	RA	5/08
CHECKED	RH	5/08
SUPERVISED:	R. HUNTER, P.E.	

APPROVED BY:

SUNSET POINT ROAD

PLAN AND ELEVATION

SHEET NO.

OF SHEETS

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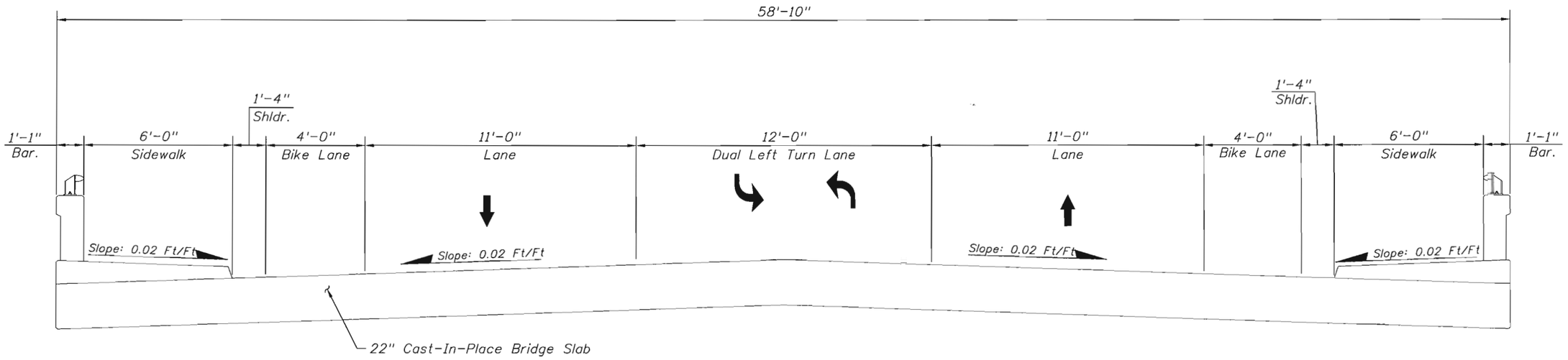

TYPICAL SECTION THROUGH BRIDGE DECK

XREF: BORDER

REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

PREPARED BY:

American
Consulting Engineers of Florida, LLC
2818 Cypress Ridge Blvd, Suite 200
Wesley Chapel, FL 33544
Phone: (813) 996-2600 Fax: (813) 996-1908
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	NAME	DATE
DESIGNED	RA	5/08
DRAWN	RA	5/08
CHECKED	RH	5/08
SUPERVISED:	R. HUNTER, P.E.	

APPROVED BY:

SUNSET POINT ROAD

TYPICAL SECTION THROUGH BRIDGE DECK

SHEET NO.

OF SHEETS

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Sunset P Road

BRIDGE SUPERSTRUCTURE ALTERNATIVE THREE (C.I.P Slab)

PAY ITEM NUMBER	ITEM	DESCRIPTION	UNITS	TOTAL QUANTITY	UNIT PRICE	COST
334-1-13	*Superpave Asphaltic Concrete	Traffic C	TON	41	$90.24	$3,699.84
400-2-4	**Concrete Class II	(Superstructure)	CY	162	$850.00	$137,955.00
400-2-10	*Concrete Class II	(Approach Slab)	CY	101	$528.00	$53,169.60
415-1-4	**Reinforcing Steel	(Superstructure)	LB	33,268	$1.00	$33,268.00
415-1-9	*Reinforcing Steel	(Approach Slab)	LB	19,131	$1.07	$20,470.17
458-1-11	*Bridge Deck Expansion Joint	(Poured Joint with Backer Rod)	LF	59	$154.00	$9,060.28
521-5-4	**Concrete Traffic Railing Barrier (Bridge)	(32" Vertical Face)	LF	162	$115.00	$18,676.00
					SUPERSTRUCTURE COST =	$276,298.89

BRIDGE SUBSTRUCTURE

PAY ITEM NUMBER	ITEM	DESCRIPTION	UNITS	TOTAL QUANTITY	UNIT PRICE	COST
400-4-5	**Concrete Class IV	(Substructure)	CY	39	$1,100.00	$42,790.00
415-1-5	**Reinforcing Steel	(Substructure)	LB	5,258	$1.12	$5,888.96
455-34-3	**Prestressed Concrete Piling	(Furnish & Driven) (18" Sq.)	LF	360	$80.00	$28,800.00
					SUBSTRUCTURE COST =	$77,478.96

MISCELLANEOUS ITEMS

PAY ITEM NUMBER	ITEM	DESCRIPTION	UNITS	TOTAL QUANTITY	UNIT PRICE	COST
455-14-4	**Concrete Sheet Piling	(12"x30" Sheet Piles)	LF	3,245	$125.00	$405,625.00
					MISCELLANEOUS COST =	$405,625.00

PROPOSED BRIDGE GEOMETRY

DIMENSIONS	Total
Bridge Width (FT)	58.83
Length of Bridge (FT)	35.00
Surface Area of Proposed Superstructure (SF)	2059.16

Sunset P[illegible] Road

UNADJUSTED BRIDGE COST

COMPONENTS	Total
Superstructure Cost	$276,298.89
Substructure Cost	$77,478.96
Miscellaneous Cost	$ 405,625.00
Unadjusted Cost	$759,402.85

CONDITIONAL VARIABLES

CONDITIONAL VARIABLES	% +/-	Total
Rural construction, decrease by 6%	0.0%	$ -
Urban construction, increase by 6%	0.0%	$ -
For construction over water, increase by 3%	3.0%	$ 22,782.09
Phased construction or widening, increase by 20%	0.0%	$ -

ADJUSTED BRIDGE COST

COMPONENTS	Total
Superstructure Cost	$276,298.89
Substructure Cost	$77,478.96
Conditional Variables Cost	$22,782.09
Adjusted Cost	$376,559.94

BRIDGE COST

BREAKDOWN	Total
Square Foot Cost	$379.86
Total Cost	$376,559.94
Miscellaneous Cost	$405,625.00
BDR Comparative Cost	$782,184.94

Design Parameters:

Number of Spans: Let $i := 1 .. N_{span}$ $N_{span} := 1$

Out to Out Bridge Width: $b_w := 58ft + 10in$

Outside Sidewalk Width: (note that sidewalks are assumed on both sides of bridge) $sw := 6 \cdot ft$

Outside Sidewalk plus Barrier(s) Width: $sww := sw + (1 \cdot ft + 1 \cdot in)$ $sww = 7.083 \cdot ft$

Sidewalk Thickness: $swt := mean[6in, (6in + sww \cdot 0.02)]$ $swt = 6.85 \cdot in$

Median: - Width: $mw := 0 \cdot ft + 0 \cdot in$

- Thickness: $mt := 0 \cdot in$

Span	Number of Beams:	Beam Dimensions: (1)	(2)	(3)	(4)	Span Lengths: (5)	(6)
$i =$	$N_{beam_i} := 1$	$J_i := 4.5 \cdot in$	$k_{b_i} := J_i + 4.5 \cdot in$	$k_{a_i} := J_i + 4.5 \cdot in$	$L_{c_c_i} := 35 \cdot ft + 0in$	$L_{b_b_i} := L_{c_c_i} - k_{b_i} - k_{a_i}$	$L_{pc_i} := L_{b_b_i} + 2 \cdot 0.5in$
1			$k_b = (9) \cdot in$	$k_a = (9) \cdot in$		$L_{b_b} = (33.5) ft$	$L_{pc} = (33.583) ft$

Beam Width:

$$S_i := \frac{b_w}{N_{beam_1}}$$

$S = (58.83) \cdot ft$

Note: (1) J is the Distance from the Centerline of the Bearing Pad to the End of the Beam
(2) k_b is the is Distance from the Centerline of the Back Cap or FFBW to the Centerline of the Bearing Pad
(3) k_a is the is Distance from the Centerline of the Ahead Cap or FFBW to the Centerline of the Bearing Pad
(4) L_{c_c} is the Distance from Centerline of Cap or FFBW to Centerline of Cap or FFBW
(5) L_{b_b} is the Distance from the Centerline of Bearing to the Centerline of Bearing
(6) L_{pc} is the Length of Beam

Total Bridge Length: $L_t := \sum_i L_{c_c_i}$ $L_t = 35ft$

Slab Thickness: - CIP Toping: $h_{ss} := 0in$

- Effective $h_e := ceil\left[\frac{max\left[0.54ft, if\left(N_{span} = 1, 1.2, 1.0\right) \cdot \left(\frac{\frac{L_{c_c_1}}{N_{span} \cdot ft} + 10}{30}\right) \cdot ft\right]}{in}\right] \cdot in$

- Total: $h_s := h_e + h_{ss}$ $h_s = 22 \cdot in$

Material Properties:

Unit Weight of Concrete: $w_c := 150 \cdot pcf$

Slab Concrete at Final: Compressive Strength: $f_{c_slab} := 4.5ksi$

Modulus of Elasticity: $E_{c_slab} := 90\% \cdot 1820 \cdot \sqrt{f_{c_slab} \cdot ksi}$ $E_{c_slab} = 3474.7 \cdot ksi$

Yield Strength of Reinforcing Steel: $f_y := 60ksi$

Beam Properties:

Span:	Width of Slab Unit:	Cross Sectional Area of Each Slab:	Bearing Pad Volume:
i = 1	$b_{tf_i} := S_i$	$A_{b_i} := (h_e \cdot b_{tf_i})$	$V_{bear_i} := 6in \cdot b_w \cdot \frac{1}{4}in$
		$A_b = (107.86)\,ft^2$	$V_{bear} = (0.61) \cdot ft^3$

Non-Composite Loading

SIP Forms and CIP Toping -

$DC_{nc_i1_i} := w_c \cdot (h_{ss}) \cdot S_i$ $DC_{nc_i1} = (0) \cdot klf$

Beam, Buildup and Effective Slab -

$DC_{nc_i2_i} := w_c \cdot (A_{b_i})$ $DC_{nc_i2} = (16.179) \cdot klf$

Total Non-Composite Dead Load:

$DC_{nc_i_i} := DC_{nc_i1_i} + DC_{nc_i2_i}$ $DC_{nc_i} = (16.179) \cdot klf$

Composite Loadings:

Barriers, Sidewalk, and Raised Median -

$DC_{c_i} := 2 \cdot (385 \cdot plf + 10plf) + w_c \cdot (mw \cdot mt) + 2 \cdot w_c \cdot (sww \cdot swt)$ $DC_c = (2.003) \cdot klf$

Future Wearing Surface -

$DW_{c_i} := 15psf \cdot (b_w - 2 \cdot sww)$ $DW_c = (0.67) \cdot klf$

Pedestrian Loadings: (This load must be inputted into CONSPAN as a Line Load in terms of "per span") -

$PL := 85 \cdot psf \cdot 2 \cdot sw$ $\quad PL = 1020 \cdot plf$

Determine Vertical Loading on Substructure: Let $j := 1 .. N_{span} + 1$

Total Dead Load of Components and Attachments on Substructure (Superstructure Only, do not include Cap):

Beam Reaction per Beam: $PDC_i_i := \left(DCnc_i_i + \frac{DC_{c_i}}{Nbeam_i} \right) \cdot Lc_c_i$ $\quad PDC_i = (636.4) \cdot kip$

Total Reaction per Bent:

$PDC_j := \frac{PDC_i_1}{2}$ $\quad PDC = \begin{pmatrix} 318.2 \\ 318.2 \end{pmatrix} \cdot kip$

Total Dead Load of Wearing Surface and Utilities:

Reaction per Beam: $PDW_ie_i := \left(\frac{DW_{c_i}}{Nbeam_i} \right) \cdot \frac{Lc_c_i}{2}$ $\quad PDW_ie = (11.7) \cdot kip$

Total Reaction per Bent:

$PDW_j := if\left(j \le N_{span}, Nbeam_j \cdot PDW_ie_j, 0 \cdot kip\right) + if\left(j \ge 2, Nbeam_{j-1} \cdot PDW_ie_{j-1}, 0 \cdot kip\right)$ $\quad PDW = \begin{pmatrix} 11.7 \\ 11.7 \end{pmatrix} \cdot kip$

Live Load - Pedestrian:

Reaction per Beam: $PPL_ie_i := \left(\frac{PL}{Nbeam_i} \right) \cdot \frac{Lc_c_i}{2}$ $\quad PPL_ie = (17.9) \cdot kip$

Total Reaction per Bent:

$PPL_j := if\left(j \le N_{span}, Nbeam_j \cdot PPL_ie_j, 0 \cdot kip\right) + if\left(j \ge 2, Nbeam_{j-1} \cdot PPL_ie_{j-1}, 0 \cdot kip\right)$ $\quad PPL = \begin{pmatrix} 17.9 \\ 17.9 \end{pmatrix} \cdot kip$

Live Load - Vehicular:

Longitudinal Load Distribution Formula: $df(a, j) := if\left(a > 0 \cdot ft, if\left(j \le N_{span}, \frac{\max\left(Lc_c_j - a, 0ft\right)}{Lc_c_j}, 0\right), if\left(j > 1, \frac{\max\left(Lc_c_{j-1} - a, 0ft\right)}{Lc_c_{j-1}}, 0\right)\right)$

Truck Load (HL93 Design Live Load) per Lane:

$Ptruck_j :=$
$\quad P \leftarrow 0 \cdot kip$
$\quad$ for $x \in -50 \cdot ft, -49.95 \cdot ft .. 50 \cdot ft$
$\quad\quad P1 \leftarrow 32 \cdot kip \cdot df(x + 0 \cdot ft, j) + 32 \cdot kip \cdot df(x + 14 \cdot ft, j) + 8 \cdot kip \cdot df(x + 28 \cdot ft, j)$
$\quad\quad P2 \leftarrow 8 \cdot kip \cdot df(x + 0 \cdot ft, j) + 32 \cdot kip \cdot df(x + 14 \cdot ft, j) + 32 \cdot kip \cdot df(x + 28 \cdot ft, j)$
$\quad\quad P \leftarrow P1$ if $P1 > P$
$\quad\quad P \leftarrow P2$ if $P2 > P$
$\quad P$

$Ptruck = \begin{pmatrix} 52.7 \\ 52.8 \end{pmatrix} \cdot kip$

Tandem Load (HL93 Design Live Load) per Lane:

$$P_{tandem_j} := \left| \begin{array}{l} P \leftarrow 0 \cdot kip \\ \text{for } x \in -10 \cdot ft, -9.95 \cdot ft .. 10 \cdot ft \\ \quad \left| \begin{array}{l} P1 \leftarrow 25 \cdot kip \cdot df(x + 0 \cdot ft, j) + 25 \cdot kip \cdot df(x + 4 \cdot ft, j) \\ P \leftarrow P1 \text{ if } P1 > P \end{array} \right. \\ P \end{array} \right.$$

$$P_{tandem} = \begin{pmatrix} 47.1 \\ 47.1 \end{pmatrix} \cdot kip$$

Truck Combination Load (HL93 Design Live Load) per Lane:

$$P_{truck_combo_j} := \left| \begin{array}{l} P \leftarrow 0 \cdot kip \\ \text{for } x \in -110 \cdot ft, -109.95 \cdot ft .. 110 \cdot ft \quad \text{if } j > 1 \wedge j \leq N_{span} \\ \quad \left| \begin{array}{l} P1 \leftarrow 32 \cdot kip \cdot df(x + 0 \cdot ft, j) + 32 \cdot kip \cdot df(x + 14 \cdot ft, j) + 8 \cdot kip \cdot df(x + 28 \cdot ft, j) \ldots \\ \qquad + 32 \cdot kip \cdot df(x + 78 \cdot ft, j) + 32 \cdot kip \cdot df(x + 92 \cdot ft, j) + 8 \cdot kip \cdot df(x + 106 \cdot ft, j) \\ P2 \leftarrow 8 \cdot kip \cdot df(x + 0 \cdot ft, j) + 32 \cdot kip \cdot df(x + 14 \cdot ft, j) + 32 \cdot kip \cdot df(x + 28 \cdot ft, j) \ldots \\ \qquad + 8 \cdot kip \cdot df(x + 78 \cdot ft, j) + 32 \cdot kip \cdot df(x + 92 \cdot ft, j) + 32 \cdot kip \cdot df(x + 106 \cdot ft, j) \\ P \leftarrow P1 \text{ if } P1 > P \\ P \leftarrow P2 \text{ if } P2 > P \end{array} \right. \\ P \end{array} \right.$$

$$P_{truck_combo} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \cdot kip$$

Lane Load (HL93 Design Live Load) per Lane:

$$P_{lane_j} := 640 plf \cdot \left(if\left(j \leq N_{span}, Lc_c_j, 0 \cdot ft\right) + if\left(j \geq 2, Lc_c_{j-1}, 0 \cdot ft\right) \right)$$

$$P_{lane} = \begin{pmatrix} 22.4 \\ 22.4 \end{pmatrix} \cdot kip$$

Total Vehicular Live Load on Substructure (Not Including Impact Factor):

$$P_{LL_j} := \max\left(\max\left(P_{truck_j}, P_{tandem_j}\right) + P_{lane_j}, 0.9 \cdot P_{truck_combo_j} \right)$$

$$P_{LL} = \begin{pmatrix} 75.1 \\ 75.2 \end{pmatrix} \cdot kip$$

Multiple Presence Factor:

Maximum Number of Lanes on Bridge: $NL := floor\left[\frac{b_w - (2 \cdot sww + mw)}{12 \cdot ft} \right]$ $NL = 3$

No Sidewalk Loading: $m1 := if(NL > 3, 0.65, if(NL > 2, 0.85, if(NL > 1, 1.0, 1.2)))$ $m1 = 0.85$

Sidewalk Loading Included $m2 := if(NL + 1 > 3, 0.65, if(NL + 1 > 2, 0.85, if(NL + 1 > 1, 1.0, 1.2)))$ $m2 = 0.65$

Vehicular: $mp_j := if\left(m1 \cdot NL \cdot P_{LL_j} > m2 \cdot NL \cdot P_{LL_j} + m2 \cdot P_{PL_j}, NL \cdot m1, NL \cdot m2\right)$

$$mp = \begin{pmatrix} 2.55 \\ 2.55 \end{pmatrix}$$

Sidewalk: $ms_j := if\left(mp_j = NL \cdot m2, m2, 0\right)$

$$ms = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

Total Factored Loads on Substructure:

$Ptu_j := 1.25 \cdot PDC_j + 1.50 \cdot PDW_j + 1.75 \cdot (mp_j \cdot PLL_j + ms_j \cdot PPL_j)$ $\quad Ptu = \begin{pmatrix} 750.4 \\ 750.9 \end{pmatrix} \cdot kip$

Factored Design Load (used to size typical Substructure Unit for Cost Estimating):

$Pu := \max(Ptu)$ $\quad Pu = 750.9 \cdot kip$

Substructure Geometry: $ton := 2kip$

Substructure Concrete Compressive Strength: $f_{c_sub} := 5.5ksi$

Number of Alternatives, $N_{sub} := 1$ $\quad p := 1 .. N_{sub}$

Foundation Type: Pile

Pile Width

$Type_p := "Piles"$ $\quad b_{df_p} := 18in$

Estimated Pile Length at Abutment, $L_{df_p} := 30ft$

Width of Cap, $W_{cap_p} := 4ft + 0in$

Assumed Area of Tension Steel in Cap, $A_{s_p} := 2 \cdot \frac{W_{cap_p} - 2.5 \cdot in}{8 \cdot 1.000 \cdot in} \cdot 0.79 \cdot in^2$

Estimated Pile Spacing @ Abutment, $S_{df_p} := 11.00ft$

Number of Beams between Piles, $n_p := ceil\left(\frac{S_{df_p}}{S_1}\right) - 1$

Estimated Moment on Cap (use factors from AISC's Manual of Steel Construction):

$$M_{cap_p} := \frac{Pu \cdot S_{df_p}}{N_{beam_1}} \cdot if\left(n_p < 1, 0, if\left(n_p = 1, 0.188, if\left(n_p = 2, 0.278, if\left(n_p = 3, 0.375, if\left(n_p = 4, 0.480, 0.096 \cdot N_{beam_1}\right)\right)\right)\right)\right)$$

Estimated Depth of Cap:

Guess Depth: $D_{cap} := 2.5ft$

Given $\quad \max(M_{cap}) = A_s \cdot 60ksi \cdot \left(D_{cap} - \frac{A_s \cdot 60ksi}{2 \cdot 0.85 \cdot f_{c_sub} \cdot W_{cap}}\right)$ $\quad H_{cap_p} := \max\left[\left(Ceil\left(\frac{Find(D_{cap})}{ft} + 0.5, 0.5\right)\right) \cdot ft, 30in\right]$

Number of Piles Required at Abutment, $N_{df_p} := \frac{b_w - 2 \cdot (1ft + 11in)}{S_{df_p}} + 1$ $\quad N_{df_p} = 6$

Foundation Type	Pile Width	Width of Cap	Height of Cap	Pile Length at Abutment	Piles Required at Abutment	Pile Spacing at Abutment
$Type_p$ =	b_{df_p} =	W_{cap_p} =	H_{cap} =	L_{df_p} =	N_{df} =	S_{df} =
"Piles"	18 in	48 in	30 in	30 ft	6	11 ft

Preliminary Pile Loads $P_{pl} := \frac{P_u}{0.65 \cdot N_{df}}$ $P_{pl} = (96.27)\,ton$

Estimated Quantities: Bridge Length: $L_t = 35\,ft$ Bridge Width: $b_w = 58.83\,ft$ Deck Area: $L_t \cdot b_w = 2059.2\,ft^2$

334-1-XX Superpave Asphaltic Concrete

$W_{sup_as} := 110 \cdot \frac{lbf}{yd^2 \cdot in} \cdot (2in) \cdot (L_t + 2 \cdot 20ft) \cdot (b_w - 2 \cdot sww)$ $W_{sup_as} = 40.94\,ton$

400-X-4 Superstructure Concrete

$V_{sup_conc} := 2 \cdot [sww \cdot swt \cdot (L_t + 2 \cdot 20ft)] + (h_e \cdot b_w \cdot L_t)$ $V_{sup_conc} = 162.3\,yd^3$

400-X-5 Substructure Concrete

$V_{sub_conc} := (N_{span} + 1) \cdot [W_{cap} \cdot H_{cap} \cdot b_w - N_{df_l} \cdot (18in)^2 \cdot 1ft - b_w \cdot 1ft \cdot 10in]$ $V_{sub_conc} = 38.9\,yd^3$

400-X-10 Approach Slab Concrete

$V_{app_conc} := 2 \cdot (23.104ft \cdot b_w \cdot 1ft)$ $V_{app_conc} = 100.7\,yd^3$

415-1-4 Superstructure Reinforcing Steel

$W_{sup_rebar} := V_{sup_conc} \cdot 205 \cdot \frac{lbf}{yd^3}$ $W_{sup_rebar} = 33268\,lbf$

415-1-5 Substructure Reinforcing Steel

$W_{sub_rebar} := V_{sub_conc} \cdot 135 \cdot \frac{lbf}{yd^3}$ $W_{sub_rebar} = 5258\,lbf$

415-1-9 Approach Slab Reinforcing Steel

$W_{app_rebar} := V_{app_conc} \cdot 190 \cdot \frac{lbf}{yd^3}$ $W_{app_rebar} = 19131\,lbf$

455-XX-X Deep Foundation (Prestressed Concrete Piles)

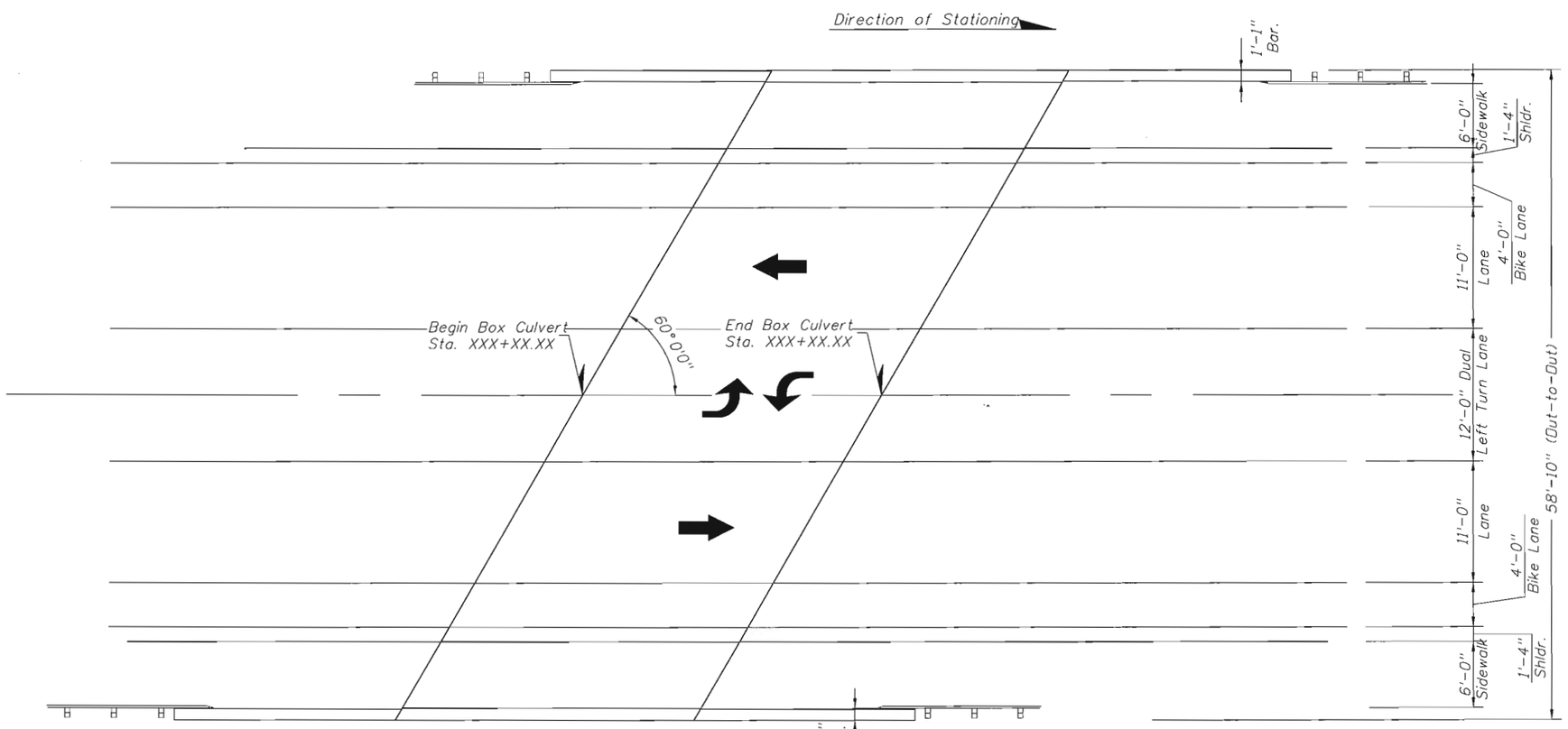
$L_{ps} := 2 \cdot (N_{df} \cdot L_{df})$ 18" Piles - 455-34-3 $L_{ps} = 360\,ft$

458-1-11 Bridge Deck Expansion Joint

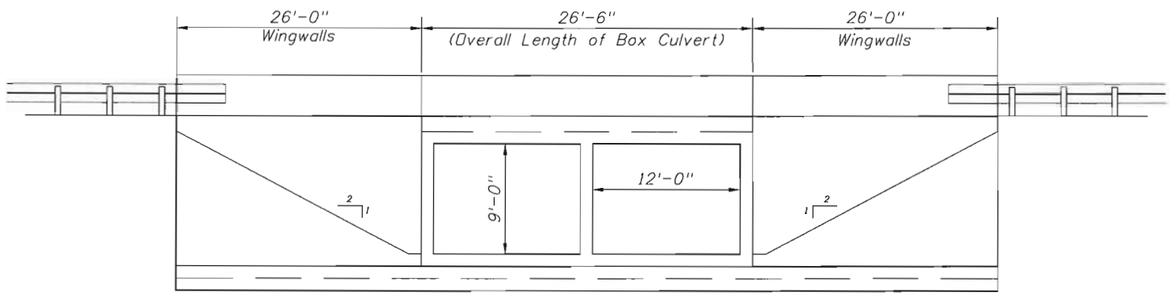
$L_{joint} := b_w \cdot \max\left(\text{round}\left(\frac{L_t}{250 \cdot ft}\right), 1\right)$ $L_{joint} = 58.83\,ft$

521-5-1 Concrete Traffic Railing Barrier (Bridge) (32" Vertical Shape)

$L_{barrier} := 2 \cdot (L_t + 2 \cdot 23.104ft)$ $L_{barrier} = 162.4\,ft$



PLAN



ELEVATION

REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

PREPARED BY:

American Consulting Engineers of Florida, LLC
2818 Cypress Ridge Blvd, Suite 200
Wesley Chapel, FL 33544
Phone: (813) 996-2800 Fax: (813) 996-1908
Certificate of Authorization No. 9302
Richard A. Hunter, P.E. No. 50601

Pinellas County PUBLIC WORKS

	NAME	DATE
DESIGNED	RA	5/08
DRAWN	RA	5/08
CHECKED	RH	5/08
SUPERVISED:	R. HUNTER, P.E.	

APPROVED BY:

SUNSET POINT ROAD

PLAN AND ELEVATION

SHEET NO.

OF SHEETS

F:\PROJECT\5079576\920476\struct\Alternatives\BPlanEle01.dwg LAYOUT:Layout2 Last Saved: Jul. 21, 08 Plot Date: 7/21/2008 2:36 PM By: agenor, remy

Sunset P. Road

BRIDGE ALTERNATIVE FOUR (Dual 12' x 9' Box Culvert)

PAY ITEM NUMBER	ITEM	DESCRIPTION	UNITS	TOTAL QUANTITY	UNIT PRICE	COST
000-0-0	****Roadway Cost (3-Lane Roadway)	New Construction	MI	0.0154	$13,099,203.50	$201,420.10
400-4-5	**Concrete Class IV	(Substructure)	CY	248	$1,100.00	$273,141.00
415-1-5	**Reinforcing Steel	(Substructure)	LB	45,969	$1.12	$51,485.28
521-5-4	**Concrete Traffic Railing Barrier (Bridge)	(32" Vertical Face)	LF	131	$115.00	$15,007.50
					BOX CULVERT COST =	**$541,053.88**

MISCELLANEOUS ITEMS

PAY ITEM NUMBER	ITEM	DESCRIPTION	UNITS	TOTAL QUANTITY	UNIT PRICE	COST
455-14-4	**Concrete Sheet Piling	(12"x30" Sheet Piles)	LF	0	$125.00	$0.00
					MISCELLANEOUS COST =	**$0.00**

PROPOSED BRIDGE GEOMETRY

DIMENSIONS	Total
Bridge Width (FT)	**58.83**
Length of Bridge (FT)	**27.00**
Surface Area of Culvert (SF)	**1588.49**

Sunset P. Road

UNADJUSTED BRIDGE COST

COMPONENTS	Total
Culvert Cost	$541,053.88
Miscellaneous Cost	$ -
Unadjusted Cost	$541,053.88

CONDITIONAL VARIABLES

CONDITIONAL VARIABLES	% +/-	Total
Rural construction, decrease by 6%	0.0%	$ -
Urban construction, increase by 6%	0.0%	$ -
Dewatering for Box Culvert Construction, increase by $100,000	--	$ 100,000.00
For construction over water, increase by 3%	0.0%	$ -
Phased construction or widening, increase by 20%	0.0%	$ -

ADJUSTED BRIDGE COST

COMPONENTS	Total
Box Culvert Cost	$541,053.88
Conditional Variables Cost	$100,000.00
Adjusted Cost	$641,053.88

BRIDGE COST

BREAKDOWN	Total
Square Foot Cost	$403.56
Total Cost	$641,053.88
Miscellaneous Cost	$0.00
BDR Comparative Cost	$641,053.88

Box Culvert Program:
Estimate of Quantities

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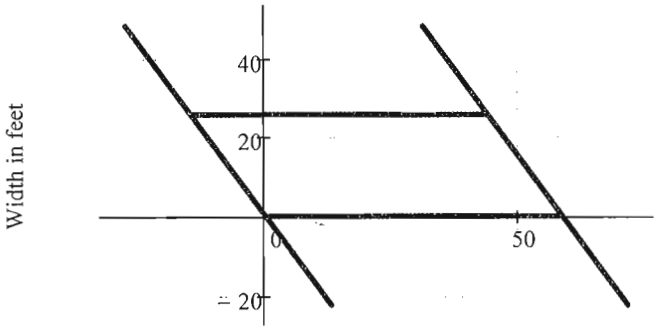
Project = "Sunset Point"

DesignedBy = "RA"

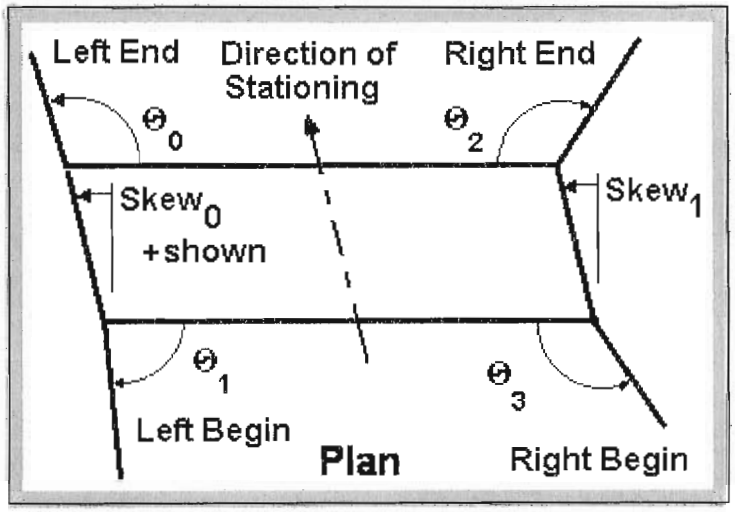
CheckedBy = "RM 7/21/08"

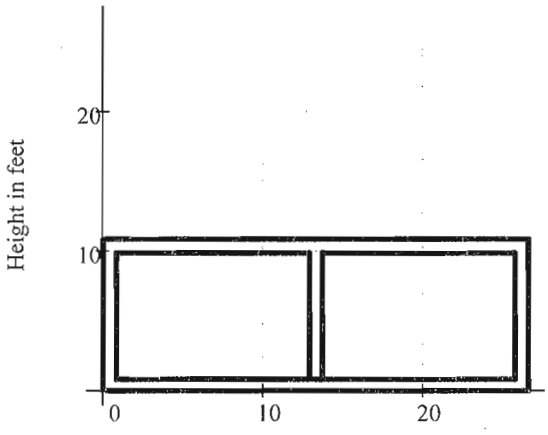
CurrentDataFile = "15x12Under3.dat"

Comment = "Dual Cell, 12 ft. x 9 ft."

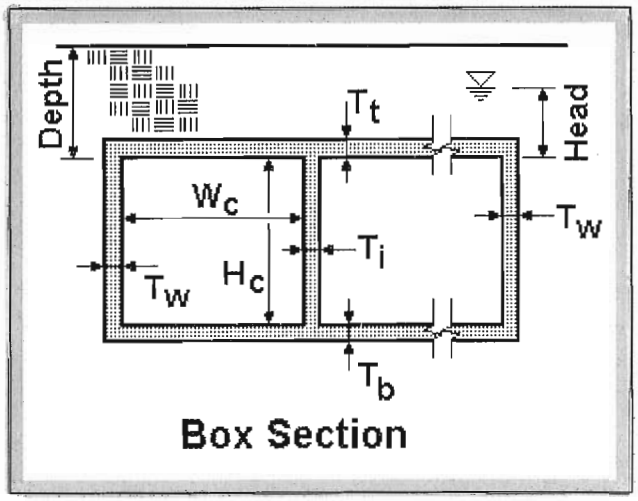


Plan - Box Culvert





Cross Section - Box Culvert



Box Dimensions HydraulicOpening:= $W_c \cdot H_c \cdot$ NoOfCells HydraulicOpening = 216 ft^2 SoilHeight = 2 ft

NoOfCells = 2 W_c = 12 ft H_c = 9 ft L_c = 58.83 ft θ^T = (120 60 60 120)·deg Head = 0 ft

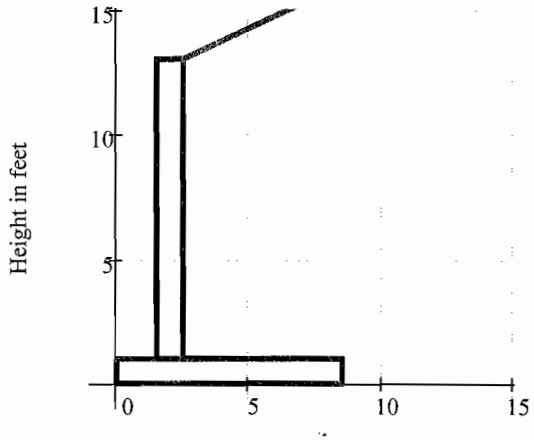
T_t = 12·in T_b = 10·in T_w = 10·in T_i = 10·in Cover = 2·in Depth = 3 ft

Cutoff wall and Headwall Dimensions

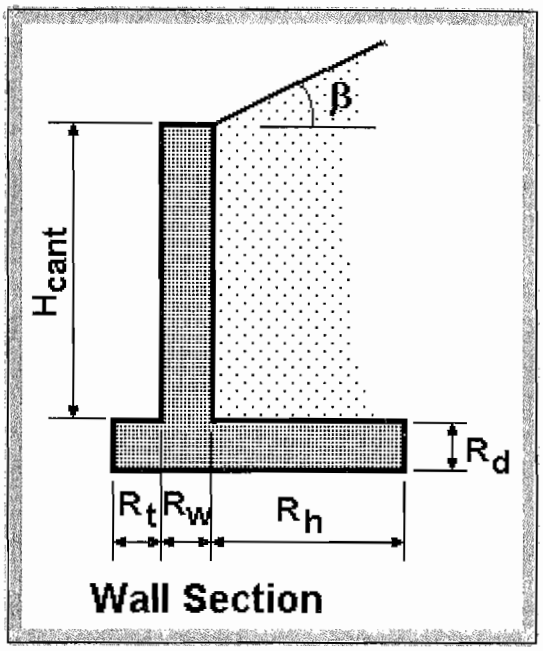
$Skew_{left}$ = 30·deg B_{lhw} = 16·in H_{lhw} = 36·in B_{lcw} = 12·in H_{lcw} = 24·in

$Skew_{right}$ = 30·deg B_{rhw} = 16·in H_{rhw} = 36·in B_{rcw} = 12·in H_{rcw} = 24·in

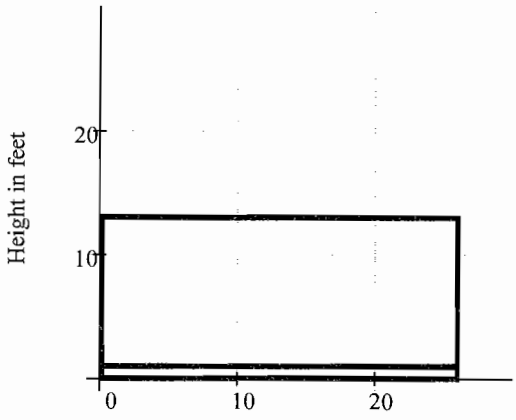
Wingwall Dimensions CurrentDataFile = "15x12Under3.dat"



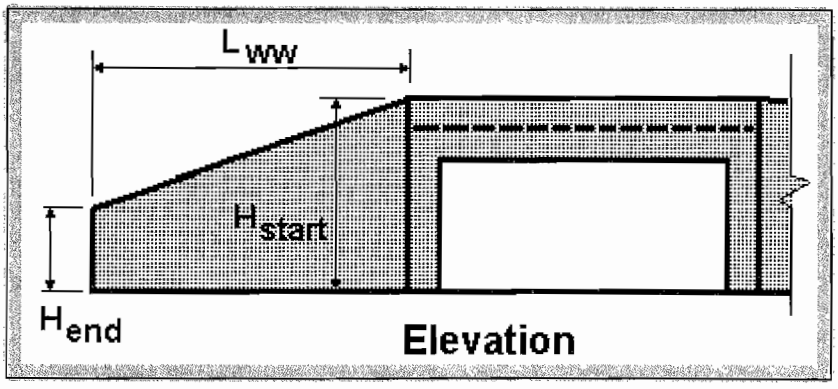
Cross Section - First Wingwall



$$R_t = \begin{pmatrix} 18 \\ 18 \\ 18 \\ 18 \end{pmatrix} \text{in} \qquad R_w = \begin{pmatrix} 12 \\ 12 \\ 12 \\ 12 \end{pmatrix} \text{in} \qquad R_h = \begin{pmatrix} 72 \\ 72 \\ 72 \\ 72 \end{pmatrix} \text{in} \qquad R_d = \begin{pmatrix} 12 \\ 12 \\ 12 \\ 12 \end{pmatrix} \text{in} \qquad \beta = \begin{pmatrix} 26.57 \\ 26.57 \\ 26.57 \\ 26.57 \end{pmatrix} \text{deg}$$



Elevation - First Wingwall



$$H_{end} = \begin{pmatrix} 12 \\ 12 \\ 12 \\ 12 \end{pmatrix} \text{ft} \qquad H_{start} = \begin{pmatrix} 12 \\ 12 \\ 12 \\ 12 \end{pmatrix} \text{ft} \qquad L_{ww} = \begin{pmatrix} 26 \\ 26 \\ 26 \\ 26 \end{pmatrix} \text{ft} \qquad \theta = \begin{pmatrix} 120 \\ 60 \\ 60 \\ 120 \end{pmatrix} \text{deg}$$

Summary of Concrete Quantities

$Vol_{cw.left} = 1.32 \cdot yd^3$ $Vol_{cw.right} = 1.32 \cdot yd^3$

$vol_{bot.slab} = 50.57 \cdot yd^3$ $Vol_{walls} = 49.02 \cdot yd^3$ $Vol_{top.slab} = 57.74 \cdot yd^3$

$Vol_{hw.left} = 3.02 \cdot yd^3$ $Vol_{hw.right} = 3.02 \cdot yd^3$

$$Vol_{wall} = \begin{pmatrix} 11.56 \\ 11.56 \\ 11.56 \\ 11.56 \end{pmatrix} yd^3 \quad Vol_{ww.cowall} = \begin{pmatrix} 0.963 \\ 0.963 \\ 0.963 \\ 0.963 \end{pmatrix} yd^3 \quad Vol_{footing} = \begin{pmatrix} 8.19 \\ 7.8 \\ 7.8 \\ 8.19 \end{pmatrix} yd^3 \quad TotalVol_{wingwall} = \begin{pmatrix} 20.7 \\ 20.32 \\ 20.32 \\ 20.7 \end{pmatrix} yd^3$$

$Vol_{box} = 166.27 \cdot yd^3$ $\sum Vol_{wall} = 46.22 \cdot yd^3$ $\sum TotalVol_{footing} = 35.82 \cdot yd^3$ $TotalVolume = 248.31 \cdot yd^3$

Summary of Soil and Miscellaneous Values

$E = 4200 \cdot ksi$ $f_c = 5.5 \cdot ksi$ $Extension = 0$

Extension type
0 - new box (no extension)
1- left extension
2 - right extension

$Env = 2$

Environmental Class
1 - slightly aggressive
2 - moderately aggressive
3 - extremely aggressive

$F_y = 60 \cdot ksi$ $n_{mod} = 9$

$ConsiderLLSurcharge_{ww} = 0$ *0 - No, 1 - Yes* $ConsiderLL_{hw} = 1$ *0 - No, 1 - Yes* $BarrierDL_{hw} = 0 \cdot \frac{kip}{ft}$

$\gamma_{soil} = 110 \cdot \frac{lbf}{ft^3}$ $k_s = 100000 \cdot \frac{lbf}{ft^3}$ $\phi = 30 \cdot deg$ $q_{nom} = 5000 \cdot \frac{lbf}{ft^2}$

Summary of Reinforcement Check Values

$Check_{box} = "OK"$ $Check_{cw} = "OK"$ $Check_{hw} = "OK"$ $Check_{ww} = "OK"$ $TotalCheck = "OK"$

$$BarSize_{slabs} = \begin{pmatrix} 6 \\ 6 \\ 6 \\ 6 \end{pmatrix} \quad S_{slabs} = \begin{pmatrix} 6 \\ 6 \\ 6 \\ 6 \end{pmatrix} in$$

top slab, top mat
top slab, bot mat
bot slab, top mat
bot slab, bot mat

$$BarSize_{long} = \begin{pmatrix} 4 \\ 4 \\ 4 \\ 4 \end{pmatrix} \quad S_{long} = \begin{pmatrix} 12 \\ 12 \\ 12 \\ 12 \\ 12 \end{pmatrix} in$$

top slab, top mat
top slab, bot mat
interior wall(s)
exterior walls
bot slab, both m.

$$BarSize_{walls} = \begin{pmatrix} 4 \\ 4 \end{pmatrix} \quad S_{walls} = \begin{pmatrix} 12 \\ 12 \end{pmatrix} in$$

interior wall(s)
exterior walls

$$BarSize_{corners} = \begin{pmatrix} 6 \\ 6 \end{pmatrix} \quad S_{corners} = \begin{pmatrix} 9 \\ 9 \end{pmatrix} in$$

top corner
bot corner

$$BarSize_{cw} = \begin{pmatrix} 6 \\ 6 \\ 6 \\ 6 \end{pmatrix} \quad Num_{cw} = \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix}$$

top bar, left cw
bot bar, left cw
top bar, right cw
bot bar, right cw

$$StirSize_{cw} = \begin{pmatrix} 4 \\ 4 \end{pmatrix} \quad S_{stirrup.cw} = \begin{pmatrix} 12 \\ 12 \end{pmatrix} in$$

$$rSize_{hw} = \begin{pmatrix} 7 \\ 7 \\ 7 \\ 7 \end{pmatrix} \quad Num_{hw} = \begin{pmatrix} 3 \\ 3 \\ 3 \\ 3 \end{pmatrix}$$

top bar, left hw
bot bar, left hw
top bar, right hw
bot bar, right hw

$$StirSize_{hw} = \begin{pmatrix} 4 \\ 4 \end{pmatrix} \quad S_{stirrup.hw} = \begin{pmatrix} 12 \\ 12 \end{pmatrix} in$$

Reinforcement List - Main Box

$Reinf_{box} =$

	0	1	2
0	"Bar Location"	"Size"	"Desig"
1	"top face, top slab"	6	101
2	" ....varies"	6	201
3	" ....varies"	-1	0
4	" ....varies"	6	301
5	" ....varies"	-1	0
6	"bot face, top slab"	6	102
7	" ....varies"	6	202
8	" ....varies"	-1	0
9	" ....varies"	6	302
10	" ....varies"	-1	0
11	"top face, bot slab"	6	103
12	" ....varies"	6	203
13	" ....varies"	-1	0
14	" ....varies"	6	303
15	" ....varies"	-1	...

Reinforcement Lists - Left Begin and Left End Wingwalls

$Rw_0 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"N
"wall vert, soil side"	6	401	11.83	52	1	0	0	11.83	0	0	0	0	0	0	0	(
"wall horiz, front side"	4	402	25.67	12	1	0	0	25.67	0	0	0	0	0	0	0	(
"wall horiz, soil side"	4	404	25.67	12	1	0	0	25.67	0	0	0	0	0	0	0	(
"wall vert, front side"	4	406	11.83	26	1	0	0	11.83	0	0	0	0	0	0	0	(
"wall vert, soil side"	6	407	6.01	52	10	0	0	2.17	3.84	0	0	0	0	0	0	(
"top footing heel"	5	409	8.17	52	1	0	0	8.17	0	0	0	0	0	0	0	(
"bot footing toe"	4	410	8.17	26	1	0	0	8.17	0	0	0	0	0	0	0	(
"temp footing"	4	411	25.67	18	1	0	0	25.67	0	0	0	0	0	0	0	(
"wall to box ties"	5	412	2	18	1	0	0	2	0	0	0	0	0	0	0	(

$Rw_1 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"N
"wall vert, soil side"	6	501	11.83	52	1	0	0	11.83	0	0	0	0	0	0	0	(
"wall horiz, front side"	4	502	25.67	12	1	0	0	25.67	0	0	0	0	0	0	0	(
"wall horiz, soil side"	4	504	25.67	12	1	0	0	25.67	0	0	0	0	0	0	0	(
"wall vert, front side"	4	506	11.83	26	1	0	0	11.83	0	0	0	0	0	0	0	(
"wall vert, soil side"	6	507	6.01	52	10	0	0	2.17	3.84	0	0	0	0	0	0	(
"top footing heel"	5	509	8.17	52	1	0	0	8.17	0	0	0	0	0	0	0	(
"bot footing toe"	4	510	8.17	26	1	0	0	8.17	0	0	0	0	0	0	0	(
"temp footing"	4	511	25.67	18	1	0	0	25.67	0	0	0	0	0	0	0	(
"wall to box ties"	5	512	2	18	1	0	0	2	0	0	0	0	0	0	0	(

Reinforcement Lists - Right Begin and Right End Wingwalls

$Rw_2 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"N
"wall vert, soil side"	6	601	11.83	52	1	0	0	11.83	0	0	0	0	0	0	0	0
"wall horiz, front side"	4	602	25.67	12	1	0	0	25.67	0	0	0	0	0	0	0	0
"wall horiz, soil side"	4	604	25.67	12	1	0	0	25.67	0	0	0	0	0	0	0	0
"wall vert, front side"	4	606	11.83	26	1	0	0	11.83	0	0	0	0	0	0	0	0
"wall vert, soil side"	6	607	6.01	52	10	0	0	2.17	3.84	0	0	0	0	0	0	0
"top footing heel"	5	609	8.17	52	1	0	0	8.17	0	0	0	0	0	0	0	0
"bot footing toe"	4	610	8.17	26	1	0	0	8.17	0	0	0	0	0	0	0	0
"temp footing"	4	611	25.67	18	1	0	0	25.67	0	0	0	0	0	0	0	0
"wall to box ties"	5	612	2	18	1	0	0	2	0	0	0	0	0	0	0	0

$Rw_3 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"N
"wall vert, soil side"	6	701	11.83	52	1	0	0	11.83	0	0	0	0	0	0	0	0
"wall horiz, front side"	4	702	25.67	12	1	0	0	25.67	0	0	0	0	0	0	0	0
"wall horiz, soil side"	4	704	25.67	12	1	0	0	25.67	0	0	0	0	0	0	0	0
"wall vert, front side"	4	706	11.83	26	1	0	0	11.83	0	0	0	0	0	0	0	0
"wall vert, soil side"	6	707	6.01	52	10	0	0	2.17	3.84	0	0	0	0	0	0	0
"top footing heel"	5	709	8.17	52	1	0	0	8.17	0	0	0	0	0	0	0	0
"bot footing toe"	4	710	8.17	26	1	0	0	8.17	0	0	0	0	0	0	0	0
"temp footing"	4	711	25.67	18	1	0	0	25.67	0	0	0	0	0	0	0	0
"wall to box ties"	5	712	2	18	1	0	0	2	0	0	0	0	0	0	0	0

Reinforcement Lists - Headwalls and Cutoff Walls

$Rh_1 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"N"
"top"	7	801	30.27	3	1	0	0	30.27	0	0	0	0	0	0	0	0
"bottom"	7	802	30.27	3	1	0	0	30.27	0	0	0	0	0	0	0	0
"stirrups"	4	803	7.9	31	27	0	0	2.6	1	0	0.33	2.27	1	1	0	0

$Rh_2 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"N"
"top"	7	804	30.27	3	1	0	0	30.27	0	0	0	0	0	0	0	0
"bottom"	7	805	30.27	3	1	0	0	30.27	0	0	0	0	0	0	0	0
"stirrups"	4	806	7.9	31	27	0	0	2.6	1	0	0.33	2.27	1	1	0	0

$Rc_1 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"N"
"top"	6	807	30.27	2	1	0	0	30.27	0	0	0	0	0	0	0	0
"bottom"	6	808	30.27	2	1	0	0	30.27	0	0	0	0	0	0	0	0
"stirrups"	4	809	5.04	31	7	0	0	1.6	0.67	0.58	0.58	0	0	0	0	0

$Rc_2 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"N"
"top"	6	810	30.27	2	1	0	0	30.27	0	0	0	0	0	0	0	0
"bottom"	6	811	30.27	2	1	0	0	30.27	0	0	0	0	0	0	0	0
"stirrups"	4	812	5.04	31	7	0	0	1.6	0.67	0.58	0.58	0	0	0	0	0

No variables are modified in this file CurrentDataFile = "15x12Under3.dat"

REINFORCING STEEL QUANTITIES
DATE RAN: MON JUL 21 09:10:51 2008

NAME OF UNIT	QUANTITY/UNIT	NO. UNITS	TOTAL-QUANTITY	COST/LB	TOTAL-COST
MAIN BOX	32563 LBS	X 1 =	32563 LBS AT	0.000 = $	0.00
LEFT END WINGWALL	2941 LBS	X 1 =	2941 LBS AT	0.000 = $	0.00
LEFT BEGIN WINGWALL	2941 LBS	X 1 =	2941 LBS AT	0.000 = $	0.00
RIGHT END WINGWALL	2941 LBS	X 1 =	2941 LBS AT	0.000 = $	0.00
RIGHT BEGIN WINGWALL	2941 LBS	X 1 =	2941 LBS AT	0.000 = $	0.00
LEFT HEADWALL	535 LBS	X 1 =	535 LBS AT	0.000 = $	0.00
RIGHT HEADWALL	535 LBS	X 1 =	535 LBS AT	0.000 = $	0.00
LEFT CUTOFF WALL	286 LBS	X 1 =	286 LBS AT	0.000 = $	0.00
RIGHT CUTOFF WALL	286 LBS	X 1 =	286 LBS AT	0.000 = $	0.00
	GRAND TOTAL =		45969 LBS		$ 0.00

LOCATION MAIN BOX NO. REQUIRED = 1

					LBS/MARK
6 101	26- 2	87	1	26- 2	3419.74
6 201	VARY	30	1	25- 9	
	13- 2	0	1	0- 6 1/4	591.86
6 301	VARY	30	1	25- 9	
	13- 2	0	1	0- 6 1/4	591.86
6 102	26- 2	87	1	26- 2	3419.74
6 202	VARY	30	1	25- 9	
	13- 2	0	1	0- 6 1/4	591.86
6 302	VARY	30	1	25- 9	
	13- 2	0	1	0- 6 1/4	591.86
6 103	26- 2	93	1	26- 2	3655.58
6 203	VARY	30	1	25- 9	
	13- 2	0	1	0- 6 1/4	591.86
6 303	VARY	30	1	25- 9	
	13- 2	0	1	0- 6 1/4	591.86
6 104	26- 2	93	1	26- 2	3655.58
6 204	VARY	30	1	25- 9	
	13- 2	0	1	0- 6 1/4	591.86

6	304	VARY	30	1	25- 9			
		13- 2	0	1	0- 6	1/4		
591.86								
6	105	9- 6	156	10	2-10		6- 8	
2228.31								
6	106	9- 6	156	10	2-10		6- 8	
2228.31								
4	107	9- 6	236	10	2-10		6- 8	
1499.23								
4	108	10- 6	118	1	10- 6			
827.65								
4	109	63- 8	28	2	2- 2		61- 6	
1		1190.88						
4	110	58- 6	28	1	58- 6			
1094.18								
4	111	57-11	28	1	57-10	1/4		
1082.03								
4	112	63- 8	28	2	2- 2		61- 6	
1		1190.88						
4	113	58- 6	20	1	58- 6			
781.56								
4	114	58- 6	20	1	58- 6			
781.56								
4	115	57-11	20	1	57-10	1/4		
772.88								

LOCATION LEFT END WINGWALL NO. REQUIRED = 1

LBS/MARK								
6	401	11-10	52	1	11-10			
923.97								
4	402	25- 8	12	1	25- 8			
205.77								
4	404	25- 8	12	1	25- 8			
205.77								
4	406	11-10	26	1	11-10			
205.46								
6	407	6- 0	52	10	2- 2		3-10	
469.17								
5	409	8- 2	52	1	8- 2			
442.95								
4	410	8- 2	26	1	8- 2			
141.84								
4	411	25- 8	18	1	25- 8			
308.66								
5	412	2- 0	18	1	2- 0			
37.55								

LOCATION LEFT BEGIN WINGWALL NO. REQUIRED = 1

6	501	11-10	52	1	11-10	
923.97						
4	502	25- 8	12	1	25- 8	
205.77						
4	504	25- 8	12	1	25- 8	
205.77						
4	506	11-10	26	1	11-10	
205.46						
6	507	6- 0	52	10	2- 2	3-10
469.17						
5	509	8- 2	52	1	8- 2	
442.95						
4	510	8- 2	26	1	8- 2	
141.84						
4	511	25- 8	18	1	25- 8	
308.66						
5	512	2- 0	18	1	2- 0	
37.55						

LOCATION RIGHT END WINGWALL NO. REQUIRED = 1

6	601	11-10	52	1	11-10	
923.97						
4	602	25- 8	12	1	25- 8	
205.77						
4	604	25- 8	12	1	25- 8	
205.77						
4	606	11-10	26	1	11-10	
205.46						
6	607	6- 0	52	10	2- 2	3-10
469.17						
5	609	8- 2	52	1	8- 2	
442.95						
4	610	8- 2	26	1	8- 2	
141.84						
4	611	25- 8	18	1	25- 8	
308.66						
5	612	2- 0	18	1	2- 0	
37.55						

LOCATION RIGHT BEGIN WINGWALL NO. REQUIRED = 1

6	701	11-10	52	1	11-10						
923.97											
4	702	25- 8	12	1	25- 8						
205.77											
4	704	25- 8	12	1	25- 8						
205.77											
4	706	11-10	26	1	11-10						
205.46											
6	707	6- 0	52	10	2- 2	3-10					
469.17											
5	709	8- 2	52	1	8- 2						
442.95											
4	710	8- 2	26	1	8- 2						
141.84											
4	711	25- 8	18	1	25- 8						
308.66											
5	712	2- 0	18	1	2- 0						
37.55											

LOCATION LEFT HEADWALL NO. REQUIRED = 1

LBS/MARK											
7	801	30- 4	3	1	30- 3 1/4						
185.62											
7	802	30- 4	3	1	30- 3 1/4						
185.62											
4	803	8- 0	31	27	2- 7 1/4	1- 0		0- 4	2- 3 1/4	1- 0	1- 0
164.19											

LOCATION RIGHT HEADWALL NO. REQUIRED = 1

LBS/MARK											
7	804	30- 4	3	1	30- 3 1/4						
185.62											
7	805	30- 4	3	1	30- 3 1/4						
185.62											
4	806	8- 0	31	27	2- 7 1/4	1- 0		0- 4	2- 3 1/4	1- 0	1- 0
164.19											

LOCATION LEFT CUTOFF WALL NO. REQUIRED = 1

LBS/MARK											
6	807	30- 4	2	1	30- 3 1/4						
90.93											
6	808	30- 4	2	1	30- 3 1/4						
90.93											

4	809	5- 1	31	7	1- 7	1/4	0- 8	0- 7	0- 7
104.39									
10	0	0- 0	0	0					

LOCATION RIGHT CUTOFF WALL NO. REQUIRED = 1

LBS/MARK									
6	810	30- 4	2	1	30- 3	1/4			
90.93									
6	811	30- 4	2	1	30- 3	1/4			
90.93									
4	812	5- 1	31	7	1- 7	1/4	0- 8	0- 7	0- 7
104.39									
10	0	0- 0	0	0					

Concrete Sheet Pile Wall Design

By: RA Date: 7/16/08
Chk: RA Date: 7/16/08

32" x 10" Concrete Sheet Piling

Prestressing Steel Tensile Strength	270	ksi
Unit Stress after losses	1.1	ksi
Section Modulus	720	in^3
Allowable Compressive Stress	2.400	ksi
Allowable Tensile Stress	-0.588	ksi
Concrete Strength	6	ksi
Modulus of Rupture	0.588	ksi

Wall Design Check	Location	Exposed Wall Height (ft)	Required Embedment (ft)	Total Length (ft)	Calculated Moment (kip-ft/ft)	Calculated Moment (kip-in)	Bending Moment Stress (ksi)	Total Stress (Compression)	Check Compression	Total Stress (Tension)	Check Tension
1	Sunset Point	11	27.105	38.5	29.334	880.02	1.2	2.3	OK	-0.1	OK

Wall Segment	Wall Length (ft)	Required # of Sheet Pile	Total Length of Sheet Piles (ft)
1L	58.83	25	962.5
1R	58.83	25	962.5
2L	22	10	330
2R	22	10	330
3L	22	10	330
3R	22	10	330
		Total	3245

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 16-JUL-2008 TIME: 10.36.54

RA 7/16/08

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° INPUT DATA °
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RH 7/16/08

I.--HEADING:
'SUNSET POINT

II.--CONTROL
CANTILEVER WALL DESIGN

LEVEL 1 FACTOR OF SAFETY FOR ACTIVE PRESSURES = 1.00
LEVEL 1 FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.00

III.--WALL DATA
ELEVATION AT TOP OF WALL = 100.00 (FT)

IV.--SURFACE POINT DATA

IV.A--RIGHTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
.00	100.00

IV.B-- LEFTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
.00	89.00

V.--SOIL LAYER DATA

V.A.--RIGHTSIDE LAYER DATA
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURES = 1.00
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.00

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
110.00	110.00	30.00	.0	.00	.0			DEF	DEF

V.B.-- LEFTSIDE LAYER DATA
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURES = 1.00
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.00

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
110.00	110.00	30.00	.0	.00	.0			DEF	DEF

VI.--WATER DATA

UNIT WEIGHT = 62.40 (PCF)
RIGHTSIDE ELEVATION = 89.00 (FT)
LEFTSIDE ELEVATION = 89.00 (FT)
NO SEEPAGE

VII.--SURFACE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS
DATE: 16-JUL-2008 TIME: 10.37.33

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° SUMMARY OF RESULTS FOR °
° CANTILEVER WALL DESIGN °
È͸¼

I.--HEADING

'SUNSET POINT

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

WALL BOTTOM ELEV. (FT) : 70.93
PENETRATION (FT) : 18.07

MAX. BEND. MOMENT (LB-FT) : 29334.
AT ELEVATION (FT) : 79.11

MAX. SCALED DEFL. (LB-IN3): 1.2256E+10
AT ELEVATION (FT) : 100.00

(NOTE: DIVIDE SCALED DEFLECTION BY MODULUS OF
ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA
IN IN**4 TO OBTAIN DEFLECTION IN INCHES.)

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS
DATE: 16-JUL-2008 TIME: 10.37.33

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° COMPLETE RESULTS FOR °
° CANTILEVER WALL DESIGN °
È͸¼

I.--HEADING

'SUNSET POINT

II.--RESULTS

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN3)	NET PRESSURE (PSF)
100.00	0.	0.	1.2256E+10	.00
99.00	6.	18.	1.1613E+10	36.67
98.00	49.	73.	1.0970E+10	73.33
97.00	165.	165.	1.0327E+10	110.00
96.00	391.	293.	9.6850E+09	146.67
95.00	764.	458.	9.0433E+09	183.33
94.00	1320.	660.	8.4030E+09	220.00
93.00	2096.	898.	7.7649E+09	256.67
92.00	3129.	1173.	7.1306E+09	293.33
91.00	4455.	1485.	6.5017E+09	330.00
90.00	6111.	1833.	5.8805E+09	366.67
89.00	8134.	2218.	5.2700E+09	403.33

88.00	10533.	2558.	4.6735E+09	276.40
87.00	13208.	2771.	4.0953E+09	149.47
86.00	16033.	2857.	3.5400E+09	22.53
85.82	16540.	2859.	3.4442E+09	.00
85.41	17714.	2848.	3.2257E+09	-52.20
85.00	18880.	2816.	3.0123E+09	-104.40
84.00	21623.	2648.	2.5173E+09	-231.33
83.00	24134.	2354.	2.0596E+09	-358.27
82.00	26288.	1932.	1.6436E+09	-485.20
81.00	27956.	1383.	1.2729E+09	-612.13
80.00	29011.	708.	9.5039E+08	-739.07
79.00	29328.	-95.	6.7794E+08	-866.00
78.00	28779.	-1024.	4.5604E+08	-992.93
77.00	27237.	-2081.	2.8373E+08	-1119.87
76.00	24575.	-3264.	1.5833E+08	-1246.80
75.00	20666.	-4574.	7.5207E+07	-1373.73
74.00	15384.	-6012.	2.7603E+07	-1500.67
73.80	14168.	-6310.	2.1655E+07	-1525.72
73.00	8835.	-6699.	6.3782E+06	557.50
72.00	2848.	-4844.	5.0164E+05	3153.08
71.00	13.	-393.	8.6950E+00	5748.67
70.93	0.	0.	0.0000E+00	5923.34

(NOTE: DIVIDE SCALED DEFLECTION BY MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN**4 TO OBTAIN DEFLECTION IN INCHES.)

III.--SOIL PRESSURES

ELEVATION	< LEFTSIDE PRESSURE (PSF) >		<RIGHTSIDE PRESSURE (PSF) >	
(FT)	PASSIVE	ACTIVE	ACTIVE	PASSIVE
100.00	0.	0.	0.	0.
99.00	0.	0.	37.	330.
98.00	0.	0.	73.	660.
97.00	0.	0.	110.	990.
96.00	0.	0.	147.	1320.
95.00	0.	0.	183.	1650.
94.00	0.	0.	220.	1980.
93.00	0.	0.	257.	2310.
92.00	0.	0.	293.	2640.
91.00	0.	0.	330.	2970.
90.00	0.	0.	367.	3300.
89.00	0.	0.	403.	3630.
88.00	143.	16.	419.	3773.
87.00	286.	32.	435.	3916.
86.00	428.	48.	451.	4058.
85.82	454.	50.	454.	4084.
85.41	512.	57.	460.	4142.
85.00	571.	63.	467.	4201.
84.00	714.	79.	483.	4344.
83.00	857.	95.	499.	4487.
82.00	1000.	111.	514.	4630.
81.00	1142.	127.	530.	4772.
80.00	1285.	143.	546.	4915.
79.00	1428.	159.	562.	5058.
78.00	1571.	175.	578.	5201.
77.00	1714.	190.	594.	5344.
76.00	1856.	206.	610.	5486.
75.00	1999.	222.	625.	5629.
74.00	2142.	238.	641.	5772.
73.80	2170.	241.	644.	5800.
73.00	2285.	254.	657.	5915.
72.00	2428.	270.	673.	6058.
71.00	2570.	286.	689.	6200.
70.93	2713.	301.	705.	6343.
69.00	2856.	317.	721.	6486.

Appendix C

Bridge Development Geotechnical Report

PRELIMINARY GEOTECHNICAL
REPORT TO SUPPORT BDR
SUNSET POINT ROAD (CR 576)
IMPROVEMENTS
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

Information To Build On
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Information To Build On
Engineering • Consulting • Testing

March 6, 2008

Pinellas County Public Works
440 Court Street
Clearwater, Florida 33756

Attention: Mr. Robert Guercia, P.E.

RE: Preliminary Geotechnical Report
To Support BDR
Sunset Point Road Improvements
Spring Branch Creek Bridge
Pinellas County, Florida
PSI Project No. 775-75056

Dear Mr. Guercia:

Professional Service Industries, Inc. (PSI) is pleased to submit this Preliminary Geotechnical Report to support the BDR for the proposed Spring Branch Creek Bridge associated with the Sunset Point Road (CR 576) improvements in Pinellas County, Florida. The study was authorized by the Public Works/Road and Street Facilities Department of Pinellas County (Purchase Order No. 226550) and performed in accordance with PSI Proposal No. 775-7G0039 (Rev. 1) dated October 23, 2007.

The following report presents the results of our preliminary study which includes a field testing program, preliminary foundation design analyses and our preliminary opinions regarding appropriate foundation alternatives for possible bridge structures associated the planned roadway improvements. The Load Resistance Factor Design (LRFD) method was used for the preliminary foundation analysis. Field and laboratory classification services were provided by PSI.

PSI appreciates the opportunity of providing our services to Pinellas County on this project. If you have any questions concerning the contents of this report or need additional information, please do not hesitate to contact our office.

Sincerely,

Professional Service Industries, Inc.
Certificate of Authorization No. 3684

Ruben Sosa, Jr., P.E.
Project Engineer
Florida License No. 61847

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Chief Engineer
Florida License No. 36115

RS/LL. 775-75056 BDR.doc

Attachments: Appendix

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 PROJECT DESCRIPTION 1
1.2 SITE DESCRIPTION 1

2.0 PROJECT APPROACH 1

3.0 GENERAL SITE GEOLOGY 2
3.1 REGIONAL GEOLOGY 2
3.2 PINELLAS COUNTY USDA SOIL SURVEY 3
3.3 USGS TOPOGRAPHICAL SURVEY 3
3.4 SUBSURFACE SOIL CONDITIONS 3
3.5 GROUNDWATER 3
3.6 POTENTIOMETRIC SURFACE CONDITIONS 3
3.7 ENVIRONMENTAL CLASSIFICATION (CORROSION SERIES) 4

4.0 PRELIMINARY BRIDGE FOUNDATION EVALUATION 4
4.1 FOUNDATION ALTERNATIVES FOR BRIDGE STRUCTURES 4
4.2 SHALLOW FOUNDATIONS 4
4.3 DEEP FOUNDATIONS 5
4.3.1 STEEL PILES 5
4.3.2 DRILLED SHAFTS 5
4.3.3 PRECAST PRESTRESSED CONCRETE PILES 5
4.3.3.1 DOWNDRAG (NEGATIVE SKIN FRICTION) 6
4.3.3.2 AXIAL CAPACITY 6
4.3.3.3 VIBRATION CONCERNS 6

5.0 REPORT LIMITATIONS 7

APPENDIX A

SUMMARY OF USDA SOIL SURVEY ..... TABLE 1
SUMMARY OF CORROSION TEST RESULTS ..... TABLE 2

APPENDIX B

USDA & USGS SOIL SURVEY MAPS ..... SHEET 1
REPORT OF CORE BORINGS ..... SHEET 2

APPENDIX C

PRESTRESSED CONCRETE PILE AXIAL CAPACITY CURVES ..... PLATE 1

APPENDIX D

SAMPLE COMPUTER OUTPUTS AND CALCULATIONS

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

This study is to support the design of proposed improvements to Sunset Point Road (CR 576) between Edgewater Drive (U.S. Alternate 19) and Keene Road in Pinellas County, Florida. The total length of the project is approximately 2 miles. Planned improvements include the following:

- Providing a 4-lane typical section from Keene Road to Highland Avenue (0.75 miles).
- Providing a 3-lane typical section from Highland Avenue to Douglas Avenue (0.75 miles)
- Evaluate roadway grades from Douglas (0.5 miles) Avenue to Edgewater Drive (0.5 miles)
- Two pond sites
- Replacement of Spring Branch Creek Bridge
- Mast arm signals at Betty Lane, Douglas Avenue, Highland Avenue and Kings Highway

Along with widening and reconstruction, storm water drainage facilities, curbs, gutters and sidewalks are also planned. The report presented herein is intended to be used to support the design of a possible bridge structure crossing Spring Branch Creek associated with this project. The existing road alignment is shown on **Sheet 1** in Appendix **B** of this report.

1.2 SITE DESCRIPTION

The project alignment is located in Pinellas County, Florida within Sections 2 and 3, Township 29 South, Range 15 East as shown on **Sheet 1** in **Appendix B** of this report. Based primarily on published information, the elevation within the area of the bridge replacement is near +25 feet National Geodetic Vertical Datum of 1929 (NGVD). The existing bridge is a large culvert over Spring Branch Creek and lies within a primarily residential area.

2.0 PROJECT APPROACH

The purpose of this study is to provide preliminary geotechnical recommendations to guide the design and construction of a possible bridge structure. This preliminary report includes our preliminary recommendations for the feasible foundation system based on the existing geotechnical information. The following services were provided in order to achieve the preceding objective:

1. Conducted a general visual reconnaissance of the site. Reviewed readily available published soils and topographic information. Reviewed the "Soil

Survey of Pinellas County, Florida" published by the United States Department of Agriculture (USDA), the "Clearwater, Florida" Quadrangle Map published by the United States Geologic Survey (USGS), and the map "Potentiometric Surface of the Upper Floridan Aquifer, West-Central Florida, May 2005" published by the USGS.

2. Planned and performed a subsurface investigation consisting of one (1) SPT boring to an approximate depth of 75 feet below existing grades for the proposed bridge replacement.

3. Inspected retained soil samples for visual classification.

4. Reviewed field data and collected subsurface information, then evaluated that data for various foundation systems.

5. Prepared this preliminary geotechnical engineering report summarizing our field testing and laboratory classification, subsurface soil and groundwater conditions and preliminary evaluations and design recommendations

This report begins with a discussion of the field testing program followed by a description of the regional geology and the encountered general subsurface conditions. Preliminary evaluations are then presented for various foundation alternatives. All tables associated with the text in the report are presented in **Appendix A.** Specifically, the Pinellas County USDA soil survey information for the proposed structure is presented on **Table 1**. The USDA and USGS Vicinity Maps for the bridge site are presented on **Sheet 1** in **Appendix B.** An aerial photograph indicating the location of the PSI boring performed as part of this study and a soil profile for this boring is presented on **Sheet 2** in **Appendix B**. An axial capacity curve is included in **Appendix C** and sample calculations and computer outputs are presented in **Appendix D**.

3.0 GENERAL SITE GEOLOGY

3.1 REGIONAL GEOLOGY

Within Pinellas County, the uppermost soil layers generally consist of young undifferentiated sediments underlain by the Hawthorn Group of formations. The Hawthorn consists of fine to medium grained quartz sands, silt, clay and limestone in varying proportions and thicknesses. Beneath the Hawthorn lies the Ocala Limestone Formation. The surface of the Ocala formation is locally very irregular. The upper part of the Ocala Limestone is a white, generally soft, somewhat friable, porous coquina composed of large foraminifera, bryozoan fragments and whole to broken echinoid remains, all loosely bound by a matrix of micritic limestone. The lower part of the Ocala Limestone consists of cream to white, generally fine-grained, soft to

semi-indurated, micritic limestone containing abundant miliolid remains and scattered large foraminiferas.

3.2 PINELLAS COUNTY USDA SOIL SURVEY

The Soil Survey of Pinellas County, Florida, published by the USDA SCS has been reviewed for the project vicinity. The soil survey shows one (1) mapping unit at the proposed structure location. The mapped soil unit encountered is summarized in **Table 1** in **Appendix A**. It should be noted that information contained in the USDA Soil Survey is very general and may be outdated. It may not therefore be reflective of actual soil and groundwater conditions.

3.3 USGS TOPOGRAPHICAL SURVEY

The published USGS topographic survey map entitled "Clearwater, Florida" was reviewed for ground surface features along the project route. Based on this review, the natural ground surface elevations within the vicinity of the bridge is approximately +25 feet, NGVD. A reproduction of the USGS topographic map for the project vicinity is presented on **Sheet 1** in **Appendix B**.

3.4 SUBSURFACE SOIL CONDITIONS

The results of the SPT boring performed for the design of the possible bridge structure are presented on the Report of Core Borings sheet (**Sheet 2** in **Appendix B**) in the form of a soil profile, along with the profile legend and other pertinent information such as measured groundwater levels and laboratory classifications. In general, the soil encountered in the borings typically consisted of medium dense sands overlying stiff to very stiff clay. Limestone was encountered below the clays.

3.5 GROUNDWATER

The groundwater table was not apparent in the SPT boring performed for the bridge structure. It should be noted that when performing SPT borings, the use of drilling mud limits the ability to obtain accurate groundwater table measurements.

Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, tidal variations as well as man-made influences, such as existing swales, canals, drainage ponds, underdrains and areas of covered soil (paved parking lots, side walks, etc).

3.6 POTENTIOMETRIC SURFACE CONDITIONS

Based on a review of the map "Potentiometric Surface of the Upper Floridan Aquifer System, West-Central Florida, May 2005" published by the USGS, the potentiometric surface elevation of the upper Floridan Aquifer in the project vicinity is less than +10 feet, NGVD. The SPT boring performed at the project site did not encounter an artesian flow condition during the field

exploration. Although unlikely, the contractor should be prepared to handle potential artesian conditions in the vicinity of the project area.

3.7 ENVIRONMENTAL CLASSIFICATION (CORROSION SERIES)

Environmental corrosion tests were conducted in accordance with the FDOT test designations FM 5-550, FM 5-551, FM 5-552 and FM 5-553. These tests were performed on recovered soil from the SPT boring and a water sample collected from the creek. Environmental corrosion tests measure parameters such as pH, resistivity, sulfate content and chloride content. Test results obtained are presented in **Table 3** in **Appendix A**. Based on the laboratory test results and FDOT's "Structures Design Guidelines", we recommend the subsurface environment be classified as moderately aggressive for both steel and concrete.

4.0 PRELIMINARY BRIDGE FOUNDATION EVALUATION

4.1 FOUNDATION ALTERNATIVES FOR BRIDGE STRUCTURES

Bridge structures can be supported on shallow or deep foundation systems depending on the soil conditions, site characteristics, design criteria, construction considerations and cost. In Florida, the typical shallow foundation type used to support bridge structures is spread footings, while the deep foundations include steel piles, prestressed concrete piles and drilled shafts. A preliminary evaluation of the foundation alternatives was performed using the Load Resistance Factor Design (LRFD) methodology to provide design information for this Bridge Development Report (BDR). The results are presented in the following sections.

4.2 SHALLOW FOUNDATIONS

With shallow foundation systems, the structure loads are supported by the bearing capacity of the foundation soils. The design of shallow foundations is typically governed by the allowable soil bearing capacity and the total and differential settlement criteria. The surficial soils throughout the project site will most likely require soil improvement to achieve an adequate bearing resistance and minimize the potential for differential settlements. This soil improvement may require excavation with dewatering and densification techniques which will significantly increase construction costs. In addition, maintenance of traffic impacts, prolonged construction timing and staging requirements for construction adjacent to existing traffic usually interfere with the efficiencies of soil improvement operation. Furthermore, spread foundations will likely require some sort of protection against scour from the adjacent creek. Therefore, considering the associated high costs due to the impact of the soil improvement operations, maintenance of traffic and scour protection, shallow foundations will not be considered further.

4.3 DEEP FOUNDATIONS

Typical deep foundation systems used in Florida to support bridge structures are steel piles including pipe piles and H-piles, square prestressed concrete piles and drilled shafts. Each of these foundation systems are discussed in further detail in subsequent sections.

4.3.1 STEEL PILES

Steel pile types include pipe piles and H-sections. Previous experience has shown that steel piles are generally more expensive than precast prestressed concrete piles for the same required design load. Typical sizes of steel pipe piles range from 13 to 20 inches in diameter. A 16-inch steel pipe pile does not develop as much capacity for similar penetration depths as square concrete piles. Steel H-sections are inappropriate for this project because of inferior capacities compared to pipe piles at similar costs. This is also a moderately aggressive environment. As a result, steel piles will not be considered further.

4.3.2 DRILLED SHAFTS

Drilled cast-in place straight sided concrete shafts are a feasible foundation alternative. Drilled shafts have the advantage of being able to develop high axial and lateral capacities in a single unit. The other advantage is that the magnitude of construction vibration during the installation of the drilled shaft is much less than the vibration during the pile driving operation. However, the quality control of the drilled shaft installation requires more engineering judgement, inspection and precaution compared with driven piles to be certain the specifications are being met. This type of foundation system is often the chosen alternative for sites where limestone or very dense bearing strata are present at a relatively shallow depth. Based on the performed SPT boring, a limestone layer was encountered at a depth of approximately 35 feet. However, expected loads are relatively low and redundancy requirements necessitate using several small-diameter shafts likely resulting in an overly conservative design. Also, the occurrence of soils advanced under the weight of rod (WR) and 100 percent loss of drilling fluid circulation in the boring performed during our drilling operation indicate that significant concrete volume overruns may occur during construction of drilled shafts due to possible voids. The quantity of concrete coupled with an overly conservative design does not appear to be cost effective when compared to driven pile foundations. As a result, we did not consider this alternative further.

4.3.3 PRECAST PRESTRESSED CONCRETE PILES

Prestressed concrete piles are a feasible foundation alternative. They are a widely used and proven foundation system in Central Florida. The minimum size for prestressed concrete piles should be 18 inch square, as referenced in the FDOT Structures Design Guidelines. Precast prestressed piles are readily available and generally have a lower cost per ton of capacity than other pile types. A disadvantage of the precast prestressed concrete piles is the potential impact the driving operation may have on nearby existing structures. Concerns of driving

through dense soils generally can be minimized through the use of pre-drilled holes or jetting to achieve the recommended penetration.

4.3.3.1 DOWNDRAG (NEGATIVE SKIN FRICTION)

Based on the soil conditions encountered in the SPT borings and because significant filling is not anticipated, downdrag is not expected for the precast concrete pile alternative.

4.3.3.2 AXIAL CAPACITY

As noted earlier, specific details regarding the planned roadway improvements were not available. Similarly, expected loading conditions for the possible bridge structure were not available. Therefore as part of this preliminary study, axial capacity curves are included in **Appendix C**. For the boring performed, the curves show the estimated Davisson Capacity with depth for square 18-inch and 24-inch precast prestressed concrete piles. Estimated scour depths were not available. Therefore, the attached capacity curves do not consider scour.

The curves were computed using the FDOT computer program SPT-97. The required Davisson axial capacities should be determined by dividing the factored load plus net scour resistance and downdrag by a resistance factor ϕ of 0.65 on the condition that dynamic load testing will be performed.

$$\text{Nominal Bearing Resistance} = \frac{\text{(Factored Design Load)} + \text{(Downdrag)} + \text{(Net Scour Resistance)}}{0.65}$$

The axial capacities were calculated anticipating both end bearing and skin friction for the piling. Based on the analysis, the Maximum Nominal Bearing Resistance allowed by FDOT guidelines (300 tons for 18-inch and 400 tons for 24-inch piles) is expected to be achieved at approximate depths of 40 to 55 feet.

4.3.3.3 VIBRATION CONCERNS

Noise and vibration impacts from driven pile installation should also be considered. Due to the distance to existing structures, noise considerations exist but are believed to be less critical than vibration impacts. Existing structures include homes nearby the bridge alignment. We recommend the contractor provide surveys and settlement/vibration monitoring as per FDOT Standard Specifications.

5.0 REPORT LIMITATIONS

Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This company is not responsible for the conclusions, opinions or recommendations made by others based on these data.

The analyses and recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated and does not reflect any variations which may occur among these borings. If any subsoil variations become evident during the course of construction, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. When final design plans and specifications are available, a general review by our office is made to check that the assumptions made in preparation of this report are correct and that earthwork and foundation recommendations are properly interpreted and implemented. The applicability of the report should also be reviewed in the event significant changes occur in the design, nature or location of the proposed structure.

The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils or other unusual conditions observed are strictly for the information of our client.

APPENDIX A

TABLES

TABLE 1
SUMMARY OF USDA SOIL SURVEY
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

USDA Map Symbol and Soil Name	Classification				Seasonal High Water Table			Risk of Corrosion	
	Depth (inch)	AASHTO Group	USCS Group	Permeability (in/hr)	Depth (ft)	Kind	Month	Uncoated Steel	Concrete
(My) Myakka fine sand	0-16	A-3	SP,SP-SM	6.3-20	<0.8	----	----	High	High
	16-25	A-3	SP-SM, SM	0.63-2.0					

TABLE 2
SUMMARY OF CORROSION TEST RESULTS
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

BORING NUMBER	BORING LOCATION[1]		SAMPLE DEPTH (feet)	pH	CHLORIDES (ppm)	SULFATES (ppm)	RESISTIVITY (ohm-cm)	SUBSTRUCTURE ENVIRONMENTAL CLASSIFICATION[2]	
	STATION (feet)	OFFSET (feet)						STEEL	CONCRETE
B-3	---	---	2 - 4	6.2	120	<3	2.000	Moderately Aggressive	Moderately Aggressive
creek water sample	N/A	N/A	N/A	6.5	160	<3	2.300	Moderately Aggressive	Moderately Aggressive

(1) Stations and off-sets were not available and will be provided in the final report

(2) Governing factor for Environmental Classification for steel and concrete is resistivity less than 3000 ohm-cm

APPENDIX B

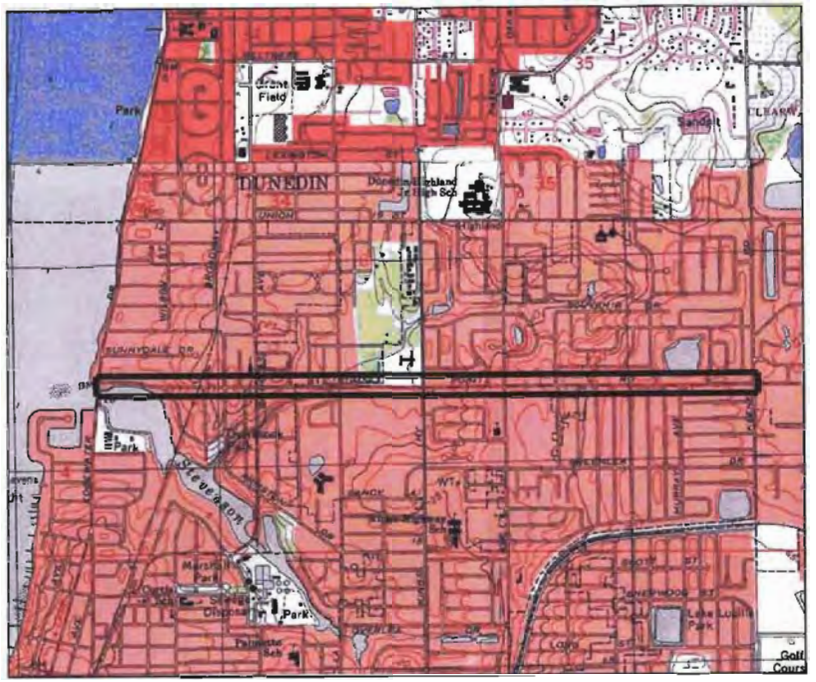
SHEETS

APPROXIMATE SITE LOCATION

REFERENCE: USDA SCS, "SOIL SURVEY OF PINELLAS COUNTY, FLORIDA"
TOWNSHIP: 29 SOUTH
RANGE: 15 EAST
SECTION: 2 & 3
ISSUED: 1972
PHOTO: 1970
SCALE: 1" = 2000'

USDA VICINITY MAP

APPROXIMATE SITE LOCATION



REFERENCE: USGS "CLEARWATER, FLORIDA" QUADRANGLE MAP
TOWNSHIP: 29 SOUTH
RANGE: 15 EAST
SECTION: 2 & 3
ISSUED: 2001
PHOTOREVISED: –
SCALE: 1" = 2000'

USGS VICINITY MAP

DRAWN	AN
CHECKED	RS
APPROVED	MEM
SCALE	NOTED

USDA & USGS VICINITY MAPS
SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DR.) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA

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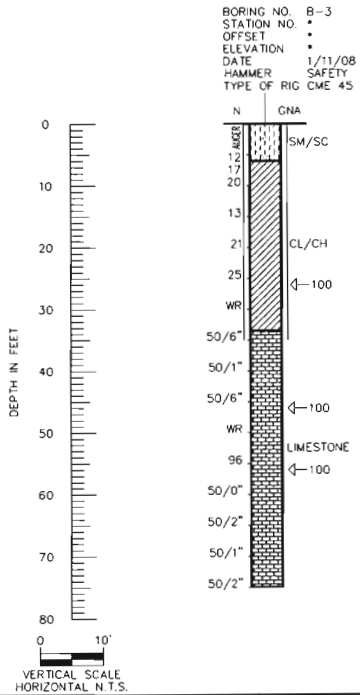
DATE	PROJ NO.	SHEET
FEB 08	775-75056	SHEET 1

BORING LOCATION PLAN

0 100'
PLAN SCALE

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3



LEGEND

- (SP/SP-SM), BROWN TO LIGHT BROWN CLEAN TO SLIGHTLY SILTY FINE SAND
- (SM/SC), BROWN, VERY LIGHT BROWN AND GRAY SILTY TO CLAYEY FINE SAND
- (CL/CH), GRAY AND BLUE-GREEN SILTY CLAY
- VERY PALE BROWN HIGHLY WEATHERED LIMESTONE

NOTES:

- WATER TABLE
- N — NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12" PENETRATION. (UNLESS OTHERWISE NOTED.)
- WR — FELL UNDER WEIGHT OF ROD
- ◁— LOSS OF CIRCULATION (%)
- GNA — GROUNDWATER LEVEL NOT APPARENT
- 50/6" — FIFTY BLOWS FOR SIX INCHES
- APPROXIMATE SPT BORING LOCATION
- * — STATIONS, OFFSETS AND ELEVATIONS WILL BE PROVIDED IN FINAL REPORT.
- -200 — FINES PASSING NO. 200 SIEVE (%)
- LL — LIQUID LIMIT (%)
- PI — PLASTICITY INDEX (%)
- CASING USED

ENVIRONMENTAL CLASSIFICATION

SOIL

SUBSTRUCTURE: MODERATELY AGGRESSIVE (RESISTIVITY=2,000 OHMS)

RESISTIVITY:	2,000 OHMS-CM
CHLORIDES:	120 PPM
SULFATES:	< 3 PPM
pH:	6.2

WATER

SUBSTRUCTURE: MODERATELY AGGRESSIVE (RESISTIVITY=2,300 OHMS)

RESISTIVITY:	2,300 OHMS-CM
CHLORIDES:	160 PPM
SULFATES:	< 3 PPM
pH:	6.5

GRANULAR MATERIALS - RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4-10
MEDIUM	10-30
DENSE	30-50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2-4
FIRM	4-8
STIFF	8-15
VERY STIFF	15-30
HARD	GREATER THAN 30

SPRING BRANCH CREEK BRIDGE

REVISIONS					
Date	By	Description	Date	By	Description

	Name	Date
Drawn by	AM	2/08
Checked by	RS	2/08
Designed by		
Checked by		
Approved by	CHING L. KUO, Ph.D., P.E.	

PROFESSIONAL SERVICE INDUSTRIES, INC.
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TAMPA, FL. 33634
(813)-886-1075
FLORIDA ENGINEERING CERTIFICATE OF AUTHORIZATION No. 3684

CHING L. KUO, Ph.D., P.E.
FLORIDA LICENSE No. 36115

FLORIDA DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
C.R. 576	PINELLAS	-

SHEET TITLE: REPORT OF CORE BORINGS

PROJECT NAME: SUNSET POINT ROAD (CR 576) FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

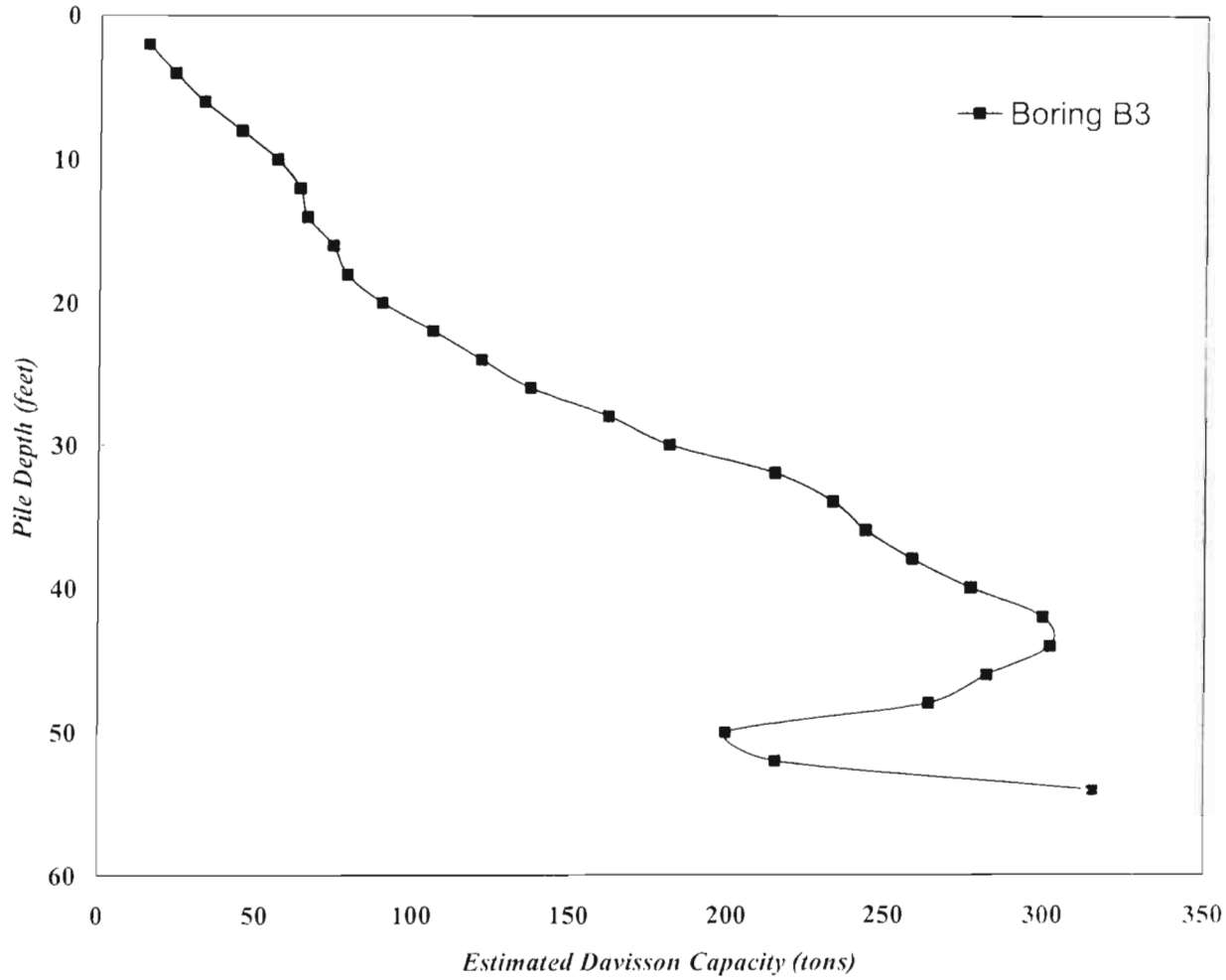
PSI PROJECT No. 775-75056
SHEET 1B

P:\775-Cad\NEW\Drawings\Sheet1.dgn

APPENDIX C

PLATES

Sunset Point Road
--- 18-inch Precast Prestressed Concrete Pile --



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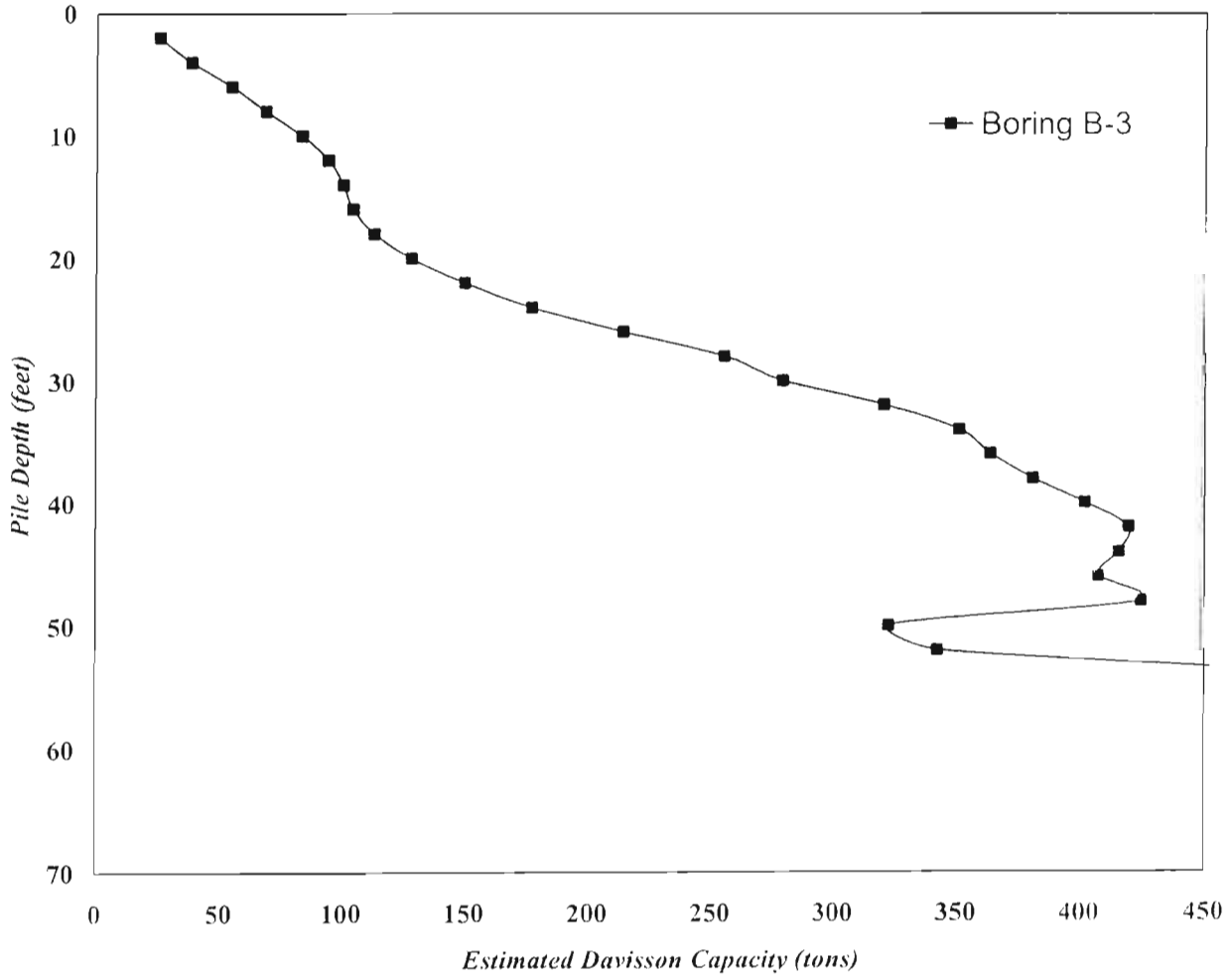
Estimated Davisson Pile Capacities
Sunset Point Road

DRAWN	SCALE	PROJ NO
RS		775-75056
CHECKED	DATE	
LTL	3/3/2008	PLATE 1

Sunset Point Road
--- 24-inch Precast Prestressed Concrete Pile --



psi Information To Build On
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Estimated Davisson Pile Capacities Sunset Point Road	DRAWN	SCALE	PROJ NO
	RS		775-75056
	CHECKED	DATE	
	ALG	3/3/2008	PLATE 2

APPENDIX E

SAMPLE COMPUTER OUTPUTS AND CALCULATIONS

FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN OFFICE
STATIC PILE BEARING CAPACITY ANALYSIS PROGRAM
SPT97 - VERSION 1.2 FEBRUARY, 1997
BASED ON RESEARCH BULLETIN RB-121
"GUIDELINES FOR USE IN THE SOILS INVESTIGATION
AND DESIGN OF FOUNDATIONS FOR
BRIDGE STRUCTURES IN THE STATE OF FLORIDA" AND
RESEARCH STUDY REPORT BY UNIVERSITY OF FLORIDA
"DESIGN OF STEEL PIPE AND H PILES"

NOTE - THIS PROGRAM IS EXPANDED FROM SPT91
IS ALSO KNOWN AS SPT94
TO INCLUDE STEEL H AND PIPE PILES

A. GENERAL INFORMATION

INPUT FILE NAME	B-3.in
RUN DATE	03/06/08
RUN TIME	09:54:02
PROJECT NUMBER	775-75056
JOB NAME	Sunset Point Road
SUBMITTING ENGINEER	R. Sosa
BORING NO.	B-3
DRILLING DATE	1/11/08
STATION NO.	
GROUND SURFACE ELEVATION	0.00 FEET
TYPE OF ANALYSIS	2 - DETERMINATION OF STATIC PILE BEARING CAPACITIES FOR A RANGE OF PILE LENGTHS (CAPACITY VS. TIP ELEVATION)

B. BORING LOG

ENTRY NO.	DEPTH (FT) D(I)	ELEVATION (FT)	SPT BLOWS/FT N(I)	SOIL TYPE ST(I)

1	0.0	0.0	12.0	1
2	4.0	-4.0	12.0	1
3	5.9	-5.9	12.0	3
4	6.0	-6.0	17.0	1
5	8.0	-8.0	20.0	1
6	13.4	-13.4	20.0	3
7	13.5	-13.5	13.0	1
8	18.4	-18.4	13.0	3
9	18.5	-18.5	21.0	1
10	23.5	-23.5	25.0	1
11	28.4	-28.4	25.0	3
12	28.5	-28.5	0.0	1
13	33.5	-33.5	100.0	4
14	38.5	-38.5	100.0	4
15	43.5	-43.5	100.0	4
16	48.4	-48.4	100.0	3
17	48.5	-48.5	0.0	4
18	53.4	-53.4	0.0	3
19	53.5	-53.5	100.0	4
20	58.8	-58.8	100.0	4
21	63.5	-63.5	100.0	4
22	68.5	-68.5	100.0	4
23	73.5	-73.5	100.0	4

SOIL TYPE LEGEND

0 - BOTTOM OF BORING
1 - PLASTIC CLAYS
2 - CLAY/SILT SAND MIXTURES, SILTS & MARLS
3 - CLEAN SAND
4 - SOFT LIMESTONE, VERY SHELLY SANDS
5 - VOID (NO CAPACITY)

C. PILE INFORMATION

TEST PILE SECTION ISECT = 1
{concrete pile, square section}

WIDTH OF PILE WP = 18.00 INCHES

D. PILE CAPACITY VS. PENETRATION

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
2.0	-2.0	6.64	8.57	15.21	7.60	32.35
4.0	-4.0	13.42	10.12	23.54	11.77	43.79
6.0	-6.0	19.04	13.63	32.67	16.33	59.93

8.0	-8.0	27.17	17.45	44.62	22.31	79.51
10.0	-10.0	36.49	19.58	56.07	28.03	95.23
12.0	-12.0	44.01	19.17	63.18	31.59	101.53
14.0	-14.0	52.01	13.52	65.53	32.77	92.58
16.0	-16.0	58.16	15.53	73.69	36.84	104.74
18.0	-18.0	62.43	15.80	78.23	39.12	109.83
20.0	-20.0	71.41	18.23	89.64	44.82	126.10
22.0	-22.0	81.97	23.85	105.82	52.91	153.52
24.0	-24.0	94.39	26.92	121.30	60.65	175.14
26.0	-26.0	105.03	31.97	137.00	68.50	200.95
28.0	-28.0	112.88	48.93	161.81	80.90	259.67
30.0	-30.0	116.69	64.52	181.21	90.60	310.24
32.0	-32.0	119.70	95.19	214.90	107.45	405.29
34.0	-34.0	126.79	106.70	233.49	116.74	446.88
36.0	-36.0	133.06	110.83	243.89	121.94	465.54
38.0	-38.0	138.81	119.88	258.68	129.34	498.43
40.0	-40.0	144.68	132.37	277.05	138.53	541.79
42.0	-42.0	150.87	148.79	299.65	149.83	597.22
44.0	-44.0	158.01	143.88	301.89	150.94	589.64
46.0	-46.0	166.98	115.13	282.11	141.05	512.37
48.0	-48.0	178.40	85.65	264.05	132.03	435.35
50.0	-50.0	186.96	12.34	199.31	99.65	223.99
52.0	-52.0	186.96	28.46	215.42	107.71	272.33
54.0	-54.0	188.94	126.38	315.32	157.66	568.07
56.0	-56.0	196.14	126.38	322.52	161.26	575.28
58.0	-58.0	203.30	126.61	329.91	164.96	583.14
60.0	-60.0	210.36	127.49	337.86	168.93	592.84
62.0	-62.0	216.31	138.03	354.33	177.17	630.39

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 64.00 FT

D. PILE CAPACITY VS. PENETRATION (CONTINUED)

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.

PROBLEM COMPLETED ANALYSIS NO. 3

C. PILE INFORMATION
==========

TEST PILE SECTION ISECT = 1
{concrete pile, square section}
WIDTH OF PILE WP = 24.00 INCHES

D. PILE CAPACITY VS. PENETRATION
==========

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
2.0	-2.0	9.39	15.91	25.31	12.65	57.14
4.0	-4.0	17.51	20.51	38.01	19.01	79.03
6.0	-6.0	25.39	29.11	54.50	27.25	112.71
8.0	-8.0	38.18	30.20	68.38	34.19	128.78
10.0	-10.0	50.15	33.08	83.22	41.61	149.38
12.0	-12.0	60.05	33.96	94.01	47.01	161.94
14.0	-14.0	69.35	30.78	100.13	50.06	161.69
16.0	-16.0	77.55	26.39	103.94	51.97	156.72
18.0	-18.0	83.25	29.35	112.60	56.30	171.30
20.0	-20.0	94.54	33.38	127.91	63.96	194.66
22.0	-22.0	107.54	42.11	149.65	74.83	233.88
24.0	-24.0	123.78	53.01	176.78	88.39	282.80
26.0	-26.0	138.03	75.95	213.97	106.99	365.86
28.0	-28.0	148.64	106.43	255.07	127.53	467.94
30.0	-30.0	155.64	123.35	278.99	139.49	525.68
32.0	-32.0	159.54	160.65	320.19	160.10	641.49
34.0	-34.0	169.08	181.69	350.77	175.39	714.16
36.0	-36.0	177.66	185.70	363.36	181.68	734.77
38.0	-38.0	185.41	195.09	380.50	190.25	770.67
40.0	-40.0	192.99	208.78	401.77	200.88	819.33
42.0	-42.0	201.74	217.71	419.45	209.73	854.88
44.0	-44.0	214.07	201.47	415.54	207.77	818.48
46.0	-46.0	228.90	178.48	407.38	203.69	764.34
48.0	-48.0	244.63	180.06	424.69	212.34	784.81
50.0	-50.0	249.28	73.03	322.31	161.16	468.37
52.0	-52.0	249.28	93.04	342.33	171.16	528.41
54.0	-54.0	251.92	240.50	492.42	246.21	973.42
56.0	-56.0	261.52	240.50	502.02	251.01	983.02
58.0	-58.0	271.12	240.50	511.62	255.81	992.62
60.0	-60.0	280.72	240.51	521.23	260.62	1002.26

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 62.00 FT

D. PILE CAPACITY VS. PENETRATION (CONTINUED)

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.

PROBLEM COMPLETED ANALYSIS NO. 4

Appendix D

Geotechnical Reports

Information To Build On
Engineering • Consulting • Testing

PRELIMINARY GEOTECHNICAL REPORT
SUNSET POINT ROAD (CR 576)
IMPROVEMENTS
BETWEEN EDGEWATER DRIVE (US ALT 19)
AND KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

Information To Build On
Engineering • Consulting • Testing

February 18, 2008

Pinellas County Public Works
440 Court Street
Clearwater, Florida 33756

Attention: Mr. Robert Guercia, P.E.

Re: Preliminary Geotechnical Report
Sunset Point Road (CR 576) Improvements
Between Edgewater Drive (US Alt 19) and Keene Road
Pinellas County, Florida
PSI Project No. 775-75056

Dear Mr. Guercia:

Professional Service Industries, Incorporated (PSI) is pleased to submit this Preliminary Geotechnical Report for the proposed improvements to Sunset Point Road (CR 576) in Pinellas County, Florida. The study was authorized by the Public Works/Road and Street Facilities Department of Pinellas County (Purchase Order No. 226550) and performed in accordance with PSI Proposal No. 775-7G0039 (Rev. 1) dated October 23, 2007.

This report presents the results of our preliminary geotechnical study for the proposed improvements. Additional services remain to evaluate stormwater pond siting, the Spring Branch Creek Bridge and delineate the horizontal and vertical extent of unsuitable soils as the design progresses. Included in this report are the methods, procedures, field and laboratory test results, and analyses and evaluations for the roadway improvements.

PSI appreciates the opportunity of providing our services to Pinellas County on this project. If you have questions concerning the contents of this report or need additional information, please do not hesitate to contact our office.

Sincerely,

Professional Service Industries, Inc.
Certificate of Authorization No. 3684

Ruben Sosa, Jr., P.E.
Project Engineer
Florida License No. 61847

Lloyd T. Lasher, Jr., P.E.
Principal Consultant
Florida License No. 56794

Ching T. Kuo, Ph.D., P.E.
Chief Engineer
Florida License No. 36115

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TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 PROJECT INFORMATION 1
1.2 SITE DESCRIPTION 1

2.0 SCOPE OF SERVICES 1

3.0 SUBSURFACE EXPLORATION 3
3.1 BORING LOCATIONS, UTILITY CLEARANCE AND TRAFFIC CONTROL 3
3.2 SOIL BORINGS 4
3.3 BULK SAMPLING FOR LIMEROCK BEARING RATIO (LBR) TESTS 4

4.0 LABORATORY TESTING 4
4.1 SOIL CLASSIFICATION TESTING 4
4.2 LIMEROCK BEARING RATIO (LBR) 5

5.0 GENERALIZED SUBSURFACE SOIL CONDITIONS 5
5.1 GENERAL GEOLOGY 5
5.2 PINELLAS USDA SOIL SURVEY 5
5.3 USGS TOPOGRAPHIC SURVEY 6
5.4 SOIL BORING RESULTS 6
5.5 GROUNDWATER 6

6.0 ENGINEERING EVALUATIONS AND RECOMMENDATIONS 7
6.1 PAVEMENT DESIGN CONSIDERATIONS 7
6.2 SOIL USAGE SUMMARY 7
6.3 ENVIRONMENTAL CLASSIFICATION (CORROSION SERIES) 8
6.4 GROUNDWATER CONTROL 8
6.5 GENERAL ROADWAY CONSTRUCTION RECOMMENDATIONS 9
6.6 TEMPORARY SIDE SLOPES 9
6.7 UNUSUAL SITE CONDITIONS 9

7.0 MAST ARM SIGNAL POLES 9

8.0 LIMITATIONS 10

LIST OF TABLES AND SHEETS

APPENDIX A

SUMMARY OF USDA SOIL SURVEY ..... TABLE 1
SUMMARY OF LABORATORY TEST RESULTS ..... TABLE 2
SUMMARY OF SEASONAL HIGH WATER LEVEL DATA ..... TABLE 3
SUMMARY OF LIMEROCK BEARING RATIO TEST RESULTS ..... TABLE 4
SUMMARY OF CORROSION TEST RESULTS ..... TABLE 5
FDOT DESIGN LBR GRAPH ..... FIGURE 1

APPENDIX B

USDA AND USGS SITE VICINITY MAPS ..... SHEET 1
BORING AND TEST LOCATION PLAN ..... SHEETS 2 THROUGH 8
SOIL PROFILES ..... SHEETS 9 THROUGH 12
CROSS SECTION SOILS SURVEY ..... SHEET 13
REPORT OF CORE BORINGS – MAST ARMS ..... SHEETS 14 THROUGH 17
REPORT OF CORE BORINGS – BRIDGE ..... SHEET 18

1.0 INTRODUCTION

1.1 PROJECT INFORMATION

This study is to support the design of proposed improvements to Sunset Point Road (CR 576) between Edgewater Drive (U.S. Alternate 19) and Keene Road in Pinellas County, Florida. The total length of the project is approximately 2 miles. Planned improvements include the following:

- Providing a 4-lane typical section from Keene Road to Highland Avenue (0.75 miles).
- Providing a 3-lane typical section from Highland Avenue to Douglas Avenue (0.75 miles)
- Evaluate roadway grades from Douglas (0.5 miles) Avenue to Edgewater Drive (0.5 miles)
- Two pond sites
- Replacement of Spring Branch Creek Bridge
- Mast arm signals at Betty Lane, Douglas Avenue, Highland Avenue and Kings Highway

Along with widening and reconstruction, storm water drainage facilities, curbs, gutters and sidewalks are also planned. An aerial photograph of the existing roadway is shown on **Sheets 2 through 8** in **Appendix B** of this report.

1.2 SITE DESCRIPTION

The project alignment is located in Pinellas County, Florida within Sections 2 and 3, Township 29 South, Range 15 East as shown on **Sheet 1** in **Appendix B** of this report. Based primarily on published information, the topography of the roadway is gently rolling, with the elevation ranging from approximately 10 to 55 feet NGVD datum, 1929. The alignment traverses a predominately residential area.

2.0 SCOPE OF SERVICES

Our geotechnical engineering services were performed in general accordance with the Pinellas County Scope of Services and PSI proposal No. No. 775-7G0039 (Rev. 1) dated October 23, 2007. The services included performing field reconnaissance, a roadway soil survey, groundwater table measurements, laboratory classification testing and engineering evaluations and design recommendations.

The purpose of this study was to obtain information concerning the general subsurface conditions along the proposed roadway improvement area in order to make engineering evaluations and recommendations in each of the following areas:

1. General assessment of the area geology based on our past experience and study of available geological literature.

2. Development of the general soil profile along the roadway alignment and the anticipated soil conditions within the depth of influence of the proposed improvements.

3. Assessment of the existing soil subgrade and groundwater conditions along the subject alignment for suitability of pavement support.

4. General location and description of potential deleterious materials encountered in the borings which may interfere with construction progress or pavement performance, including existing fills or surficial organics.

5. Discuss site preparation requirements and engineering criteria for placement and compaction of in-situ soils and approved fill materials.

6. Identification of critical design and/or construction considerations based on the soil and groundwater conditions encountered in the borings.

7. Groundwater levels in the borings along the project alignment and estimated seasonal high groundwater levels at the boring locations.

8. Determine soil parameters for the design of mast arms pole foundations.

The scope of services for the geotechnical testing program associated with the roadway design included the following:

1. Conducted a general visual reconnaissance of the site and coordinated underground utility location services and maintenance of traffic.

2. Reviewed readily available published soil and topographic information. Reviewed the "Soil Pinellas of Pinellas County, Florida" published by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) and the "Clearwater, Florida" Quadrangle Map published by the United States Geologic Survey (USGS).

3. Perfórmed Standard Penetration Test (SPT) borings for the planned mast arm signal poles to be located at the intersections of Sunset Point Road and:

    - Douglas Avenue
    - North Betty Lane
    - Kings Highway
    - North Highland Avenue

4. Performed one (1) SPT boring for the planned Spring Branch Creek Bridge replacement.

5. Performed hand auger borings to depths of 5 feet below the existing grade along the proposed alignment.

6. Collected five (5) bulk samples within proposed areas of new pavement construction and performed Limerock Bearing Ratio (LBR) testing to assist in pavement design.

7. Reviewed the sampled soils in the laboratory and conducted a laboratory testing program consisting of gradation analyses, Atterberg Limit tests and Limerock Bearing Ratio (LBR) tests. Visually classified the recovered sampled soils from the roadway borings according to the AASHTO Soil Classification System.

8. Measured observed groundwater levels and estimated seasonal high groundwater levels at the boring locations.

9. Prepared this Preliminary Geotechnical Report summarizing the field and laboratory testing program results, and the subsurface soil and groundwater conditions encountered. Developed engineering recommendations for the design and construction of the subgrade for the proposed roadway improvements.

3.0 SUBSURFACE EXPLORATION

3.1 BORING LOCATIONS, UTILITY CLEARANCE AND TRAFFIC CONTROL

An aerial photograph of the existing roadway alignment was provided by American Consulting Engineers of Florida, L.L.C. All the soil boring locations were staked in the field by PSI and have been surveyed by others. We understand the project surveyor and/or American Consulting Engineers of Florida, L.L.C. will provide a construction baseline for reference prior to PSI issuing a final geotechnical report.

Utility clearances were coordinated by PSI and updated as required for the duration of the field investigation, flagmen, barricades, cones and sign devices were used as necessary in compliance with the applicable FDOT Roadway and Traffic Design Standard Indices.

3.2 SOIL BORINGS

To evaluate the subsurface conditions along the proposed alignment, hand auger borings were performed to a depth of 5 feet below the existing grade. The borings were alternatively staggered to the left and right of the existing roadway. The hand auger borings were performed by manually twisting and advancing a bucket auger into the ground in 4 to 6 inch increments. As each soil type was revealed, representative samples were placed in air-tight jars and returned to the PSI Tampa office for review by a geotechnical engineer. . After performing the auger borings, the boreholes were backfilled with available existing materials for safety.

To explore subsurface conditions within the vicinity of proposed mast arm signal pole locations, a total of nine (9) SPT borings were performed to a depth of approximately 30 feet below the existing ground surface. The SPT borings were performed for the intersections of Sunset Point Road with Douglas Avenue, North Betty Lane, Kings Highway and North Highland Avenue. In addition for the proposed replacement of the Spring Branch Creek Bridge, one (1) SPT boring was performed to an approximate depth of 75 feet. Details regarding this bridge boring will be included in separate report. The SPT borings were advanced utilizing rotary mud drilling methods and soil samples were routinely obtained at select intervals during the drilling process. Samples obtained in the field were returned to the laboratory for visual classification and laboratory testing. Drilling and sampling techniques were accomplished in general accordance with ASTM Standards.

The roadway auger boring locations are shown on the Boring Location Plans presented on **Sheets 2 through 8** in **Appendix B** of this report. The SPT boring locations are presented on **Sheets 14 through 18** in **Appendix B**. Once the project survey is complete, station and offset for each boring will be provided.

3.3 BULK SAMPLING FOR LIMEROCK BEARING RATIO (LBR) TESTS

Bulk samples were retrieved for LBR testing at five (5) locations along the roadway alignment. The samples were collected from surficial soils within 3 feet of current grades at the locations indicated on **Sheets 2 through 8** in **Appendix B**. A summary of the LBR test results is provided in **Table 4** in **Appendix A**.

4.0 LABORATORY TESTING

4.1 SOIL CLASSIFICATION TESTING

Representative soil samples collected from the auger borings were visually reviewed in the laboratory by a geotechnical engineer to confirm the field classification. The roadway samples were classified in general accordance with the AASHTO Classification System and the SPT borings for the mast arm and bridge foundations were classified in general accordance with the

Unified Soil Classification System (USCS). Classification was based on visual observations with the aid of the laboratory test results performed on selected representative samples. Laboratory classification tests consisted of grain-size analysis tests (gradation), Atterberg Limit tests and corrosion series.

Sheet 13 in **Appendix B** summarizes the laboratory testing program described above, as well as the tested range of values for each soil strata. **Table 2** in **Appendix A** includes a summary of the classification test results.

4.2 LIMEROCK BEARING RATIO (LBR)

LBR tests were performed in accordance with the FDOT Standard FM 5-515 including a modified Proctor test. The LBR test is a measure of the bearing capacity of a soil. The test consists of measuring the load required to cause a standard circular plunger (area of three 3 square inches) to penetrate a specimen at a specified rate. The LBR is the load in pounds per square inch (psi) units, required to force the plunger into the soil 0.1 inch expressed as a percentage of the load in psi units, required to force the same plunger the same depth into a standard sample of crushed limerock. The average penetration load for a typical crushed limerock found in Florida has been standardized to 800 psi. A summary of the LBR tests performed is shown on **Table 4** in **Appendix A**.

5.0 GENERALIZED SUBSURFACE SOIL CONDITIONS

5.1 GENERAL GEOLOGY

Within Pinellas County, the uppermost soil layers generally consist of young undifferentiated sediments underlain by the Hawthorn Group of formations. The Hawthorn consists of fine to medium grained quartz sands, silt, clay and limestone in varying proportions and thicknesses. Beneath the Hawthorn lies the Ocala Limestone Formation. The surface of the Ocala formation is locally very irregular. The upper part of the Ocala Limestone is a white, generally soft, somewhat friable, porous coquina composed of large foraminifera, bryozoan fragments and whole to broken echinoid remains, all loosely bound by a matrix of micritic limestone. The lower part of the Ocala Limestone consists of cream to white, generally fine-grained, soft to semi-indurated, micritic limestone containing abundant miliolid remains and scattered large foraminiferas.

5.2 PINELLAS COUNTY USDA SOIL SURVEY

The Soil Survey of Pinellas County, Florida, published by the USDA SCS has been reviewed for the project vicinity. The soil survey map for the project vicinity is illustrated on **Sheet 1** in **Appendix B** of this report. A summary of the mapped soil units within the project vicinity is presented in **Table 1** in **Appendix A** of this report.

5.3 USGS TOPOGRAPHIC SURVEY

The project is located within the USGS "Clearwater, Florida" Quadrangle Map dated 2001, Township 29 South, Range 15 East and Sections 2 and 3. The existing ground surface along the project alignment varies from an approximate elevation of 10 to 55 feet NGVD of 1929. A reproduction of the USGS Quadrangle map for the project vicinity is presented on **Sheet 1** in **Appendix B**.

5.4 SOIL BORING RESULTS

Based upon the exploratory borings and results of the laboratory testing, the near surface soils along the project alignment have been grouped into four (4) categories/strata. **Sheet 13** in **Appendix B** of this report is provided to show the general range of engineering properties measured in the laboratory for the various soil strata encountered during our exploration.

The results of the hand auger borings performed for roadway are presented on **Sheets 9 through 12** in **Appendix B** in the form of soil profiles, along with the profile legend and other pertinent information such as measured groundwater levels. Soil stratification is based on an examination of the recovered soil samples, the laboratory testing, and interpretation of field boring logs by a geotechnical engineer. The stratification lines represent the approximate boundaries between soil types of significantly different engineering properties. The actual transition may be gradual. In some cases, small variations in properties not considered pertinent to our engineering evaluation may have been abbreviated or omitted for clarity. The profiles represent the conditions at the boring locations only and variations may occur among the borings.

In general, the auger borings performed encountered the following strata.

STRATUM	SOIL DESCRIPTION	AASHTO SOIL CLASSIFICATION
1	Clean to Slightly Silty Fine SAND	A-3
2	Silty to Clayey Fine SAND	A-2-4
3	Sand CLAY	A-6
4	Silty Fine SAND with organics (Muck)	A-8

5.5 GROUNDWATER

When encountered, groundwater was observed at depths ranging from 2½ to greater than 5 feet below the existing ground surface in the borings performed at the project site. Groundwater levels will fluctuate seasonally and groundwater conditions will change with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, tidal influences, as well as man-made influences, such as existing swales, drainage ponds and underdrains.

A summary of estimated seasonal high groundwater table levels at the boring locations is presented in **Table 3** in **Appendix A**. It is noted that these groundwater predictions are preliminary and will be updated and/or revised in accordance with future site topographic data to be provided by others.

6.0 ENGINEERING EVALUATIONS AND RECOMMENDATIONS

6.1 PAVEMENT DESIGN CONSIDERATIONS

Five (5) LBR tests were performed on near surface soils at various locations along the existing roadway. The LBR tests yielded values ranging from 26 to 49 percent. Using the FDOT 90 percentile method, a design LBR of 29 percent is recommended for the existing project soils for soil support for use in pavement design. **Table 4** in **Appendix A** of this report presents a summary of the LBR tests performed for the study.

It should be noted that the LBR values might not be representative of borrow materials which may be used to support some of the new roadway. An approximate LBR value should be used in design for fill soils used beneath the proposed pavement section. While fill sources are not known, based on past experience, an LBR value of 20 should be available from typical compacted "select" fill that may be imported.

It is recommended that the subgrade soils be stabilized to a minimum LBR of 40. The amount of stabilizing material required will vary depending on the actual subgrade LBR values.

In accordance with FDOT guidelines, grades for this type of roadway should be ideally set to provide a minimum separation of 3 feet between the bottom of the base and the estimated seasonal high groundwater levels. If this minimum separation is maintained, then a limestone, or bank-run shell base can be utilized; otherwise, crushed concrete, or asphaltic concrete base would be required.

6.2 SOIL USAGE SUMMARY

In general, the existing subsurface soils should be acceptable for construction to support typical embankment pavement section after proper subgrade preparation. Unsuitable soils or debris, if encountered within the construction limits, should be removed and replaced with compacted clean sand as outline herein.

The generalized soil strata information is shown on **Sheet 13** in **Appendix B**. Material use and/or removal shall be completed in accordance with FDOT Indices 500 and 505. Once the roadway grade and alignment are established, PSI will evaluate the estimated extent of unsuitable material.

Materials directly beneath the base should be "select" materials. The following summarized the generalized use or non-use of the soils and material that will most likely be encountered during construction.

- The material from Strata 1 (A-3) and 2 (A-2-4) appears to be satisfactory for use in the embankment when utilized in accordance with FDOT Index 505.

- The material from Stratum 3 (A-6) is plastic material and shall be removed in accordance with FDOT index 500. It may be placed above the existing water level (at the time of construction) to within 4 feet of the proposed base. It should be placed uniformly in the lower portion of the embankment for some distance along the project rather than full depth for shorter distanced.

- The material from Stratum 4 (muck) is organic material and shall be removed in accordance with Index 500.

The removal of topsoil and other shallow surficial organic soil deposits should be accomplished in accordance with FDOT Standard Specification for Road and Bridge Construction, Section 110.

Backfill should consist of materials conforming to Standard Index 505 and compacted in accordance with Section 120-9 of the Standard Specification.

6.3 ENVIRONMENTAL CLASSIFICATION (CORROSION SERIES)

Environmental corrosion tests were conducted in accordance with the FDOT test designations FM 5-550, FM 5-551, FM 5-552 and FM 5-553. These tests were performed on recovered soil samples obtained from the roadway auger borings. Environmental corrosion tests measure parameters such as pH, resistivity, sulfate content and chloride content. Test results will be presented in the subsequent geotechnical report. Test results obtained are presented in **Table 5** in **Appendix A**. Based on the laboratory test results and FDOT's "Structures Design Guidelines", we recommend the subsurface environment be classified as moderately aggressive for steel and slightly aggressive for concrete.

6.4 GROUNDWATER CONTROL

Depending upon groundwater levels at the time of construction, some form of dewatering may be required for deeper excavation such as trenches for utility installation. Groundwater can normally be controlled in shallow excavations with pumps and sumps. During subgrade soil preparation any plastic soils below design grade could become disturbed by construction activities. If this becomes the case, the contractor may be directed by the Engineer to remove the disturbed or pumping soils to a depth of 1 to 2 feet below the excavation bottom and backfill the area with structural fill. In such situations, FDOT Indices 500 and 505 should be followed closely.

6.5 GENERAL ROADWAY CONSTRUCTION RECOMMENDATIONS

The overall site preparation and mechanical densification work for the construction of the roadway should be in accordance with the FDOT Standard Specifications for Road and Bridge Construction and Standard Index requirements.

6.6 TEMPORARY SIDE SLOPES

In areas where unbraced temporary excavation is feasible, side slope may stand near one (1) horizontal to one (1) vertical (1H:1V) for short dry periods of time (less than 24 hours) and a maximum excavation depth of five (5) feet. Where restriction will not permit slopes to be laid back as presented above, the excavation should be shored in accordance with the most current Occupational Safety and Health Administration (OSHA) requirements. Furthermore, open-cut excavations up to a maximum depth of five (5) feet (for periods longer than 24 inches) should be properly dewatered and sloped 2H:1V or flatter or be braced using a bracing plan approved by a professional engineer licensed in the state of Florida. Excavated material should not be stock piles at the top of the slope within a horizontal distance equal to the excavation depth.

6.7 UNUSUAL SITE CONDITIONS

Our scope of services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Although our scope does not include an assessment for the presence of hazardous materials, one of our borings completed on January 14, 2008 did encounter a foreign chemical substance. Within our SPT boring B-10 performed at the southeast corner of the intersection of Sunset Point Road and North Highland Avenue, an unidentified chemical substance with an unusual odor was encountered within the soil from a depth of approximately 2 feet to the bottom of the boring at 10 feet below the ground surface. In our professional opinion, this substance was petroleum-based and we recommend further environmental evaluation.

7.0 MAST ARM SIGNAL POLES

New mast arm signal poles are planned for the project. Mast arms are planned for the intersections of Sunset Point Road with Douglas Avenue, North Betty Lane, Kings Highway and North Highland Avenue.

A total of nine (9) SPT borings were performed for the subject mast arms signal poles to a depth 30. However, boring B-10 was terminated at a depth of 10 feet due to apparent petroleum fumes. The boring profiles and locations are presented on the Report of Core Boring Sheets (**Sheets 14 through 17**) in **Appendix B**. These sheets also present soil parameters for each soil strata encountered. Included in the soil parameter table are the soil unit weight, friction angle, cohesion and coefficients of active and passive earth pressure.

It is our understanding that the foundation system for the proposed mast arms will be designed by others. Once the final loads are known, the mast arm signal pole foundations should be designed using the soil parameters provided on **Sheets 14 through 17**. The foundation design should also consider torsional loads created by wind action.

8.0 LIMITATIONS

Our professional services have been performed, our finding obtained and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This company is not responsible for the conclusions, opinions or recommendations made by others based on these data.

The scope of the exploration was intended to evaluate shallow soil conditions and does not include an evaluation of the potential of sinkhole development for the project site. The analysis and recommendations submitted in this report are based upon data obtained from the soil borings performed at the locations indicated. If any subsoil variations become evident during the course of this project, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. The applicability of the report should also be reviewed in the event significant changes occur in the design, nature or location of the proposed roadway improvement areas.

The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils or other unusual conditions observed are strictly for the information of our client.

APPENDIX A

TABLE 1
SUMMARY OF USDA SOIL SURVEY
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

USDA Map Symbol and Soil Name	Classification				Seasonal High Water Table			Risk of Corrosion	
	Depth (inch)	AASHTO Group	USCS Group	Permeability (in/hr)	Depth (ft)	Kind	Month	Uncoated Steel	Concrete
(As) Astatula fine sand moderately deep water table	0-48	A-3	SP-SM, SP	>20	3.3-5	----	----	Low	High
(Ma) Made land	----	----	----	----	----	----	----	----	----
(My) Myakka fine sand	0-16	A-3	SP,SP-SM	6.3-20	<0.8	----	----	High	High
	16-25	A-3	SP-SM, SM	0.63-2.0					
	25-84	A-3	SP-SM, SP	6.3-20					
(Ps) Pompano fine sand ponded	0-14	A-3	SP,SP-SM	6.3-20	<0.8	----	----	Low	High
	14-80	A-3	SP,SP-SM	6.3-20					
(Uc) Urban land-Astatula complex	----	----	----	----	----	----	----	----	----
(Um) Urban land-Myakka complex	----	----	----	----	----	----	----	----	----

TABLE 2
SUMMARY OF LABORATORY TEST RESULTS
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

Location*	Sample Depth (feet)	Organic Content (%)	Moisture Content (%)	Sieve Analysis (%)					Atterberg Limits (%)		AASHTO Group	Stratum Number
				#10	#40	#60	#100	#200	LL	PI		
RA - 75	3.5 - 5			100	98	84	32	4				1
RA - 85	0 - 3			100	96	73	28	4				1
LBR - 1	0 - 3			96	91	79	42	5				1
LBR - 2	0 - 3			100	98	89	56	6				1
LBR - 3	0 - 3			97	92	79	41	9				1
LBR - 4	0 - 3			100	98	84	37	5				1
LBR - 5	0 - 3			100	95	62	22	6				1
RA - 54	3.5 - 5							3				1
RA - 65	2.5 - 3.5								NP	NP		2
RA - 38	2 - 4.5								40	25		3
RA - 36	3 - 4.5	15										4
RA - 48	2 - 4	8										4
RA - 55	4 - 5	11										4
RA - 95	3.5 - 5	6										4

* station and offset information not yet available

TABLE 3
SEASONAL HIGH WATER TABLE DATA
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

Boring*	USDA SCS Soil Type	Observed Groundwater Table Depth (feet)	Date Recorded	Estimated Seasonal High Water Table Depth** (feet)
RA - 1	Uc	4	01/23/08	1
RA - 2	Uc	4½	12/20/07	1
RA - 3	Uc	2½	01/23/08	1
RA - 4	Uc	4	12/20/07	1
RA - 5	Uc	2½	01/23/08	perched
RA - 6	Uc	3	12/20/07	1
RA - 7	Uc	4	01/23/08	1
RA - 8	Uc	>5	12/20/07	2
RA - 9	Uc	>5	01/23/08	2
RA - 10	Uc	>5	12/20/07	2
RA - 11	Uc	>5	01/23/08	2
RA - 12	Uc	>5	12/20/07	2
RA - 13	Uc	>5	01/23/08	2
RA - 14	Uc	>5	12/20/07	2
RA - 15	Uc	>5	01/22/08	2
RA - 16	Uc	>5	12/20/07	2
RA - 17	Uc	>5	01/22/08	2
RA - 18	Uc	>5	12/20/07	2
RA - 19	Uc	>5	01/22/08	2
RA - 20	Uc	4	12/20/07	1
RA - 21	Uc	4	01/22/08	1
RA - 22	My	>5	12/20/07	1½
RA - 23	My	4	01/22/08	2
RA - 24	My	>5	12/20/07	2
RA - 25	My	>5	01/22/08	2
RA - 26	My	>5	12/20/07	perched
RA - 27	My	4	01/22/08	1
RA - 28	My	>5	12/20/07	½
RA - 29	My	4	01/22/08	½
RA - 30	My	4½	01/22/08	½
RA - 31	My	>5	01/22/08	½
RA - 32	Ps	4½	12/20/07	½
RA - 33	Ps	3	01/22/08	½
RA - 34	Ps	>5	01/02/08	½
RA - 35	Ps	3	01/22/08	½
RA - 36	Ps	3½	01/02/08	½
RA - 37	Ps	>5	01/22/08	½
RA - 38	Ps	4½	01/02/08	½
RA - 39	Um	>5	01/22/08	1
RA - 40	Um	4½	01/02/08	1½

TABLE 3
SEASONAL HIGH WATER TABLE DATA
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

Boring*	USDA SCS Soil Type	Observed Groundwater Table Depth (feet)	Date Recorded	Estimated Seasonal High Water Table Depth** (feet)
RA - 41	Um	4	01/02/08	1
RA - 42	Um	>5	01/22/08	1
RA - 43	Um	2½	01/02/08	½
RA - 44	Um	5	01/22/08	2
RA - 45	Um	2½	01/02/08	½
RA - 46	Um	3	01/02/08	½
RA - 47	Um	3½	01/22/08	½
RA - 48	Um	4½	01/02/08	perched
RA - 49	Um	4	01/22/08	1
RA - 50	Um	4	01/22/08	1
RA - 51	Um	4	01/02/08	1
RA - 52	Um	>5	01/22/08	1
RA - 53	Um	>5	01/22/08	1
RA - 54	Um	3½	01/02/08	2
RA - 55	Um	3	01/22/08	1½
RA - 56	Um	4	01/02/08	2½
RA - 57	Um	2½	01/22/08	1
RA - 58	Um	2½	01/22/08	1
RA - 59	Um	>5	01/02/08	1
RA - 60	Um	>5	01/11/08	1
RA - 61	Um	>5	01/02/08	1
RA - 62	Um	>5	01/11/08	1
RA - 63	Um	>5	01/02/08	1
RA - 64	Um	>5	01/02/08	1
RA - 65	Um	4	01/11/08	1
RA - 66	Um	>5	01/07/08	1
RA - 67	Um	4	01/11/08	1
RA - 68	Um	3½	01/07/08	½
RA - 69	Um	3	01/11/08	½
RA - 70	Um	3½	01/02/08	½
RA - 71	Um	3½	01/07/08	½
RA - 72	Um	4	01/11/08	1
RA - 73	Um	4	01/07/08	1
RA - 74	Uc	3½	01/11/08	½
RA - 75	Uc	>5	01/07/08	1
RA - 76	Uc	>5	01/11/08	1
RA - 77	Uc	>5	01/07/08	1
RA - 78	Uc	>5	01/11/08	1
RA - 79	Uc	>5	01/11/08	1
RA - 80	Uc	>5	01/07/08	1

TABLE 3
SEASONAL HIGH WATER TABLE DATA
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

Boring*	USDA SCS Soil Type	Observed Groundwater Table Depth (feet)	Date Recorded	Estimated Seasonal High Water Table Depth** (feet)
RA - 81	Uc	>5	01/11/08	1
RA - 82	Uc	>5	01/07/08	1
RA - 83	Uc	>5	01/11/08	1
RA - 84	Uc	>5	01/11/08	1
RA - 85	Uc	>5	01/07/08	1
RA - 86	Uc	>5	01/07/08	1
RA - 87	Uc	>5	01/11/08	1
RA - 88	Uc	>5	01/07/08	1
RA - 89	Uc	>5	01/11/08	1
RA - 90	Uc	>5	01/07/08	1
RA - 91	Uc	>5	01/10/08	1
RA - 92	Uc	>5	01/10/08	1
RA - 93	Uc	>5	01/07/08	1
RA - 94	Uc	>5	01/10/08	2
RA - 95	Uc	5	01/07/08	2
RA - 96	Uc	>5	01/10/08	2
RA - 97	Uc	>5	01/07/08	2
RA - 98	Ma	>5	01/10/08	2
RA - 99	Ma	>5	01/10/08	2
RA - 100	Ma	>5	01/07/08	2
RA - 101	Ma	>5	01/10/08	2
RA - 102	Ma	>5	01/07/08	2
RA - 103	Ma	>5	01/10/08	2
RA - 104	Ma	>5	01/10/08	2
RA - 105	Ma	>5	01/10/08	2½
RA - 106	Ma	>5	01/10/08	2½
RA - 107	Ma	>5	01/10/08	2½
RA - 108	As	>5	01/10/08	3
RA - 109	As	>5	01/10/08	3
RA - 110	As	>5	01/10/08	3
RA - 111	As	>5	01/22/08	3
RA - 112	As	>5	01/10/08	3
RA - 113	As	>5	01/10/08	3
RA - 114	Um	>5	01/10/08	2
RA - 115	Um	4½	01/22/08	1½

* station and offset information not yet available

** predicted seasonal high water table levels are preliminary and will be updated in accordance with future topographic data to be provided by others

TABLE 4
SUMMARY OF LIMEROCK BEARING RATIO TEST RESULTS
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

Sample	Location*		Sample Depth (feet)	LBR (%)	Maximum Dry Density	Optimum Moisture	AASHTO Classification
	Station	Offset					
LBR-1	--	--	1	49	110	12	A-3
LBR-2	--	--	1	40	109	11	A-3
LBR-3	--	--	1	45	114	11	A-3
LBR-4	--	--	1	26	108	10.5	A-3
LBR-5	--	--	1	31	110	11.5	A-3

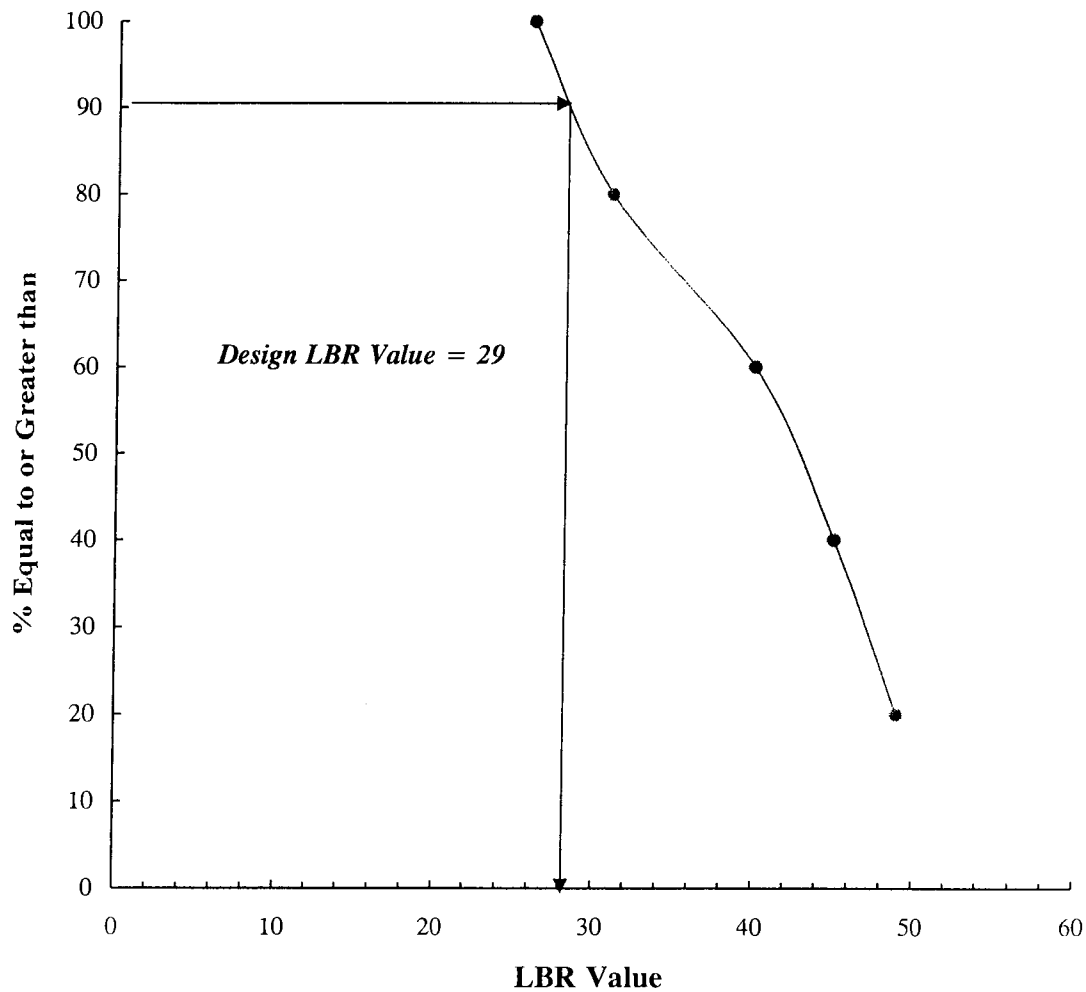
* station and offset information not yet available

TABLE 5
SUMMARY OF CORROSION TEST RESULTS
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

BORING NUMBER	BORING LOCATION[1]		SAMPLE DEPTH (feet)	pH	CHLORIDES (ppm)	SULFATES (ppm)	RESISTIVITY (ohm-cm)	SUBSTRUCTURE ENVIRONMENTAL CLASSIFICATION	
	STATION (feet)	OFFSET (feet)						STEEL	CONCRETE
RA-64	---	---	2 - 4	6.1	60	<3	15,000	Moderately Aggressive	Slightly Aggressive
RA-84	---	---	3.5 - 5	6.2	60	9.9	29,000	Moderately Aggressive	Slightly Aggressive

(1) Stations and off-sets were not available and will be provided in the final report

LBR Design Curve (90% Method)



LBR DESIGN CURVE

SUNSET POINT ROAD (CR 576) IMPROVEMENTS
PINELLAS COUNTY, FLORIDA

psi Information To Build On
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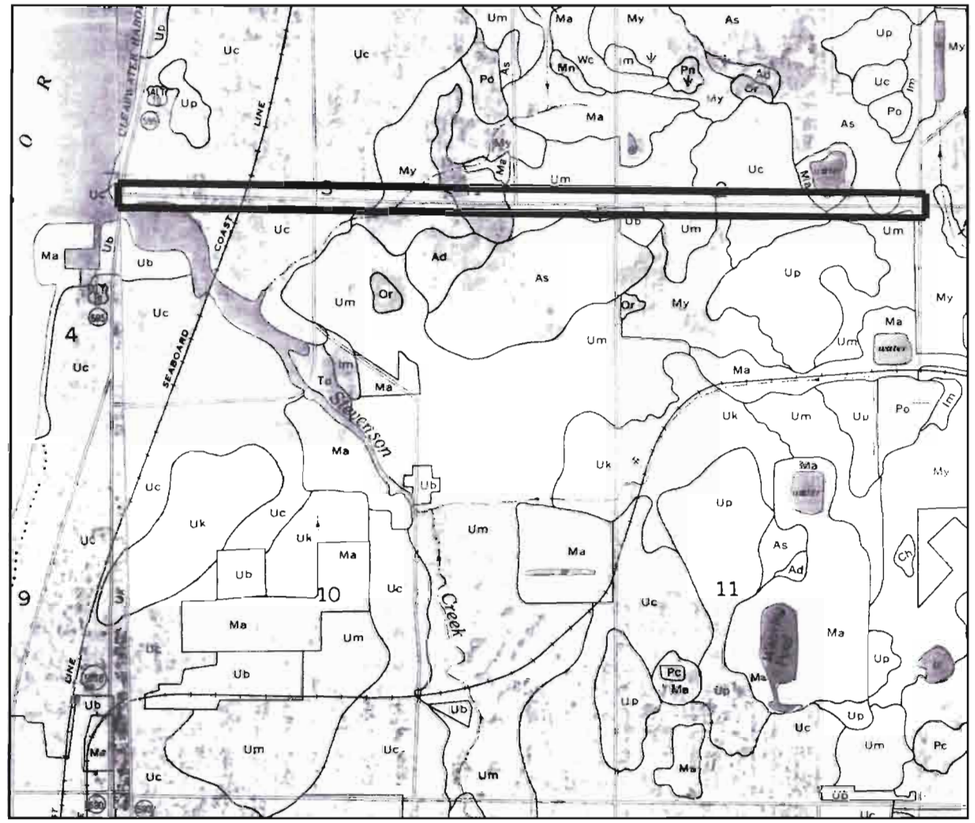
DRAWN	SCALE	PROJ. NO.
RS	NOTED	775-75056
CHECKED	DATE	FIGURE
LL	FEB 08	1

APPENDIX B

APPROXIMATE SITE LOCATION

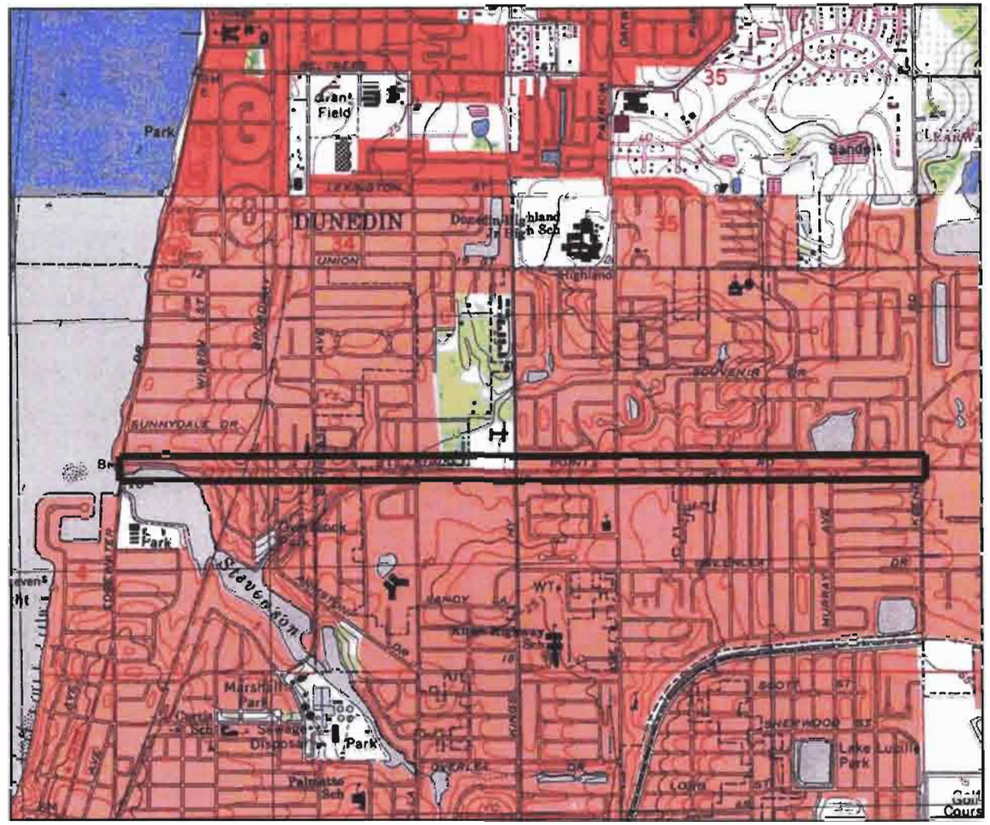


REFERENCE: USDA SCS, "SOIL SURVEY OF PINELLAS COUNTY, FLORIDA"

TOWNSHIP:	29 SOUTH	ISSUED:	1972
RANGE:	15 EAST	PHOTO:	1970
SECTION:	2 & 3	SCALE:	1" = 2000'

USDA VICINITY MAP

APPROXIMATE SITE LOCATION



REFERENCE: USGS "CLEARWATER, FLORIDA" QUADRANGLE MAP

TOWNSHIP:	29 SOUTH	ISSUED:	2001
RANGE:	15 EAST	PHOTOREVISED:	–
SECTION:	2 & 3	SCALE:	1" = 2000'

USGS VICINITY MAP

DRAWN	AN
CHECKED	RS
APPROVED	MEM
SCALE	NOTED

USDA & USGS VICINITY MAPS

SUNSET POINT ROAD (CR 576)

FROM US ALT 19 (EDGEWATER DR.) TO KEENE ROAD

PINELLAS COUNTY, FLORIDA

psi *Information To Build On*

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DATE	PROJ. NO.	SHEET
FEB 08	775-75056	SHEET 1

P:\775-Eng\2007\75056 Suntrust Point road\cad\75056s1

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 2

REVISIONS

Date	By	Description	Date	By

psi

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO.

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 2

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CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO.

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 3

REVISIONS

Date	By	Description	Date	By	Description

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CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO.

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 4

REVISIONS					
Date	By	Description	Date	By	Description

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO.

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 5

REVISIONS					
Date	By	Description	Date	By	Description

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO.

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 6

REVISIONS					
Date	By	Description	Date	By	Description

psi

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DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO.

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 7

REVISIONS

Date	By	Description	Date	By	Description

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO.

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 8

REVISIONS

Date	By	Description	Date	By	Description

psi

CHING L. KUO, Ph.D., P.E.
FLORIDA LICENSE No. 36115

PROFESSIONAL SERVICE INDUSTRIES, INC.
5801 BENJAMIN CENTER DR., SUITE 112
TAMPA, FL. 33634
(813)-886-1075

FLORIDA ENGINEERING CERTIFICATE
OF AUTHORIZATION No. 3684

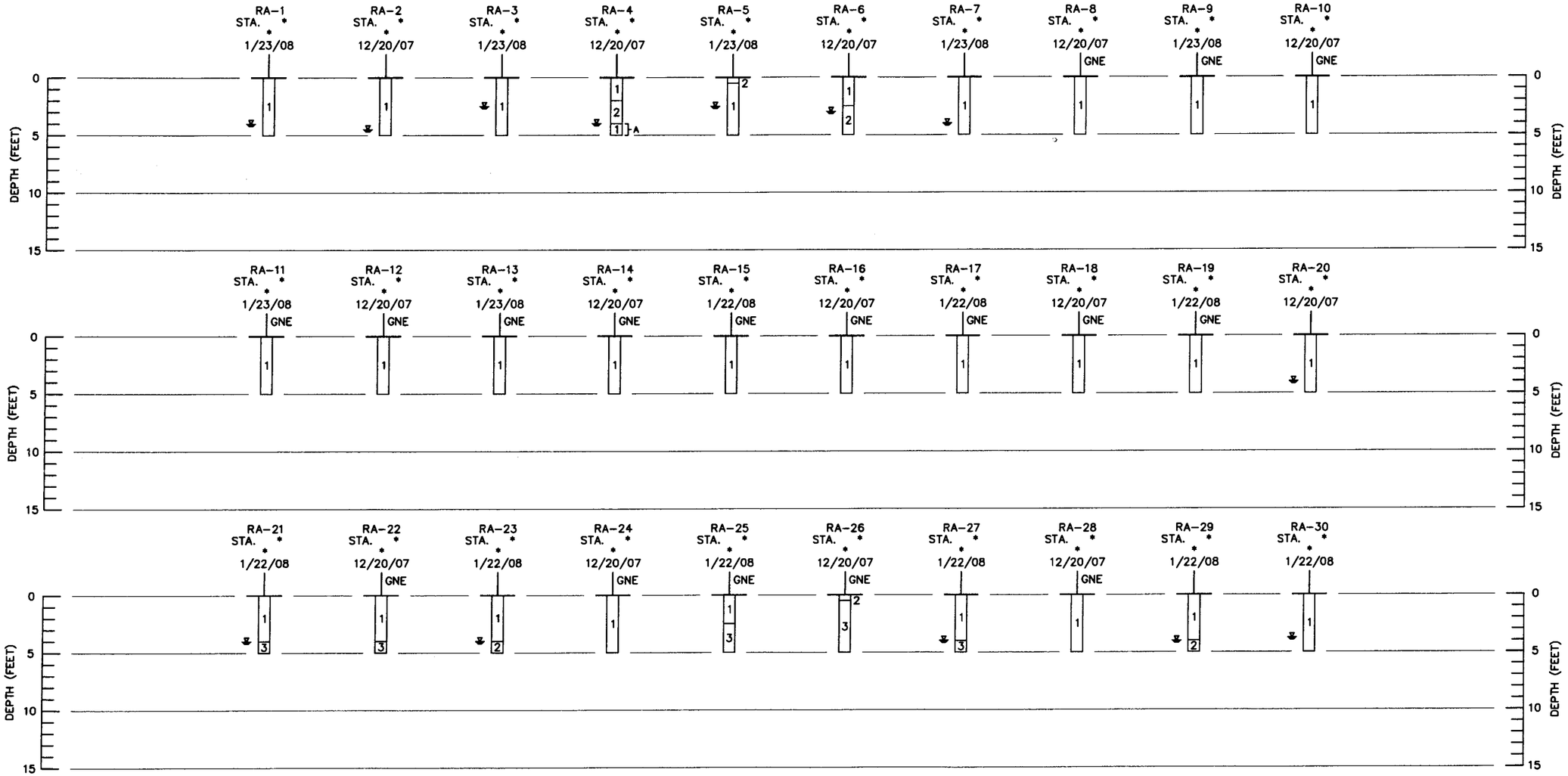
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO



0 5'
VERTICAL SCALE
HORIZONTAL N.T.S.

SOIL PROFILES

LEGEND

1. LIGHT TO DARK BROWN AND GRAY TO DARK GRAY CLEAN TO SLIGHTLY SILTY FINE SAND (A-3)
2. LIGHT BROWN, BROWN AND DARK GRAY SILTY TO CLAYEY FINE SAND (A-2-4)
3. BROWN AND ORANGISH BROWN SANDY CLAY (A-6)
4. BLACK SILTY FINE SAND WITH ORGANICS (MUCK) (A-8)

A-3 AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW

GROUNDWATER LEVEL OBSERVED

GNE GROUNDWATER LEVEL NOT ENCOUNTERED

A WITH SHELL FRAGMENTS

B WITH ROCK FRAGMENTS

* STATION AND OFFSETS TO BE PROVIDED IN FINAL REPORT.

P:\775-Geo\2007\75056 Sunset Point Road\Geo\roadway\75056e2

REVISIONS

Date	By	Description	Date	By	Description

psi
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

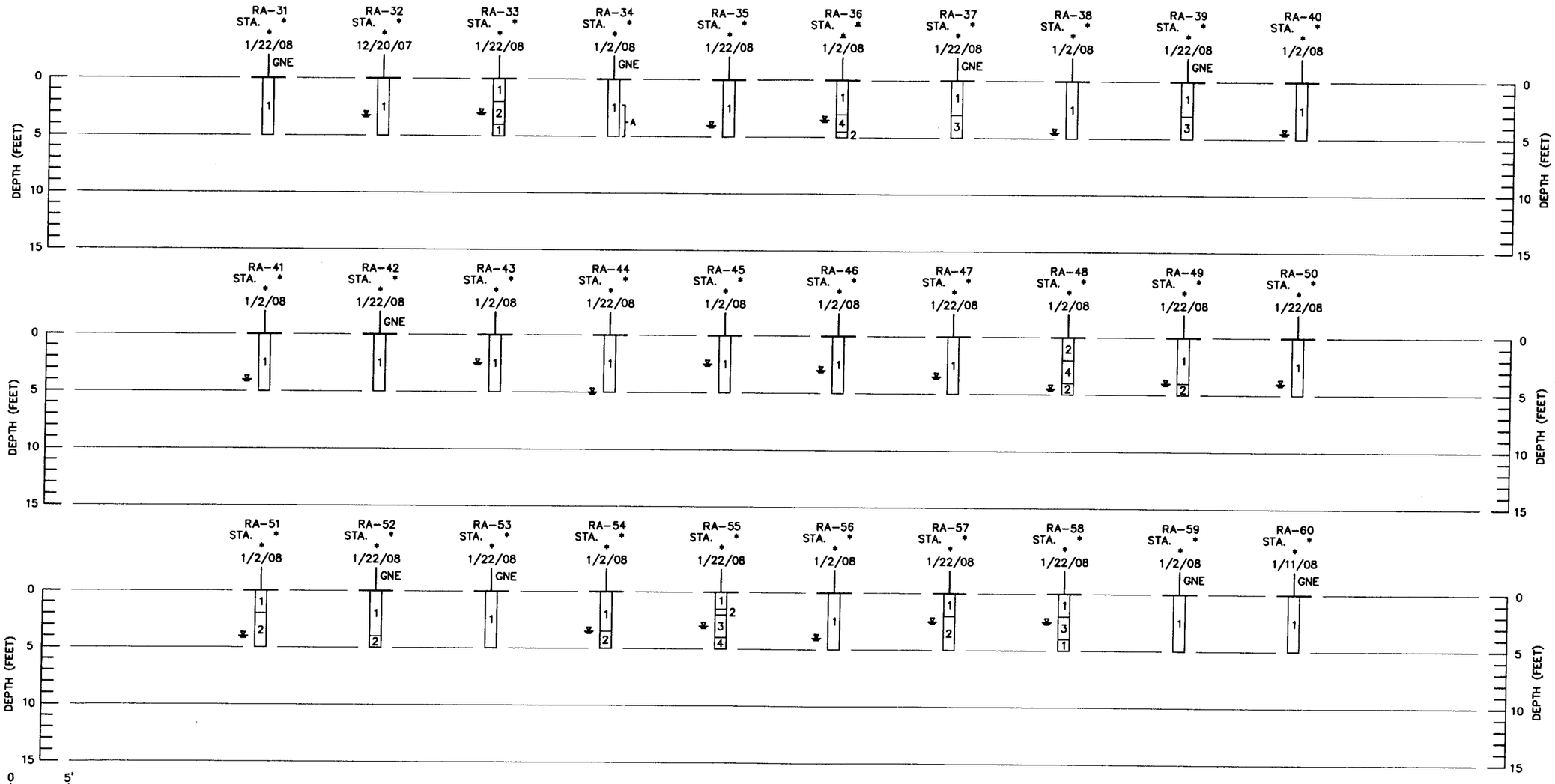
ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
C.R. 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 9



SOIL PROFILES

LEGEND

1. LIGHT TO DARK BROWN AND GRAY TO DARK GRAY CLEAN TO SLIGHTLY SILTY FINE SAND (A-3)
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A WITH SHELL FRAGMENTS

B WITH ROCK FRAGMENTS

* STATION AND OFFSETS TO BE PROVIDED IN FINAL REPORT.

P:\775-Geo\2007\75056 Sunset Point Road\Soil\roadway\75056r2

REVISIONS

Date	By	Description	Date	By	Description

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

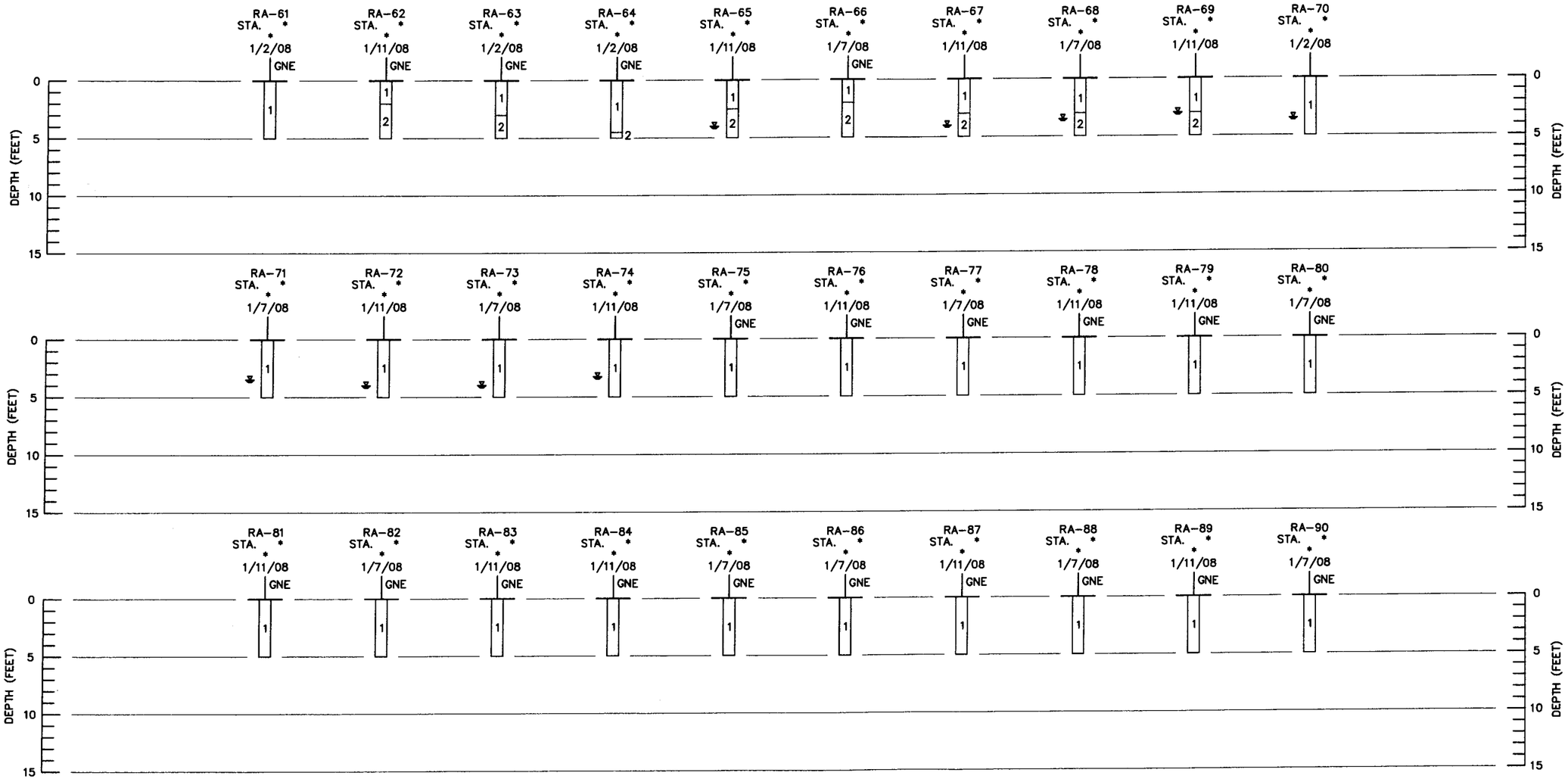
ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
C.R. 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 10



SOIL PROFILES

LEGEND

1. LIGHT TO DARK BROWN AND GRAY TO DARK GRAY CLEAN TO SLIGHTLY SILTY FINE SAND (A-3)
2. LIGHT BROWN, BROWN AND DARK GRAY SILTY TO CLAYEY FINE SAND (A-2-4)
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A WITH SHELL FRAGMENTS

B WITH ROCK FRAGMENTS

* STATION AND OFFSETS TO BE PROVIDED IN FINAL REPORT.

P:\775-Geo\2007\75056 Sunset Point Road\cad\roadway\75056s2

REVISIONS

Date	By	Description	Date	By	Description

psi
CHING L. KUO, Ph.D., P.E.
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

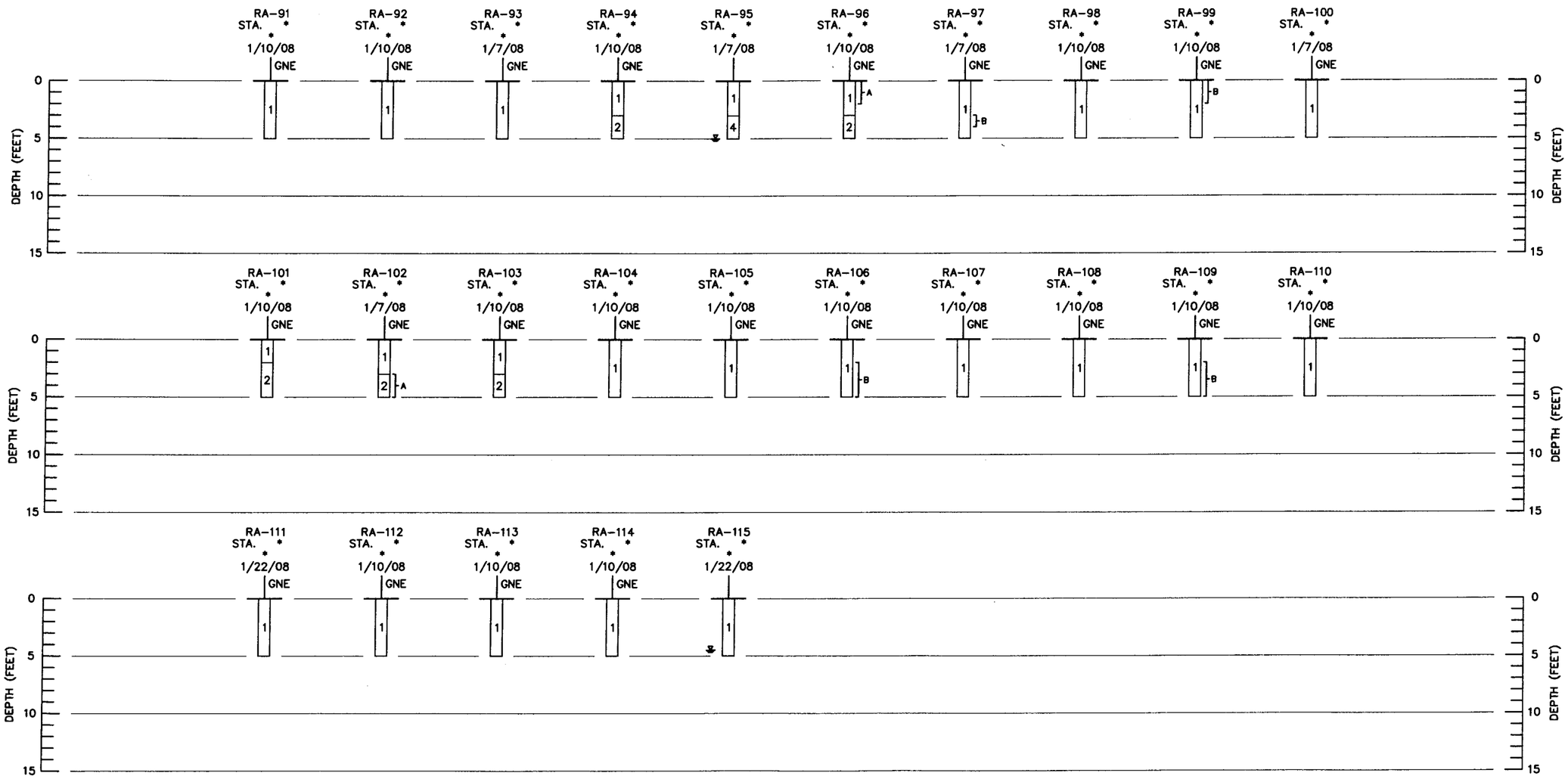
ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
C.R. 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 11



LEGEND

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GROUNDWATER LEVEL OBSERVED

GNE GROUNDWATER LEVEL NOT ENCOUNTERED

A WITH SHELL FRAGMENTS

B WITH ROCK FRAGMENTS

* STATION AND OFFSETS TO BE PROVIDED IN FINAL REPORT.

SOIL PROFILES

P:\775-Geo\2007\75056 Sunset Point Road\eod\roadway\75056s2

REVISIONS					
Date	By	Description	Date	By	Description

psi
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
C.R. 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 12

PINELLAS COUNTY
SUNSET POINT ROAD (CR 576)
EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD

DATE OF SURVEY: JANUARY 2008
SURVEY MADE BY: PSI

PURCHASE ORDER No. 226550

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

		ORGANIC CONTENT		MOISTURE CONTENT		SIEVE ANALYSIS RESULTS % PASS						ATTERBERG LIMITS (%)					CORROSION TEST RESULTS				
STRATUM NO.	LBR VALUE (%)	No. OF TESTS	% ORGANIC	No. OF TESTS	MOISTURE CONTENT	No. OF TESTS	10 MESH	40 MESH	60 MESH	100 MESH	200 MESH	NO. OF TESTS	LIQUID LIMIT	PLASTIC INDEX	AASHTO GROUP	DESCRIPTION	NO. OF TESTS	RESISTIVITY OHM-CM	CHLORIDES PPM	SULFATE PPM	pH
1	26-49	--	-----	8	96-100	91-98	62-89	22-56	3-9	-----	-----	--	-----	-----	(A-3)	LIGHT TO DARK BROWN AND GRAY TO DARK GRAY CLEAN TO SLIGHTLY SILTY FINE SAND	2	15,000-29,000	60	< 3-9.9	6.1-6.2
2	-----	--	-----	--	-----	--	-----	-----	-----	1	NP	NP	-----	-----	(A-2-4)	LIGHT BROWN, BROWN AND DARK GRAY SILTY TO CLAYEY FINE SAND	--	-----	-----	-----	-----
3	-----	--	-----	--	-----	--	-----	-----	-----	1	40	25	-----	-----	(A-6)	BROWN AND ORANGISH BROWN SANDY CLAY	--	-----	-----	-----	-----
4	-----	4	6-15	--	-----	--	-----	-----	-----	-----	-----	--	-----	-----	(A-8)	BLACK SILTY FINE SAND WITH ORGANICS (MUCK)	--	-----	-----	-----	-----

EMBANKMENT AND SUBGRADE MATERIAL

STRATA BOUNDARIES ARE APPROXIMATE AND REPRESENT SOIL STRATA AT EACH TEST HOLE LOCATION ONLY.

GWT GROUNDWATER TABLE ENCOUNTERED
GNE GROUNDWATER TABLE NOT ENCOUNTERED
GNA GROUNDWATER TABLE NOT APPARENT
A INDICATES WITH SHELL FRAGMENTS.
B INDICATES WITH ROCK FRAGMENTS.

NOTES:

1. THE MATERIAL FROM STRATA NUMBERS 1 (A-3) AND 2 (A-2-4) APPEAR SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH INDEX 505.
2. THE MATERIAL FROM STRATUM NUMBER 4 IS ORGANIC (MUCK) MATERIAL AND SHALL BE REMOVED IN ACCORDANCE WITH INDEX 500. THE MATERIAL WAS ENCOUNTERED AT BORINGS RA-36, RA-48, RA-55 AND RA-95 . FURTHER DELINEATION TO ESTIMATE THE HORIZONTAL AND VERTICAL EXTENTS WILL BE PERFORMED FOR THE NEXT SUBMITTAL.
3. THE MATERIAL FROM STRATUM NUMBER 3 (A-6) IS PLASTIC MATERIAL AND SHALL BE REMOVED IN ACCORDANCE WITH INDEX 500. ONCE ROADWAY PROFILES AND CROSS SECTIONS ARE AVAILABLE, LOCATIONS OF POSSIBLE REMOVAL WILL BE PROVIDED. IT MAY BE PLACED ABOVE THE EXISTING WATER LEVEL (AT THE TIME OF CONSTRUCTION) TO WITHIN 4 FEET OF THE PROPOSED BASE. IT SHOULD BE PLACED UNIFORMLY IN THE LOWER PORTION OF THE EMBANKMENT FOR SOME DISTANCE ALONG THE PROJECT RATHER THAN FULL DEPTH FOR SHORTER DISTANCES.

P:\775-Geo\2007\75056 Sunset Point Road\cad\cross\v75056s2

REVISIONS

Date	By	Description	Date	By	Description

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
C.R. 576	PINELLAS	-

ROADWAY SOILS SURVEY

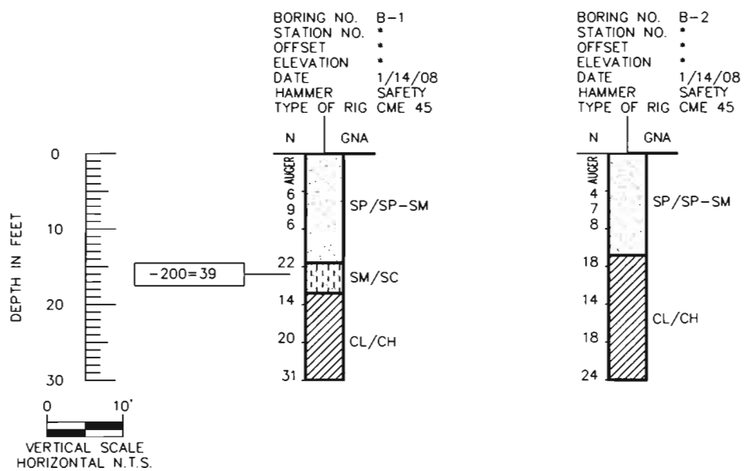
SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

BORING LOCATION PLAN

0 100'
PLAN SCALE

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3



LEGEND

- (SP/SP-SM), BROWN TO LIGHT BROWN CLEAN TO SLIGHTLY SILTY FINE SAND
- (SM/SC), BROWN, VERY LIGHT BROWN AND GRAY SILTY TO CLAYEY FINE SAND
- (CL/CH), GRAY AND BLUE-GREEN SILTY CLAY
- VERY PALE BROWN HIGHLY WEATHERED LIMESTONE

NOTES:

- WATER TABLE
- N — NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12" PENETRATION. (UNLESS OTHERWISE NOTED.)
- WR — FELL UNDER WEIGHT OF ROD
- ⇦ — LOSS OF CIRCULATION (%)
- GNA — GROUNDWATER LEVEL NOT APPARENT
- 50/6" — FIFTY BLOWS FOR SIX INCHES
- APPROXIMATE SPT BORING LOCATION
- * — STATIONS, OFFSETS AND ELEVATIONS WILL BE PROVIDED IN FINAL REPORT.
- -200 — FINES PASSING NO. 200 SIEVE (%)
- LL — LIQUID LIMIT (%)
- PI — PLASTICITY INDEX (%)

ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE: EXTREMELY AGGRESSIVE (ASSUMED)

SOIL PARAMETERS

BORING NUMBER	DEPTH (FEET)	SPT "N" RANGE	SOIL CLASSIFICATION	APPROXIMATE SOIL UNIT WEIGHT (PCF)		SOIL ANGLE OF FRICTION (DEGREES)	COHESION (PSF)	EARTH PRESSURE COEFFICIENT	
				ɣ SAT	ɣ SUBMERGED			ACTIVE (Ka)	PASSIVE (Kp)
B-1	0-13	6-9	SP/SP-SM	105	42.6	29	0	.347	2.88
	13-18	22	SM/SC	115	52.6	32	0	.307	3.25
	18-30	14-31	CL/CH	125	62.6	0	2700	1.00	1.00
B-2	0-13	4-8	SP/SP-SM	105	42.6	29	0	.347	2.88
	13-30	14-24	CL/CH	125	62.6	0	2300	1.00	1.00

GRANULAR MATERIALS-RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4-10
MEDIUM	10-30
DENSE	30-50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2-4
FIRM	4-8
STIFF	8-15
VERY STIFF	15-30
HARD	GREATER THAN 30

SUNSET POINT RD. AND DOUGLAS AVE.

REVISIONS

Date	By	Description	Date	By	Description

	Name	Date
Drawn by	AM	2/08
Checked by	RS	2/08
Designed by		
Checked by		
Approved by	CHING L. KUO, Ph.D., P.E.	

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CHING L. KUO, Ph.D., P.E.
FLORIDA LICENSE No. 36115

FLORIDA DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID.
C.R. 576	PINELLAS	-

SHEET TITLE: REPORT OF CORE BORINGS

PROJECT NAME: SUNSET POINT ROAD (CR 576) FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 14

P:\775-Gen\2007\75056 Sunset Point Road\Road\Struct\75056b2

BORING LOCATION PLAN

0 100'
PLAN SCALE

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

LEGEND

- (SP/SP-SM), BROWN TO LIGHT BROWN CLEAN TO SLIGHTLY SILTY FINE SAND
- (SM/SC), BROWN, VERY LIGHT BROWN AND GRAY SILTY TO CLAYEY FINE SAND
- (CL/CH), GRAY AND BLUE-GREEN SILTY CLAY
- VERY PALE BROWN HIGHLY WEATHERED LIMESTONE

NOTES:

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- APPROXIMATE SPT BORING LOCATION
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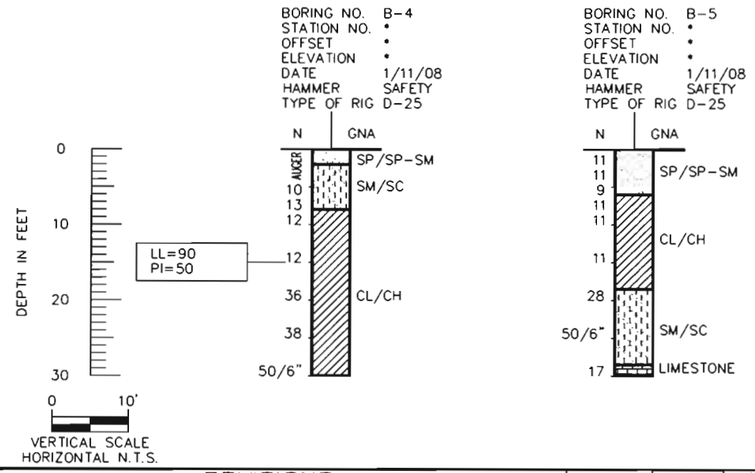
- -200 — FINES PASSING NO. 200 SIEVE (%)
- LL — LIQUID LIMIT (%)
- PI — PLASTICITY INDEX (%)

ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE: EXTREMELY AGGRESSIVE (ASSUMED)



SOIL PARAMETERS

BORING NUMBER	DEPTH (FEET)	SPT "N" RANGE	SOIL CLASSIFICATION	APPROXIMATE SOIL UNIT WEIGHT (PCF)		SOIL ANGLE OF FRICTION (DEGREES)	COHESION (PSF)	EARTH PRESSURE COEFFICIENT	
				ɣ SAT	ɣ SUBMERGED			ACTIVE (Ka)	PASSIVE (Kp)
B-4	0-8	10-13	SP/SP-SM/SM/SC	110	47.6	30	0	.333	3.00
	8-18	12	CL/CH	120	57.6	0	1500	1.00	1.00
	18-30	36-50/6"	CL/CH	125	62.6	0	4000	1.00	1.00
B-5	0-6	9-11	SP/SP-SM	105	42.6	29	0	.347	2.88
	6-18	11	CL/CH	120	57.6	0	1350	1.00	1.00
	18-28	28-50/6"	SM/SC	115	52.6	32	0	.307	3.25
	28-30	17	LIMESTONE	135	72.6	0	2100**	1.00	1.00

** MATERIALS CLASIFIED AS LIMESTONE, ULTIMATE SHEAR STRENGTH PROVIDED.

GRANULAR MATERIALS-RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4-10
MEDIUM	10-30
DENSE	30-50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2-4
FIRM	4-8
STIFF	8-15
VERY STIFF	15-30
HARD	GREATER THAN 30

SUNSET POINT RD. AND N. BETTY LANE

REVISIONS					
Date	By	Description	Date	By	Description

	Name	Date
Drawn by	AN	2/08
Checked by	RS	2/08
Designed by		
Checked by		
Approved by	CHING L. KUO, Ph.D., P.E.	

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FLORIDA LICENSE No. 36115

FLORIDA DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID.
C.R. 576	PINELLAS	-

SHEET TITLE: REPORT OF CORE BORINGS

PROJECT NAME: SUNSET POINT ROAD (CR 576) FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

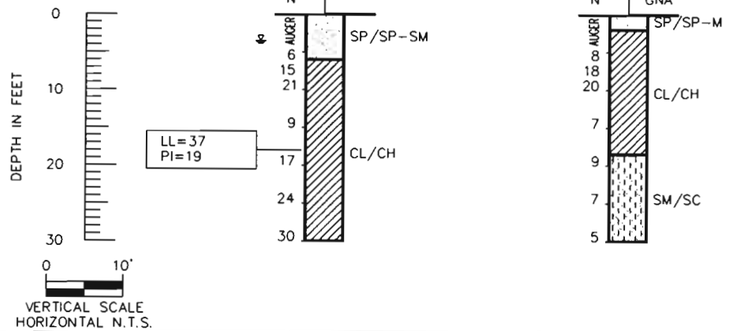
PSI PROJECT No. 775-75056
SHEET 15

P:\775-Geo\2007\Pasco Sunset Point Road\construct\Plans\

BORING LOCATION PLAN

0 100'
PLAN SCALE

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3



LEGEND

- (SP/SP-SM), BROWN TO LIGHT BROWN CLEAN TO SLIGHTLY SILTY FINE SAND
- (SM/SC), BROWN, VERY LIGHT BROWN AND GRAY SILTY TO CLAYEY FINE SAND
- (CL/CH), GRAY AND BLUE-GREEN SILTY CLAY
- VERY PALE BROWN HIGHLY WEATHERED LIMESTONE

NOTES:

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- ⇦ — LOSS OF CIRCULATION (%)
- GNA — GROUNDWATER LEVEL NOT APPARENT
- 50/6" — FIFTY BLOWS FOR SIX INCHES
- APPROXIMATE SPT BORING LOCATION
- STATIONS, OFFSETS AND ELEVATIONS WILL BE PROVIDED IN FINAL REPORT.
- -200 — FINES PASSING NO. 200 SIEVE (%)
- LL — LIQUID LIMIT (%)
- PI — PLASTICITY INDEX (%)

ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE: EXTREMELY AGGRESSIVE (ASSUMED)

SOIL PARAMETERS

BORING NUMBER	DEPTH (FEET)	SPT "N" RANGE	SOIL CLASSIFICATION	APPROXIMATE SOIL UNIT WEIGHT (PCF)		SOIL ANGLE OF FRICTION (DEGREES)	COHESION (PSF)	EARTH PRESSURE COEFFICIENT	
				% SAT	% SUBMERGED			ACTIVE (Ka)	PASSIVE (Kp)
B-6	0-6	6	SP/SP-SM	105	42.6	29	0	.347	2.88
	6-18	9-21	CL/CH	120	57.6	0	1800	1.00	1.00
	18-30	17-30	CL/CH	125	62.6	0	3000	1.00	1.00
B-7	0-2	HAND AUGER	SP/SP-SM	105	42.6	29	0	.347	2.88
	2-13	8-20	CL/CH	120	57.6	0	1900	1.00	1.00
	13-18	7	CL/CH	115	52.6	0	800	1.00	1.00
	18-30	5-9	SM/SC	105	42.6	29	0	.350	2.88

GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4-10
MEDIUM	10-30
DENSE	30-50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2-4
FIRM	4-8
STIFF	8-15
VERY STIFF	15-30
HARD	GREATER THAN 30

SUNSET POINT RD. AND KINGS HIGHWAY

REVISIONS					
Date	By	Description	Date	By	Description

	Name	Date
Drawn by	AN	2/08
Checked by	RS	2/08
Designed by		
Checked by		
Approved by	CHING L. KUO, Ph.D., P.E.	

PROFESSIONAL SERVICE INDUSTRIES, INC.
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FLORIDA LICENSE No. 36115

FLORIDA DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID.
C.R. 576	PINELLAS	-

SHEET TITLE: REPORT OF CORE BORINGS

PROJECT NAME: SUNSET POINT ROAD (CR 576) FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 16

P:\775-Geo\2007\775SS Sunset Point Road\cad\struct\775ss02

BORING LOCATION PLAN

0 100'
PLAN SCALE

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

BORING NO. B-8
STATION NO. *
OFFSET *
ELEVATION *
DATE 1/14/08
HAMMER SAFETY
TYPE OF RIG CME 45

	N	
0		SP/SP-M
	WR AUGER	SM/SC
10	10	
	14	
15	15	
21	21	CL/CH
	40	
30	37	

-200=22

BORING NO. B-9
STATION NO. *
OFFSET *
ELEVATION *
DATE 1/14/08
HAMMER SAFETY
TYPE OF RIG CME 45

	N	
0	AUGER	SP/SP-M
	2	SM/SC
10	4	
	18	
15	4	
21	38	CL/CH
	43	
30	49	

BORING NO. B-10
STATION NO. *
OFFSET *
ELEVATION *
DATE 1/14/08
HAMMER SAFETY
TYPE OF RIG CME 45

	N	
0	AUGER	SP/SP-M
	6	
10	13	SM/SC
	13	
15		
21		
30		

DEPTH IN FEET

0 10'
VERTICAL SCALE
HORIZONTAL N.T.S.

SOIL PARAMETERS

BORING NUMBER	DEPTH (FEET)	SPT "N" RANGE	SOIL CLASSIFICATION	APPROXIMATE SOIL UNIT WEIGHT (PCF)		SOIL ANGLE OF FRICTION (DEGREES)	COHESION (PSF)	EARTH PRESSURE COEFFICIENT	
				ɣ SAT	ɣ SUBMERGED			ACTIVE (Ka)	PASSIVE (Kp)
B-8	0-4	HAND AUGER	SP/SP-SM/SM/SC	105	42.6	29	0	.347	2.88
	4-6	WH	SM/SC	100	37.6	26	0	.390	2.56
	6-18	10-15	CL/CH	120	57.6	0	1600	1.00	1.00
	18-30	21-40	CL/CH	125	62.6	0	4000	1.00	1.00
B-9	0-8	2-4	SP/SP-SM/SM/SC	100	37.6	28	0	.361	2.77
	8-13	18	CL/CH	125	62.6	0	2000	1.00	1.00
	13-18	4	CL/CH	110	47.6	0	500	1.00	1.00
	18-30	38-49	CL/CH	125	62.6	0	4000	1.00	1.00
B-10	0-10	6-13	SP/SP-SM/SM/SC	105	42.6	29	0	.347	2.88

LEGEND

- (SP/SP-SM), BROWN TO LIGHT BROWN CLEAN TO SLIGHTLY SILTY FINE SAND
- (SM/SC), BROWN, VERY LIGHT BROWN AND GRAY SILTY TO CLAYEY FINE SAND
- (CL/CH), GRAY AND BLUE-GREEN SILTY CLAY
- VERY PALE BROWN HIGHLY WEATHERED LIMESTONE

NOTES:

- WATER TABLE
- N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12" PENETRATION. (UNLESS OTHERWISE NOTED.)
- WR FELL UNDER WEIGHT OF ROD
- ⇦ LOSS OF CIRCULATION (%)
- GNA GROUNDWATER LEVEL NOT APPARENT
- 50/6" FIFTY BLOWS FOR SIX INCHES
- APPROXIMATE SPT BORING LOCATION
- • STATIONS, OFFSETS AND ELEVATIONS WILL BE PROVIDED IN FINAL REPORT.
- -200 FINES PASSING NO. 200 SIEVE (%)
- LL LIQUID LIMIT (%)
- PI PLASTICITY INDEX (%)

ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE: EXTREMELY AGGRESSIVE (ASSUMED)

GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4-10
MEDIUM	10-30
DENSE	30-50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2-4
FIRM	4-8
STIFF	8-15
VERY STIFF	15-30
HARD	GREATER THAN 30

SUNSET POINT AND N. HIGHLAND AVE.

REVISIONS					
Date	By	Description	Date	By	Description

	Name	Date
Drawn by	AN	2/08
Checked by	RS	2/08
Designed by		
Checked by		
Approved by	CHING L. KUO, Ph.D., P.E.	

psi
CHING L. KUO, Ph.D., P.E.
FLORIDA LICENSE No. 36115

PROFESSIONAL SERVICE INDUSTRIES, INC.
5801 BENJAMIN CENTER DR., SUITE 112
TAMPA, FL. 33634
(813)-886-1075
FLORIDA ENGINEERING CERTIFICATE OF AUTHORIZATION No. 3684

FLORIDA DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID.
C.R. 576	PINELLAS	-

SHEET TITLE: REPORT OF CORE BORINGS

PROJECT NAME: SUNSET POINT ROAD (CR 576) FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

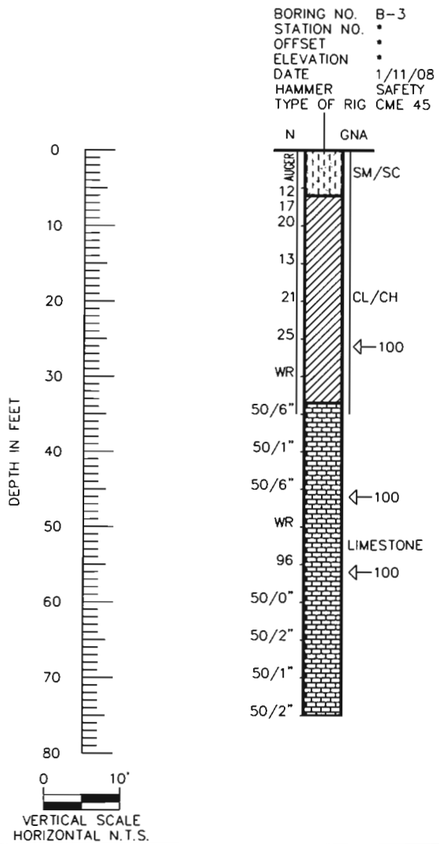
PSI PROJECT No. 775-75056
SHEET 17

P:\775_Geo\2007\75056 Sunset Point Road\stru\drgs\75056s2

BORING LOCATION PLAN

0 100'
PLAN SCALE

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3



LEGEND

- (SP/SP-SM), BROWN TO LIGHT BROWN CLEAN TO SLIGHTLY SILTY FINE SAND
- (SM/SC), BROWN, VERY LIGHT BROWN AND GRAY SILTY TO CLAYEY FINE SAND
- (CL/CH), GRAY AND BLUE-GREEN SILTY CLAY
- VERY PALE BROWN HIGHLY WEATHERED LIMESTONE

NOTES:

- WATER TABLE
- N — NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12" PENETRATION. (UNLESS OTHERWISE NOTED.)
- WR — FELL UNDER WEIGHT OF ROD
- ⟵ — LOSS OF CIRCULATION (%)
- GNA — GROUNDWATER LEVEL NOT APPARENT
- 50/6" — FIFTY BLOWS FOR SIX INCHES
- APPROXIMATE SPT BORING LOCATION
- • — STATIONS, OFFSETS AND ELEVATIONS WILL BE PROVIDED IN FINAL REPORT.
- -200 — FINES PASSING NO. 200 SIEVE (%)
- LL — LIQUID LIMIT (%)
- PI — PLASTICITY INDEX (%)
- | | — CASING USED

ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE: EXTREMELY AGGRESSIVE (ASSUMED)

GRANULAR MATERIALS - RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4-10
MEDIUM	10-30
DENSE	30-50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2-4
FIRM	4-8
STIFF	8-15
VERY STIFF	15-30
HARD	GREATER THAN 30

SPRING BRANCH CREEK BRIDGE

REVISIONS

Date	By	Description	Date	By	Description

	Name	Date
Drawn by	AN	2/08
Checked by	RS	2/08
Designed by		
Checked by		
Approved by	CHING L. KUO, Ph.D., P.E.	

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FLORIDA DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID.
C.R. 576	PINELLAS	-

SHEET TITLE: REPORT OF CORE BORINGS

PROJECT NAME: SUNSET POINT ROAD (CR 576) FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 18

P:\775-Reg\2007\75056 Sunset Point Road\cad\struct\75056s2

FINAL GEOTECHNICAL REPORT (DRAFT)
SUNSET POINT ROAD (CR 576)
IMPROVEMENTS
BETWEEN EDGEWATER DRIVE (US ALT 19)
AND KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

PSI Information To Build On
Engineering • Consulting • Testing

December 10, 2008

Pinellas County Public Works
440 Court Street
Clearwater, Florida 33756

Attention: Mr. Mike H. Skrzypkowiak
Consultant Services

Re: Final Geotechnical Report (Draft)
Sunset Point Road Improvements
Between Edgewater Drive (US Alt 19)
and Keene Road
Pinellas County, Florida
PSI Project No. 775-75056

Dear Mr. Skrzypkowiak:

Professional Service Industries, Incorporated (PSI) is pleased to submit this Final Geotechnical Report (Draft) for the proposed improvements to Sunset Point Road (CR 576) in Pinellas County, Florida. The study was authorized by the Public Works/Road and Street Facilities Department of Pinellas County (Purchase Order No. 226550) and performed in accordance with PSI Proposal Nos. 775-7G0039 (Rev. 1) dated October 23, 2007 and 775-8G0052 (Rev. 2) dated October 31, 2008.

This report presents the results of our geotechnical study for the proposed improvements. Additional services which remain are to perform muck probing to delineate the extent of unsuitable soils, incorporate soil boring survey data and any report comments. Included in this report are the methods, procedures, field results, and analyses and evaluations for the roadway improvements.

PSI appreciates the opportunity of providing our services to Pinellas County on this project. If you have questions concerning the contents of this report or need additional information, please do not hesitate to contact our office.

Sincerely,
Professional Service Industries, Inc.
Certificate of Authorization No. 3684

Ruben Sosa, Jr., P.E.
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TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 PROJECT INFORMATION 1
1.2 SITE DESCRIPTION 1

2.0 SCOPE OF SERVICES 1

3.0 SUBSURFACE EXPLORATION 4
3.1 BORING LOCATIONS, UTILITY CLEARANCE AND TRAFFIC CONTROL 4
3.2 ROADWAY SOIL BORINGS 4
3.3 STORMWATER SYSTEM SOIL BORINGS 5
3.4 PAVEMENT CORES 5
3.5 BULK SAMPLING FOR LIMEROCK BEARING RATIO (LBR) TESTS 5

4.0 LABORATORY TESTING 5
4.1 SOIL CLASSIFICATION TESTING 6
4.2 LIMEROCK BEARING RATIO (LBR) 6

5.0 GENERALIZED SUBSURFACE SOIL CONDITIONS 6
5.1 GENERAL GEOLOGY 6
5.2 PINELLAS USDA SOIL SURVEY 6
5.3 USGS TOPOGRAPHIC SURVEY 7
5.4 SOIL BORING RESULTS 7
5.5 GROUNDWATER 7

6.0 ENGINEERING EVALUATIONS AND RECOMMENDATIONS 8
6.1 PAVEMENT DESIGN CONSIDERATIONS 8
6.2 PAVEMENT MILLING AND RESURFACING 9
6.3 SOIL USAGE SUMMARY 9
6.4 ENVIRONMENTAL CLASSIFICATION (CORROSION SERIES) 10
6.5 GROUNDWATER CONTROL 10
6.6 GENERAL ROADWAY CONSTRUCTION RECOMMENDATIONS 10
6.7 TEMPORARY SIDE SLOPES 11
6.8 UNUSUAL SITE CONDITIONS 11

7.0 MAST ARM SIGNAL POLES 11

8.0 LIMITATIONS 12

LIST OF TABLES AND SHEETS

APPENDIX A

SUMMARY OF USDA SOIL SURVEY ..... TABLE 1
SUMMARY OF LABORATORY TEST RESULTS ..... TABLE 2
SUMMARY OF SEASONAL HIGH WATER LEVEL DATA ..... TABLE 3
SUMMARY OF LIMEROCK BEARING RATIO TEST RESULTS ..... TABLE 4
SUMMARY OF CORROSION TEST RESULTS ..... TABLE 5
PAVEMENT EVALUATION AND CONDITION DATA SHEET ..... TABLE 6
FDOT DESIGN LBR GRAPH ..... FIGURE 1

APPENDIX B

USDA AND USGS SITE VICINITY MAPS ..... SHEET 1
BORING AND TEST LOCATION PLAN ..... SHEETS 2 THROUGH 8
SOIL PROFILES ..... SHEETS 9 THROUGH 12
ROADWAY SOILS SURVEY – POND 300B & FPC-3A ..... SHEET 13
ROADWAY SOILS SURVEY – POND 200A, FPC-2, FPC-4 & FPC-5 ..... SHEET 14
CROSS SECTION SOILS SURVEY ..... SHEET 15
REPORT OF CORE BORINGS – MAST ARMS ..... SHEETS 16 THROUGH 20
REPORT OF CORE BORINGS – BRIDGE ..... SHEET 21

1.0 INTRODUCTION

1.1 PROJECT INFORMATION

This study is to support the design of proposed improvements to Sunset Point Road (CR 576) between Edgewater Drive (U.S. Alternate 19) and just east of Keene Road in Pinellas County, Florida. The total length of the project is approximately 2 miles. Planned improvements include the following:

- Providing a 4-lane typical section from Keene Road to Highland Avenue (0.75 miles).
- Providing a 3-lane typical section from Highland Avenue to Douglas Avenue (0.75 miles)
- Evaluate roadway grades from Douglas (0.5 miles) Avenue to Edgewater Drive (0.5 miles)
- Two pond sites and several floodplain compensation areas
- Replacement of Spring Branch Creek Bridge
- Mast arm signals at Betty Lane, Douglas Avenue, Highland Avenue, Kings Highway and Keene Road

Along with widening and reconstruction, storm water drainage facilities, curbs, gutters and sidewalks are also planned. An aerial photograph of the existing roadway is shown on **Sheets 2 through 8** in **Appendix B** of this report.

1.2 SITE DESCRIPTION

The project alignment is located in Pinellas County, Florida within Sections 2 and 3, Township 29 South, Range 15 East as shown on **Sheet 1** in **Appendix B** of this report. Based primarily on published information, the topography of the roadway is gently rolling, with the elevation ranging from approximately 10 to 55 feet NGVD datum, 1929. The alignment traverses a predominately residential area.

2.0 SCOPE OF SERVICES

Our geotechnical engineering services were performed in general accordance with the Pinellas County Scope of Services and PSI Proposal Nos. 775-7G0039 (Rev. 1) dated October 23, 2007 and 775-8G0052 (Rev. 2) dated October 31, 2008. The services included performing field reconnaissance, a roadway soil survey, groundwater table measurements, laboratory classification testing and engineering evaluations and design recommendations.

The purpose of this study was to obtain information concerning the general subsurface conditions along the proposed roadway improvement area in order to make engineering evaluations and recommendations in each of the following areas:

1. General assessment of the area geology based on our past experience and study of available geological literature.

2. Development of the general soil profile along the roadway alignment and the anticipated soil conditions within the depth of influence of the proposed improvements.

3. Assessment of the existing soil subgrade and groundwater conditions along the subject alignment for suitability of pavement support.

4. General location and description of potential deleterious materials encountered in the borings which may interfere with construction progress or pavement performance, including existing fills or surficial organics.

5. Discuss site preparation requirements and engineering criteria for placement and compaction of in-situ soils and approved fill materials.

6. Identification of critical design and/or construction considerations based on the soil and groundwater conditions encountered in the borings.

7. Groundwater levels in the borings along the project alignment and estimated seasonal high groundwater levels at the boring locations.

8. Determine soil parameters for the design of mast arms pole foundations.

9. Recommendations regarding possible milling and resurfacing of the roadway from U.S. Alternate 19 to Douglas Avenue.

The scope of services for the geotechnical testing program associated with the roadway design included the following:

1. Conducted a general visual reconnaissance of the site and coordinated underground utility location services and maintenance of traffic.

2. Reviewed readily available published soil and topographic information. Reviewed the “Soil Survey of Pinellas County, Florida” published by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) and the “Clearwater, Florida” Quadrangle Map published by the United States Geologic Survey (USGS).

3. Performed Standard Penetration Test (SPT) borings for the planned mast arm signal poles to be located at the intersections of Sunset Point Road and:

- Douglas Avenue
- North Betty Lane
- Kings Highway
- North Highland Avenue
- Keene Road

4. Performed one (1) SPT boring for the planned Spring Branch Creek Bridge replacement.

5. Performed hand auger borings to depths of 5 feet below the existing grade along the proposed alignment.

6. Performed power auger borings within or near the proposed stormwater ponds and floodplain compensation areas to a depth of approximately 20 feet below the existing grade.

7. Collected pavement cores and performed 5-foot auger borings along Sunset Point Road between U.S. Alternate 19 and Douglas Avenue.

8. Collected five (5) bulk samples within proposed areas of new pavement construction and performed Limerock Bearing Ratio (LBR) testing to assist in pavement design.

9. Reviewed the sampled soils in the laboratory and conducted a laboratory testing program consisting of gradation analyses, Atterberg Limit tests and Limerock Bearing Ratio (LBR) tests. Visually classified the recovered sampled soils from the roadway borings according to the AASHTO Soil Classification System.

10. Measured observed groundwater levels and estimated seasonal high groundwater levels at the boring locations.

11. Prepared this Preliminary Geotechnical Report summarizing the field and laboratory testing program results, and the subsurface soil and groundwater conditions encountered. Developed engineering recommendations for the design and construction of the subgrade for the proposed roadway improvements.

3.0 SUBSURFACE EXPLORATION

3.1 BORING LOCATIONS, UTILITY CLEARANCE AND TRAFFIC CONTROL

An aerial photograph of the existing roadway alignment was provided by American Consulting Engineers of Florida, L.L.C. All the soil boring locations were staked in the field by PSI and have been surveyed by others. We understand the project surveyor and/or American Consulting Engineers of Florida, L.L.C. will provide a construction baseline for reference prior to PSI issuing a final geotechnical report.

Utility clearances were coordinated by PSI and updated as required for the duration of the field investigation, flagmen, barricades, cones and sign devices were used as necessary in compliance with the applicable FDOT Roadway and Traffic Design Standard Indices.

3.2 ROADWAY SOIL BORINGS

To evaluate the subsurface conditions along the proposed alignment, hand auger borings were performed to a depth of 5 feet below the existing grade. The borings were alternatively staggered to the left and right of the existing roadway. The hand auger borings were performed by manually twisting and advancing a bucket auger into the ground in 4 to 6 inch increments. As each soil type was revealed, representative samples were placed in air-tight jars and returned to the PSI Tampa office for review by a geotechnical engineer. . After performing the auger borings, the boreholes were backfilled with available existing materials for safety.

To explore subsurface conditions within the vicinity of proposed mast arm signal pole locations, a total of nine (9) SPT borings were performed to a depth of approximately 30 feet below the existing ground surface. The SPT borings were performed for the intersections of Sunset Point Road with Douglas Avenue, North Betty Lane, Kings Highway and North Highland Avenue. In addition for the proposed replacement of the Spring Branch Creek Bridge, one (1) SPT boring was performed to an approximate depth of 75 feet. Details regarding this bridge boring will be included in separate report. The SPT borings were advanced utilizing rotary mud drilling methods and soil samples were routinely obtained at select intervals during the drilling process. Samples obtained in the field were returned to the laboratory for visual classification and laboratory testing. Drilling and sampling techniques were accomplished in general accordance with ASTM Standards.

The roadway auger boring locations are shown on the Boring Location Plans presented on **Sheets 2 through 8** in **Appendix B** of this report. The SPT boring locations are presented on **Sheets 16 through 21** in **Appendix B**. Once the project survey is complete, station and offset for each boring will be provided.

3.3 STORMWATER SYSTEM SOIL BORINGS

As part of the planned improvements, two (2) stormwater ponds and four (4) floodplain compensation areas (FPC) are planned, the areas of which are summarized below:

LOCATION	APPROXIMATE AREA (acre)
Pond 200A	1.05
Pond 300B	2.15
FPC-2	0.25
FPC-3A	1.18
FPC-4	1.59
FPC-5	0.78

To evaluate the subsurface conditions at the pond and FPC sites, fourteen (14) power auger borings were performed to a depth of approximately 20 feet below existing grades. **Table 3** in **Appendix A** summarizes the boring locations and encountered groundwater tables for the borings performed. The boring locations and soil profiles are shown on **Sheets 13 and 14** in **Appendix B**. These areas are planned to be "wet" detention/retention areas. Therefore, infiltration testing was not required.

3.4 PAVEMENT CORES

To supplement collected roadway data to be used in evaluation of seasonal high groundwater levels and to provide recommendations for possible milling and resurfacing, five (5) pavement cores were collected along Sunset Point Road from U.S. Alternate 19 to Douglas Avenue. At the location of each pavement core, a 5-foot auger boring was performed to evaluate soils underlying the pavement.

A summary of the collected pavement cores is included on **Table 6** in **Appendix A. Table 3** in **Appendix A** summarizes the boring locations and encountered groundwater tables for the borings performed. The pavement core and boring locations are shown on **Sheets 2 and 3** in **Appendix B**. The soil profiles for the soil borings performed during collection of the pavement cores are included on **Sheet 12** in **Appendix B**.

3.5 BULK SAMPLING FOR LIMEROCK BEARING RATIO (LBR) TESTS

Bulk samples were retrieved for LBR testing at five (5) locations along the roadway alignment. The samples were collected from surficial soils within 3 feet of current grades at the locations indicated on **Sheets 2 through 8** in **Appendix B**. A summary of the LBR test results is provided in **Table 4** in **Appendix A**.

4.0 LABORATORY TESTING

4.1 SOIL CLASSIFICATION TESTING

Representative soil samples collected from the auger borings were visually reviewed in the laboratory by a geotechnical engineer to confirm the field classification. The roadway samples were classified in general accordance with the AASHTO Classification System and the SPT borings for the mast arm and bridge foundations were classified in general accordance with the Unified Soil Classification System (USCS). Classification was based on visual observations with the aid of the laboratory test results performed on selected representative samples. Laboratory classification tests consisted of grain-size analysis tests (gradation), Atterberg Limit tests and corrosion series.

Sheet 15 in **Appendix B** summarizes the laboratory testing program described above, as well as the tested range of values for each soil strata. **Table 2** in **Appendix A** includes a summary of the classification test results.

4.2 LIMEROCK BEARING RATIO (LBR)

LBR tests were performed in accordance with the FDOT Standard FM 5-515 including a modified Proctor test. The LBR test is a measure of the bearing capacity of a soil. The test consists of measuring the load required to cause a standard circular plunger (area of three 3 square inches) to penetrate a specimen at a specified rate. The LBR is the load in pounds per square inch (psi) units, required to force the plunger into the soil 0.1 inch expressed as a percentage of the load in psi units, required to force the same plunger the same depth into a standard sample of crushed limerock. The average penetration load for a typical crushed limerock found in Florida has been standardized to 800 psi. A summary of the LBR tests performed is shown on **Table 4** in **Appendix A**.

5.0 GENERALIZED SUBSURFACE SOIL CONDITIONS

5.1 GENERAL GEOLOGY

Within Pinellas County, the uppermost soil layers generally consist of young undifferentiated sediments underlain by the Hawthorn Group of formations. The Hawthorn consists of fine to medium grained quartz sands, silt, clay and limestone in varying proportions and thicknesses. Beneath the Hawthorn lies the Ocala Limestone Formation. The surface of the Ocala formation is locally very irregular. The upper part of the Ocala Limestone is a white, generally soft, somewhat friable, porous coquina composed of large foraminifera, bryozoan fragments and whole to broken echinoid remains, all loosely bound by a matrix of micritic limestone. The lower part of the Ocala Limestone consists of cream to white, generally fine-grained, soft to semi-indurated, micritic limestone containing abundant miliolid remains and scattered large foraminiferas.

5.2 PINELLAS COUNTY USDA SOIL SURVEY

The Soil Survey of Pinellas County, Florida, published by the USDA SCS has been reviewed for the project vicinity. The soil survey map for the project vicinity is illustrated on **Sheet 1** in **Appendix B** of this report. A summary of the mapped soil units within the project vicinity is presented in **Table 1** in **Appendix A** of this report.

5.3 USGS TOPOGRAPHIC SURVEY

The project is located within the USGS "Clearwater, Florida" Quadrangle Map dated 2001, Township 29 South, Range 15 East and Sections 2 and 3. The existing ground surface along the project alignment varies from an approximate elevation of 10 to 55 feet NGVD of 1929. A reproduction of the USGS Quadrangle map for the project vicinity is presented on **Sheet 1** in **Appendix B**.

5.4 SOIL BORING RESULTS

Based upon the exploratory borings and results of the laboratory testing, the near surface soils along the project alignment have been grouped into four (4) categories/strata. **Sheet 15** in **Appendix B** of this report is provided to show the general range of engineering properties measured in the laboratory for the various soil strata encountered during our exploration.

The results of the auger borings performed for roadway are presented on **Sheets 9 through 12** in **Appendix B** in the form of soil profiles, along with the profile legend and other pertinent information such as measured groundwater levels. **Sheets 13 and 14** in **Appendix B** show the results of the auger borings performed for the stormwater areas. Soil stratification is based on an examination of the recovered soil samples, the laboratory testing, and interpretation of field boring logs by a geotechnical engineer. The stratification lines represent the approximate boundaries between soil types of significantly different engineering properties. The actual transition may be gradual. In some cases, small variations in properties not considered pertinent to our engineering evaluation may have been abbreviated or omitted for clarity. The profiles represent the conditions at the boring locations only and variations may occur among the borings.

In general, the auger borings performed encountered the following strata.

STRATUM	SOIL DESCRIPTION	AASHTO SOIL CLASSIFICATION
1	Clean to Slightly Silty Fine SAND	A-3
2	Silty to Clayey Fine SAND	A-2-4
3	Sandy CLAY	A-6
4	Silty Fine SAND with organics (Muck)	A-8

5.5 GROUNDWATER

When encountered, groundwater was observed at depths ranging from 2½ to greater than 5 feet below the existing ground surface in the borings performed at the project site. Groundwater levels will fluctuate seasonally and groundwater conditions will change with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, tidal influences, as well as man-made influences, such as existing swales, drainage ponds and underdrains.

A summary of estimated seasonal high groundwater table levels at the boring locations is presented in **Table 3** in **Appendix A**.

6.0 ENGINEERING EVALUATIONS AND RECOMMENDATIONS

6.1 PAVEMENT DESIGN CONSIDERATIONS

Five (5) LBR tests were performed on near surface soils at various locations along the existing roadway. The LBR tests yielded values ranging from 26 to 49 percent. Using the FDOT 90 percentile method, a design LBR of 29 percent is recommended for the existing project soils for soil support for use in pavement design. **Table 4** in **Appendix A** of this report presents a summary of the LBR tests performed for the study.

It should be noted that the LBR values might not be representative of borrow materials which may be used to support some of the new roadway. An approximate LBR value should be used in design for fill soils used beneath the proposed pavement section. While fill sources are not known, based on past experience, an LBR value of 20 should be available from typical compacted "select" fill that may be imported.

It is recommended that the subgrade soils be stabilized to a minimum LBR of 40. The amount of stabilizing material required will vary depending on the actual subgrade LBR values.

In accordance with FDOT guidelines, grades for this type of roadway should be ideally set to provide a minimum separation of 3 feet between the bottom of the base and the estimated seasonal high groundwater levels. If this minimum separation is maintained, then a limestone, or bank-run shell base can be utilized; otherwise, crushed concrete, or asphaltic concrete base would be required.

6.2 PAVEMENT MILLING AND RESURFACING

To supplement collected roadway data to be used in evaluation of seasonal high groundwater levels and to provide recommendations for possible milling and resurfacing, five (5) pavement cores were collected along Sunset Point Road from U.S. Alternate 19 to Douglas Avenue. At the location of each pavement core, a 5-foot auger boring was performed to evaluate soils underlying the pavement.

As shown on **Table 6** in **Appendix A**, the pavement had an asphaltic base course (ABC). The base layer varied in thickness from approximately 1.0 to 2.8 inches. Asphaltic base material is typically used in areas with relatively high groundwater levels since it is moisture resistant. Unfortunately, the use of an ABC did not allow for confirmation that the existing pavements are subject to shallow groundwater conditions.

The pavement structural course was found to vary in thickness from approximately 1.0 to 2.0 inches. When present, a friction course was identified which varied in thickness from approximately 0.5 to 0.8 inches. Depending on the expected traffic conditions, the structural and/or base course thicknesses may need to be increased as part pavement rehabilitation activities.

Possible milling and resurfacing will depend upon the planned pavement grades. If the design engineer and the County decide that the use of a moisture resistant base material such as ABC is acceptable under the expected shallow groundwater conditions, milling and resurfacing can be used for pavement rehabilitation. In this situation, we recommend removal of the upper one (1) inch of pavement with subsequent resurfacing as directed by the design engineer.

If pavement grades are to be significantly increased, we recommend pavement reconstruction. The reconstructed pavement design should utilize accepted construction practices with respect to groundwater separation from the base material.

6.3 SOIL USAGE SUMMARY

In general, the existing subsurface soils should be acceptable for construction to support typical embankment pavement section after proper subgrade preparation. Unsuitable soils or debris, if encountered within the construction limits, should be removed and replaced with compacted clean sand as outline herein.

The generalized soil strata information is shown on **Sheet 15** in **Appendix B**. Material use and/or removal shall be completed in accordance with FDOT Indices 500 and 505. Once the roadway grade and alignment are established, PSI will evaluate the estimated extent of unsuitable material.

Materials directly beneath the base should be “select” materials. The following summarized the generalized use or non-use of the soils and material that will most likely be encountered during construction.

- The material from Strata 1 (A-3) and 2 (A-2-4) appears to be satisfactory for use in the embankment when utilized in accordance with FDOT Index 505.

- The material from Stratum 3 (A-6) is plastic material and shall be removed in accordance with FDOT index 500. It may be placed above the existing water level (at the time of construction) to within 4 feet of the proposed

base. It should be placed uniformly in the lower portion of the embankment for some distance along the project rather than full depth for shorter distanced.

- The material from Stratum 4 (muck) is organic material and shall be removed in accordance with Index 500. It is noted that additional services remain to perform muck probing and delineate the approximate extent of unsuitable soils. These services will be performed prior to the finalization of the geotechnical report.

The removal of topsoil and other shallow surficial organic soil deposits should be accomplished in accordance with FDOT Standard Specification for Road and Bridge Construction, Section 110.

Backfill should consist of materials conforming to Standard Index 505 and compacted in accordance with Section 120-9 of the Standard Specification.

6.4 ENVIRONMENTAL CLASSIFICATION (CORROSION SERIES)

Environmental corrosion tests were conducted in accordance with the FDOT test designations FM 5-550, FM 5-551, FM 5-552 and FM 5-553. These tests were performed on recovered soil samples obtained from the roadway auger borings. Environmental corrosion tests measure parameters such as pH, resistivity, sulfate content and chloride content. Test results will be presented in the subsequent geotechnical report. Test results obtained are presented in **Table 5** in **Appendix A**. Based on the laboratory test results and FDOT's "Structures Design Guidelines", we recommend the subsurface environment be classified as moderately aggressive for steel and slightly aggressive for concrete.

6.5 GROUNDWATER CONTROL

Depending upon groundwater levels at the time of construction, some form of dewatering may be required for deeper excavation such as trenches for utility installation. Groundwater can normally be controlled in shallow excavations with pumps and sumps. During subgrade soil preparation any plastic soils below design grade could become disturbed by construction activities. If this becomes the case, the contractor may be directed by the Engineer to remove the disturbed or pumping soils to a depth of 1 to 2 feet below the excavation bottom and backfill the area with structural fill. In such situations, FDOT Indices 500 and 505 should be followed closely.

6.6 GENERAL ROADWAY CONSTRUCTION RECOMMENDATIONS

The overall site preparation and mechanical densification work for the construction of the roadway should be in accordance with the FDOT Standard Specifications for Road and Bridge Construction and Standard Index requirements.

6.7 TEMPORARY SIDE SLOPES

In areas where unbraced temporary excavation is feasible, side slope may stand near one (1) horizontal to one (1) vertical (1H:1V) for short dry periods of time (less than 24 hours) and a maximum excavation depth of five (5) feet. Where restriction will not permit slopes to be laid back as presented above, the excavation should be shored in accordance with the most current Occupational Safety and Health Administration (OSHA) requirements. Furthermore, open-cut excavations up to a maximum depth of five (5) feet (for periods longer than 24 inches) should be properly dewatered and sloped 2H:1V or flatter or be braced using a bracing plan approved by a professional engineer licensed in the state of Florida. Excavated material should not be stock piles at the top of the slope within a horizontal distance equal to the excavation depth.

6.8 UNUSUAL SITE CONDITIONS

Our scope of services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Although our scope does not include an assessment for the presence of hazardous materials, one of our borings completed on January 14, 2008 did encounter a foreign chemical substance. Within our SPT boring B-10 performed at the southeast corner of the intersection of Sunset Point Road and North Highland Avenue, an unidentified chemical substance with an unusual odor was encountered within the soil from a depth of approximately 2 feet to the bottom of the boring at 10 feet below the ground surface. In our professional opinion, this substance was petroleum-based and we recommend further environmental evaluation.

7.0 MAST ARM SIGNAL POLES

New mast arm signal poles are planned for the project. Mast arms are planned for the intersections of Sunset Point Road with Douglas Avenue, North Betty Lane, Kings Highway, North Highland Avenue and Douglas Avenue.

A total of eleven (11) SPT borings were performed for the subject mast arms signal poles to a depth 30. However, boring B-10 was terminated at a depth of 10 feet due to apparent petroleum fumes. The boring profiles and locations are presented on the Report of Core Boring Sheets (**Sheets 16 through 20**) in **Appendix B**. These sheets also present soil parameters for each soil strata encountered. Included in the soil parameter table are the soil unit weight, friction angle, cohesion and coefficients of active and passive earth pressure.

It is our understanding that the foundation system for the proposed mast arms will be designed by others. Once the final loads are known, the mast arm signal pole foundations should be designed using the soil parameters provided on **Sheets 16 through 20**. The foundation design should also consider torsional loads created by wind action.

8.0 LIMITATIONS

Our professional services have been performed, our finding obtained and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This company is not responsible for the conclusions, opinions or recommendations made by others based on these data.

The scope of the exploration was intended to evaluate shallow soil conditions and does not include an evaluation of the potential of sinkhole development for the project site. The analysis and recommendations submitted in this report are based upon data obtained from the soil borings performed at the locations indicated. If any subsoil variations become evident during the course of this project, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. The applicability of the report should also be reviewed in the event significant changes occur in the design, nature or location of the proposed roadway improvement areas.

The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils or other unusual conditions observed are strictly for the information of our client.

APPENDIX A

TABLE 1
SUMMARY OF USDA SOIL SURVEY
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

USDA Map Symbol and Soil Name	Classification				Seasonal High Water Table			Risk of Corrosion	
	Depth (inch)	AASHTO Group	USCS Group	Permeability (in/hr)	Depth (ft)	Kind	Month	Uncoated Steel	Concrete
(As) Astatula fine sand moderately deep water table	0-48	A-3	SP-SM, SP	>20	3.3-5	----	----	Low	High
(Ma) Made land	----	----	----	----	----	----	----	----	----
(My) Myakka fine sand	0-16	A-3	SP,SP-SM	6.3-20	<0.8	----	----	High	High
	16-25	A-3	SP-SM, SM	0.63-2.0					
	25-84	A-3	SP-SM, SP	6.3-20					
(Ps) Pompano fine sand ponded	0-14	A-3	SP,SP-SM	6.3-20	<0.8	----	----	Low	High
	14-80	A-3	SP,SP-SM	6.3-20					
(Uc) Urban land-Astatula complex	----	----	----	----	----	----	----	----	----
(Um) Urban land-Myakka complex	----	----	----	----	----	----	----	----	----

TABLE 2
SUMMARY OF LABORATORY TEST RESULTS
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

Location*	Sample Depth (feet)	Organic Content (%)	Moisture Content (%)	Sieve Analysis (%)					Atterberg Limits (%)		AASHTO Group	Stratum Number
				#10	#40	#60	#100	#200	LL	PI		
RA - 75	3.5 - 5			100	98	84	32	4				1
RA - 85	0 - 3			100	96	73	28	4				1
LBR - 1	0 - 3			96	91	79	42	5				1
LBR - 2	0 - 3			100	98	89	56	6				1
LBR - 3	0 - 3			97	92	79	41	9				1
LBR - 4	0 - 3			100	98	84	37	5				1
LBR - 5	0 - 3			100	95	62	22	6				1
RA - 54	3.5 - 5							3				1
RA - 65	2.5 - 3.5								NP	NP		2
RA - 38	2 - 4.5								40	25		3
RA - 36	3 - 4.5	15										4
RA - 48	2 - 4	8										4
RA - 55	4 - 5	11										4
RA - 95	3.5 - 5	6										4

* station and offset information not yet available

TABLE 3
SEASONAL HIGH WATER TABLE DATA
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

BORING[1]	USDA SCS SOIL TYPE	BORING ELEVATION[2] (ft, NGVD)	MEASURED GROUNDWATER TABLE		BORING DATE	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE	
			DEPTH (ft)	ELEVATION (ft, NGVD)		DEPTH (ft)	ELEVATION (ft, NGVD)
RA - 1	Uc	5.0 [3]	4	1.0	01/23/08	1.5	3.5
C - 1	Uc	not available	>5	--	11/20/08	1.5	--
RA - 2	Uc	4.5 [3]	4.5	0.0	12/20/07	1.0	3.5
RA - 3	Uc	4.5 [3]	2.5	2.0	01/23/08	1.0	3.5
C - 2	Uc	not available	4	--	11/20/08	0.5	--
RA - 4	Uc	3.4	4	-0.6	12/20/07	perched	--
RA - 5	Uc	4.0 [3]	2.5	1.5	01/23/08	0.5	3.5
RA - 6	Uc	5.0 [3]	3	2.0	12/20/07	1.0	4.0
C - 3	Uc	not available	4	--	11/20/08	2.0	--
RA - 7	Uc	9.4 [3]	4	5.4	01/23/08	2.0	7.4
RA - 8	Uc	15.8 [3]	>5	--	12/20/07	>4	<11.8
C - 4	Uc	not available	>5	--	11/20/08	>5	--
RA - 9	Uc	22.5 [3]	>5	--	01/23/08	>5	<17.5
RA - 10	Uc	25.1	>5	--	12/20/07	>5	<20.1
RA - 11	Uc	30.0 [3]	>5	--	01/23/08	>5	<25
C - 5	Uc	not available	>5	--	11/20/08	>5	--
RA - 12	Uc	30.0 [3]	>5	--	12/20/07	>5	<25
RA - 13	Uc	26.9 [3]	>5	--	01/23/08	>5	<21.9
RA - 14	Uc	23.1 [3]	>5	--	12/20/07	>5	<18.1
RA - 15	Uc	22.8 [3]	>5	--	01/22/08	>5	<17.8
RA - 16	Uc	20.9 [3]	>5	--	12/20/07	>4	<16.9
RA - 17	Uc	20.8 [3]	>5	--	01/22/08	>4	<16.8
RA - 18	Uc	18.6 [3]	>5	--	12/20/07	>4	<14.6
RA - 19	Uc	18.0 [3]	>5	--	01/22/08	>4	<14
RA - 20	Uc	17.5 [3]	4	13.5	12/20/07	2.0	15.5
RA - 21	Uc	17.8 [3]	4	13.8	01/22/08	2.0	15.8
RA - 22	My	17.5	>5	--	12/20/07	2.5	15.0
RA - 23	My	17.1 [3]	4	13.1	01/22/08	2.0	15.1
RA - 24	My	16.1	>5	--	12/20/07	1.0	15.1
RA - 25	My	15.5 [3]	>5	--	01/22/08	0.5	15.0
RA - 26	My	17.2	>5	--	12/20/07	2.0	15.2
RA - 27	My	15.0 [3]	4	11.0	01/22/08	2.0	13.0
RA - 28	My	15.4	>5	--	12/20/07	2.0	13.4
RA - 29	My	14.0 [3]	4	10.0	01/22/08	2.0	12.0
RA - 30	My	14.8	4.5	10.3	01/22/08	2.5	12.3
RA - 31	My	10.9 [3]	>5	--	01/22/08	2.0	8.9
RA - 32	Ps	11.2	4.5	--	12/20/07	2.5	8.7
RA - 33	Ps	10.0 [3]	3	7.0	01/22/08	1.0	9.0
RA - 34	Ps	10.9	>5	--	01/02/08	2.0	8.9
RA - 35	Ps	10.1 [3]	3	7.1	01/22/08	1.0	9.1
RA - 36	Ps	11.4	3.5	7.9	01/02/08	1.0	10.4
RA - 37	Ps	11.0 [3]	>5	--	01/22/08	1.0	10.0
RA - 38	Ps	13.5	4.5	9.0	01/02/08	2.5	11.0
RA - 39	Um	14.0	>5	--	01/22/08	3.0	11.0
RA - 40	Um	16.6	4.5	12.1	01/02/08	2.0	14.6
RA - 41	Um	17.9 [3]	4	13.9	01/02/08	2.0	15.9
RA - 42	Um	17.9	>5	--	01/22/08	2.0	15.9

TABLE 3
SEASONAL HIGH WATER TABLE DATA
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

BORING[1]	USDA SCS SOIL TYPE	BORING ELEVATION[2] (ft, NGVD)	MEASURED GROUNDWATER TABLE		BORING DATE	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE	
			DEPTH (ft)	ELEVATION (ft, NGVD)		DEPTH (ft)	ELEVATION (ft, NGVD)
RA - 43	Um	19.0 [3]	2.5	16.5	01/02/08	0.5	18.5
RA - 44	Um	19.2	5	14.2	01/22/08	2.0	17.2
RA - 45	Um	20.5	2.5	18.0	01/02/08	1.0	19.5
RA - 46	Um	22.7	3	19.7	01/02/08	1.5	21.7
RA - 47	Um	23.5 [3]	3.5	20.0	01/22/08	1.5	22.5
RA - 48	Um	26.9	4.5	22.4	01/02/08	2.5	24.4
RA - 49	Um	27.4 [3]	4	23.4	01/22/08	2.0	25.4
RA - 50	Um	30.3 [3]	4	26.3	01/22/08	2.0	28.3
RA - 51	Um	31.7	4	27.7	01/02/08	2.0	29.7
RA - 52	Um	32.8 [3]	>5	--	01/22/08	3.0	29.8
RA - 53	Um	32.1 [3]	>5	--	01/22/08	3.0	29.1
RA - 54	Um	33.1 [3]	3.5	29.6	01/02/08	1.5	31.6
RA - 55	Um	32.0 [3]	3	29.0	01/22/08	1.0	31.0
RA - 56	Um	33.0 [3]	4	29.0	01/02/08	2.0	31.0
RA - 57	Um	34.0 [3]	2.5	31.5	01/22/08	1.0	33.0
RA - 58	Um	36.5 [3]	2.5	34.0	01/22/08	1.0	35.5
RA - 59	Um	35.5	>5	--	01/02/08	3.0	32.5
RA - 60	Um	38.5 [3]	>5	--	01/11/08	3.0	35.5
RA - 61	Um	37.3 [3]	>5	--	01/02/08	3.0	34.3
RA - 62	Um	39.5 [3]	>5	--	01/11/08	3.0	36.5
RA - 63	Um	39.0 [3]	>5	--	01/02/08	3.0	36.0
RA - 64	Um	40.0 [3]	>5	--	01/02/08	3.0	37.0
RA - 65	Um	41.9 [3]	4	37.9	01/11/08	2.0	39.9
RA - 66	Um	41.5 [3]	>5	--	01/07/08	3.0	38.5
RA - 67	Um	43.2	4	39.2	01/11/08	2.0	41.2
RA - 68	Um	44.6	3.5	41.1	01/07/08	1.5	43.1
RA - 69	Um	45.0 [3]	3	42.0	01/11/08	1.0	44.0
RA - 70	Um	45.8	3.5	42.3	01/02/08	1.5	44.3
RA - 71	Um	46.8	3.5	43.3	01/07/08	1.5	45.3
RA - 72	Um	47.8	4	43.8	01/11/08	2.0	45.8
RA - 73	Um	48.4	4	44.4	01/07/08	2.0	46.4
RA - 74	Uc	49.4	3.5	45.9	01/11/08	1.5	47.9
RA - 75	Uc	49.9	>5	--	01/07/08	3.0	46.9
RA - 76	Uc	50.9	>5	--	01/11/08	3.0	47.9
RA - 77	Uc	51.6	>5	--	01/07/08	3.0	48.6
RA - 78	Uc	52.4	>5	--	01/11/08	3.0	49.4
RA - 79	Uc	54.3	>5	--	01/11/08	3.0	51.3
RA - 80	Uc	54.5	>5	--	01/07/08	3.0	51.5
RA - 81	Uc	55.4	>5	--	01/11/08	3.0	52.4
RA - 82	Uc	56.2	>5	--	01/07/08	3.0	53.2
RA - 83	Uc	56.9	>5	--	01/11/08	3.0	53.9
RA - 84	Uc	56.9	>5	--	01/11/08	3.0	53.9
RA - 85	Uc	58.6	>5	--	01/07/08	3.0	55.6
RA - 86	Uc	59.7	>5	--	01/07/08	3.0	56.7
RA - 87	Uc	58.7	>5	--	01/11/08	3.0	55.7
RA - 88	Uc	60.5	>5	--	01/07/08	3.0	57.5
RA - 89	Uc	59.2	>5	--	01/11/08	3.0	56.2

TABLE 3
SEASONAL HIGH WATER TABLE DATA
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

BORING[1]	USDA SCS SOIL TYPE	BORING ELEVATION[2] (ft, NGVD)	MEASURED GROUNDWATER TABLE		BORING DATE	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE	
			DEPTH (ft)	ELEVATION (ft, NGVD)		DEPTH (ft)	ELEVATION (ft, NGVD)
RA - 90	Uc	59.8	>5	--	01/07/08	3.0	56.8
RA - 91	Uc	60.5	>5	--	01/10/08	3.0	57.5
RA - 92	Uc	59.7	>5	--	01/10/08	3.0	56.7
RA - 93	Uc	59.9	>5	--	01/07/08	3.0	56.9
RA - 94	Uc	59.7	>5	--	01/10/08	3.0	56.7
RA - 95	Uc	59.9	5	54.9	01/07/08	3.0	56.9
RA - 96	Uc	59.5	>5	--	01/10/08	3.0	56.5
RA - 97	Uc	59.5	>5	--	01/07/08	3.0	56.5
RA - 98	Ma	59.2	>5	--	01/10/08	3.0	56.2
RA - 99	Ma	59.2	>5	--	01/10/08	3.0	56.2
RA - 100	Ma	59.5	>5	--	01/07/08	3.0	56.5
RA - 101	Ma	59.6	>5	--	01/10/08	3.0	56.6
RA - 102	Ma	59.6	>5	--	01/07/08	3.0	56.6
RA - 103	Ma	60.0	>5	--	01/10/08	3.0	57.0
RA - 104	Ma	60.0 [3]	>5	--	01/10/08	3.0	57.0
RA - 105	Ma	60.6	>5	--	01/10/08	3.0	57.6
RA - 106	Ma	60.1	>5	--	01/10/08	3.0	57.1
RA - 107	Ma	60.4	>5	--	01/10/08	3.0	57.4
RA - 108	As	60.6	>5	--	01/10/08	3.0	57.6
RA - 109	As	60.5	>5	--	01/10/08	3.0	57.5
RA - 110	As	60.7	>5	--	01/10/08	3.0	57.7
RA - 111	As	61.0 [3]	>5	--	01/22/08	3.0	58.0
RA - 112	As	60.3	>5	--	01/10/08	3.0	57.3
RA - 113	As	60.2	>5	--	01/10/08	3.0	57.2
RA - 114	Um	60.4	>5	--	01/10/08	3.0	57.4
RA - 115	Um	60.0 [3]	4.5	55.5	01/22/08	3.0	57.0
RA - 116	Um	not available	>5	--	11/19/08	3.0	--
RA - 117	Um	not available	>5	--	11/19/08	3.0	--
RA - 118	Um	not available	>5	--	11/19/08	3.0	--
RA - 119	Um	not available	>5	--	11/19/08	3.0	--
RA - 120	Um	not available	>5	--	11/19/08	3.0	--
RA - 121	Um	not available	>5	--	11/19/08	3.0	--

[1] station and offset information not yet available

[2] boring elevations provided by McKim and Creed (unless otherwise noted)

[3] boring elevations estimated from topographic data provided by McKim and Creed

TABLE 4
SUMMARY OF LIMEROCK BEARING RATIO TEST RESULTS
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

Sample	Location*		Sample Depth (feet)	LBR (%)	Maximum Dry Density	Optimum Moisture	AASHTO Classification
	Station	Offset					
LBR-1	--	--	1	49	110	12	A-3
LBR-2	--	--	1	40	109	11	A-3
LBR-3	--	--	1	45	114	11	A-3
LBR-4	--	--	1	26	108	10.5	A-3
LBR-5	--	--	1	31	110	11.5	A-3

* station and offset information not yet available

TABLE 5
SUMMARY OF CORROSION TEST RESULTS
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

BORING NUMBER	BORING LOCATION[1]		SAMPLE DEPTH (feet)	pH	CHLORIDES (ppm)	SULFATES (ppm)	RESISTIVITY (ohm-cm)	SUBSTRUCTURE ENVIRONMENTAL CLASSIFICATION	
	STATION (feet)	OFFSET (feet)						STEEL	CONCRETE
RA-64	---	---	2 - 4	6.1	60	<3	15,000	Moderately Aggressive	Slightly Aggressive
RA-84	---	---	3.5 - 5	6.2	60	9.9	29,000	Moderately Aggressive	Slightly Aggressive

(1) Stations and off-sets were not available and will be provided in the final report

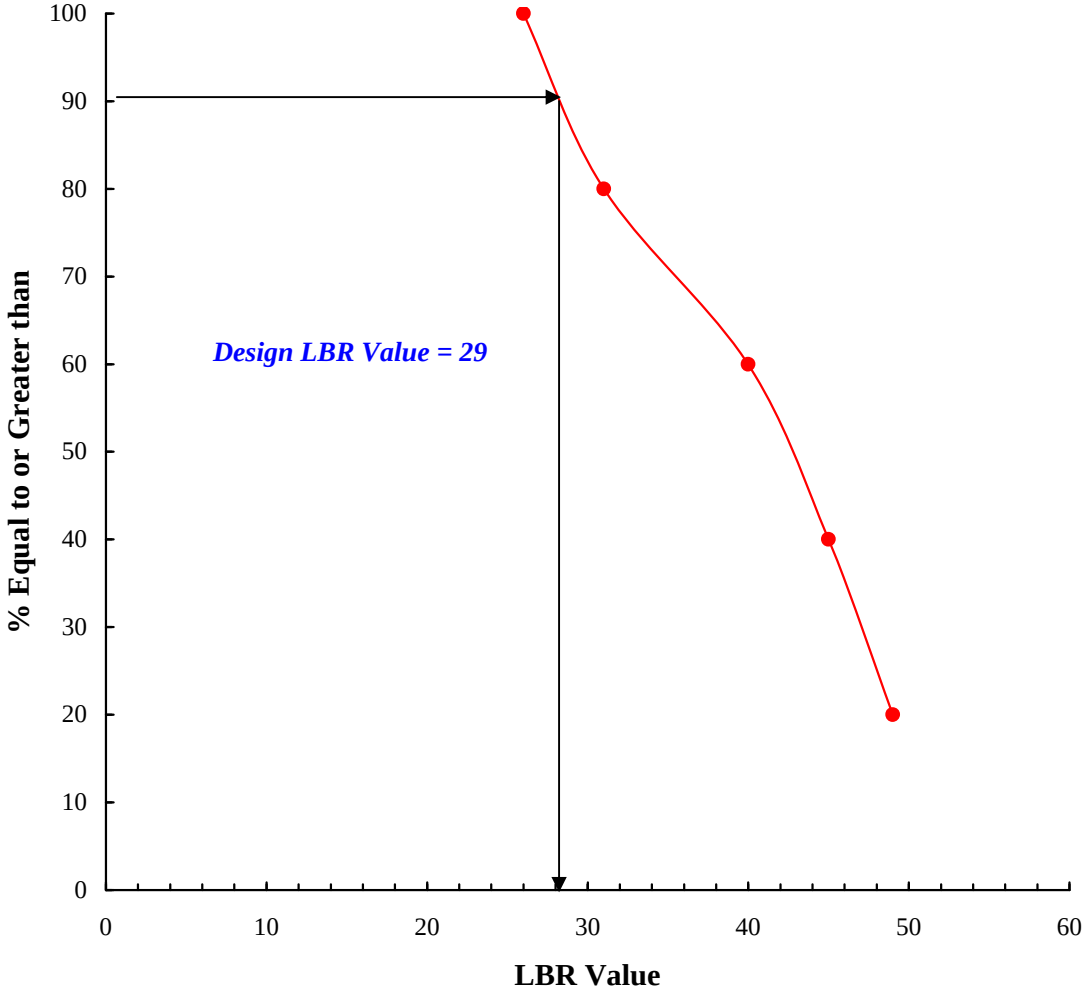
TABLE 6
PAVEMENT EVALUATION AND CONDITION DATA SHEET
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
FROM EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA
PSI PROJECT NO. 775-75056

Project No.: PID #920476	**Cored By:** J. Blowers	**Date:** 11/21/2008	**Page No.:** 1 of 1
County: Pinellas	**Highway Sect. No:**	**From:** U.S. Alternate 19	**To:** Keene Road
Road No.: Sunset Point Road (CR 576)	**Begin STA.:** 1406 + 43	**End STA.:** 1409 + 13	**Length:** 2 + 70

Core No.	Station	Distance from left edge of lane (ft)	Lane	Wheel Path	Pavement Layer (in)										Crack				Pavt. Cond.	Rut Depth (in)	Cross Slope	Comments
					FC	FC-5	FC-6	Structural Course	ARMI	T-S	T-1 / Binder	Core Length (in)	Base Type	Base Thick (in)	Depth (in)	Type	Class	Extent				
C-1	1408 + 23	6	L1		0.8			2.0				2.8	ABC	4	--	--	--	--	F	--	--	
C-2	1407 + 33	6	R1		0.5			1.5				2.0	ABC	2.5	--	--	--	--	F	--	--	
C-3	1408 + 59	6	L1					1.0				1.0	ABC	1.8	--	--	--	--	F	--	--	
C-4	1408 + 05	6	R1					1.3				1.3	ABC	1.5	--	--	--	--	F	--	--	
C-5	1407 + 51	6	L1					1.3				1.3	ABC	1.0	--	--	--	--	F	--	--	

Remarks: Mainline

LBR Design Curve (90% Method)



LBR DESIGN CURVE

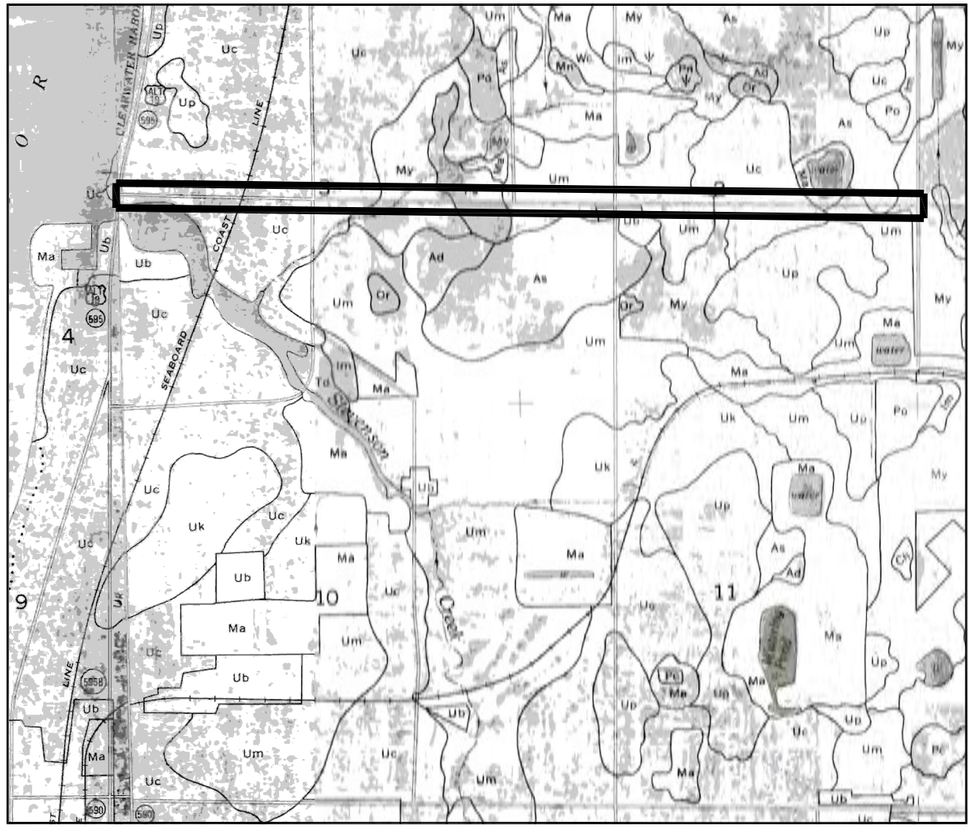
SUNSET POINT ROAD (CR 576) IMPROVEMENTS
PINELLAS COUNTY, FLORIDA

psi Information To Build On
Engineering • Consulting • Testing

DRAWN	SCALE	PROJ. NO.
RS	NOTED	775-75056
CHECKED	DATE	FIGURE
LL	FEB 08	1

APPENDIX B

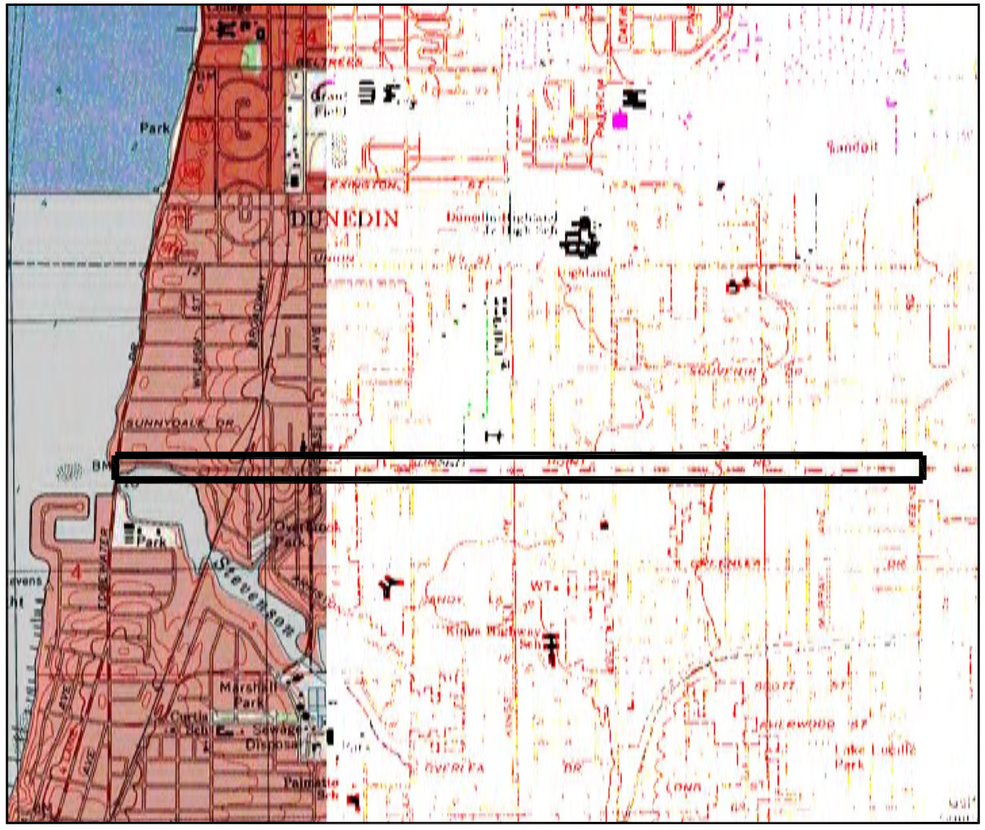
APPROXIMATE SITE LOCATION



REFERENCE: USDA SCS, "SOIL SURVEY OF PINELLAS COUNTY, FLORIDA"
TOWNSHIP: 29 SOUTH
RANGE: 15 EAST
SECTION: 2 & 3
ISSUED: 1972
PHOTO: 1970
SCALE: 1" = 2000'

USDA VICINITY MAP

APPROXIMATE SITE LOCATION



REFERENCE: USGS "CLEARWATER, FLORIDA" QUADRANGLE MAP
TOWNSHIP: 29 SOUTH
RANGE: 15 EAST
SECTION: 2 & 3
ISSUED: 2001
PHOTOREVISED: –
SCALE: 1" = 2000'

USGS VICINITY MAP

DRAWN	AN
CHECKED	RS
APPROVED	MEM
SCALE	NOTED

USDA & USGS VICINITY MAPS
SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DR.) TO KEENE ROAD
PINELLAS COUNTY, FLORIDA

psi Information To Build On
Engineering • Consulting • Testing

DATE	PROJ. NO.	SHEET
FEB 08	775-75056	SHEET 1

P:\775-Geo\2007\75056 Suntrust Point road\cad\75056s1

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION
- APPROXIMATE PAVEMENT CORE AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 2

REVISIONS

Date	By	Description	Date	By

CHING L. KUO, Ph.D., P.E.
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FLORIDA ENGINEERING CERTIFICATE
OF AUTHORIZATION No. 3684

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO.

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION
- APPROXIMATE PAVEMENT CORE AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 3

REVISIONS

Date	By	Description	Date	By	Description

psi

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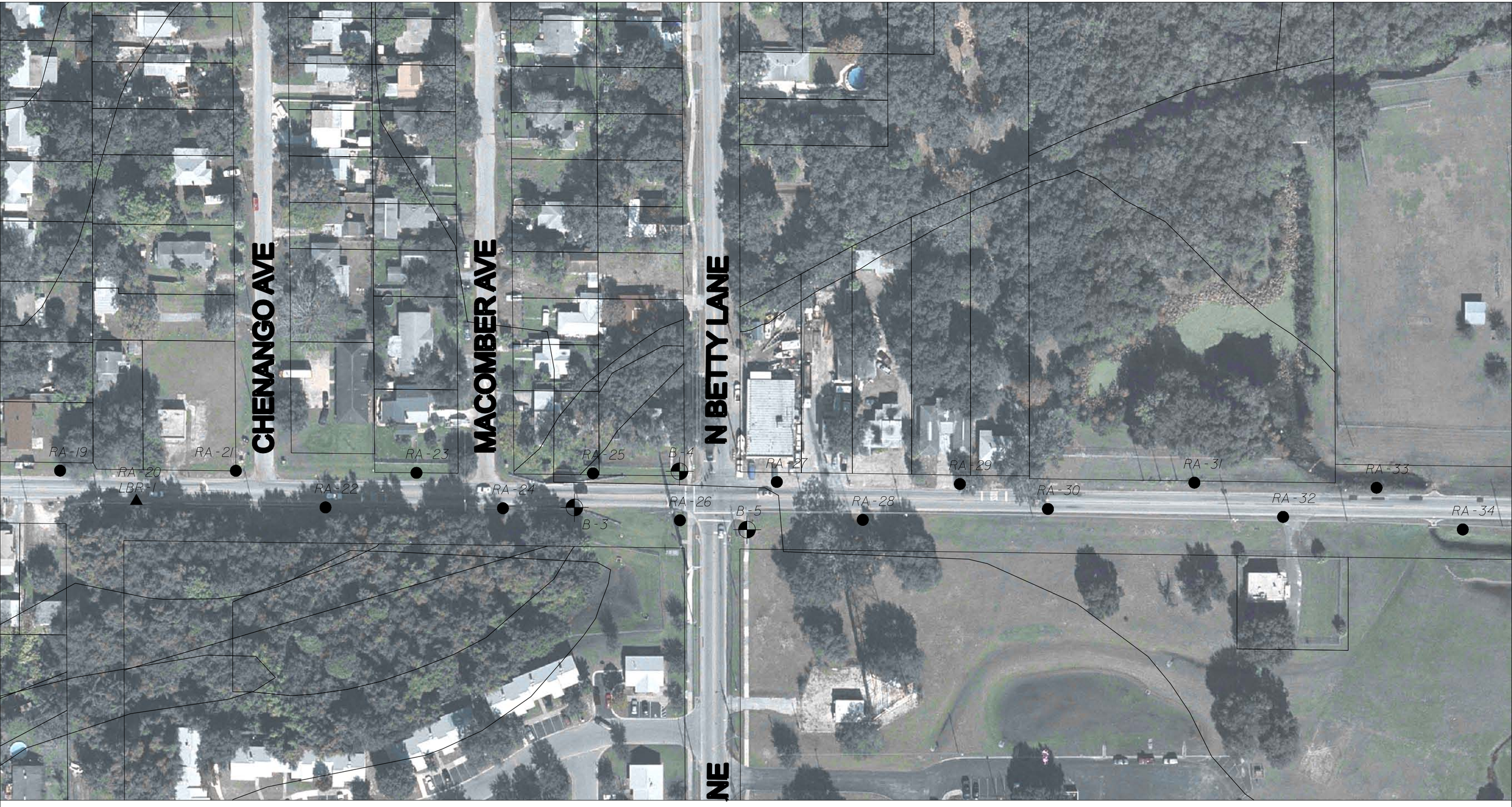
CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO.



LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION
- APPROXIMATE PAVEMENT CORE AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 4

REVISIONS

Date	By	Description	Date	By	Description

psi

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CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO.

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION
- APPROXIMATE PAVEMENT CORE AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 5

REVISIONS

Date	By	Description	Date	By	Description

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ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO.

LEGEND

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- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION
- APPROXIMATE PAVEMENT CORE AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 6

REVISIONS

Date	By	Description	Date	By	Description

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ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO.

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION
- APPROXIMATE PAVEMENT CORE AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 7

REVISIONS

Date	By	Description	Date	By	Description

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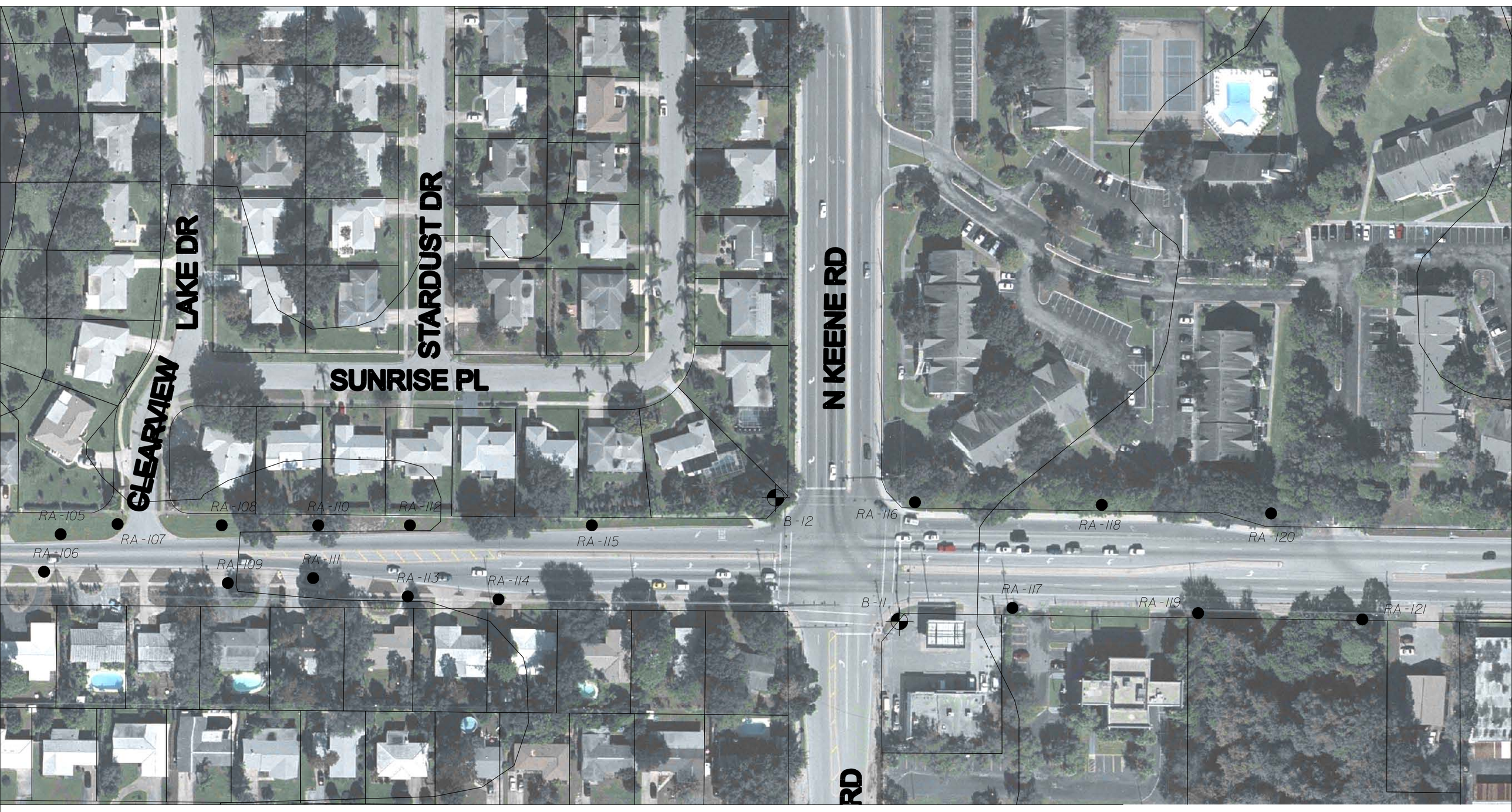
ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO.



LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE LBR TEST AND AUGER BORING LOCATION
- APPROXIMATE PAVEMENT CORE AND AUGER BORING LOCATION

BORING LOCATION PLAN

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3

0 100

PLAN SCALE

PSI PROJECT No. 775-75056 SHEET 8

REVISIONS

Date	By	Description	Date	By	Description

psi

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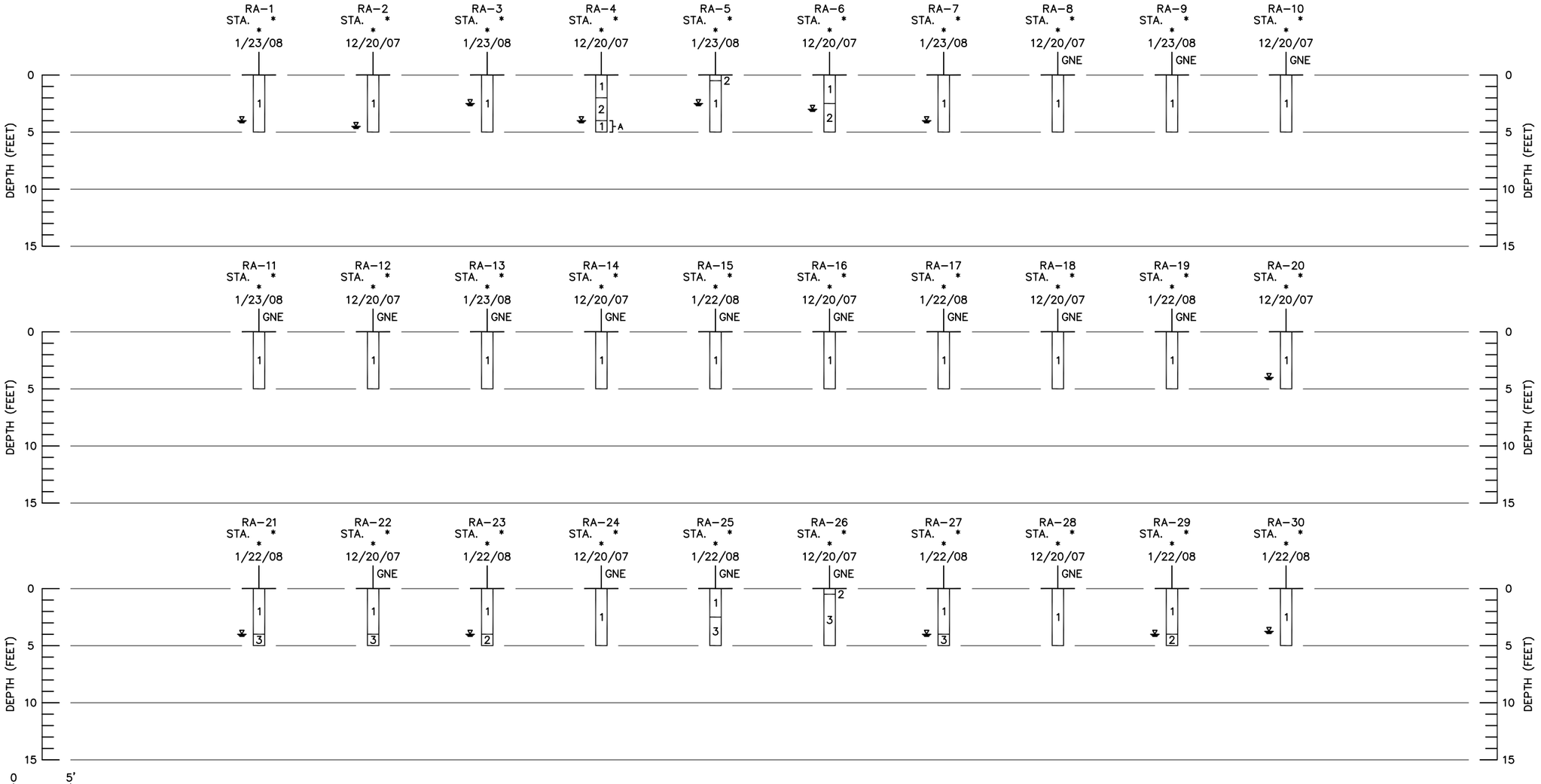
ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
CR 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGEWATER DRIVE) TO KEENE ROAD

SHEET NO.



SOIL PROFILES

LEGEND

1. LIGHT TO DARK BROWN AND GRAY TO DARK GRAY CLEAN TO SLIGHTLY SILTY FINE SAND (A-3)
2. LIGHT BROWN, BROWN AND DARK GRAY SILTY TO CLAYEY FINE SAND (A-2-4)
3. BROWN AND ORANGISH BROWN SANDY CLAY (A-6)
4. BLACK SILTY FINE SAND WITH ORGANICS (MUCK) (A-8)

A-3 AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW

GROUNDWATER LEVEL OBSERVED

GNE GROUNDWATER LEVEL NOT ENCOUNTERED

A WITH SHELL FRAGMENTS

B WITH ROCK FRAGMENTS

* STATION AND OFFSETS TO BE PROVIDED IN FINAL REPORT.

REVISIONS					
Date	By	Description	Date	By	Description

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STATE OF FLORIDA
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ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
C.R. 576	PINELLAS	–

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 9

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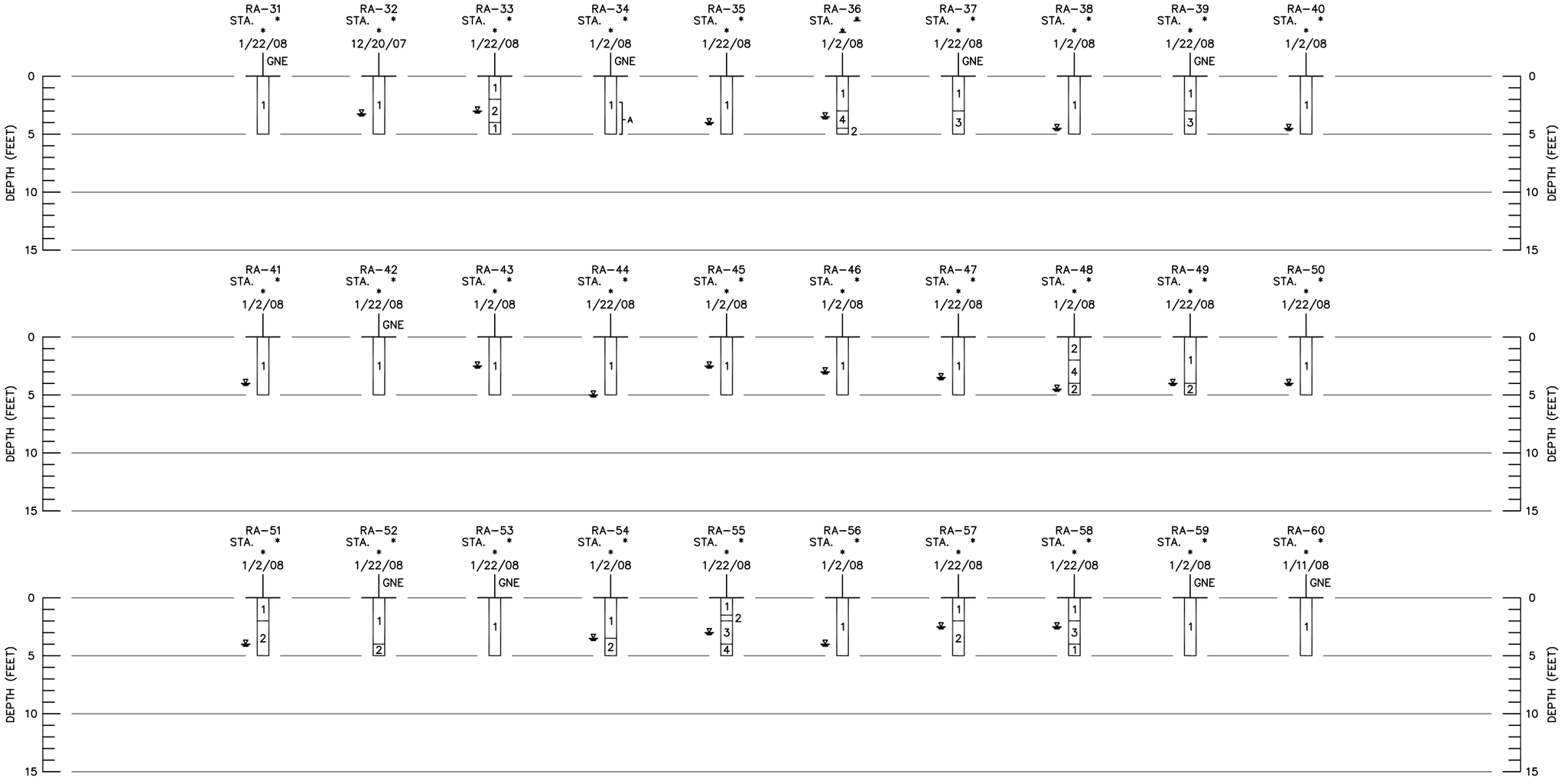

SOIL PROFILES

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GNE GROUNDWATER LEVEL NOT ENCOUNTERED

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B WITH ROCK FRAGMENTS

* STATION AND OFFSETS TO BE PROVIDED IN FINAL REPORT.

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Date	By	Description	Date	By	Description

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
C.R. 576	PINELLAS	–

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 10

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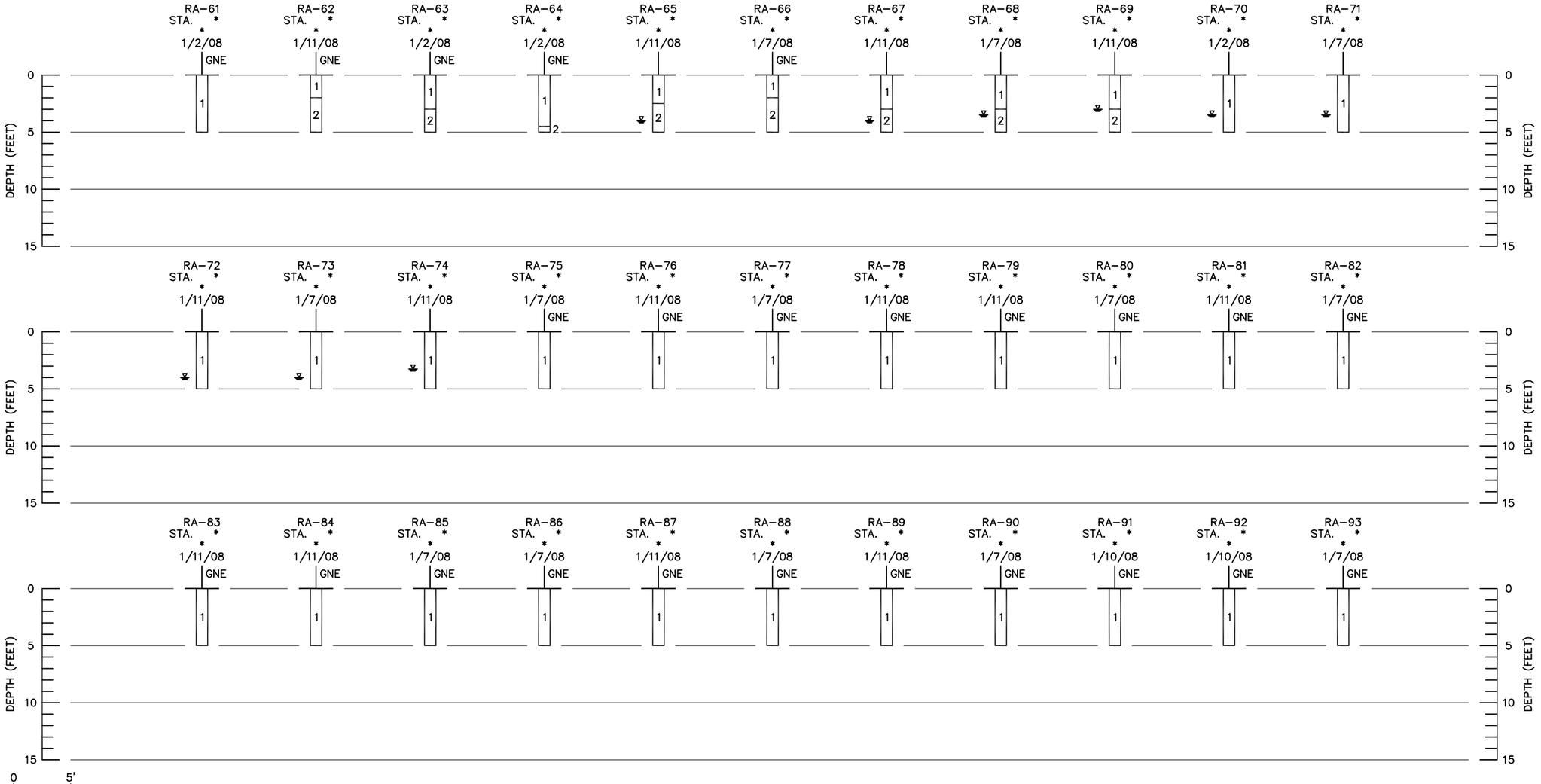

SOIL PROFILES

LEGEND

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A-3 AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW

GROUNDWATER LEVEL OBSERVED

GNE GROUNDWATER LEVEL NOT ENCOUNTERED

A WITH SHELL FRAGMENTS

B WITH ROCK FRAGMENTS

* STATION AND OFFSETS TO BE PROVIDED IN FINAL REPORT.

REVISIONS					
Date	By	Description	Date	By	Description

PROFESSIONAL SERVICE INDUSTRIES, INC.
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
C.R. 576	PINELLAS	–

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 11

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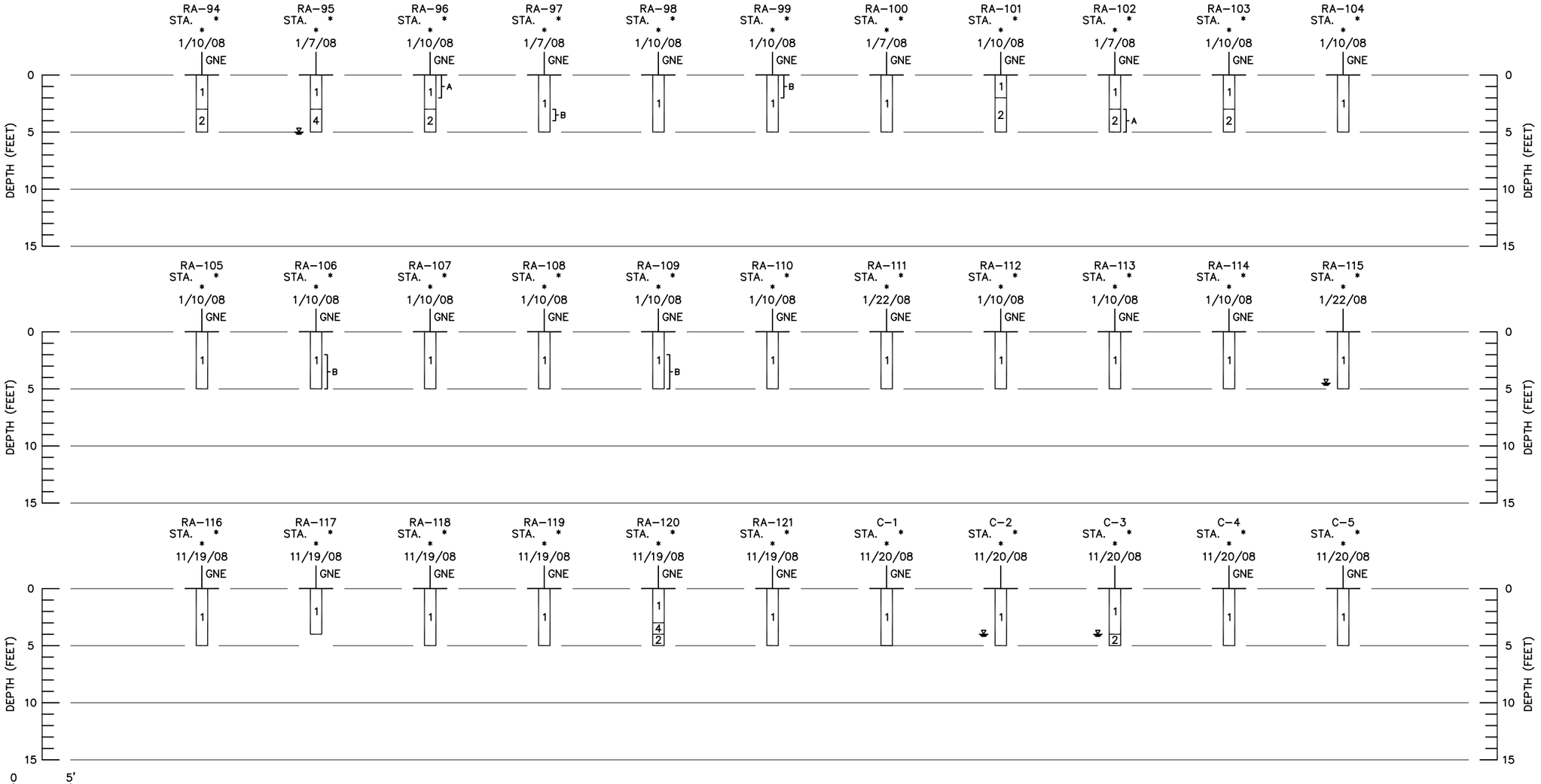

SOIL PROFILES

LEGEND

1. LIGHT TO DARK BROWN AND GRAY TO DARK GRAY CLEAN TO SLIGHTLY SILTY FINE SAND (A-3)
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A-3 AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW

GROUNDWATER LEVEL OBSERVED

GNE GROUNDWATER LEVEL NOT ENCOUNTERED

A WITH SHELL FRAGMENTS

B WITH ROCK FRAGMENTS

* STATION AND OFFSETS TO BE PROVIDED IN FINAL REPORT.

REVISIONS

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
C.R. 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 12

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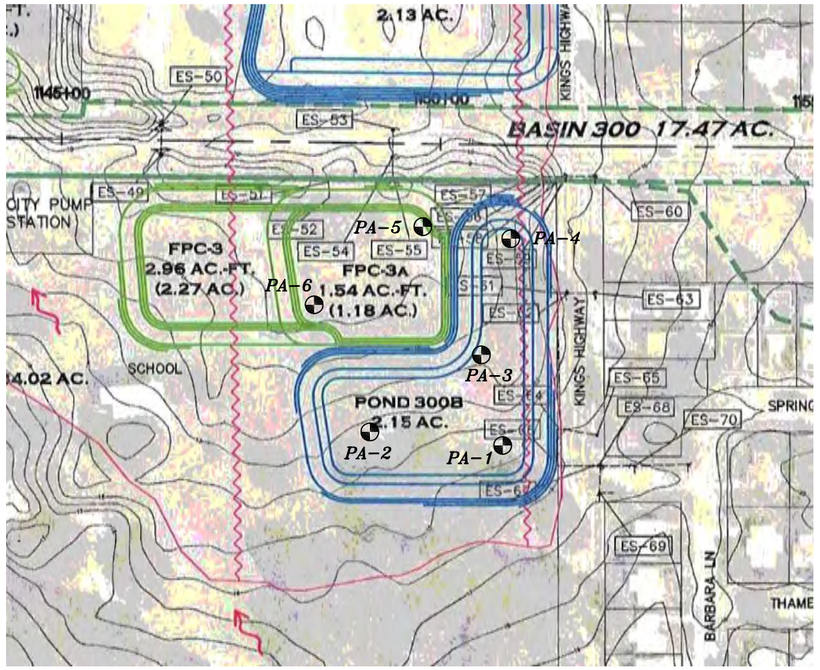

BORING LOCATION PLAN

0 100'
PLAN SCALE

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2 & 3

LEGEND

1. LIGHT TO DARK BROWN AND GRAY TO DARK GRAY CLEAN TO SLIGHTLY SILTY FINE SAND (A-3)
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A-3 AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW

GROUNDWATER LEVEL OBSERVED

GNE GROUNDWATER LEVEL NOT ENCOUNTERED

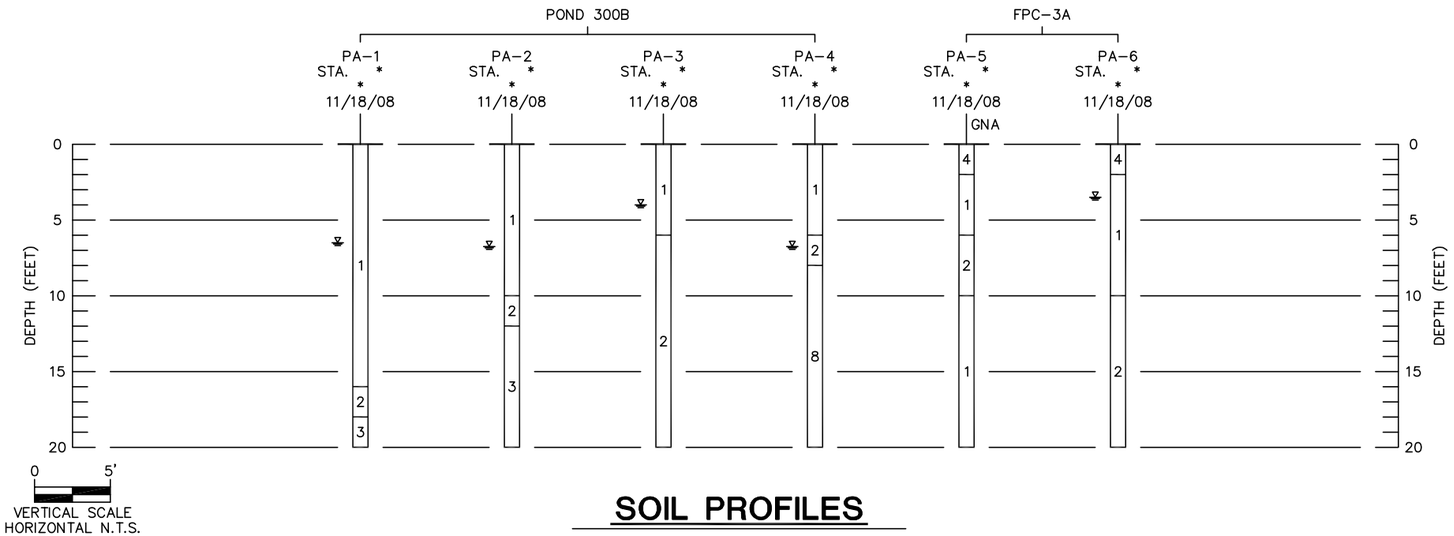
GNA GROUNDWATER LEVEL NOT APPARENT

A WITH SHELL FRAGMENTS

B WITH ROCK FRAGMENTS

* STATION AND OFFSETS TO BE PROVIDED IN FINAL REPORT.

APPROXIMATE POWER AUGER BORING LOCATION



SOIL PROFILES

POND 300B & FPC-3A

REVISIONS					
Date	By	Description	Date	By	Description

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
C.R. 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 13

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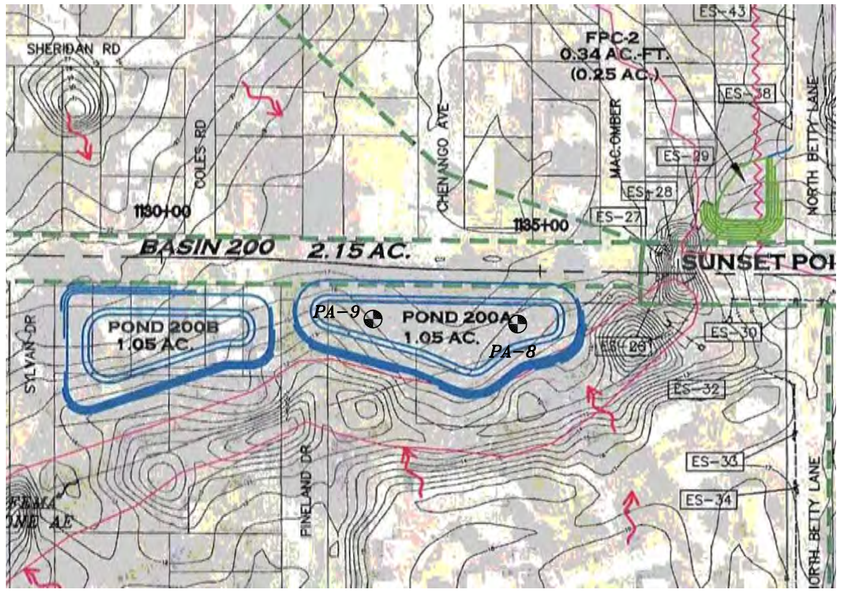
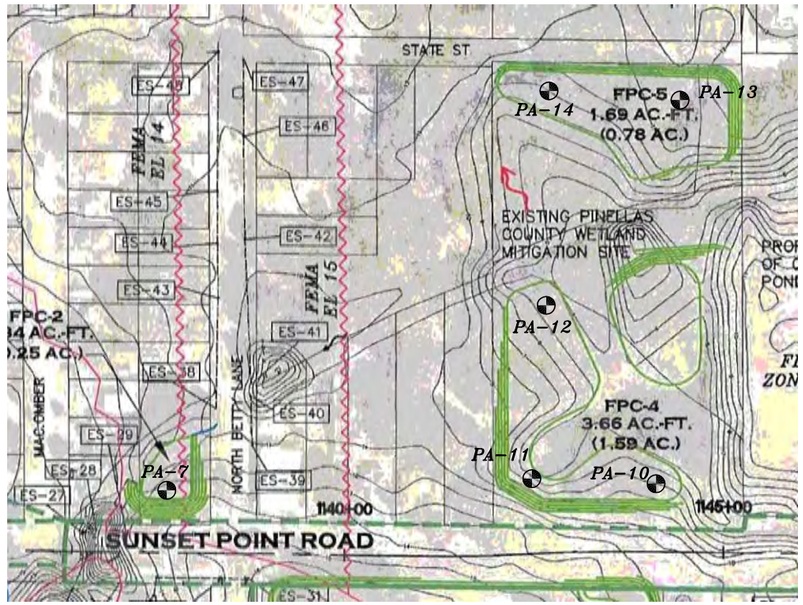




BORING LOCATION PLAN

0 100'
PLAN SCALE

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2 & 3

LEGEND

1. LIGHT TO DARK BROWN AND GRAY TO DARK GRAY CLEAN TO SLIGHTLY SILTY FINE SAND (A-3)
2. LIGHT BROWN, BROWN AND DARK GRAY SILTY TO CLAYEY FINE SAND (A-2-4)
3. BROWN AND ORANGISH BROWN SANDY CLAY (A-6)
4. BLACK SILTY FINE SAND WITH ORGANICS (MUCK) (A-8)

A-3 AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW

GROUNDWATER LEVEL OBSERVED

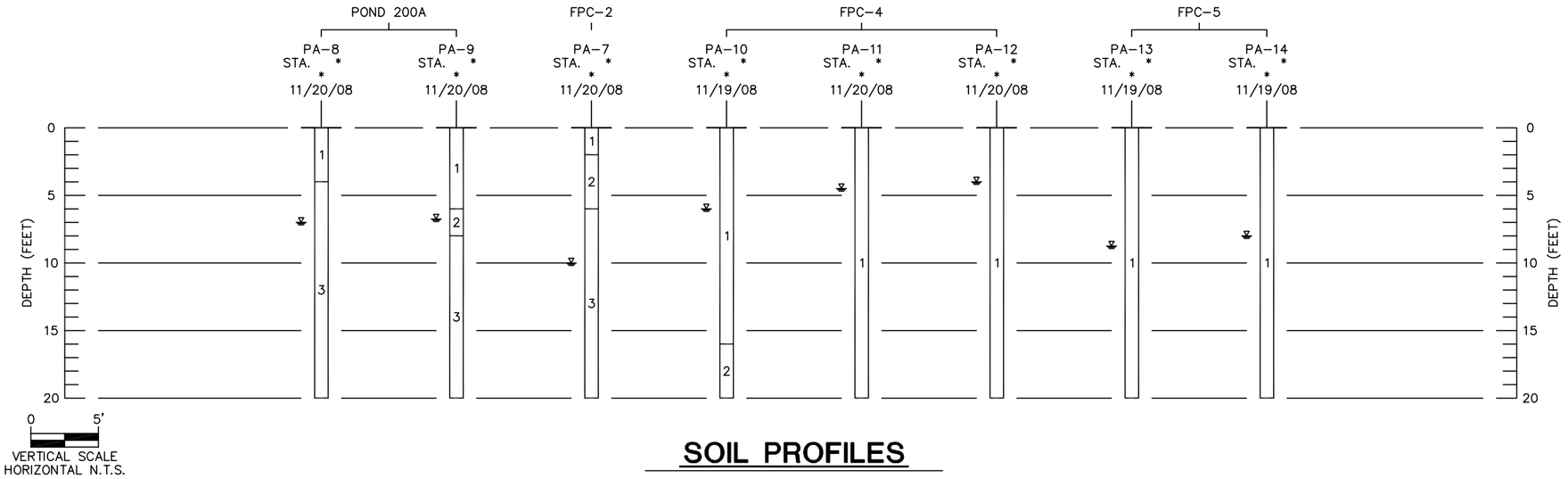
GNE GROUNDWATER LEVEL NOT ENCOUNTERED

A WITH SHELL FRAGMENTS

B WITH ROCK FRAGMENTS

* STATION AND OFFSETS TO BE PROVIDED IN FINAL REPORT.

APPROXIMATE POWER AUGER BORING LOCATION



SOIL PROFILES

POND 200A, FPC-2, FPC-4 & FPC-5

REVISIONS

Date	By	Description	Date	By	Description

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STATE OF FLORIDA
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ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
C.R. 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 14

P:\775-Geo\2007\75056 Sunset Point Road\cad\roadway\75056s2

PINELLAS COUNTY
SUNSET POINT ROAD (CR 576)
EDGEWATER DRIVE (US ALT 19) TO KEENE ROAD

DATE OF SURVEY: JANUARY 2008
SURVEY MADE BY: PSI

PURCHASE ORDER No. 226550

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

		ORGANIC CONTENT		MOISTURE CONTENT		SIEVE ANALYSIS RESULTS % PASS						ATTERBERG LIMITS (%)					CORROSION TEST RESULTS				
STRATUM NO.	LBR VALUE (%)	No. OF TESTS	% ORGANIC	No. OF TESTS	MOISTURE CONTENT	No. OF TESTS	10 MESH	40 MESH	60 MESH	100 MESH	200 MESH	NO. OF TESTS	LIQUID LIMIT	PLASTIC INDEX	AASHTO GROUP	DESCRIPTION	NO. OF TESTS	RESISTIVITY OHM-CM	CHLORIDES PPM	SULFATE PPM	pH
1	26-49	--	-----	8	96-100	91-98	62-89	22-56	3-9	-----	-----	--	-----	-----	(A-3)	LIGHT TO DARK BROWN AND GRAY TO DARK GRAY CLEAN TO SLIGHTLY SILTY FINE SAND	2	15,000-29,000	60	< 3-9.9	6.1-6.2
2	-----	--	-----	--	-----	--	-----	-----	-----	1	NP	NP	-----	-----	(A-2-4)	LIGHT BROWN, BROWN AND DARK GRAY SILTY TO CLAYEY FINE SAND	--	-----	-----	-----	-----
3	-----	--	-----	--	-----	--	-----	-----	-----	1	40	25	-----	-----	(A-6)	BROWN AND ORANGISH BROWN SANDY CLAY	--	-----	-----	-----	-----
4	-----	4	6-15	--	-----	--	-----	-----	-----	-----	-----	--	-----	-----	(A-8)	BLACK SILTY FINE SAND WITH ORGANICS (MUCK)	--	-----	-----	-----	-----

EMBANKMENT AND SUBGRADE MATERIAL

STRATA BOUNDARIES ARE APPROXIMATE AND REPRESENT SOIL STRATA AT EACH TEST HOLE LOCATION ONLY.

GNA GROUNDWATER TABLE NOT APPARENT

GNE GROUNDWATER TABLE NOT ENCOUNTERED

A INDICATES WITH SHELL FRAGMENTS.

B INDICATES WITH ROCK FRAGMENTS.

NOTES:

1. THE MATERIAL FROM STRATA NUMBERS 1 (A-3) AND 2 (A-2-4) APPEAR SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH INDEX 505.
2. THE MATERIAL FROM STRATUM NUMBER 4 IS ORGANIC (MUCK) MATERIAL AND SHALL BE REMOVED IN ACCORDANCE WITH INDEX 500. THE MATERIAL WAS ENCOUNTERED AT BORINGS RA-36, RA-48, RA-55 AND RA-95 . FURTHER DELINEATION TO ESTIMATE THE HORIZONTAL AND VERTICAL EXTENTS WILL BE PERFORMED FOR THE NEXT SUBMITTAL.
3. THE MATERIAL FROM STRATUM NUMBER 3 (A-6) IS PLASTIC MATERIAL AND SHALL BE REMOVED IN ACCORDANCE WITH INDEX 500. ONCE ROADWAY PROFILES AND CROSS SECTIONS ARE AVAILABLE, LOCATIONS OF POSSIBLE REMOVAL WILL BE PROVIDED. IT MAY BE PLACED ABOVE THE EXISTING WATER LEVEL (AT THE TIME OF CONSTRUCTION) TO WITHIN 4 FEET OF THE PROPOSED BASE. IT SHOULD BE PLACED UNIFORMLY IN THE LOWER PORTION OF THE EMBANKMENT FOR SOME DISTANCE ALONG THE PROJECT RATHER THAN FULL DEPTH FOR SHORTER DISTANCES.

REVISIONS					
Date	By	Description	Date	By	Description

CHING L. KUO, Ph.D., P.E.
FLORIDA LICENSE No. 36115

PROFESSIONAL SERVICE INDUSTRIES, INC.
5801 BENJAMIN CENTER DR., SUITE 112
TAMPA, FL. 33634
(813)-886-1075
FLORIDA ENGINEERING CERTIFICATE OF AUTHORIZATION No. 3684

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
C.R. 576	PINELLAS	-

ROADWAY SOILS SURVEY

SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

P:\775-Geo\2007\75056 Sunset Point Road\cad\roadway\75056s2

LEGEND

- (SP/SP–SM), BROWN TO LIGHT BROWN CLEAN TO SLIGHTLY SILTY FINE SAND
- (SM/SC), BROWN, VERY LIGHT BROWN AND GRAY SILTY TO CLAYEY FINE SAND
- (CL/CH), GRAY AND BLUE–GREEN SILTY CLAY
- VERY PALE BROWN HIGHLY WEATHERED LIMESTONE

NOTES:

- WATER TABLE
- N — NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12" PENETRATION. (UNLESS OTHERWISE NOTED.)
- WR — FELL UNDER WEIGHT OF ROD
- ◁— — LOSS OF CIRCULATION (%)
- GNA — GROUNDWATER LEVEL NOT APPARENT
- 50/6" — FIFTY BLOWS FOR SIX INCHES
- APPROXIMATE SPT BORING LOCATION
- * — STATIONS, OFFSETS AND ELEVATIONS WILL BE PROVIDED IN FINAL REPORT.
- –200 — FINES PASSING NO. 200 SIEVE (%)
- LL — LIQUID LIMIT (%)
- PI — PLASTICITY INDEX (%)

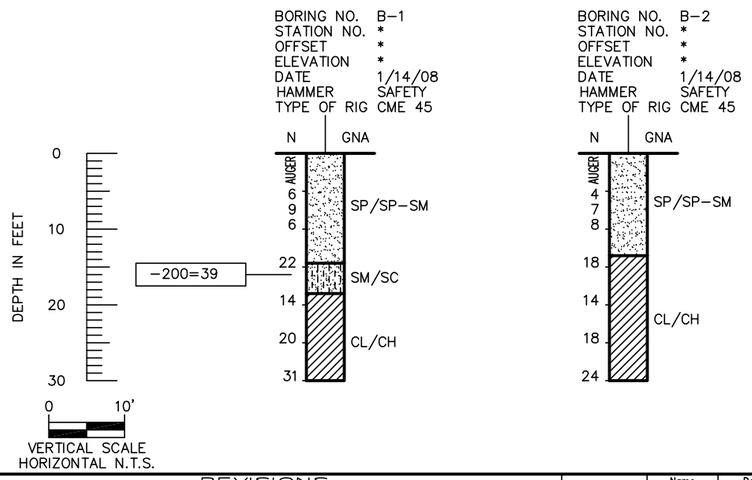
ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE: EXTREMELY AGGRESSIVE (ASSUMED)

BORING LOCATION PLAN

0 100'
PLAN SCALE

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3



SOIL PARAMETERS

BORING NUMBER	DEPTH (FEET)	SPT "N" RANGE	SOIL CLASSIFICATION	APPROXIMATE SOIL UNIT WEIGHT (PCF)		SOIL ANGLE OF FRICTION (DEGREES)	COHESION (PSF)	EARTH PRESSURE COEFFICIENT	
				ɣ SAT	ɣ SUBMERGED			ACTIVE (Ka)	PASSIVE (Kp)
B–1	0–13 13–18 18–30	6–9 22 14–31	SP/SP–SM SM/SC CL/CH	105 115 125	42.6 52.6 62.6	29 32 0	0 0 2700	.347 .307 1.00	2.88 3.25 1.00
B–2	0–13 13–30	4–8 14–24	SP/SP–SM CL/CH	105 125	42.6 62.6	29 0	0 2300	.347 1.00	2.88 1.00

GRANULAR MATERIALS– RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4–10
MEDIUM	10–30
DENSE	30–50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2–4
FIRM	4–8
STIFF	8–15
VERY STIFF	15–30
HARD	GREATER THAN 30

SUNSET POINT RD. AND DOUGLAS AVE.

REVISIONS

Date	By	Description	Date	By	Description

	Name	Date
Drawn by	AN	2/08
Checked by	RS	2/08
Designed by		
Checked by		
Approved by	CHING L. KUO, Ph.D., P.E.	

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FLORIDA DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID.
C.R. 576	PINELLAS	–

SHEET TITLE: REPORT OF CORE BORINGS

PROJECT NAME: SUNSET POINT ROAD (CR 576) FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

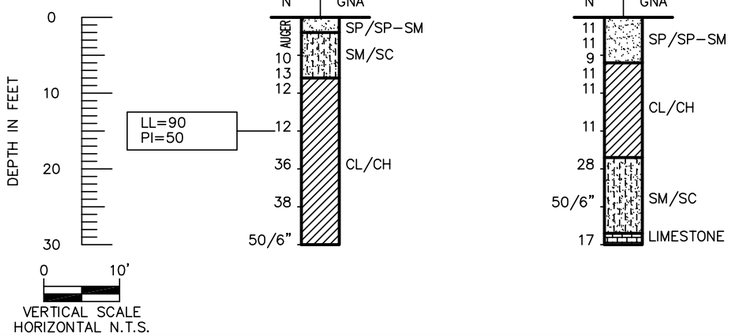
PSI PROJECT No. 775–75056
SHEET 16

P:\775-Geo\2007\75056 Sunset Point Road\cad\struct\75056s2

BORING LOCATION PLAN

0 100'
PLAN SCALE

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3



LEGEND

- (SP/SP-SM), BROWN TO LIGHT BROWN CLEAN TO SLIGHTLY SILTY FINE SAND
- (SM/SC), BROWN, VERY LIGHT BROWN AND GRAY SILTY TO CLAYEY FINE SAND
- (CL/CH), GRAY AND BLUE-GREEN SILTY CLAY
- VERY PALE BROWN HIGHLY WEATHERED LIMESTONE

NOTES:

- WATER TABLE
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- WR — FELL UNDER WEIGHT OF ROD
- ⟵ — LOSS OF CIRCULATION (%)
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- 50/6" — FIFTY BLOWS FOR SIX INCHES
- APPROXIMATE SPT BORING LOCATION
- * — STATIONS, OFFSETS AND ELEVATIONS WILL BE PROVIDED IN FINAL REPORT.
- −200 — FINES PASSING NO. 200 SIEVE (%)
- LL — LIQUID LIMIT (%)
- PI — PLASTICITY INDEX (%)

ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE: EXTREMELY AGGRESSIVE (ASSUMED)

SOIL PARAMETERS

BORING NUMBER	DEPTH (FEET)	SPT "N" RANGE	SOIL CLASSIFICATION	APPROXIMATE SOIL UNIT WEIGHT (PCF)		SOIL ANGLE OF FRICTION (DEGREES)	COHESION (PSF)	EARTH PRESSURE COEFFICIENT	
				γ SAT	γ SUBMERGED			ACTIVE (Ka)	PASSIVE (Kp)
B-4	0-8	10-13	SP/SP-SM/SM/SC	110	47.6	30	0	.333	3.00
	8-18	12	CL/CH	120	57.6	0	1500	1.00	1.00
	18-30	36-50/6"	CL/CH	125	62.6	0	4000	1.00	1.00
B-5	0-6	9-11	SP/SP-SM	105	42.6	29	0	.347	2.88
	6-18	11	CL/CH	120	57.6	0	1350	1.00	1.00
	18-28	28-50/6"	SM/SC	115	52.6	32	0	.307	3.25
	28-30	17	LIMESTONE	135	72.6	0	2100 **	1.00	1.00

** MATERIALS CLASIFIED AS LIMESTONE, ULTIMATE SHEAR STRENGTH PROVIDED.

GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4-10
MEDIUM	10-30
DENSE	30-50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2-4
FIRM	4-8
STIFF	8-15
VERY STIFF	15-30
HARD	GREATER THAN 30

SUNSET POINT RD. AND N. BETTY LANE

REVISIONS

Date	By	Description	Date	By	Description

	Name	Date
Drawn by	AN	2/08
Checked by	RS	2/08
Designed by		
Checked by		
Approved by	CHING L. KUO, Ph.D., P.E.	

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FLORIDA LICENSE No. 36115

FLORIDA DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID.
C.R. 576	PINELLAS	-

SHEET TITLE: REPORT OF CORE BORINGS

PROJECT NAME: SUNSET POINT ROAD (CR 576)
FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

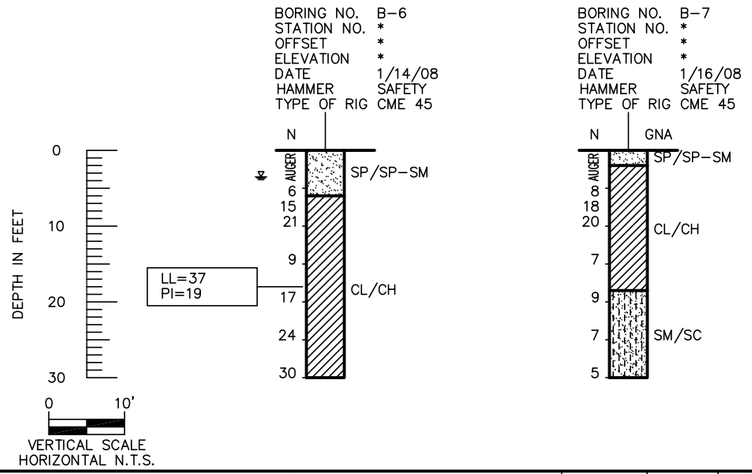
SHEET NO.

P:\775-Geo\2007\75056 Sunset Point Road\cad\struct\75056s2

BORING LOCATION PLAN

0 100'
PLAN SCALE

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3



LEGEND

- (SP/SP-SM), BROWN TO LIGHT BROWN CLEAN TO SLIGHTLY SILTY FINE SAND
- (SM/SC), BROWN, VERY LIGHT BROWN AND GRAY SILTY TO CLAYEY FINE SAND
- (CL/CH), GRAY AND BLUE-GREEN SILTY CLAY
- VERY PALE BROWN HIGHLY WEATHERED LIMESTONE

NOTES:

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- ⟵ — LOSS OF CIRCULATION (%)
- GNA — GROUNDWATER LEVEL NOT APPARENT
- 50/6" — FIFTY BLOWS FOR SIX INCHES
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- -200 — FINES PASSING NO. 200 SIEVE (%)
- LL — LIQUID LIMIT (%)
- PI — PLASTICITY INDEX (%)

ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE: EXTREMELY AGGRESSIVE (ASSUMED)

SOIL PARAMETERS

BORING NUMBER	DEPTH (FEET)	SPT "N" RANGE	SOIL CLASSIFICATION	APPROXIMATE SOIL UNIT WEIGHT (PCF)		SOIL ANGLE OF FRICTION (DEGREES)	COHESION (PSF)	EARTH PRESSURE COEFFICIENT	
				γ SAT	γ SUBMERGED			ACTIVE (Ka)	PASSIVE (Kp)
B-6	0-6	6	SP/SP-SM	105	42.6	29	0	.347	2.88
	6-18	9-21	CL/CH	120	57.6	0	1800	1.00	1.00
	18-30	17-30	CL/CH	125	62.6	0	3000	1.00	1.00
B-7	0-2	HAND AUGER	SP/SP-SM	105	42.6	29	0	.347	2.88
	2-13	8-20	CL/CH	120	57.6	0	1900	1.00	1.00
	13-18	7	CL/CH	115	52.6	0	800	1.00	1.00
	18-30	5-9	SM/SC	105	42.6	29	0	.350	2.88

GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4-10
MEDIUM	10-30
DENSE	30-50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2-4
FIRM	4-8
STIFF	8-15
VERY STIFF	15-30
HARD	GREATER THAN 30

SUNSET POINT RD. AND KINGS HIGHWAY

REVISIONS

Date	By	Description	Date	By	Description

	Name	Date
Drawn by	AN	2/08
Checked by	RS	2/08
Designed by		
Checked by		
Approved by	CHING L. KUO, Ph.D., P.E.	

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FLORIDA DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID.
C.R. 576	PINELLAS	-

SHEET TITLE: REPORT OF CORE BORINGS

PROJECT NAME: SUNSET POINT ROAD (CR 576) FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 18

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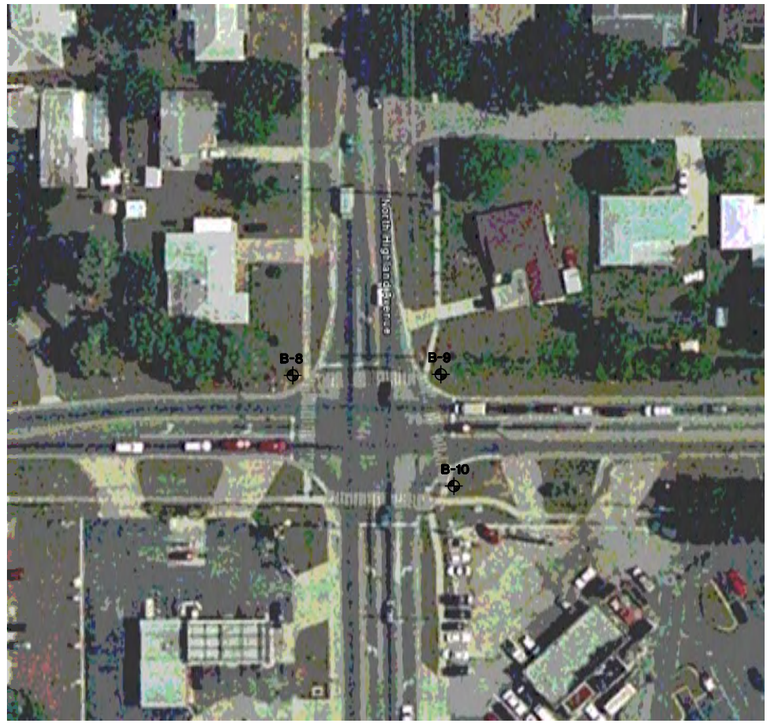


SOIL PARAMETERS

BORING NUMBER	DEPTH (FEET)	SPT "N" RANGE	SOIL CLASSIFICATION	APPROXIMATE SOIL UNIT WEIGHT (PCF)		SOIL ANGLE OF FRICTION (DEGREES)	COHESION (PSF)	EARTH PRESSURE COEFFICIENT	
				ɣ SAT	ɣ SUBMERGED			ACTIVE (Ka)	PASSIVE (Kp)
B-8	0-4	HAND AUGER	SP/SP-SM/SM/SC	105	42.6	29	0	.347	2.88
	4-6	WH	SM/SC	100	37.6	26	0	.390	2.56
	6-18	10-15	CL/CH	120	57.6	0	1600	1.00	1.00
	18-30	21-40	CL/CH	125	62.6	0	4000	1.00	1.00
B-9	0-8	2-4	SP/SP-SM/SM/SC	100	37.6	28	0	.361	2.77
	8-13	18	CL/CH	125	62.6	0	2000	1.00	1.00
	13-18	4	CL/CH	110	47.6	0	500	1.00	1.00
	18-30	38-49	CL/CH	125	62.6	0	4000	1.00	1.00
B-10	0-10	6-13	SP/SP-SM/SM/SC	105	42.6	29	0	.347	2.88

LEGEND

- (SP/SP-SM), BROWN TO LIGHT BROWN CLEAN TO SLIGHTLY SILTY FINE SAND
- (SM/SC), BROWN, VERY LIGHT BROWN AND GRAY SILTY TO CLAYEY FINE SAND
- (CL/CH), GRAY AND BLUE-GREEN SILTY CLAY
- VERY PALE BROWN HIGHLY WEATHERED LIMESTONE

NOTES:

- ⏚ WATER TABLE
- N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12" PENETRATION. (UNLESS OTHERWISE NOTED.)
- WR FELL UNDER WEIGHT OF ROD
- ⟵ LOSS OF CIRCULATION (%)
- GNA GROUNDWATER LEVEL NOT APPARENT
- 50/6" FIFTY BLOWS FOR SIX INCHES
- ⌖ APPROXIMATE SPT BORING LOCATION
- * STATIONS, OFFSETS AND ELEVATIONS WILL BE PROVIDED IN FINAL REPORT.
- -200 FINES PASSING NO. 200 SIEVE (%)
- LL LIQUID LIMIT (%)
- PI PLASTICITY INDEX (%)

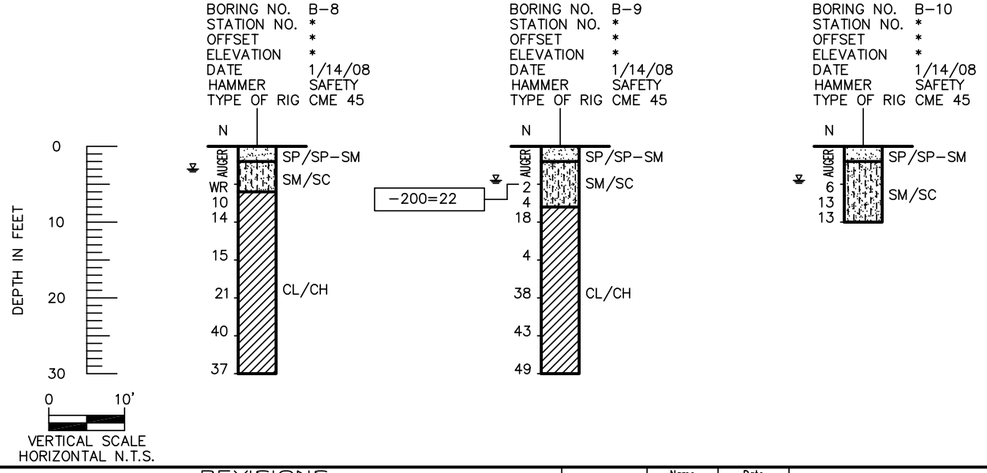
ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE: EXTREMELY AGGRESSIVE (ASSUMED)

BORING LOCATION PLAN

0 100'
PLAN SCALE

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3



GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4-10
MEDIUM	10-30
DENSE	30-50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2-4
FIRM	4-8
STIFF	8-15
VERY STIFF	15-30
HARD	GREATER THAN 30

SUNSET POINT RD. AND N. HIGHLAND AVE.

REVISIONS

Date	By	Description	Date	By	Description

	Name	Date
Drawn by	AN	2/08
Checked by	RS	2/08
Designed by		
Checked by		
Approved by	CHING L. KUO, Ph.D., P.E.	

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FLORIDA DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID.
C.R. 576	PINELLAS	-

SHEET TITLE: REPORT OF CORE BORINGS

PROJECT NAME: SUNSET POINT ROAD (CR 576) FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775-75056
SHEET 19

P:\775-Geo\2007\75056 Sunset Point Road\cad\struct\75056s2

SOIL PARAMETERS

BORING NUMBER	DEPTH (FEET)	SPT "N" RANGE	SOIL CLASSIFICATION	APPROXIMATE SOIL UNIT WEIGHT (PCF)		SOIL ANGLE OF FRICTION (DEGREES)	COHESION (PSF)	EARTH PRESSURE COEFFICIENT	
				ϒ SAT	ϒ SUBMERGED			ACTIVE (Ka)	PASSIVE (Kp)
B–11	0–13.5	5–9	SP/SP–SM, SM/SC	105	42.6	29	0	0.344	2.91
	13.5–30	17–28	CL/CH	120	57.6	0	2875	1.000	1.00
B–12	0–6	6–11	SP/SP–SM	105	42.6	30	0	0.339	2.95
	6–13.5	3	SP/SP–SM	100	37.6	29	0	0.353	2.84
	13.5–18.5	33	SM/SC	120	57.6	35	0	0.276	3.63
	18.5–23.5	3	CL/CH	105	42.6	0	375	1.000	1.00
	23.5–30	21–37	CL/CH	120	57.6	0	3625	1.000	1.00

LEGEND

- (SP/SP–SM), BROWN TO LIGHT BROWN CLEAN TO SLIGHTLY SILTY FINE SAND
- (SM/SC), BROWN, VERY LIGHT BROWN AND GRAY SILTY TO CLAYEY FINE SAND
- (CL/CH), GRAY AND BLUE–GREEN SILTY CLAY
- VERY PALE BROWN HIGHLY WEATHERED LIMESTONE

NOTES:

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- WR FELL UNDER WEIGHT OF ROD
- ⟵ LOSS OF CIRCULATION (%)
- GNA GROUNDWATER LEVEL NOT APPARENT
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- –200 FINES PASSING NO. 200 SIEVE (%)
- LL LIQUID LIMIT (%)
- PI PLASTICITY INDEX (%)

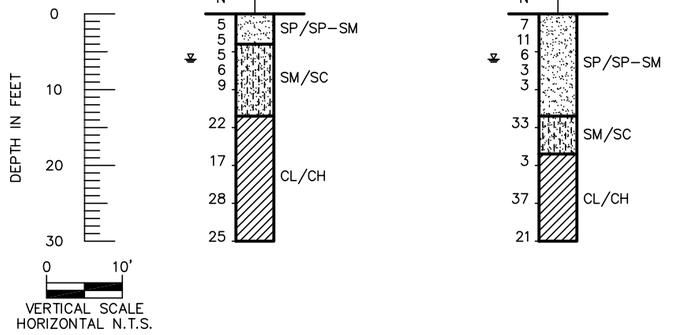
ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE: EXTREMELY AGGRESSIVE (ASSUMED)

BORING LOCATION PLAN

0 100'
PLAN SCALE

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3



GRANULAR MATERIALS– RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4–10
MEDIUM	10–30
DENSE	30–50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2–4
FIRM	4–8
STIFF	8–15
VERY STIFF	15–30
HARD	GREATER THAN 30

SUNSET POINT RD. AND KEENE RD.

REVISIONS					
Date	By	Description	Date	By	Description

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FLORIDA DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID.
C.R. 576	PINELLAS	–

SHEET TITLE: REPORT OF CORE BORINGS

PROJECT NAME: SUNSET POINT ROAD (CR 576) FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

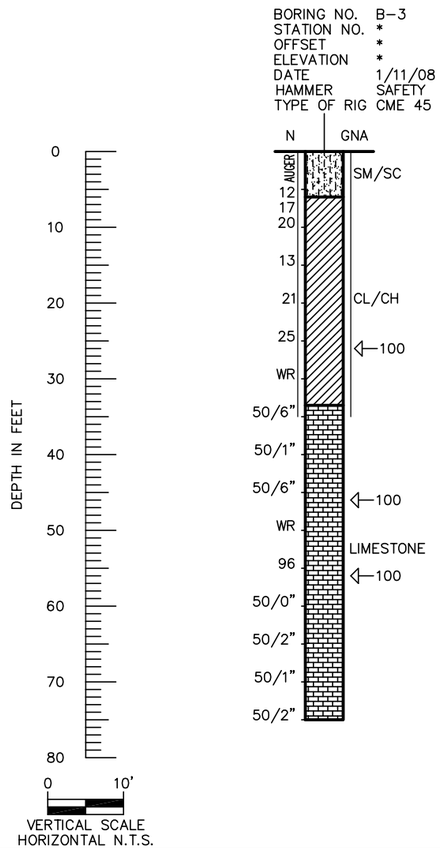
PSI PROJECT No. 775–75056
SHEET 20

P:\775-Geo\2007\75056 Sunset Point Road\cad\struct\75056s2

BORING LOCATION PLAN

0 100'
PLAN SCALE

LOCATION	
TOWNSHIP:	29 S
RANGE:	15 E
SECTION:	2, 3



LEGEND

- (SP/SP–SM), BROWN TO LIGHT BROWN CLEAN TO SLIGHTLY SILTY FINE SAND
- (SM/SC), BROWN, VERY LIGHT BROWN AND GRAY SILTY TO CLAYEY FINE SAND
- (CL/CH), GRAY AND BLUE–GREEN SILTY CLAY
- VERY PALE BROWN HIGHLY WEATHERED LIMESTONE

NOTES:

- WATER TABLE
- N — NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12" PENETRATION. (UNLESS OTHERWISE NOTED.)
- WR — FELL UNDER WEIGHT OF ROD
- ← — LOSS OF CIRCULATION (%)
- GNA — GROUNDWATER LEVEL NOT APPARENT
- 50/6" — FIFTY BLOWS FOR SIX INCHES
- APPROXIMATE SPT BORING LOCATION
- * — STATIONS, OFFSETS AND ELEVATIONS WILL BE PROVIDED IN FINAL REPORT.
- –200 — FINES PASSING NO. 200 SIEVE (%)
- LL — LIQUID LIMIT (%)
- PI — PLASTICITY INDEX (%)
- CASING USED

ENVIRONMENTAL CLASSIFICATION

SOIL

SUBSTRUCTURE: MODERATELY AGGRESSIVE (RESISTIVITY=2,000 OHMS)

RESISTIVITY: 2,000 OHMS–CM
CHLORIDES: 120 PPM
SULFATES: < 3 PPM
pH: 6.2

WATER

SUBSTRUCTURE: MODERATELY AGGRESSIVE (RESISTIVITY=2,300 OHMS)

RESISTIVITY: 2,300 OHMS–CM
CHLORIDES: 160 PPM
SULFATES: < 3 PPM
pH: 6.5

GRANULAR MATERIALS– RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4–10
MEDIUM	10–30
DENSE	30–50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2–4
FIRM	4–8
STIFF	8–15
VERY STIFF	15–30
HARD	GREATER THAN 30

SPRING BRANCH CREEK BRIDGE

REVISIONS

Date	By	Description	Date	By	Description

	Name	Date
Drawn by	AN	2/08
Checked by	RS	2/08
Designed by		
Checked by		
Approved by	CHING L. KUO, Ph.D., P.E.	

CHING L. KUO, Ph.D., P.E.
FLORIDA LICENSE No. 36115

PROFESSIONAL SERVICE INDUSTRIES, INC.
5801 BENJAMIN CENTER DR., SUITE 112
TAMPA, FL. 33634
(813)–886–1075
FLORIDA ENGINEERING CERTIFICATE OF AUTHORIZATION No. 3684

FLORIDA DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID.
C.R. 576	PINELLAS	–

SHEET TITLE: REPORT OF CORE BORINGS

PROJECT NAME: SUNSET POINT ROAD (CR 576) FROM US ALT 19 (EDGWOOD DR.) TO KEENE ROAD

SHEET NO.

PSI PROJECT No. 775–75056
SHEET 21

P:\775-Geo\2007\75056 Sunset Point Road\cad\struct\75056s2

Appendix E

Correspondence

Florida Fish and Wildlife Conservation Commission

Commissioners
Rodney Barreto
Chair
Miami

Kathy Barco
Jacksonville

Ronald M. Bergeron
Fort Lauderdale

Richard A. Corbett
Tampa

Dwight Stephenson
Delray Beach

Kenneth W. Wright
Winter Park

Brian S. Yablonski
Tallahassee

Executive Staff
Kenneth D. Haddad
Executive Director

Victor J. Heller
Assistant Executive Director

Karen Ventimiglia
Deputy Chief of Staff

Fish and Wildlife Research Institute
Information Science And Management
(850) 488-0588
(850) 410-5269

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

620 South Meridian Street
Tallahassee, Florida
32399-1600
Voice: (850) 488-4676

Hearing/speech impaired:
(800) 955-8771 (T)
(800) 955-8770 (V)

MyFWC.com

February 13, 2008

Mr. Chris Salicco
American Consulting Engineers of Florida Inc.
18250 N. U.S. Highway 41
Lutz, Florida 33549

Dear Mr. Salicco:

This letter is in response to your request for listed species occurrence records and critical habitats for your project (Sunset Point Road Corridor) located in Pinellas County, Florida. Records from The Florida Fish and Wildlife Conservation Commission's database indicate that listed species occurrence data are located within or adjacent to the project area. Enclosed are 8.5 x 11 maps showing listed species locations, biodiversity hotspots, priority wetlands for listed species, and land cover for the project area.

Please note, as of August 17th, 2007, the Strategic Habitat Conservation Areas and the Biodiversity Hotspots data sets used for this request are from the 2007 Endries et al. report "Wildlife Habitat Conservation Needs in Florida: Updated Recommendations for Strategic Habitat Conservation Areas".

This letter and attachments should not be considered as a review or an assessment of the impact upon threatened or endangered species of the project site. It provides FWC's most current data regarding the location of listed species and their associated habitats.

Our fish and wildlife location data represents only those occurrences recorded by FWC staff and other affiliated researchers. It is important to understand that our database does not necessarily contain records of all listed species that may occur in a given area. Also, data on certain species, such as gopher tortoises, are not entered into our database on a site-specific basis. **Therefore, one should not assume that an absence of occurrences in our database indicates that species of significance do not occur in the area.**

The Florida Natural Areas Inventory (FNAI) maintains a separate database of listed plant and wildlife species, please contact FNAI directly for specific information on the location of element occurrences within the project area. Because FNAI is funded to provide information to public agencies only, you may be required to pay a fee for this information. County-wide listed species information can be located at their website (http://www.fnai.org).

Please credit the Florida Fish and Wildlife Conservation Commission in any publication or presentation of these data. If you have any questions or further requests, please contact me at (850) 488-0588 or gisrequests@myfwc.com.

Sincerely,

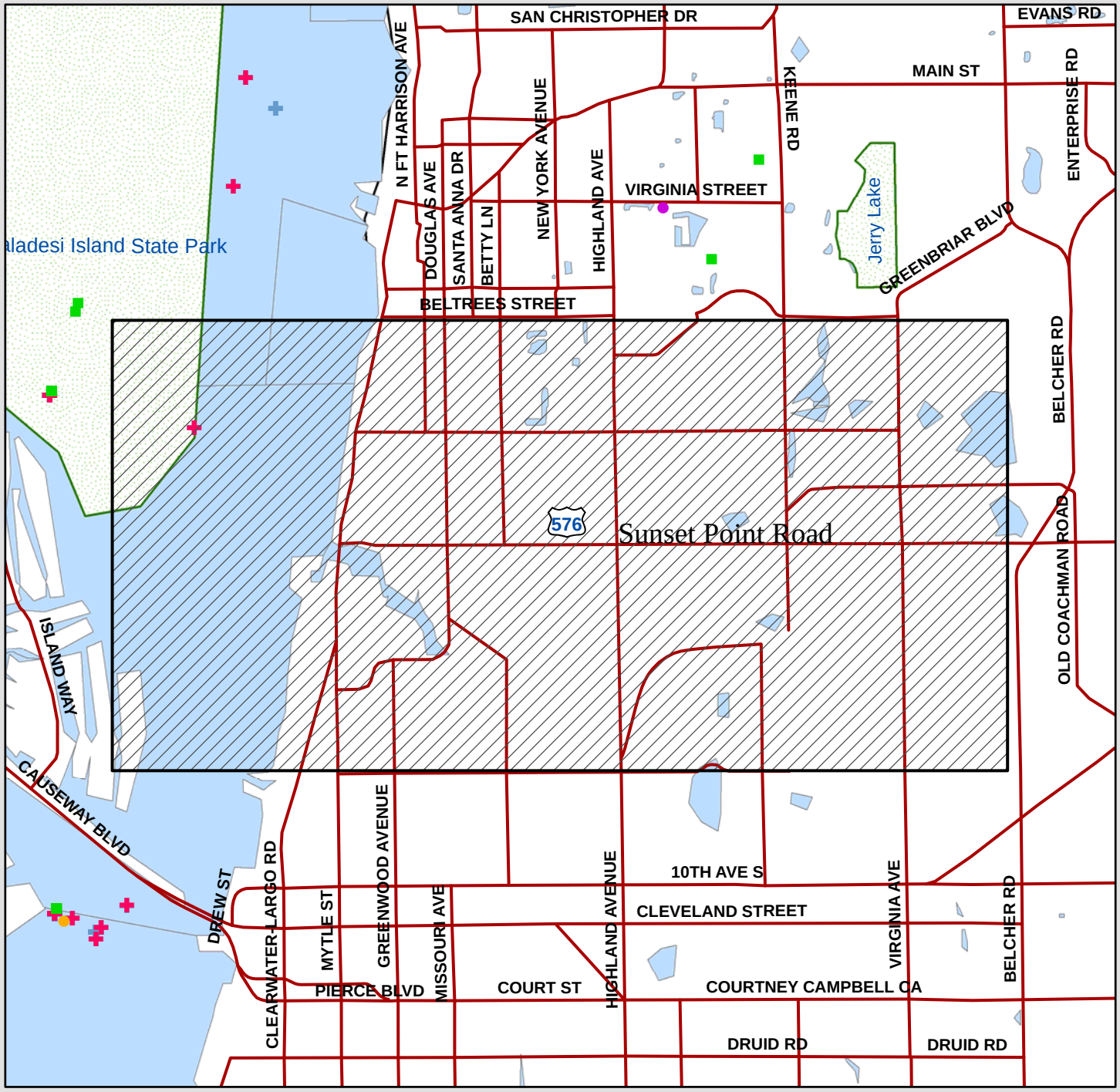
Jan Stearns

Jan Stearns
Staff Assistant

js
2008_4840
Enclosures

Species Occurrence

Sunset Point Road Corridor



Wading Bird Rookeries 1999
Eagle Nests 2006.shp
Florida Natural Areas Inventory
Wildlife observations of listed species 2002
Wildlife observations 2006
Major Roads
Florida Land Management Areas
Aquatic Areas
County Boundary
Project Site

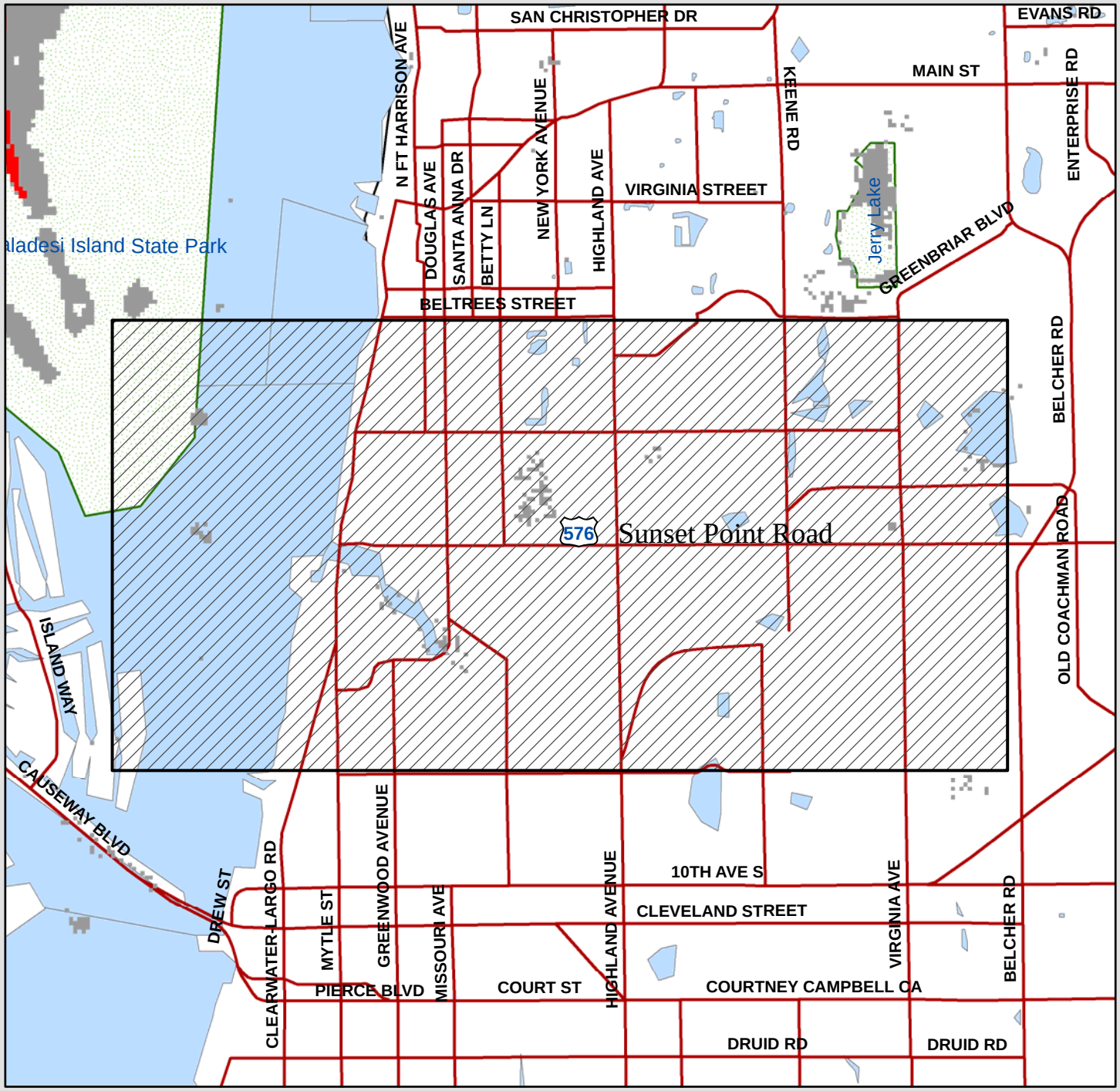
Miles
0 0.5 1

N

2008_4840

Biodiversity Hotspots

Sunset Point Road Corridor



Biodiversity Hotspots

- 3 - 4 Focal Species Overlap
- 5 - 6 Focal Species Overlap
- 7 - 13 Focal Species Overlap

- Major Roads
- Florida Land Management Areas
- Aquatic Areas
- County Boundary
- Project Site

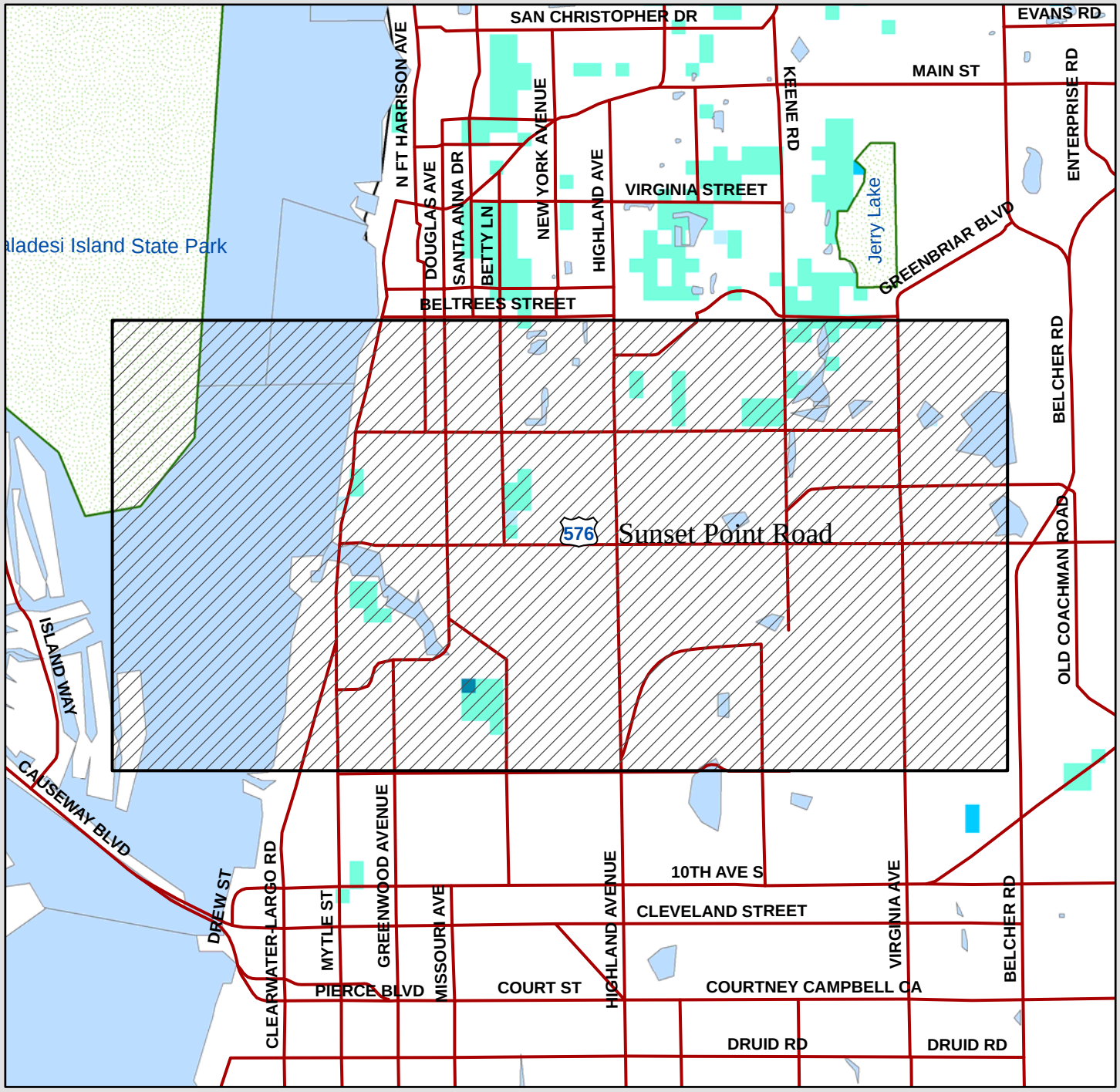
Miles
0 0.5 1 1.5

N

2008_4840

Priority Wetlands

Sunset Point Road Corridor



Major Roads
Florida Land Management Areas
Aquatic Areas
County Boundary
Project Site

Priority Wetlands

7-9 species, wetland habitat
4-6 species, wetland habitat
4-6 species, upland habitat
10-11 species, wetland habitat
1-3 species, wetland habitat
1-3 species, upland habitat

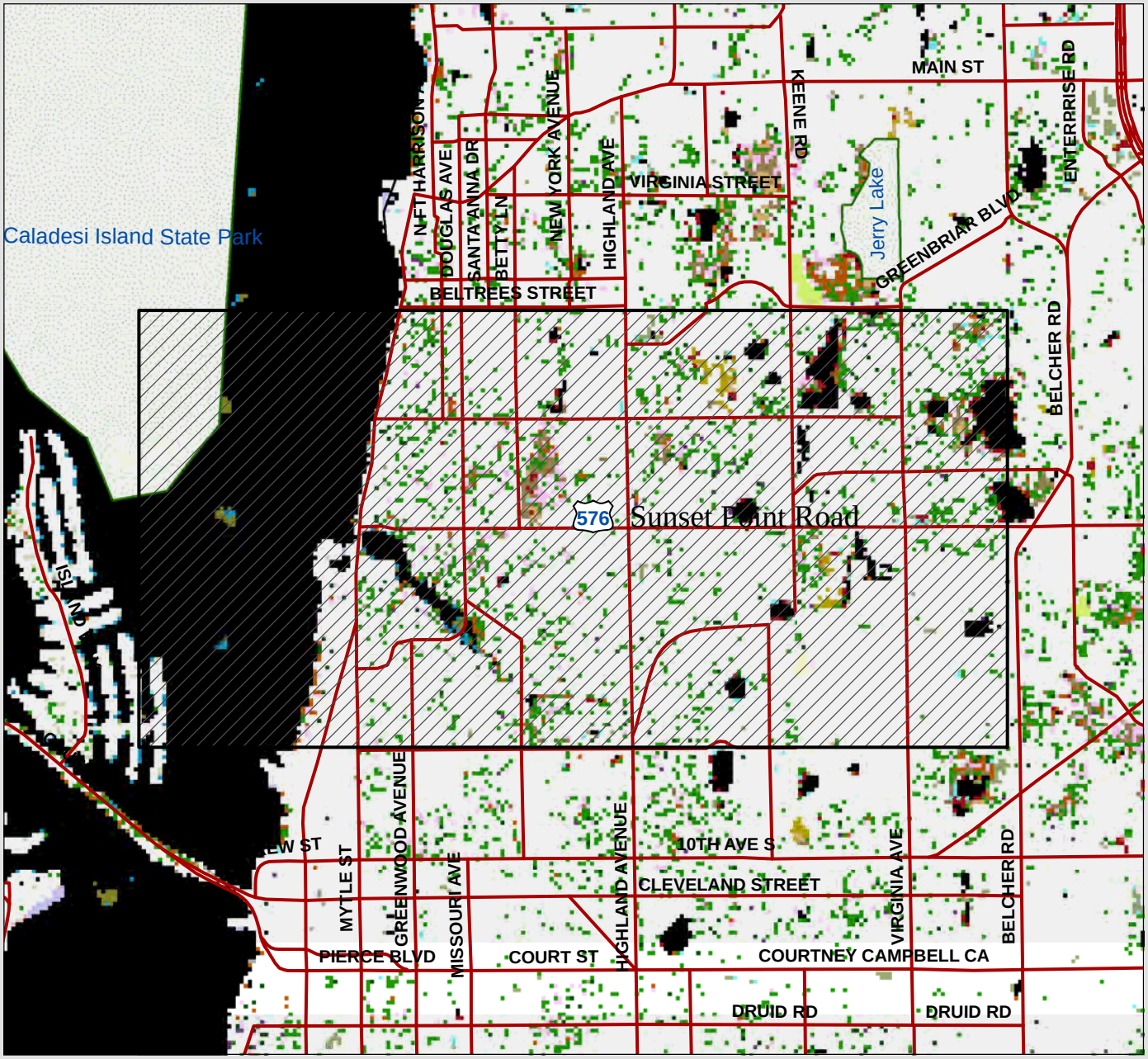
Miles
0 0.5 1 1.5

N

2008_4840

Florida Land Cover - 2003

Sunset Point Road Corridor



Project Site

Major Roads

County Boundary

- Coastal Strand
- Sand/Beach
- Xeric Oak Scrub
- Sand Pine Scrub
- Sandhill
- Dry Prairie
- Mixed Pine-Hardwood Forest
- Hardwood Hammocks and Forest
- Pinelands
- Cabbage Palm-Live Oak Hammock
- Tropical Hardwood Hammock
- Freshwater Marsh and Wet Prairie
- Sawgrass Marsh
- Cattail Marsh
- Shrub Swamp
- Bay Swamp
- Cypress Swamp
- Cypress/Pine/Cabbage Palm
- Mixed Wetland Forest
- Hardwood Swamp
- Hydric Hammock
- Bottomland Hardwood Forest
- Salt Marsh
- Mangrove Swamp
- Scrub Mangrove
- Tidal Flat
- Open Water
- Shrub and Brushland
- Grassland
- Bare Soil/Clearcut
- Improved Pasture
- Unimproved Pasture
- Other Agriculture
- Citrus
- Exotic Plants
- High and Low Impact Urban
- Extractive

Miles

0 0.2 0.4 0.8

N

2008_4840

THIS FORM IS INTENDED TO FACILITATE AND GUIDE THE DIALOGUE DURING A PRE-APPLICATION MEETING BY PROVIDING A PARTIAL "PROMPT LIST" OF DISCUSSION SUBJECTS. IT IS NOT A LIST OF REQUIREMENTS FOR SUBMITTAL BY THE APPLICANT.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RESOURCE REGULATION DIVISION
PRE-APPLICATION MEETING NOTES

FILE NUMBER:

Date:	7/29/08
Time:	10:00
Project Name:	Sunset Point Road
Attendees:	David Kramer, Alberto Martinez, Marty Morlan, Bryan Anderson (American Consulting), Mike Skrzypkowiak, Julie Brennan, Jim Meyer (Pinellas Co.)

County:	Pinellas	**Sec/Twp/Rge:**	2 and 3/29/15
Total Land Acreage:	ROW	**Project Acreage:**	10+ (2 miles)

Prior On-Site/Off-Site Permit Activity:

- Significant number of permitted projects within the proposed alignment and within the potential pond sites.

Project Overview:

- Widening of Sunset Point Road in between US Alt 19 and Keene Rd (approximately 2 miles).
- Widening will include 3 different sections.
- From 2 lane reconstruction including sidewalks, second section will be three lane (continuous center lane), and the 3rd section will be 4 lane divided.

Environmental Discussion: (Wetlands On-Site, Wetlands on Adjacent Properties, Delineation, T&E species, Easements, Drawdown Issues, Setbacks, Justification, Elimination/Reduction, Permanent/Temporary Impacts, Secondary and Cumulative Impacts, Mitigation Options, SHWL, Upland Habitats, Site Visit, etc.)

- Wetlands and Ditches within project area including Spring Branch.
- Provide appropriate mitigation for impacts using UMAM.
- Need approved limits of wetlands within the project area.

Site Information Discussion: (SHW Levels, Floodplain, Tailwater Conditions, Adjacent Off-Site Contributing Sources, Receiving Waterbody, etc.)

- Spring Branch/Stevenson Creek Drainage Basin.
- Spring Branch and Stevenson Creek may be impaired.

Water Quantity Discussions: (Basin Description, Storm Event, Pre/Post Volume, Pre/Post Discharge, etc.)

- Demonstrate that discharges from proposed project area will not cause an adverse impact for a 25-year, 24-hour storm event.
- Demonstrate that site will not impede the conveyance of contributing off-site flows.
- Provide equivalent compensating storage for all floodplain impacts.
- Provide bridge hydraulics analysis for creek crossings and demonstrate that the proposed improvements will not increase flood stages or velocities up or downstream of the project area.
- Demonstrate that impacts to permitted stormwater management systems that are adjacent to the ROW will not cause adverse water quantity impacts or increases in allowable discharge rates.
- For discharges directly to infinite tidal waters, no formal water quantity attenuation required.

Water Quality Discussions: (Type of Treatment, Technical Characteristics, Non-presumptive Alternatives, etc.)

- Provide water quality treatment consistent with Section 5.8 of the B.O.R.
- Entire new roadway alignment is considered reconstruction and will require water quality treatment.
- Also replace treatment function of existing ditches to be filled.
- Discharges may need to meet elevated water quality requirements if discharging directly to impaired waters.

Sovereign Lands Discussion: (Determining Location, Correct Form of Authorization, Content of Application, Assessment of Fees, Coordination with FDEP)

- May need to have a title search performed through DEP in Tallahassee and a public easement/land lease obtained.

Operation and Maintenance/Legal Information: (Ownership or Perpetual Control, O&M Entity, O&M Instructions, Homeowner Association Documents, Coastal Zone requirements, etc.)

- Provide proof of ownership in the form of a deed or contract for sale.
- Provide appropriate O&M instructions.
- Provide all appropriate cross-drainage agreements and/or drainage easements and/or agreements to modify any permitted ponds within the ROW.
- Provide detailed construction surface water management plan.

Application Type and Fee Required:

- General Construction ERP - $1600.00 – Sections A, C and E of ERP Application.

Other: (Future Pre-Application Meetings, Fast Track, Submittal Date, Construction Start Date, Required District Permits – WUP, WOD, Well Construction, etc.)

-

Disclaimer: The District ERP pre-application meeting process is a service made available to the public to assist interested parties in preparing for submittal of a permit application. Information shared at pre-application meetings is superseded by the actual permit application submittal. District permit decisions are based upon information submitted during the application process and Rules in effect at the time the application is complete.

THIS FORM IS INTENDED TO FACILITATE AND GUIDE THE DIALOGUE DURING A PRE-APPLICATION MEETING BY PROVIDING A PARTIAL "PROMPT LIST" OF DISCUSSION SUBJECTS. IT IS NOT A LIST OF REQUIREMENTS FOR SUBMITTAL BY THE APPLICANT.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RESOURCE REGULATION DIVISION
PRE-APPLICATION MEETING NOTES

FILE NUMBER:

Date:	2/10/09
Time:	9:00
Project Name:	Sunset Point Road – **2nd Meeting**
Attendees:	David Kramer, Marty Morlan, Bryan Anderson (American Consulting), Julie Brennan, (Pinellas Co.)

County:	Pinellas	**Sec/Twp/Rge:**	2 and 3/29/15
Total Land Acreage:	ROW	**Project Acreage:**	10+ (2 miles)

Prior On-Site/Off-Site Permit Activity:

- **Previous pre-app on 7/29/08 – Discussion on 2/10/09 in bold.**
- Significant number of permitted projects within the proposed alignment and within the potential pond sites.

Project Overview:

- Widening of Sunset Point Road in between US Alt 19 and Keene Rd (approximately 2 miles).
- Widening will include 3 different sections.
- ~~From 2 lane reconstruction~~ **Milling and resurfacing of the first phase and the addition of an 8 foot multi-use sidewalk/path**, second section will be three lane (continuous center lane), and the 3rd section will be 4 lane divided.

Environmental Discussion: (Wetlands On-Site, Wetlands on Adjacent Properties, Delineation, T&E species, Easements, Drawdown Issues, Setbacks, Justification, Elimination/Reduction, Permanent/Temporary Impacts, Secondary and Cumulative Impacts, Mitigation Options, SHWL, Upland Habitats, Site Visit, etc.)

- Wetlands and Ditches within project area including Spring Branch.
- Provide appropriate mitigation for impacts using UMAM.
- Need approved limits of wetlands within the project area.

Site Information Discussion: (SHW Levels, Floodplain, Tailwater Conditions, Adjacent Off-Site Contributing Sources, Receiving Waterbody, etc.)

- Spring Branch/Stevenson Creek Drainage Basin.
- Spring Branch and Stevenson Creek may be impaired.

Water Quantity Discussions: (Basin Description, Storm Event, Pre/Post Volume, Pre/Post Discharge, etc.)

- Demonstrate that discharges from proposed project area will not cause an adverse impact for a 25-year, 24-hour storm event.
- Demonstrate that site will not impede the conveyance of contributing off-site flows.
- Provide equivalent compensating storage for all floodplain impacts.
- Provide bridge hydraulics analysis for creek crossings and demonstrate that the proposed improvements will not increase flood stages or velocities up or downstream of the project area.
- Demonstrate that impacts to permitted stormwater management systems that are adjacent to the ROW will not cause adverse water quantity impacts or increases in allowable discharge rates.
- For discharges directly to infinite tidal waters, no formal water quantity attenuation required.

Water Quality Discussions: (Type of Treatment, Technical Characteristics, Non-presumptive Alternatives, etc.)

- Provide water quality treatment consistent with Section 5.8 of the B.O.R.
- Entire new roadway alignment is considered reconstruction and will require water quality treatment.
- Also replace treatment function of existing ditches to be filled.
- Discharges may need to meet elevated water quality requirements if discharging directly to impaired waters.

Sovereign Lands Discussion: (Determining Location, Correct Form of Authorization, Content of Application, Assessment of Fees, Coordination with FDEP)

- May need to have a title search performed through DEP in Tallahassee and a public easement/land lease obtained.

Operation and Maintenance/Legal Information: (Ownership or Perpetual Control, O&M Entity, O&M Instructions, Homeowner Association Documents, Coastal Zone requirements, etc.)

- Provide proof of ownership in the form of a deed or contract for sale.
- Provide appropriate O&M instructions.
- Provide all appropriate cross-drainage agreements and/or drainage easements and/or agreements to modify any permitted ponds within the ROW.
- Provide detailed construction surface water management plan.

Application Type and Fee Required:

- **First phase (milling and resurfacing) including shared use path is exempt from permitting – can be included on the complete construction plans for all three phases if construction will be simultaneous.**
- General Construction ERP - $1600.00 – Sections A, C and E of ERP Application.

Other: (Future Pre-Application Meetings, Fast Track, Submittal Date, Construction Start Date, Required District Permits – WUP, WOD, Well Construction, etc.)

-

Disclaimer: The District ERP pre-application meeting process is a service made available to the public to assist interested parties in preparing for submittal of a permit application. Information shared at pre-application meetings is superseded by the actual permit application submittal. District permit decisions are based upon information submitted during the application process and Rules in effect at the time the application is complete.

Appendix F

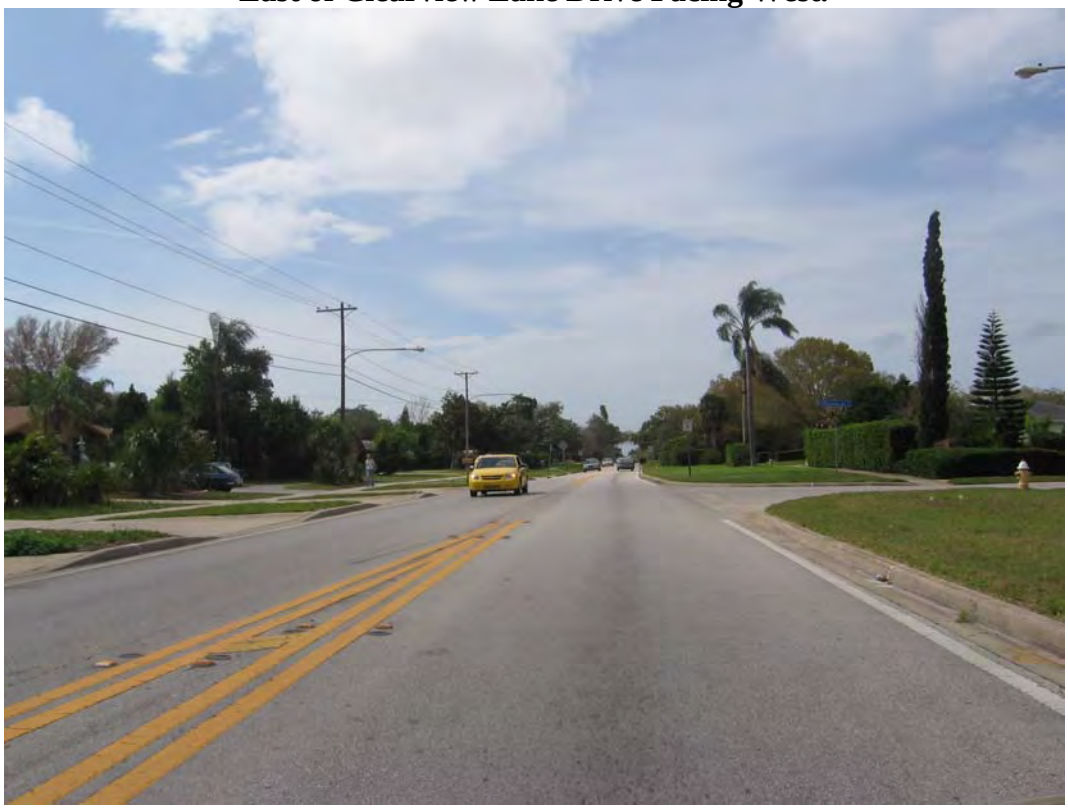
Existing Conditions Photos

East of Keene Road Facing West.

Keene Road Intersection Facing West.

West of Keene Road Facing West.

East of Clearview Lake Drive Facing West.



East of Murray Avenue Facing West.

East of Greenhill Drive Facing West.

Nugget Drive Intersection Facing West

Ridgeway Drive Intersection Facing West.

East of Bellemeade Drive Facing West.

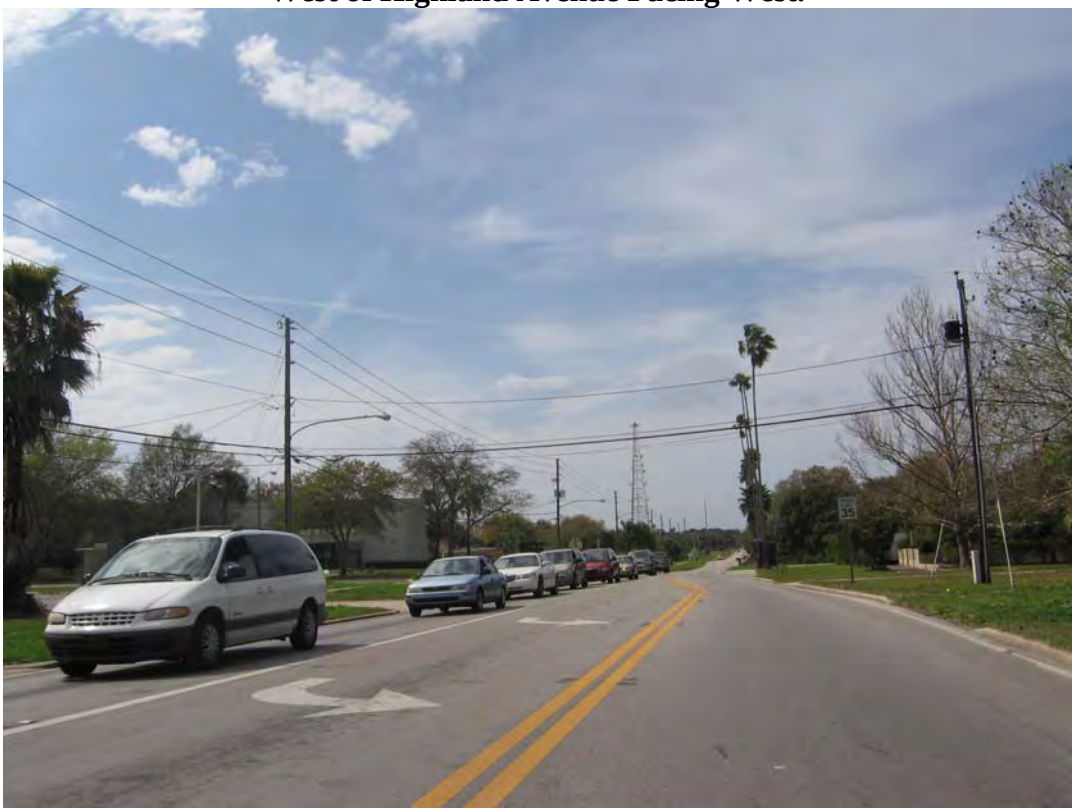
East of East Drive Facing West.

West of Souvenir Drive Facing West.

East of Highland Avenue Facing West.

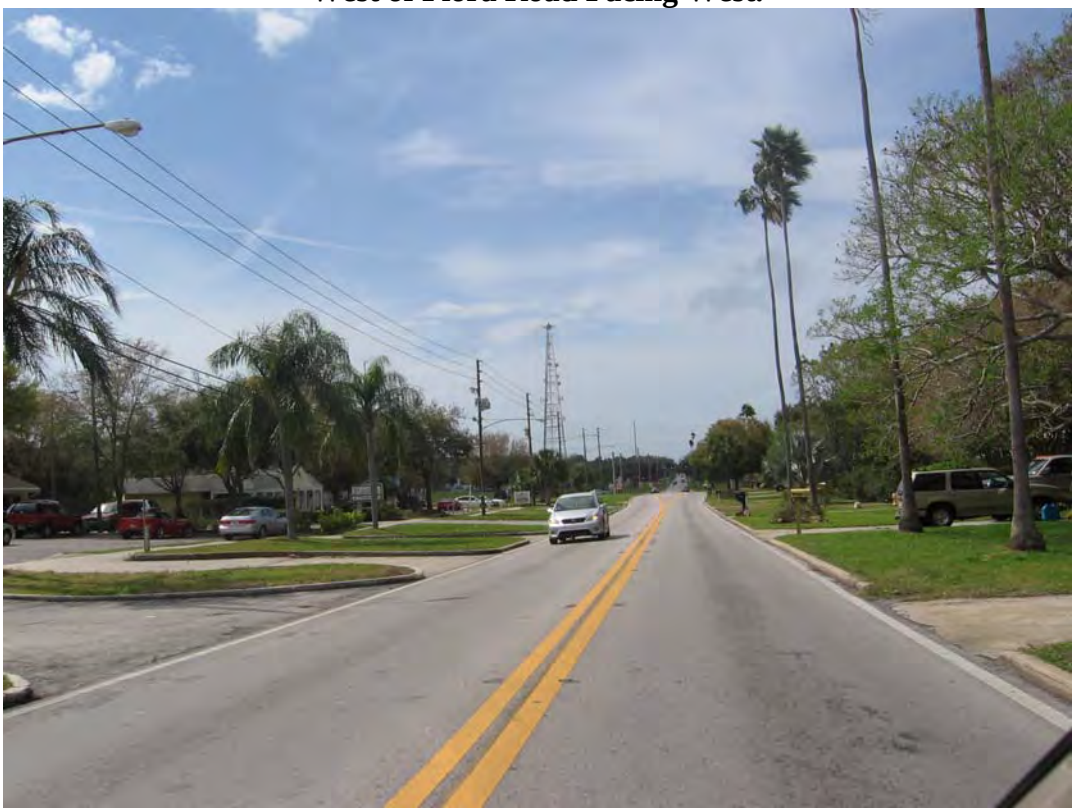
Highland Avenue Intersection Facing West

West of Highland Avenue Facing West.



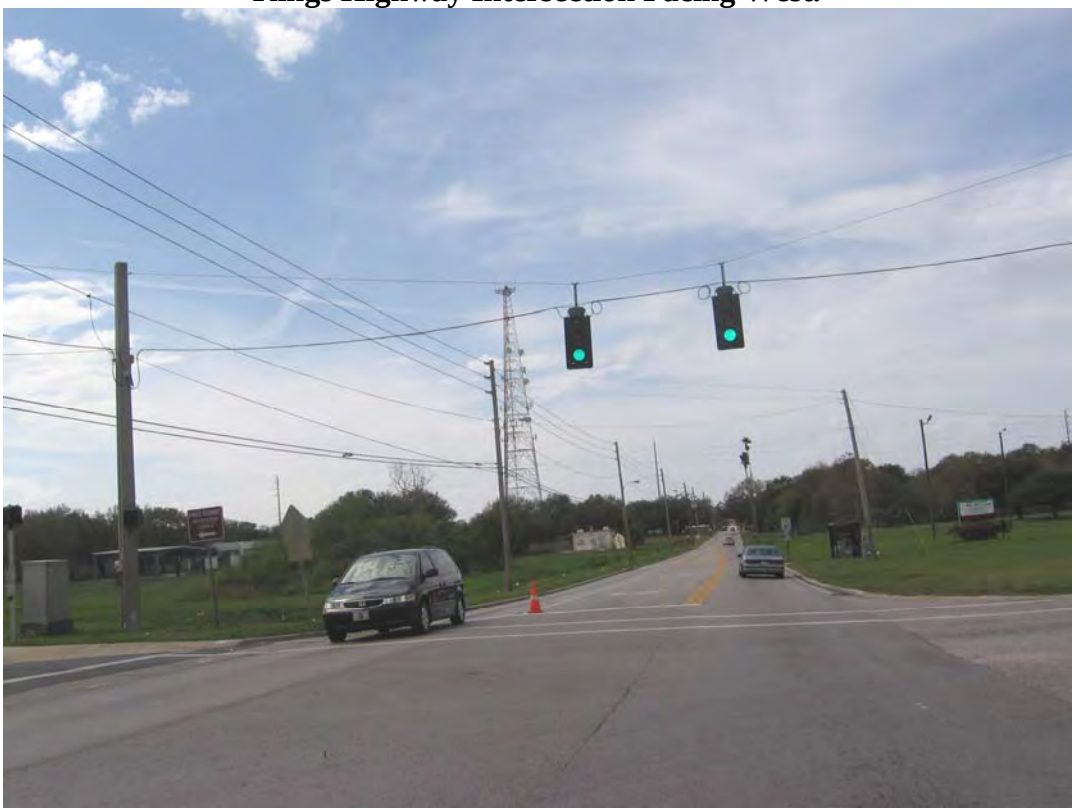
Bus Shelter West of Highland Avenue Facing South

West of Flora Road Facing West.

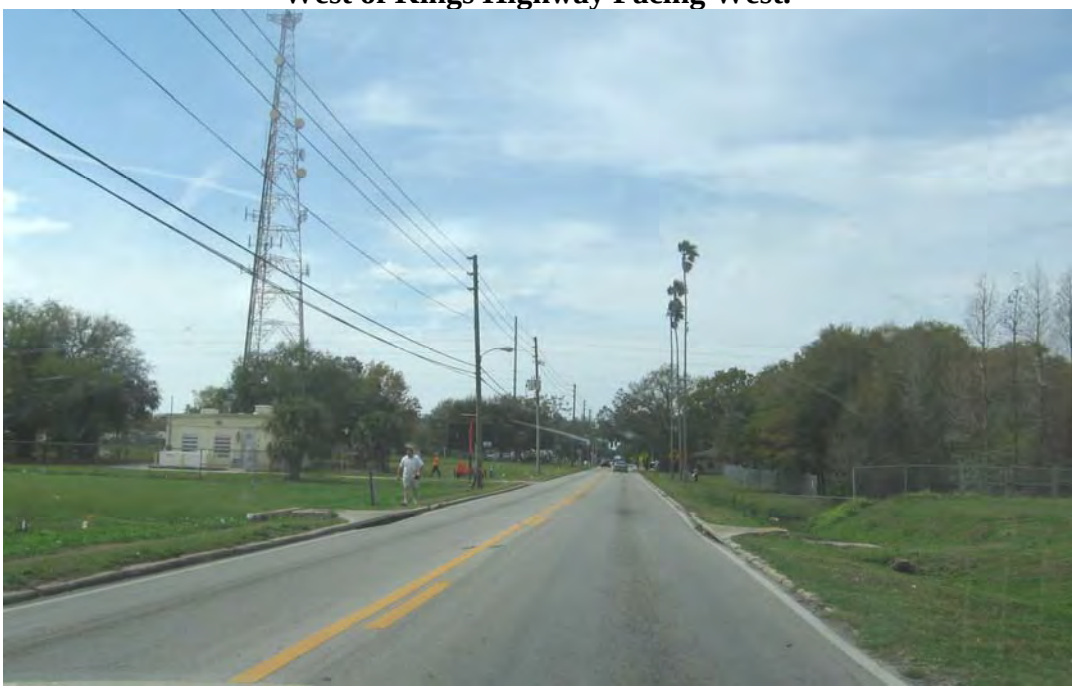


East of Kings Highway Facing West.

Kings Highway Intersection Facing West.



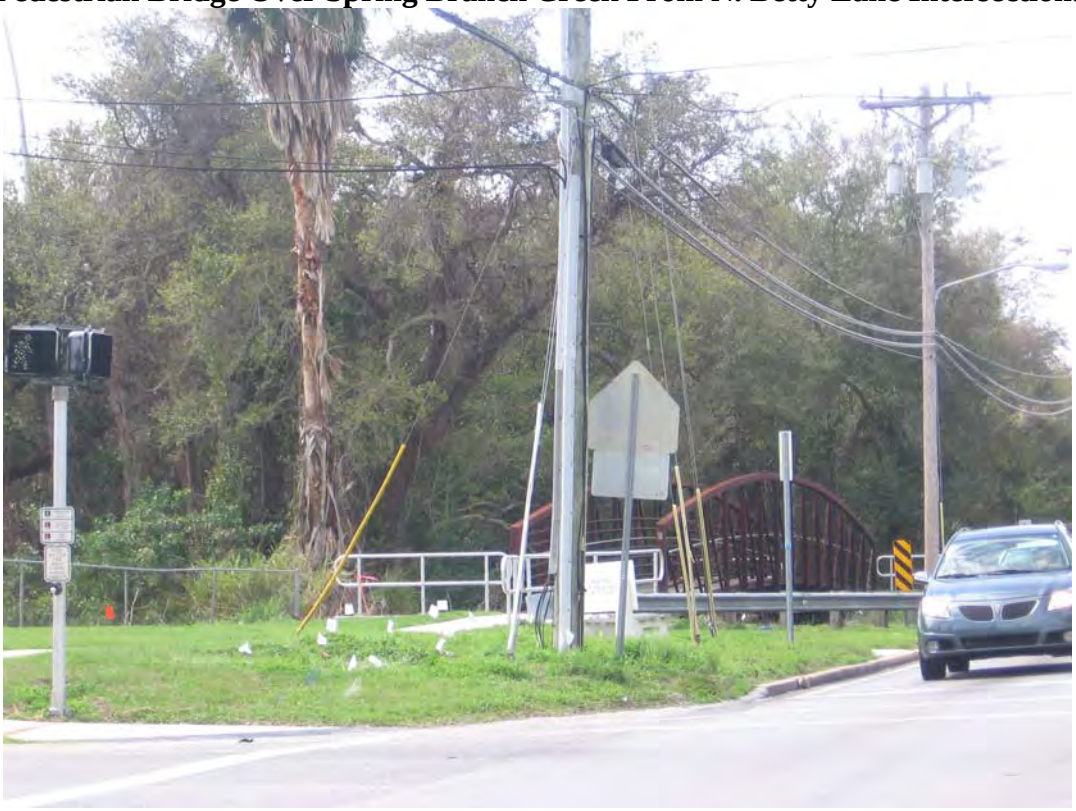
West of Kings Highway Facing West.



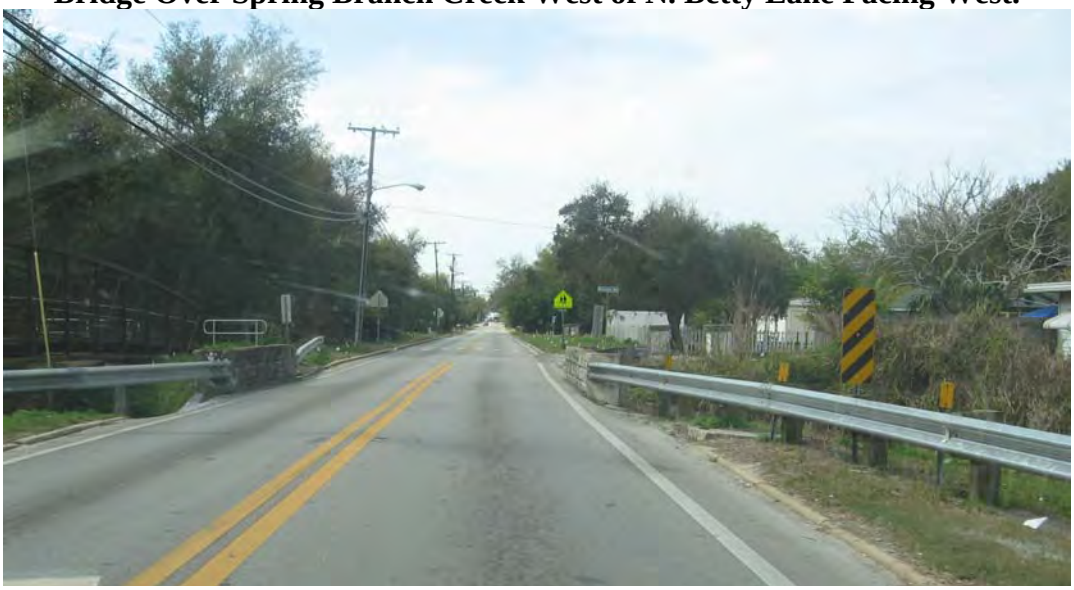
East of North Betty Lane Facing West.

North Betty Lane Intersection Facing West.

Pedestrian Bridge Over Spring Branch Creek From N. Betty Lane Intersection.



Bridge Over Spring Branch Creek West of N. Betty Lane Facing West.



East of Coles Road Facing West.

East of Douglas Avenue Facing West.

Douglas Avenue Intersection Facing West.

West of Douglas Avenue Facing West.

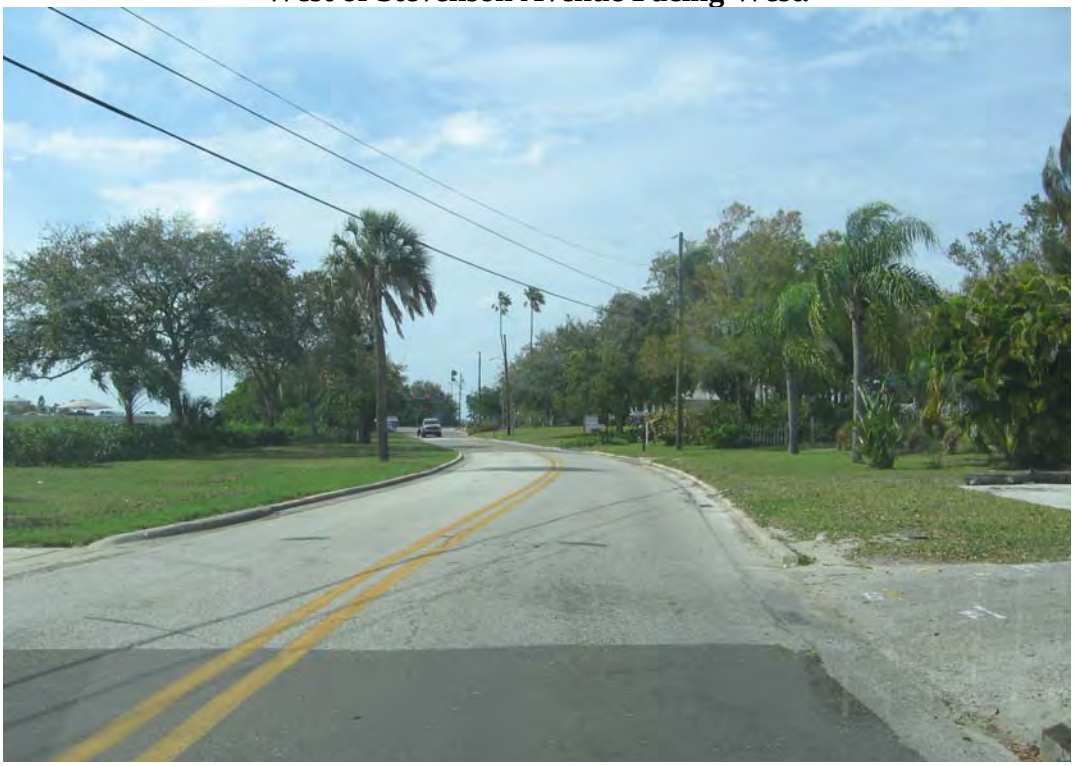
Overbrook Drive Intersection Facing West.

East of the Fred E. Marquis Pinellas Trail Facing West.

West of the Fred E. Marquis Pinellas Trail Facing West.

Stevenson Avenue Intersection Facing West.

West of Stevenson Avenue Facing West.



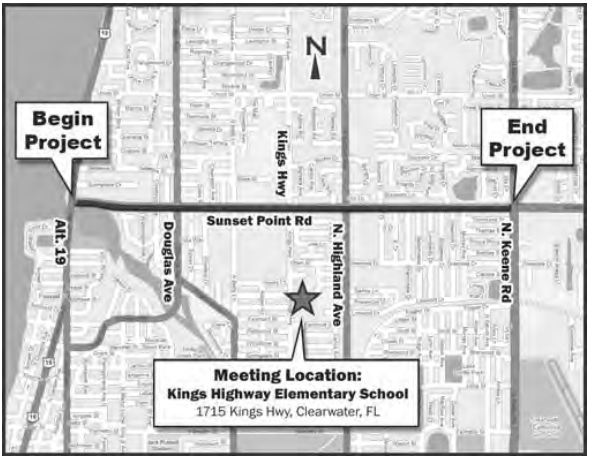
East of Edgewater Drive Facing West.

Edgewater Drive Intersection Facing West.

Appendix G

Public Involvement

NOTICE: INTRODUCTORY PUBLIC INFORMATION MEETING



Public Works Department

Pinellas County

The Pinellas County Transportation Division will conduct an Introductory Public Information Meeting for the proposed roadway improvements to Sunset Point Road, from US Alt. 19 (Edgewater Drive) to Keene Road. The meeting will be held on Wednesday, March 5, 2008, from 4:00 pm to 7:00 pm, at the Kings Highway Elementary School, 1715 Kings Highway, Clearwater, Florida.

All interested parties are encouraged to attend this meeting, review materials on display and express their opinions concerning this project. For further information, please contact Mr. Robert Guercia, P.E., Project Manager, at (727) 464-3661. Persons with disabilities requiring reasonable accommodations to participate in the meeting should call (727) 464-4062 (VOICE/TDD), no later than February 27, 2008.

BOARD OF COUNTY COMMISSIONERS
Robert B. Stewart - Chairman
Calvin D. Harris - Vice Chairman
Ronnie E. Duncan
Susan Latvala
John Morroni
Karen Williams Seel
Kenneth T. Welch

Pinellas County
PUBLIC WORKS

February 13, 2008

Re: Introductory Public Information Meeting
Sunset Point Road – from US Alt 19 (Edgewater Drive) to Keene Road
Project Number 920476

Dear Property Owner or Interested Party:

This notice is to inform you that Pinellas County will conduct an Introductory Public Information Meeting to discuss proposed roadway modifications to Sunset Point Road from US Alt 19 (Edgewater Drive) to Keene Road. The meeting will be held on Wednesday, March 5, 2008 from 4:00 p.m. to 7:00 p.m. in the Media Center at Kings Highway Elementary School located at 1715 Kings Highway, Clearwater, Florida. Please refer to the map on the back of this letter.

The purpose of the Introductory Public Information Meeting is to provide an opportunity for interested persons to comment and share local knowledge on the project for Sunset Point Road. Representatives from Pinellas County will be available, beginning at 4:00 p.m., to discuss the project, answer questions, and receive comments. Aerial photographs depicting the project location will be made available for review.

Everyone will have an opportunity to express his or her opinion in writing using the enclosed form. Written comments must be postmarked no later than March 19, 2008. For further information, please contact Mr. Robert Guercia, P.E., Project Manager, at (727) 464-3661.

Persons with disabilities requiring reasonable accommodations to participate in the meeting should call (727) 464-4062 (VOICE/TDD), no later than February 27, 2008.

We invite and encourage you to attend and participate in this public meeting.

Sincerely,

Robert F. Guercia, P.E.
Project Manager

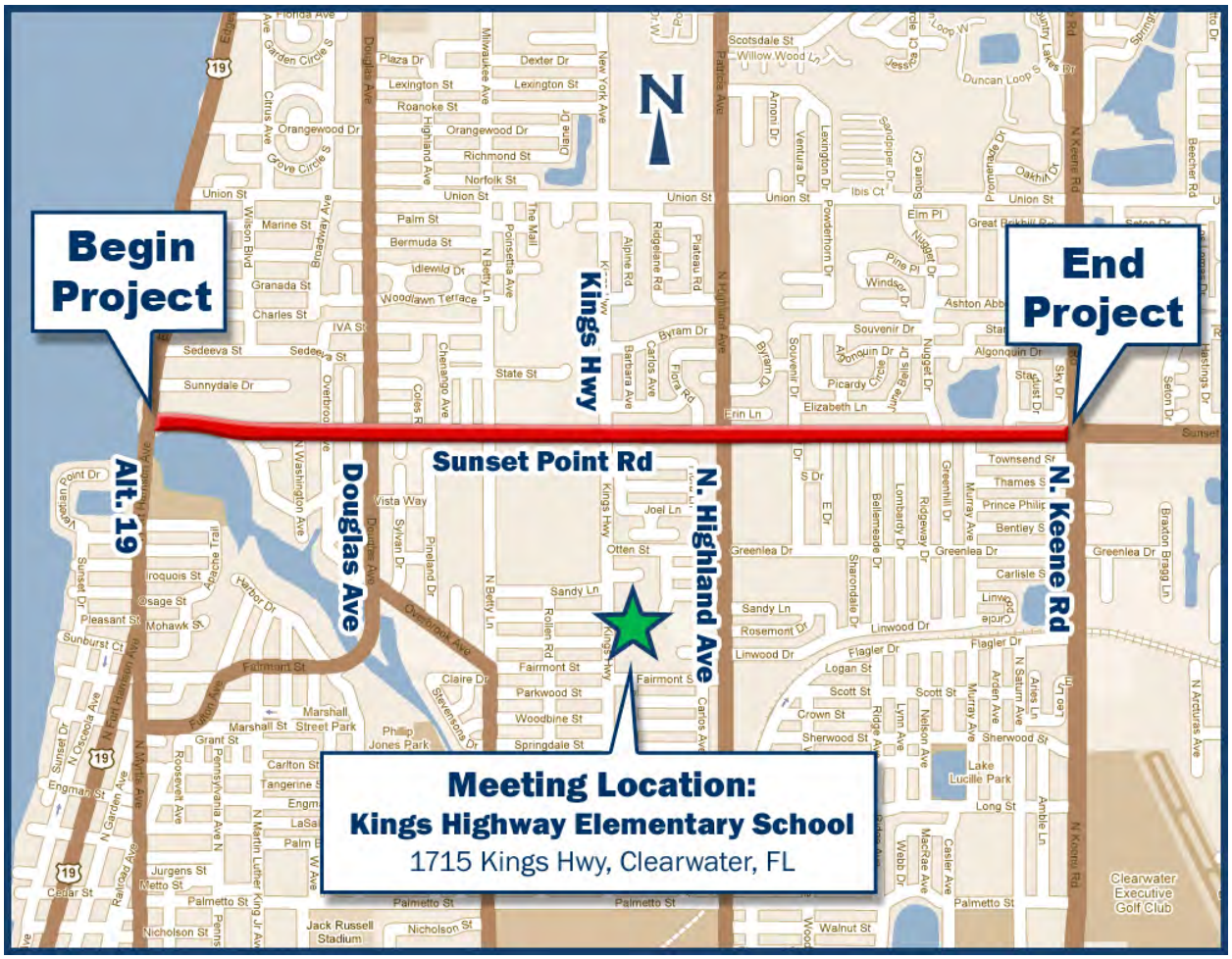
Attachments: Fact Sheet, Comment Form, Meeting Notice

Public letter (back)
Sunset Point Road\Public Info Notice.doc

PLEASE ADDRESS REPLY TO:
440 Court Street
Clearwater, Florida 33756
Phone: (727) 464-3251
Website: www.pinellascounty.org

NOTICE
INTRODUCTORY PUBLIC INFORMATION MEETING

The Pinellas County Transportation Department will conduct an Introductory Public Information Meeting for the proposed roadway improvements to Sunset Point Road, from US Alt. 19 (Edgewater Drive) to Keene Road. The meeting will be held on Wednesday, March 5, 2008, from 4:00 pm to 7:00 pm, at the Kings Highway Elementary School, 1715 Kings Highway, Clearwater, Florida.



All interested parties are encouraged to attend this meeting, review materials on display and express their opinions concerning this project. For further information, please contact Mr. Robert Guercia, P.E., Project Manager, at (727) 464-3661. Persons with disabilities requiring reasonable accommodations to participate in the meeting should call (727) 464-4062 (VOICE/TDD), no later than February 27, 2008.

PROJECT FACT SHEET

Sunset Point Road
From US Alt. 19 (Edgewater Drive) to Keene Road
Project Number 920476

PROJECT DESCRIPTION

Sunset Point Road presently is a two lane, undivided road between US Alt. 19 (Edgewater Drive) and Keene Road. There are no existing bicycle facilities, limited pedestrian features and stormwater collection and treatment facilities along this segment. The County has contracted with American Consulting Engineers of Florida, LLC, to evaluate the need for future transportation improvements. Their work will involve reviewing the corridor including traffic, safety, environmental and stormwater conditions and to make recommendations in a Preliminary Engineering Report (PER).

Once the data collection phase and Draft PER is completed, a 2nd Public Workshop will be held. This will provide another opportunity to provide feedback on the potential improvements being considered by the County. After receiving feedback from this 2nd Public Workshop and the evaluation is completed, a Final Engineering Report will be prepared and presented for consideration by the Board of County Commissioners (BCC). If recommendations are approved by the BCC, then the Preliminary Design Phase will begin. This phase will include preparing construction plans, right-of-way maps, permit applications and necessary documents to ready the project for construction.

PROJECT SCHEDULE

PROJECT MILESTONE	ESTIMATED COMPLETION DATE
Draft Preliminary Engineering Report (PER)	Summer 2008
2nd Public Workshop	Autumn 2008
Final Preliminary Engineering Report (PER)	Fall 2008
Preliminary Design	Winter 2009
Final Design	Winter 2010
Right-of-Way/Land Acquisition	To Be Determined
Begin Construction	To Be Determined
End Construction	To Be Determined

PROJECT COST

The cost of implementing the project shall be determined during the development of the Preliminary Engineering Report.

PROJECT CONTACT

Mr. Robert Guercia, P.E., Project Manager
Pinellas County Public Works
Transportation Department
440 Court Street
Clearwater, Florida 33756
Telephone: (727) 464-3661
Facsimile: (727) 464-4363
Email: rguercia@pinellascounty.org

COMMENT FORM

Sunset Point Road
From US Alt. 19 (Edgewater Drive) to Keene Road
Project Number: 920476

Introductory Public Information Meeting
Kings Highway Elementary School
Clearwater, Florida
March 5, 2008 from 4:00 pm to 7:00 pm

If you desire to express comments in writing, please note them on this sheet and leave it in the comments box provided at the meeting. If you are unable to attend the meeting and wish to submit written comments, we ask that you please mail this form to the following address, postmarked by March 19, 2008, so it can be evaluated in a timely fashion. Thank you in advance for your time and cooperation.

COMMENTS

_____
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_____
_____

_____
Name

_____
Address

_____
City, State, Zip

_____
Phone Number

_____
E-mail

PLEASE RETURN COMMENTS TO:

Robert Guercia, PE, Project Manager
Pinellas County Public Works
Transportation Department
440 Court Street
Clearwater, Florida 33756
E-mail: rguercia@pinellascounty.org

COMMENTS must be postmarked by March 19, 2008.

Sunset Point Road Improvements
Project No. 920476
Introductory Public Meeting – March 3, 2008
Summary of Comments

For the March 3rd 2008 Introductory Public Meeting, there were a total of 450 letters/notices which were sent to adjacent property owners. The meeting had an attendance of 75 people. Comments were requested and submitted by 47 different individuals and households. The following is a summary of the most common requests and concerns addressed in these comments and the percentage of individuals that made those comments.

Requests:

1) Add sidewalks along Sunset Point Road (45%)
2) Add Bike Lanes and Improve access to Trails (34%)
3) Preserve Current Tree Canopy and Add Trees (28%)
4) Use Underground Utilities Only (19%)
5) Create an Aesthetically Pleasing Roadway (19%)
6) Add a Center Turn Lane along the Corridor (15%)
7) Make Sunset Point Road a 4 Lane Road (11%)

Concerns:

1) Water Runoff and Drainage Concerns (30%)
2) Loss of Property and Property Value Concerns (26%)
3) Do Not Want the Road to be Widened (21%)
4) Concerns of Increased Road Noise (19%)
5) Difficulty Accessing Driveways and Shopping Centers (17%)
6) Safety of Pedestrians, Cyclists, and Homes (17%)
7) Road Improvements will Generate More Traffic Volume (13%)
8) Road Improvements will Encourage Speeding (11%)

Requests and Concerns Addressed by less than 10% of Attendees:

1) Add Water/Sewer Lines for Residents to Hook Up to (6%)
2) Add a Right Turn Lane from Sunset Point to Keene Southbound (6%)
3) Concerns of Construction Impacts on Daily Life (6%)
4) Remove Median on Sunset Point Road (4%)
5) Concerns on Impacts to the Environment (4%)
6) Add Barrier Walls for Safety of Homes from Traffic (4%)
7) Change Signal Timing or Traffic Control Devices (4%)
8) Only Widen to Highland Avenue (2%)
9) Concerns of “Wasting Taxpayer Money” (2%)

BOARD OF COUNTY COMMISSIONERS
Robert B. Stewart - Chairman
Calvin D. Harris - Vice Chairman
Ronnie E. Duncan
Susan Latvala
John Morroni
Karen Williams Seel
Kenneth T. Welch

Pinellas County
PUBLIC WORKS

May 8, 2009

RE: Public Information Meeting
Sunset Point Road – from U.S. Alt. 19 (Edgewater Drive) to east of Keene Road
PID No.: 920476

Dear Property Owner or Interested Party:

This notice is to inform you that Pinellas County will conduct a Public Information Meeting to discuss the proposed roadway improvements to Sunset Point Road, from US Alt. 19 (Edgewater Drive) to east of Keene Road. The meeting will be held on Thursday, May 28, 2009 from 4:00 pm to 7:00 pm, in the Cafeteria at the Kings Highway Elementary School, 1715 Kings Highway, Clearwater, Florida. Attached for your use is a map identifying the location of the Kings Highway Elementary School and the locations of the proposed improvements.

The purpose of the Public Information Meeting is to provide an opportunity for property owners and interested parties to comment on the project for Sunset Point Road. Representatives from Pinellas County and the County's consultant, American Consulting Engineers of Florida, LLC, will be available beginning at 4:00 p.m., to discuss the project, answer questions, and receive comments. Aerial maps, Conceptual plans and reports will be available for review.

Everyone will have an opportunity to express his or her opinion in writing using the enclosed form. All comments received will be considered. Written comments must be postmarked no later than June 17, 2009. For further information, please contact Mr. Mike H. Skrzypkowiak, Pinellas County Project Manager, at (727) 464-3661.

Persons with disabilities requiring reasonable accommodations to participate in the meeting should call (727) 464-4062 (VOICE/TDD), no later than May 21, 2009.

We invite and encourage you to attend and participate in this public meeting.

Sincerely,

Mike H. Skrzypkowiak
Project Manager

Enclosures: Fact Sheet, Comment Form, Meeting Notice

PLEASE ADDRESS REPLY TO:
440 Court Street
Clearwater, Florida 33756
Phone: (727) 464-3251
Website: www.pinellascounty.org

PROJECT FACT SHEET

Sunset Point Road
From US Alt. 19 (Edgewater Drive) to east of Keene Road
PID Number 920476

PROJECT DESCRIPTION

The County has contracted with American Consulting Engineers of Florida, LLC, to evaluate the need for future transportation improvements. American has completed the work involved in reviewing the corridor including traffic, safety, environmental and storm water conditions and has made recommendations for improvements in a Preliminary Engineering Report (PER).

Improvements are proposed to meet existing and future traffic demands, improve safety, provide drainage improvements, and improve pedestrian and bicycle access along Sunset Point Road (CR 576) from US Alt. 19 (Edgewater Drive) to east of Keene Road (CR 1). To achieve these objectives, the existing two-lane, undivided roadway will be modified as follows:

1. East of Edgewater Drive to Douglas Avenue – an 8 ft. wide sidewalk will be added along the north side of the proposed 2-lane roadway, and the existing pavement will be milled and resurfaced and new concrete curb and gutter will be added.
2. Douglas Avenue to west of Highland Avenue – roadway will be reconstructed to provide a two-lane curb and gutter roadway with a continuous two-way left turn lane. Also included are bike lanes and a 5 or 6 ft. sidewalk on each side.
3. Highland Avenue to Keene Road - roadway will be reconstructed to an urban four-lane divided curb and gutter section with bike lanes and sidewalks on each side.

In addition to the improvements identified above, there will be storm water drainage improvements added including new curb inlets, storm water piping and storm water ponds. The existing bridge at Spring Branch will also be replaced with a new bridge culvert structure. Intersection improvements are also proposed including: extending the southbound left-turn lane on Highland Ave., adding an eastbound right-through lane on Sunset Pt. Rd. at Highland Ave. and adding a 2nd eastbound and westbound left-turn lane on Sunset Pt. Rd. at Keene Rd.

PROJECT SCHEDULE

PROJECT MILESTONE	ESTIMATED COMPLETION DATE
Final Preliminary Engineering Report (PER)	June 2009
Preliminary Design	August 2009
Final Design	August 2010
Right-of-Way/Land Acquisition	December 2011
Begin Construction	To Be Determined

PROJECT COST

The estimated preliminary construction cost of the recommended improvements is $10,500,000

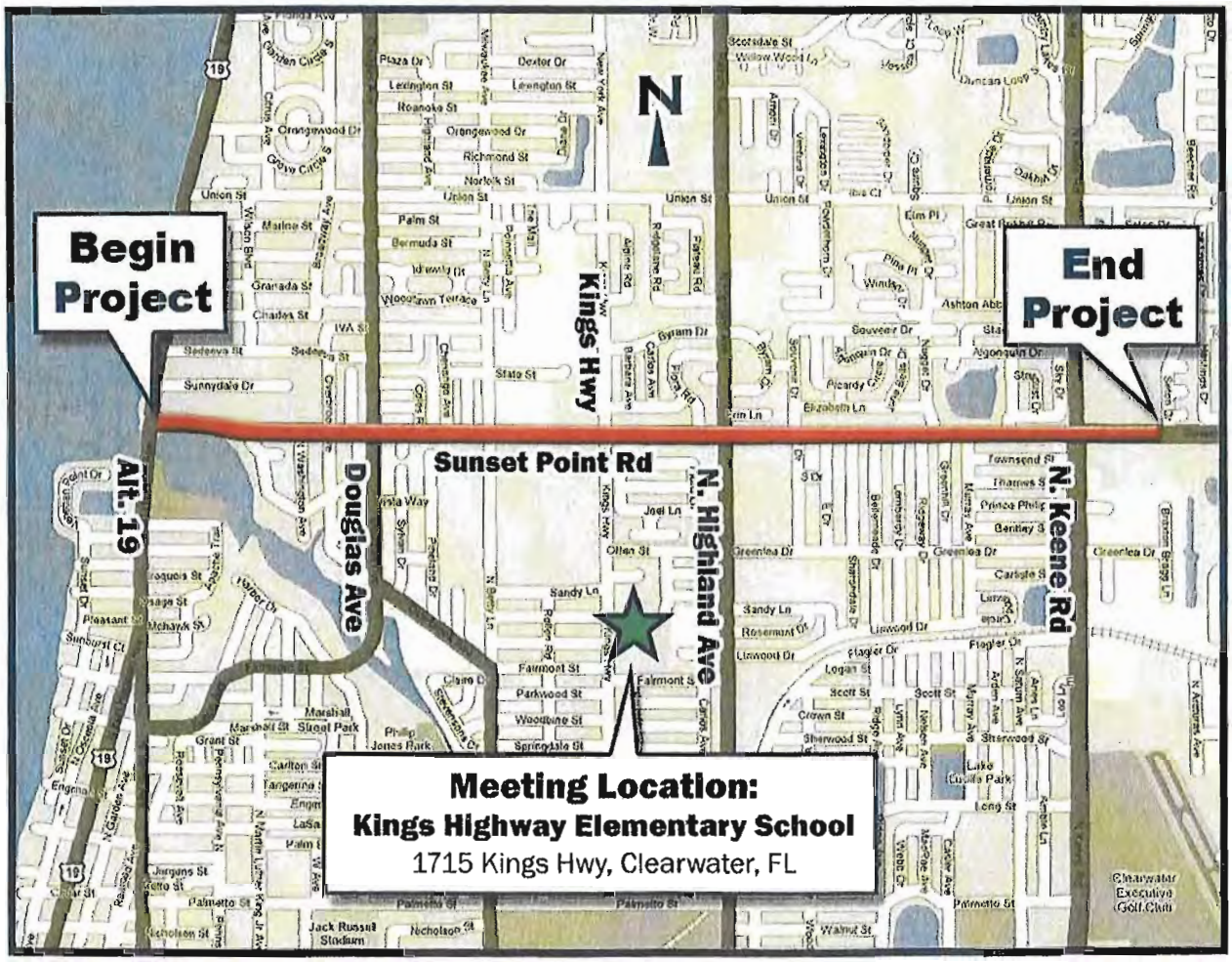
PROJECT CONTACT

Mr. Mike Skrzypkowiak, Project Manager
Pinellas County Public Works
Transportation Department
440 Court Street
Clearwater, Florida 33756
Telephone: (727) 464-3661
Facsimile: (727) 464-4363
Email: mskrzypkowiak@pinellascounty.org

NOTICE

PUBLIC INFORMATION MEETING

The Pinellas County Transportation Department will conduct a Public Information Meeting for the proposed roadway improvements to Sunset Point Road, from US Alt. 19 (Edgewater Drive) to east of Keene Road. The meeting will be held on Thursday, May 28, 2009, from 4:00 pm to 7:00 pm, at the Kings Highway Elementary School, 1715 Kings Highway, Clearwater, Florida.



All interested parties are encouraged to attend this meeting, review materials on display and express their opinions concerning this project. For further information, please contact Mr. Mike Skrzypkowiak, Project Manager, at (727) 464-3661. Persons with disabilities requiring reasonable accommodations to participate in the meeting should call (727) 464-4062 (VOICE/TDD), no later than May 21, 2009.

COMMENT FORM

Sunset Point Road
From US Alt. 19 (Edgewater Drive) to east of Keene Road
Project Number: 920476

Public Information Meeting
Kings Highway Elementary School
Clearwater, Florida
May 28, 2009 from 4:00 pm to 7:00 pm

If you desire to express comments in writing, please note them on this sheet and leave it in the comments box provided at the meeting. If you are unable to attend the meeting and wish to submit written comments, we ask that you please mail this form to the address on the reverse side, **postmarked by June 17, 2009**, so it can be evaluated in a timely fashion. Thank you in advance for your time and cooperation.

COMMENTS

Name:_____

Address:_____

Phone and/or Email:_____

FOLD

Mike H. Skrzypkowiak, Project Manager
Pinellas County Public Works
Transportation Department
440 Court Street
Clearwater, Florida 33756

FOLD

Sunset Point Road Improvements – Preliminary Engineering Phase
CIP Project No. 920476
Second Public Meeting – May 28, 2009
Summary of Comments

For the May 28, 2009 Second Public Meeting, there were a total of 451 letters/notices which were sent to adjacent property owners and city/county officials. The meeting had an attendance of 69 people, as well as county and city officials. Comments were requested and submitted by 27 different individuals and households. The following is a summary of the most common requests and concerns addressed in these comments and the number of individuals that made those comments.

Requests:

1) Add Sidewalks along Sunset Point Road (10)
2) Add Bike Lanes along Sunset Point Road (7)
3) Support the Current Design (7)
4) Keep or Lengthen Trail Access Path (5)
5) Continue 3-Lane Section between Highland and Keene (5)
6) Add Walls along 4-Lane Section for Noise and Safety (4)
7) Preserve Current Tree Canopy and Add Trees (4)

Concerns:

1) Loss of Property and Property Value Concerns (10)
2) Do Not Want 4 Lanes between Highland and Keene (7)
3) Concerns of Increased Speeding through the Corridor (6)
4) Safety Concerns from History of Vehicles Leaving the Road (4)
5) Concerns of Increased Road Noise through the Corridor (4)
6) Driveway Accessibility Concerns (4)
7) Budgeting and Proper use of Tax Dollars (4)
8) Do Not Want Sunset Point Road to be Widened (3)

Requests and Concerns Addressed by less than 3 Attendees:

1) Concerns about Safety of Making U-Turns at Median (2)
2) Pedestrian Safety Concerns and Requests for Cross Walks (2)
3) Affects and Impacts of Construction Activities (2)
4) Access to Side Streets obstructed by Raised Median (2)
5) Increases in Traffic Volume along the Corridor (2)
6) Improve Emergency Vehicle Access to the Corridor (2)
7) Water Quality and Environmental Concerns (2)
8) Add Landscaping to Medians (2)
9) 8' Sidewalk is Too Wide/ Attracts More Pedestrians (2)
10) Add Reclaimed Water Lines along Sunset Point Road (1)

Sunset Point Road

From US Alt. 19 (Edgewater Drive) to east of Keene Road
PID Number 920476

The County proposes improvements to Sunset Point Road. Please attend the Board of County Commissioners meeting to voice your comments. This item will be presented after the Public Hearing portion of the agenda. Citizen comments will be taken on this item after the presentation. We need your participation and input.

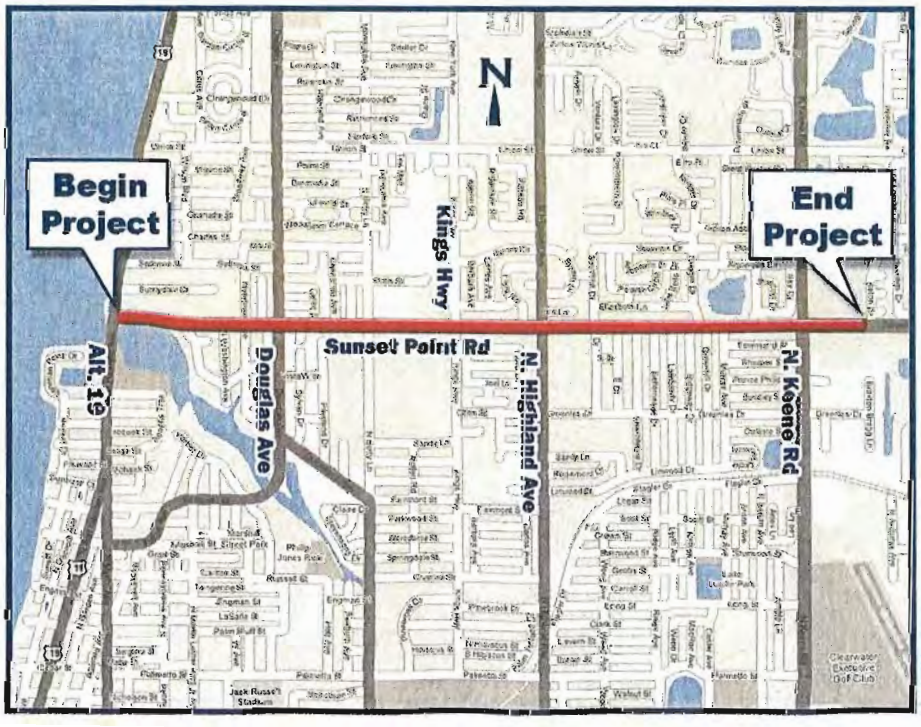
NOTICE - CHANGE IN DATE AND TIME

BOARD OF COUNTY COMMISSIONERS MEETING

PUBLIC CAN FORMALLY ADDRESS THE BOARD OF COUNTY COMMISSIONERS

DATE: Tuesday, August 18th, 2009
TIME: 6:30 PM
PLACE: COUNTY COMMISSION CHAMBERS
315 Court Street, 5th Floor – Clearwater, FL

All interested parties are encouraged to attend this meeting. For further information, please contact Mr. Mike Skrzypkowiak, Project Manager, at (727) 464-3661. Persons with disabilities requiring reasonable accommodations to participate in the meeting should call (727) 464-4062 (VOICE/TDD), no later than Aug 11, 2009.



STATE OF FLORIDA
COUNTY OF PINELLAS } S.S.

ST. PETERSBURG TIMES

Published Daily
St.Petersburg, Pinellas County, Florida

Before the undersigned authority personally appeared Jessica Attard
who on oath says that she is Legal Clerk
of the St. Petersburg Times Clearwater Times
a daily newspaper published at St. Petersburg, in Pinellas County, Florida: that
the attached copy of advertisement, being a Legal Notice
in the matter RE: Pinellas County Public Works - BCC Notice Of Rescheduled Meeting - Sunset Point
ad#1003072499 in the Court
was published in said newpaper in the issues of August 5 & 12, 2009

Affiant further states the said St. Petersburg Times is a newspaper published at St. Petersburg, in said Pinellas County, Florida, and that the said newspaper has heretofore been continuously published in said Pinellas County, Florida, each day and has been entered as second class mail matter at the post office in St. Petersburg, in said Pinellas County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement, and affiant further says that he has neither paid nor promised any person, firm, or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newpaper.

Jessica Attard

Sworn to and subScribed before me this 12th day of August A.D. 2009

Notary Public

LORI A. SHOWEN
MY COMMISSION # DD 891166
EXPIRES: June 9, 2013
Bonded Thru Budget Notary Services

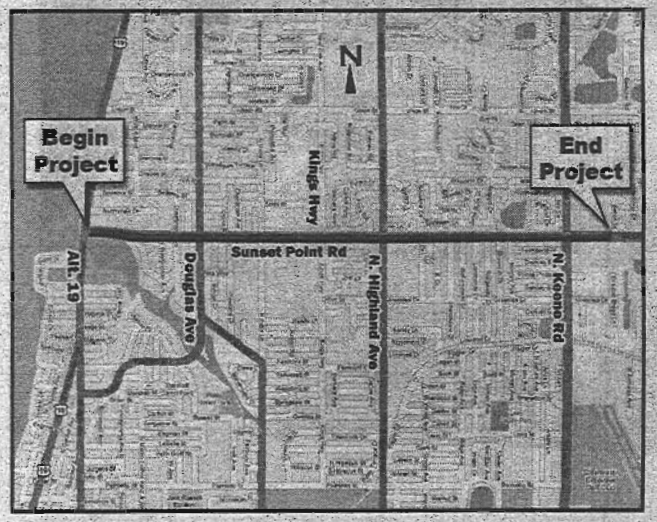
Personally known (Seal)
or produced identification
Type of identification produced

LEGAL NOTICE

NOTICE OF RESCHEDULED PUBLIC MEETING

Pinellas County
PUBLIC WORKS

Pinellas County Public Works has rescheduled its presentation of the proposed roadway improvements to Sunset Point Road, from Alt. U.S. 19 (Edgewater Drive) to east of Keene Road, for the Tuesday, Aug. 18, Board of County Commissioners (BCC) Public Meeting at 6:30 p.m., in the fifth-floor Assembly Room of the Pinellas County Courthouse, 315 Court St., Clearwater, Florida. This item will follow the Public Hearing portion of the agenda. All interested parties are encouraged to attend this meeting and express their opinions concerning this project after the presentation. For further information, please contact Project Manager Mike H. Skrzypkowiak at (727) 464-3661. Persons with disabilities requiring reasonable accommodations to participate in the meeting should call (727) 464-4062 (VOICE/TDD), no later than Aug. 11, 2009.



Appendix H

Roadway Schematic Plans

PINELLAS COUNTY ENGINEERING DEPARTMENT
STATE OF FLORIDA

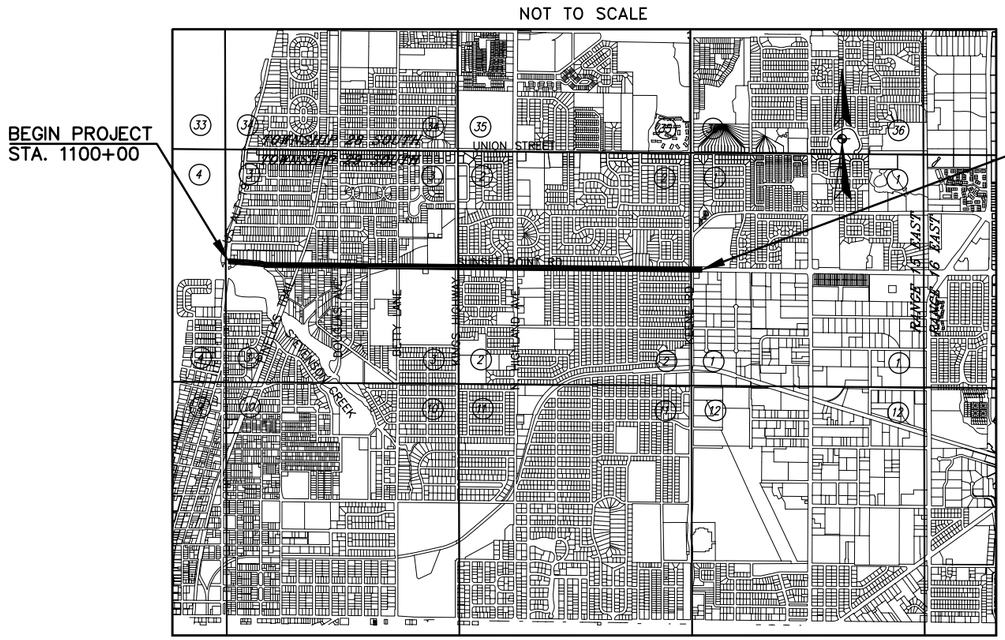
PLANS OF PROPOSED

SUNSET POINT ROAD
FROM US ALT 19 TO KEENE RD

P.I.D. NO. 920476

Pinellas County Government is committed to progressive public policy, superior public service, courteous public contact, judicious exercise of authority and sound management of public resources, to meet the needs and concerns of our citizens today and tomorrow.

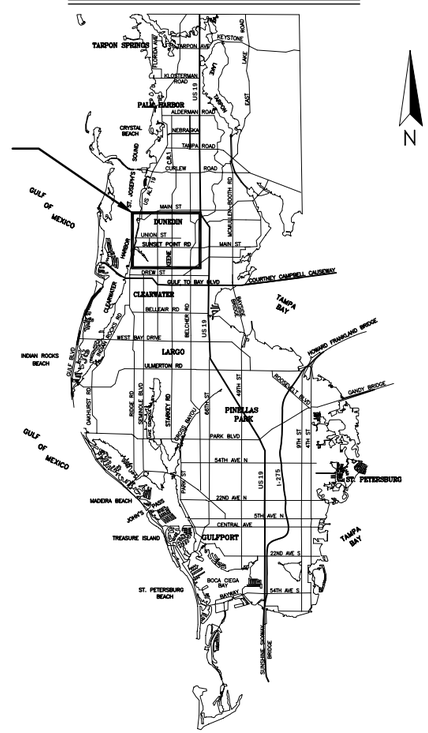
NOT TO SCALE



SECTIONS 1, 2 & 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

VICINITY MAP

PINELLAS COUNTY MAP



INDEX OF PLANS

SHEET NO.	SHEET DESCRIPTION
1	COVER SHEET
2–5	DRAINAGE MAPS
6	EXISTING DRAINAGE STRUCTURES
7–12	TYPICAL SECTIONS
13–34	PLAN & PROFILES
35–43	CROSS SECTIONS

RELATED STANDARDS AND SPECIFICATIONS

DESCRIPTION

FLORIDA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", AND ALL SUPPLEMENTAL SPECIFICATIONS LATEST EDITION.

STATE OF FLORIDA "MANUAL OF UNIFORM MINIMUM STANDARDS FOR DESIGN, CONSTRUCTION AND MAINTENANCE FOR STREETS AND HIGHWAYS", LATEST EDITION.

FEDERAL HIGHWAY ADMINISTRATION "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS".

PINELLAS COUNTY "SPECIFICATIONS FOR HOT BITUMINOUS MIXTURES METHODS, EQUIPMENT AND CONSTRUCTION METHODS", LATEST EDITION.

FLORIDA DEPARTMENT OF TRANSPORTATION "DESIGN STANDARDS", LATEST EDITION.

PINELLAS COUNTY ENGINEERING DEPARTMENT "SPECIFICATIONS FOR ROAD AND DRAINAGE CONSTRUCTION" (FOR CONTRACT CORRESPONDING TO THESE PLANS).

PINELLAS COUNTY DEPARTMENT OF PUBLIC WORKS "STANDARD CONSTRUCTION DETAILS", LATEST EDITION.

SUMMARY OF REVISIONS		
NUMBER	DATE	DESCRIPTION

LENGTH OF PROJECT

	TOTAL	
	LIN. FT.	MILES
ROADWAY	11,100	2.10
BRIDGES	60	0.01
NET LENGTH OF PROJECT	11,100	2.10
EXCEPTIONS	N/A	N/A
GROSS LENGTH OF PROJECT	11,100	2.10

ROAD CLASSIFICATION: URBAN MINOR ARTERIAL
DESIGN SPEED: 35 MPH to 45 MPH

ENGINEER OF RECORD:

MARTY L. MORLAN, P.E. #45326

PROJECT PRODUCTION TEAM

PROJECT MANAGER: MIKE H. SKRZYPKOWIAK
DESIGN TEAM: JAMES K. COLLINS
HIGHWAY: DENNIS GRIZZELL
CONSTRUCTION: RON GARRAFFA
SURVEY: CHARLES N. GIBSON
REAL ESTATE: SEAN GRIFFIN
TRAFFIC: TOM WASHBURN
UTILITY COORDINATION: SANDY KELLEY
PERMIT COORDINATION: JULIE BRENNAN
STRUCTURES: TOM MENKE
ENVIRONMENTAL: JAMES MEYER

Prepared By:

American Consulting Engineers of Florida, LLC

129 6th Ave. North
Safety Harbor, FL 34695
Phone: (727) 499-5762 Fax: (727) 499-5751
Certificate of Authorization No. 9302

PRELIMINARY ENGINEERING PHASE

SCHEMATIC PLANS

RECOMMENDED FOR APPROVAL BY: _____ _____
JAMES K. COLLINS P.E., DIVISION ENGINEER — DATE

RECOMMENDED FOR APPROVAL BY: _____ _____
JAN R. HERBST, P.E., DIRECTOR OF PRODUCTION — DATE

APPROVED BY: _____ _____
PETE YAUCH, P.E., DIRECTOR OF PUBLIC WORKS — DATE

ATTENTION IS DIRECTED TO THE FACT THAT THESE PLANS MAY HAVE BEEN REDUCED IN SIZE BY REPRODUCTION. THIS MUST BE CONSIDERED WHEN OBTAINING SCALED DATA.

FINAL PER SUBMITTAL: JANUARY, 2009

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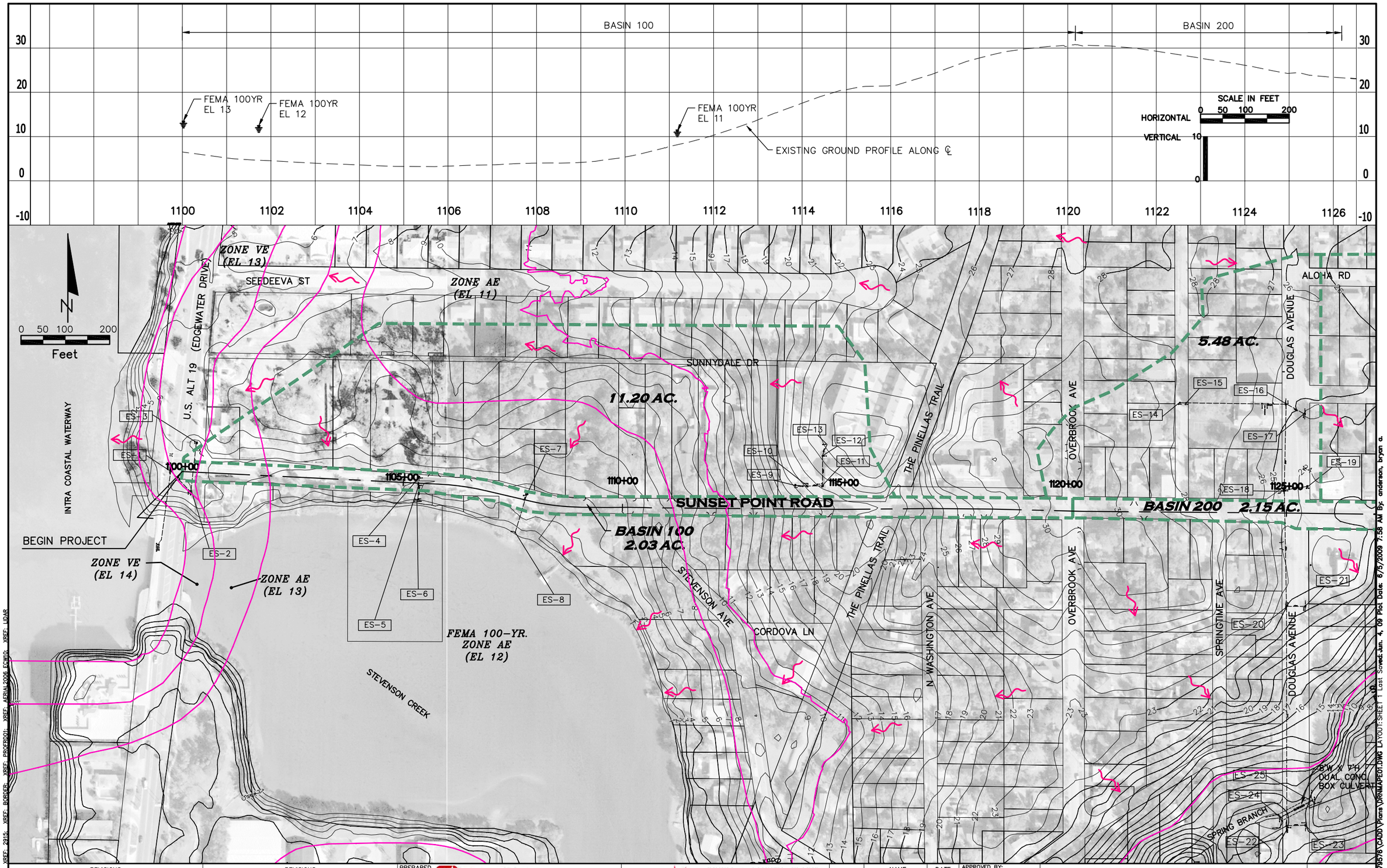

REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

PREPARED BY:

American Consulting Engineers of Florida, LLC
129 6th Ave. North
Safety Harbor, FL 34695
Phone: (727) 499-5762 Fax: (727) 499-5751
Certificate of Authorization No. 9302

Pinellas County PUBLIC WORKS

PINELLAS COUNTY, FLORIDA
Department of Public Works
ENGINEERING DEPARTMENT
440 COURT STREET
CLEARWATER, FLORIDA 33756-5136
PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD

DRAINAGE MAP (1)

SHEET NO. 2 OF 43 SHEETS

XREF: LIDAR XREF: AERIAL 2006 ECW10 XREF: PROFROD1 XREF: BORDER XREF: 2915

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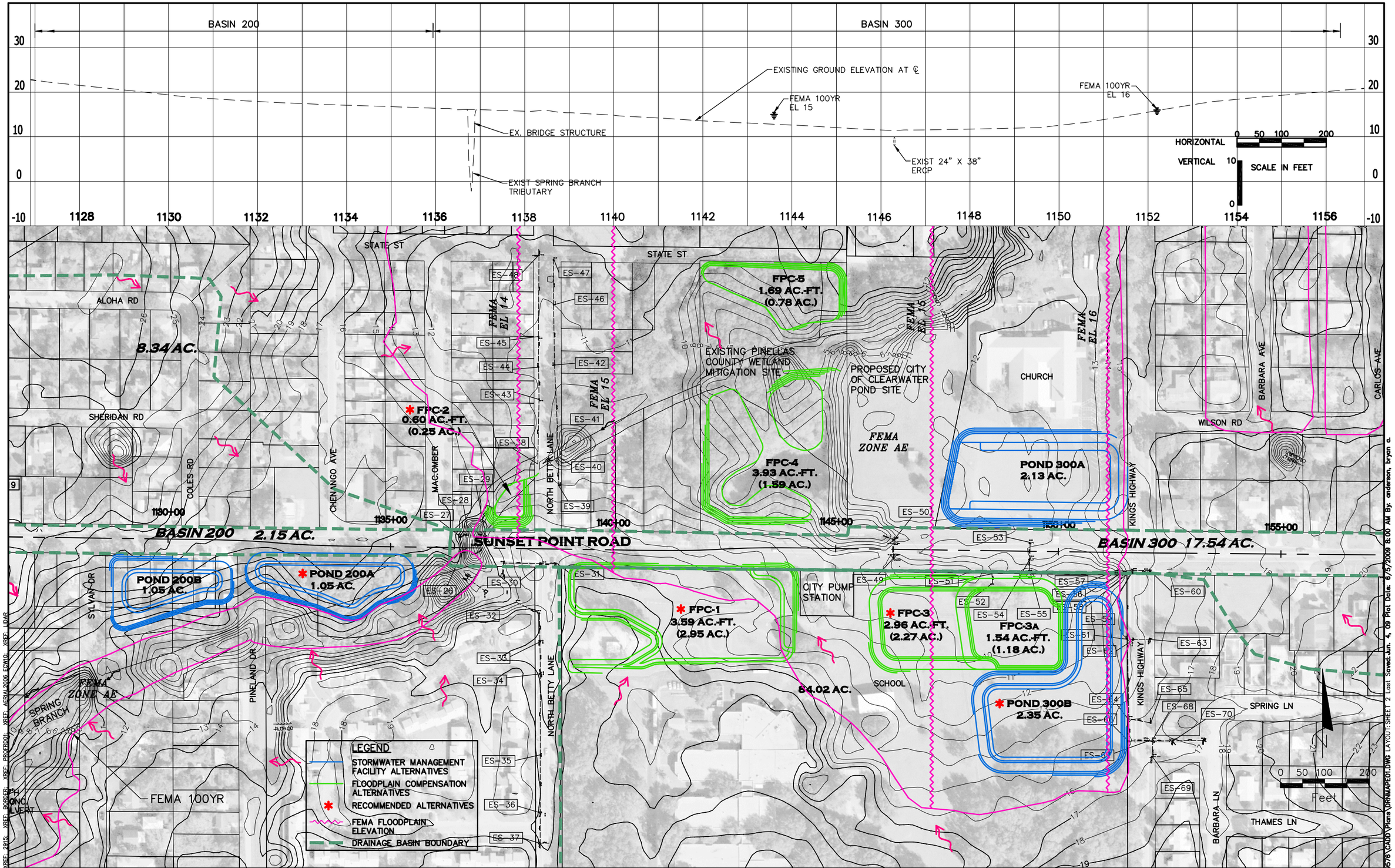

REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

PREPARED BY:

American Consulting Engineers of Florida, LLC
129 6th Ave. North
Safety Harbor, FL 34695
Phone: (727) 499-5762 Fax: (727) 499-5751
Certificate of Authorization No. 9302

PINELLAS COUNTY, FLORIDA
Department of Public Works
ENGINEERING DEPARTMENT
440 COURT STREET
CLEARWATER, FLORIDA 33756-5136
PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD

DRAINAGE MAP (2)

SHEET NO. 3 OF 43 SHEETS

XREF: 2915_BORDER XREF: PROFROD01 XREF: AERIAL2006 ECW01 XREF: LIDAR

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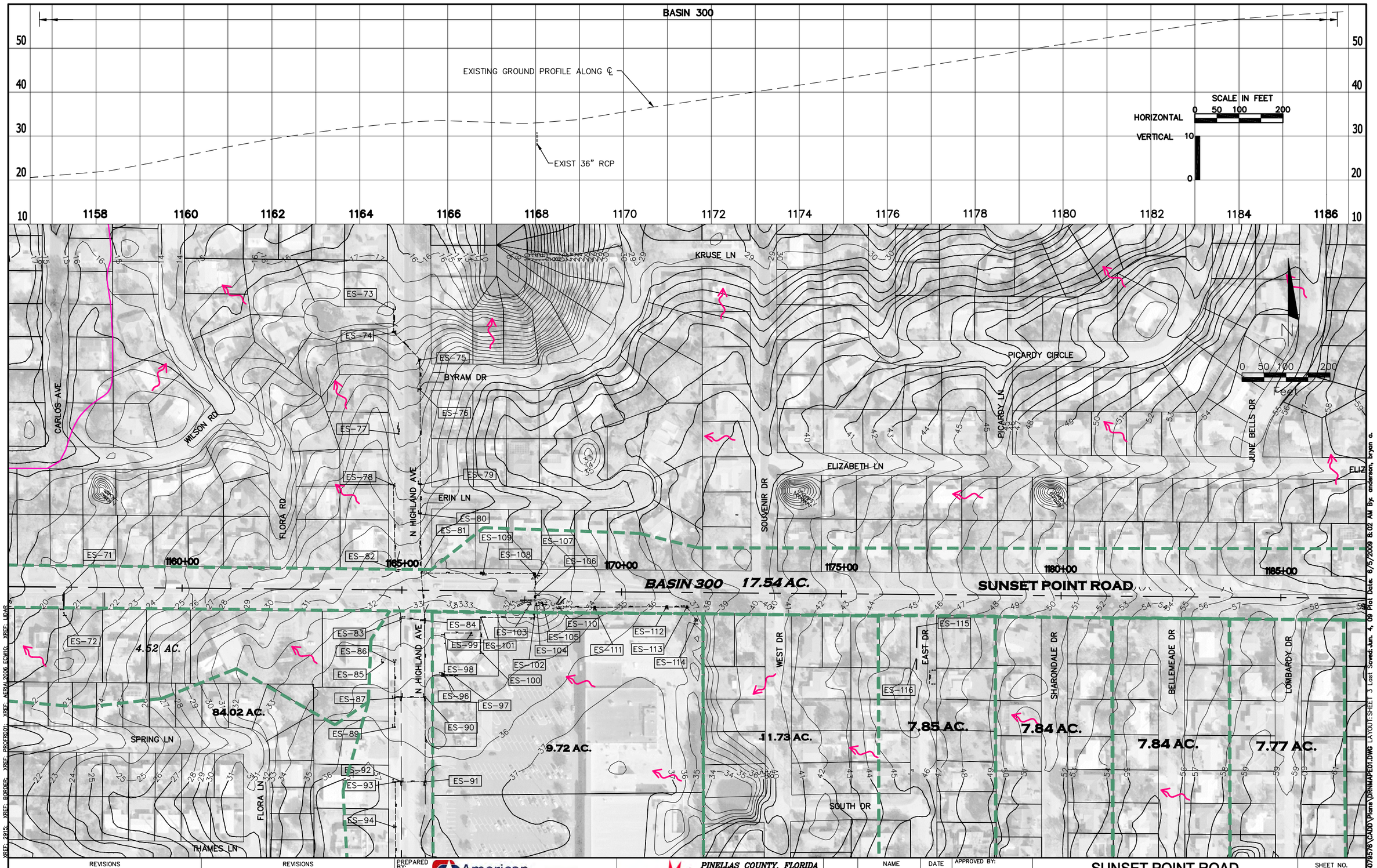

XREF: 2915... XREF: BORDER XREF: PROFROO1 XREF: AERIAL2006 ECWID XREF: LIDAR
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REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

PREPARED BY:

American Consulting Engineers of Florida, LLC
129 6th Ave. North
Safety Harbor, FL 34695
Phone: (727) 499-5762 Fax: (727) 499-5751
Certificate of Authorization No. 9302

PINELLAS COUNTY, FLORIDA
Department of Public Works
ENGINEERING DEPARTMENT
440 COURT STREET
CLEARWATER, FLORIDA 33756-5136
PHONE (727) 464-3251

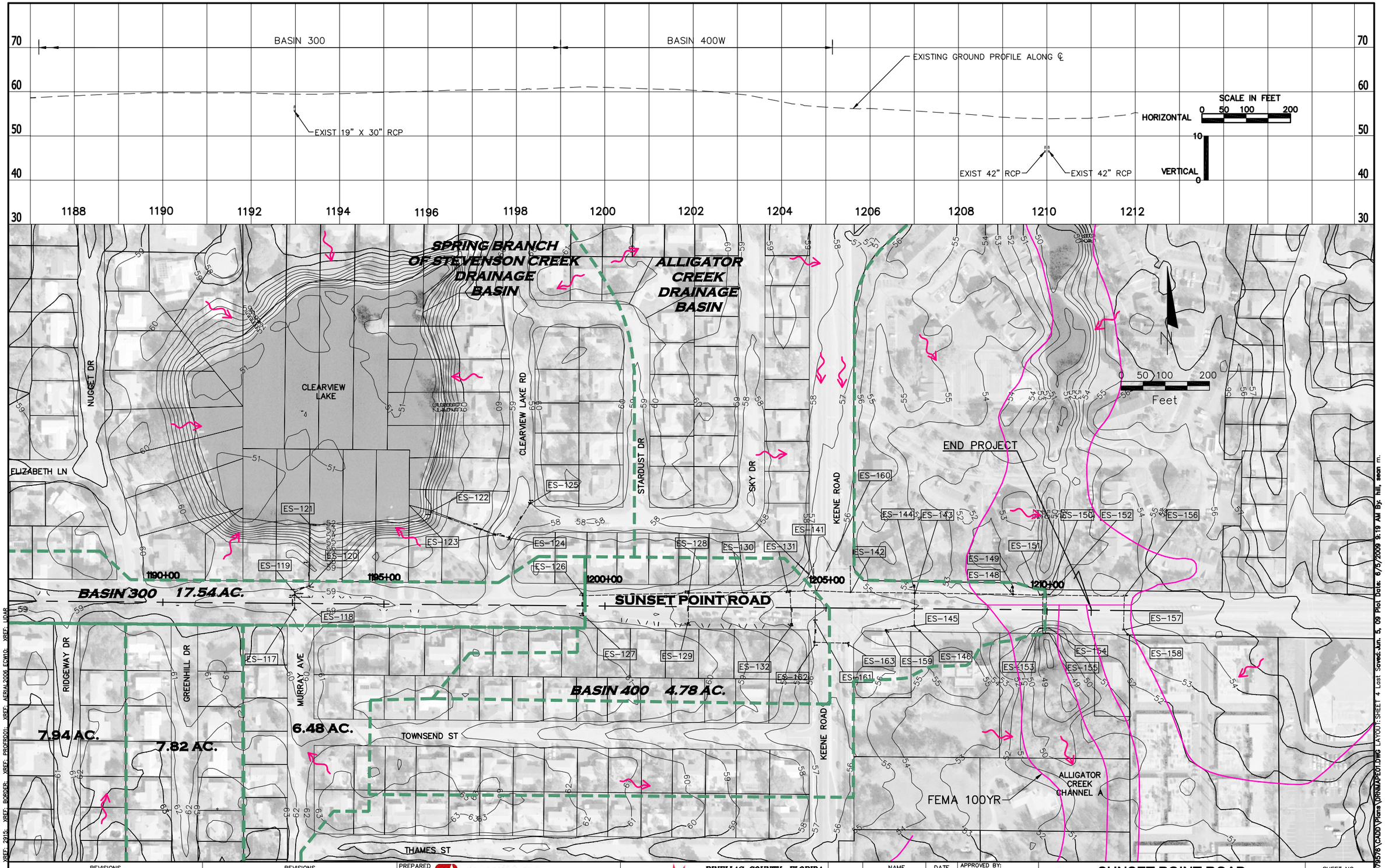
	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD

DRAINAGE MAP (3)

SHEET NO. 4 OF 43 SHEETS



REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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APPROVED BY:

SUNSET POINT ROAD

DRAINAGE MAP (4)

SHEET NO. 5 OF 43 SHEETS

XREF: 2915; XREF: BORDER; XREF: PROFROD1; XREF: AERIAL2006.FCWD; XREF: LIDAR

F:\PROJECT\507957\6\CADD\Plans\DRNMAP5501.DWG LAYOUT:SHEET 4 Last Saved: Jun. 5, 09 Plot Date: 6/5/2009 9:19 AM By: hill, sean m.

EXISTING STRUCTURES: DRAINAGE

NUMBER	STATION	OFFSET	DESCRIPTION
ES-1	N/A	N/A	CURB INLET TOP EL=6.52 GRATE EL=5.60 SE 18" RCP INV EL=0.48
ES-2	100+21.5	41.4 RT	CURB INLET TOP EL=7.08 GRATE EL=6.27 NW 18" RCP INV EL=1.25 N 18" RCP INV EL=1.13
ES-3	100+30.2	65.1 LT	GRATE INLET EL=6.14 S 18"RCP INV EL=1.56
ES-4	105+35.3	10.9 LT	GRATE INLET EL=2.66 S 18"RCP INV EL=0.10
ES-5	105+35.3	10.6 RT	CURB INLET TOP EL=3.67 GRATE EL=2.80 N 18"RCP INV EL=(-)0.25 S 18"RCP INV EL=(-)0.24
ES-6	105+34.3	40.5 RT	RAILROAD TIE HEADWALL TOP EL=1.52 18"RCP INV EL=(-)0.55
ES-7	107+78.8	15.3 LT	CURB INLET WITH MANHOLE RIM EL=3.97 THROAT EL=2.99 S 12"RCP INV EL=0.94
ES-8	107+80.4	72.4 RT	CONC HEADWALL TOP EL=0.80 12"RCP INV EL=(-)1.00
ES-9	113+90.1	46.4 LT	GRATE INLET EL=20.90 18"X12"RCP INV EL=19.55
ES-10	114+16.8	45.1 LT	CURB INLET WITH MANHOLE RIM EL=22.58 THROAT EL=21.72 W 18"X12"RCP INV EL=19.56 E 18"RCP INV EL=19.58
ES-11	114+51.7	45.6 LT	CURB INLET WITH MANHOLE RIM EL=22.62 THROAT EL=21.75 W 18"RCP INV EL=19.47 N 18"RCP INV EL=19.53
ES-12	114+50.4	113.2 LT	MANHOLE RIM EL=23.01 S 18"RCP INV EL=19.33 N 18"RCP INV EL=19.40
ES-13	114+60.3	138.5 LT	MANHOLE RIM EL= S 18"RCP INV EL=19.20 N 18"RCP INV EL=19.66 E 38"X24"RCP INV EL=19.04
ES-14	122+56.0	245.6 LT	GRATE INLET EL=26.55 E 12"VCP INV EL=21.99
ES-15	122+69.6	245.1 LT	GRATE INLET EL=26.66 W 12"VCP INV EL=22.07 E 15"RCP INV EL=22.28
ES-16	124+95.2	245.6 LT	CURB INLET TOP EL=24.76 GRATE EL=23.97 W 15"RCP INV EL=20.99 S 18"RCP INV EL=18.50 SE 15"RCP INV EL=18.61
ES-17	125+39.0	224.4 LT	CURB INLET TOP EL=24.35 GRATE EL=23.69 NW 15"RCP INV EL=19.74
ES-18	124+93.5	50.5 LT	CURB INLET TOP EL=24.33 GRATE EL=23.51 N 18"RCP INV EL=17.11 E 18"RCP INV EL=17.02 S 18"RCP INV EL=17.10 W 6"DIP INV EL=19.86
ES-19	125+46.0	60.5 LT	DRAIN INLET TOP EL=23.72 GRATE EL=23.47 W 18"RCP INV EL=18.93
ES-20	125+02.7	211.2 RT	CURB INLET TOP EL=22.72 GRATE EL=22.04 N 18"RCP INV EL=15.20 E 15"RCP INV EL=16.29 S 24"RCP INV EL=15.10 W 6"DIP INV EL=18.66
ES-21	125+46.0	210.4 RT	CURB INLET TOP EL=22.72 GRATE EL=21.89 W 15"RCP INV EL=18.63
ES-22	125+10.7	706.2 RT	CURB INLET TOP EL=8.92 GRATE EL=8.14 N 24"RCP INV EL=2.48 E 24"RCP INV EL=2.81 S 15"RCP INV EL=3.37 W 6"DIP INV EL=3.00
ES-23	125+53.7	704.4 RT	CURB INLET TOP EL=8.91 GRATE EL=8.02 W 24"RCP INV EL=3.12
ES-24	124+95.9	688.1 RT	CONC HEADWALL TOP EL=7.10 TWIN 8' WIDE X 7' TALL BOX CULVERTS INV EL=(-)1.95
ES-25	125+69.0	648.3 RT	CONC HEADWALL TOP EL=6.94 TWIN 8' WIDE X 7' TALL BOX CULVERTS INV EL=(-)1.96
ES-26	136+61.9	17.2 RT	CONCRETE SPILLWAY WITH HEADWALL TOP EL=14.60 THROAT EL=14.08
ES-27	136+57.1	14.4 LT	DRAIN INLET WITH CONFLICT GRATE EL=17.01 E 24"CMP INV EL=10.91 E-W 4"DIP THROUGH BOX TOP EL=14.56
ES-28	136+74.6	18.2 LT	END OF PIPE 24"CMP INV EL=9.01
ES-29	137+15.1	14.5 LT	DRAIN INLET TOP EL=16.50 THROAT EL=15.38 W 12"X 18" ECMP FILLED WITH DIRT
ES-30	138+37.1	43.2 RT	CURB INLET WITH MANHOLE RIM EL=16.53 THROAT EL=15.53 W 15"RCP INV EL=12.52 E 15"RCP INV EL=12.69
ES-31	138+71.1	43.4 RT	CURB INLET WITH MANHOLE RIM EL=15.88 THROAT EL=15.03 W 15"RCP INV EL=13.15
ES-32	138+36.4	154.9 RT	MANHOLE RIM EL=17.52 NW 30"RCP INV EL=12.06 S 30"RCP INV EL=12.14
ES-33	138+38.4	217.7 RT	CURB INLET WITH MANHOLE RIM EL=16.78 THROAT EL=15.77 N 30"RCP INV EL=12.32 S 30"RCP INV EL=12.34
ES-34	138+40.6	290.4 RT	CURB INLET WITH MANHOLE RIM EL=17.02 THROAT EL=16.07 N 30"RCP INV EL=12.50 S 30"RCP INV EL=12.57
ES-35	138+43.0	472.9 RT	MANHOLE RIM EL=17.90 N 30"RCP INV EL=12.68 S 30"RCP INV EL=12.68
ES-36	138+44.6	603.4 RT	CURB INLET WITH MANHOLE RIM EL=18.22 THROAT EL=17.40 N 30"RCP INV EL=13.29 S 30"RCP INV EL=13.55
ES-37	138+45.4	670.8 RT	MANHOLE RIM EL=18.48 N 30"RCP INV EL=13.85 E 24"RCP INV EL=14.02 S 24"RCP INV EL=14.05
ES-38	138+28.1	180.6 LT	END OF PIPE 30"CMP INV EL=5.48
ES-39	138+76.1	133.2 LT	GRATE INLET EL=10.93 N 12"RCP INV EL=9.49
ES-40	138+73.6	198.8 LT	END OF PIPE 12"CMP INV EL=7.61
ES-41	138+73.9	214.1 LT	END OF PIPE 24"RCP INV EL=6.01
ES-42	138+62.6	403.5 LT	GRATE INLET EL=10.66 N 24"RCP INV EL=7.18 S 24"RCP INV EL=7.10
ES-43	138+28.9	325.9 LT	GRATE INLET EL=10.54 N 24"RCP INV EL=7.10 S 30"CMP INV EL=7.05
ES-44	138+26.7	398.2 LT	MANHOLE RIM EL=10.95 N 24"RCP INV EL=7.29 S 24"RCP INV EL=7.39
ES-45	138+25.6	466.4 LT	GRATE INLET EL=10.57 N 24"RCP INV EL=7.82 S 24"RCP INV EL=7.83
ES-46	138+58.6	538.7 LT	GRATE INLET EL=10.72 N 24"RCP INV EL=7.64 S 24"RCP INV EL=7.73
ES-47	138+57.1	639.2 LT	GRATE INLET EL=10.71 S 24"RCP INV EL=8.10
ES-48	138+24.3	649.1 LT	GRATE INLET EL=11.66 N 18"RCP INV EL=8.58 W 18"RCP INV EL=8.50 S 24"RCP INV EL=8.73
ES-49	146+29.8	17.0 RT	CURB INLET WITH MANHOLE RIM EL=11.10 N 38"X24"RCP INV EL=7.15 S 38"X24"RCP INV EL=7.23
	146+29.9	21.6 RT	CONC HEADWALL TOP EL=7.37 38"X24"RCP INV EL=7.19
ES-50	146+29.8	22.0 LT	CURB INLET WITH MANHOLE RIM EL=9.79 NE 15"RCP INV EL=7.56 NW 38"X24"RCP INV EL=5.81 S 38"X24"RCP INV EL=6.14
	146+39.8	25.4 LT	END OF PIPE 15"RCP INV EL=7.72
	146+20.7	25.2 LT	END OF PIPE 38"X24"RCP INV EL=5.81
ES-51	148+51.3	51.1 RT	END OF PIPE 15"ADS INV EL=8.16
ES-52	148+53.1	71.6 RT	END OF PIPE 15"ADS INV EL=8.97
ES-53	149+36.2	18.4 LT	CURB INLET TOP EL=11.26 GRATE EL=10.56 S 15"RCP INV EL=8.50
ES-54	149+36.1	18.2 RT	CURB INLET TOP EL=11.44 GRATE EL=10.80 N 15"RCP INV EL=8.38 S 24"RCP INV EL=8.40
ES-55	149+36.0	42.6 RT	END OF PIPE 24"RCP INV EL=7.70
ES-56	151+36.3	46.3 RT	END OF PIPE 48"RCP INV EL=8.13
ES-57	151+37.3	41.3 RT	END OF PIPE 18"RCP INV EL=9.14
ES-58	151+54.2	48.6 RT	GRATE INLET EL=15.30 W 48"RCP INV EL=8.57 S 48"RCP INV EL=8.68
ES-59	151+66.4	39.2 RT	CURB INLET TOP EL=15.40 GRATE EL=14.63 W 18"RCP INV EL=9.65 E 18"RCP INV EL=9.65
ES-60	152+06.7	39.4 RT	CURB INLET TOP EL=15.31 GRATE EL=14.54 W 18"RCP INV EL=10.08
ES-61	151+57.8	194.1 RT	MANHOLE RIM EL=15.77 N 48"RCP INV EL=9.23 S 48"RCP INV EL=9.23 E 24"RCP INV EL=11.21
ES-62	151+70.5	194.4 RT	CURB INLET TOP EL=15.72 GRATE EL=14.97 W 24"RCP INV EL=11.76 E 12"CMP INV EL=12.94
ES-63	152+06.9	193.9 RT	CURB INLET TOP EL=15.83 GRATE EL=15.11 W 12"CMP INV EL=13.32
ES-64	151+63.6	373.7 RT	MANHOLE RIM EL=16.57 N 48"RCP INV EL=9.94 S 48"RCP INV EL=9.94 E 24"CMP INV EL=12.77
ES-65	152+10.5	381.3 RT	GRATE INLET EL=16.10 W 24"CMP INV EL=12.97
ES-66	151+64.9	422.6 RT	CURB INLET WITH MANHOLE MANHOLE EL=16.72 THROAT EL=15.60 N 48"RCP INV EL=9.97 E 36"CMP INV EL=10.10
ES-67	152+06.2	422.2 RT	MANHOLE WTH CONFLICT MANHOLE RIM EL=16.37 W 36"CMP INV EL=10.24 E 36"PVC INV EL=10.44 NW 6"PVC INV EL=11.07 N-S 12"DIP UNKNOWN LINE TOP OF PIPE EL=12.15
ES-68	152+16.0	422.5 RT	CURB INLET WITH MANHOLE MANHOLE RIM EL=16.53 THROAT EL=15.77 W 36"PVC INV EL=10.71 S 24"CMP INV EL=11.25
ES-69	152+14.7	458.1 RT	CURB INLET TOP EL=16.55 GRATE EL=15.77 N 24"CMP INV EL=12.17 S 24"CMP INV EL=11.32 E 6"VCP INV EL=12.59
ES-70	153+29.6	419.5 RT	MANHOLE RIM EL=17.43 W 24"PVC INV EL=12.08 S 30"CMP INV EL=12.83 E 6"PVC INV EL=13.94 SE 18"PVC INV EL=13.16
ES-71	157+31.3	50.3 RT	CONC FLUME WITH ALUMINUM COVER RUNNING UNDER SIDEWALK WITH MES AND 11'WIDE X 3"DEEP WEIR WEIR INV EL=20.55
ES-72	157+31.4	58.8 RT	CONTROL STRUCTURE GRATE EL=22.18 SKIMMER EL=22.15 11'WIDE X 3"DEEP WEIR INV EL=21.43
ES-73	164+75.2	638.0 LT	GRATE INLET EL=17.92 S 53"X34"RCP INV EL=13.25
ES-74	164+76.1	587.2 LT	GRATE INLET EL=19.54 N 53"X34"RCP INV EL=13.71 SE 53"X34"RCP INV EL=14.55
ES-75	165+35.9	524.7 LT	GRATE INLET EL=23.25 NW 53"X34"RCP INV EL=15.59 S 48"RCP INV EL=15.74
ES-76	165+37.4	457.4 LT	GRATE INLET EL=24.61 N 48"RCP INV EL=15.56 S 48"RCP INV EL=15.72
ES-77	164+89.1	355.8 LT	INLET TOP EL=25.87 THROAT EL=24.87 N 15"CMP INV EL=22.80
ES-78	164+78.6	238.9 LT	MANHOLE RIM EL=28.58 S 24"CMP INV EL=23.34 W 15"RCP INV EL=23.28
ES-79	165+39.7	241.2 LT	GRATE INLET EL=27.37 N 48"RCP INV EL=19.74 S 42"RCP INV EL=22.21
ES-80	165+40.5	174.8 LT	GRATE INLET EL=27.95 N 42"RCP INV EL=23.28 S 42"RCP INV EL=23.30
ES-81	165+43.7	39.2 LT	MANHOLE RIM EL=32.13 N 42"RCP INV EL=24.81 E 36"RCP INV EL=24.81 S 18"RCP INV EL=25.96
ES-82	164+84.8	46.3 LT	MANHOLE RIM EL=31.34 S 24"CMP INV EL=25.42 E 24" CMP INV EL=25.53
ES-83	164+97.5	65.2 RT	CURB INLET TOP EL=34.15 GRATE EL=32.32 E 18"RCP INV EL=27.68
ES-84	165+53.5	66.3 RT	CURB INLET TOP EL=33.84 GRATE EL=33.05 W 18"RCP INV EL=27.51 N 18"RCP INV EL=25.98 S 18"RCP INV EL=27.32
ES-85	164+58.5	164.9 RT	UTILITY VAULT W/ GRATE 2"PVC PIPE THROUGH STRUCTURE W/ VALVE GRATE EL=34.85
ES-86	164+84.9	164.2 RT	GRATE INLET EL=34.08 S 8"DIP INV EL=32.54
ES-87	164+85.9	244.9 RT	GRATE INLET EL=35.20 N 8"DIP INV EL=32.14 E 10"DIP INV EL=32.07 S 10"DIP INV EL=32.10
ES-88	164+99.3	244.0 RT	CURB INLET TOP EL=36.11 GRATE EL=35.35 W 10"DIP INV EL=32.80 E 18"RCP INV EL=29.44
ES-89	164+86.4	312.4 RT	GRATE INLET EL=35.50 N 10"DIP INV EL=32.84
ES-90	165+55.3	243.5 RT	CURB INLET TOP EL=35.69 GRATE EL=34.91 N 18"RCP INV EL=29.02 S 18"RCP INV EL=29.06 W 18"RCP INV EL=29.13
ES-91	165+57.1	436.3 RT	CURB INLET TOP EL=37.01 GRATE EL=36.22 N 18"RCP INV EL=31.35 W 18"RCP INV EL=31.45
ES-92	165+01.5	436.2 RT	CURB INLET TOP EL=37.22 GRATE EL=36.44 E 18"RCP INV EL=31.74 W 8"DIP INV EL=33.95
ES-93	164+88.5	436.9 RT	GRATE INLET EL=36.86 E 8"DIP INV EL=34.68 S 8"DIP INV EL=34.74
ES-94	164+90.1	538.4 RT	GRATE INLET EL=36.78 N 8"DIP INV EL=35.08 S 8"DIP INV EL=35.07
ES-95	164+91.2	617.3 RT	GRATE INLET EL=36.76 N 8"DIP INV EL=35.33
ES-96	165+95.6	192.5 RT	GRATE INLET EL=34.12 SKIMMER EL=34.64 E 18"RCP INV EL=31.43
ES-97	166+18.9	194.1 RT	END OF PIPE 18"RCP INV EL=31.49
ES-98	165+97.2	96.9 RT	END OF PIPE 23"X14"RCP INV EL=31.85
ES-99	166+58.5	96.5 RT	GRATE INLET TOP EL=35.07 E 23"X14"RCP INV EL=32.22
ES-100	166+80.4	139.3 RT	GRATE INLET TOP EL=36.25 N 18"RCP INV EL=28.96
ES-101	166+80.1	61.0 RT	MANHOLE RIM EL=35.47 E 18"RCP INV EL=29.21 S 18"RCP INV EL=29.25
ES-102	168+01.6	60.1 RT	MANHOLE RIM EL=35.40 N 18"RCP INV EL=28.72 W 18"RCP INV EL=28.63
ES-103	167+92.8	26.9 RT	MANHOLE RIM EL=32.72 W 36"RCP INV EL=28.47
	167+79.4	26.1 RT	END OF PIPE AT FLUME 36"RCP INV EL=28.86
ES-104	168+06.2	27.6 RT	MANHOLE RIM EL=32.77 N 3.5"X3.0" BOX CULVERT INV EL=27.95 S 18"RCP INV EL=27.83 E 36"RCP INV EL=28.03
ES-105	168+20.5	28.5 RT	END OF PIPE 36"RCP INV EL=27.97
ES-106	168+03.1	14.0 RT	CURB INLET WITH 2 GRATES GRATE AT FL EL=32.15 GRATE AT BC EL=33.37 N 36"RCP INV EL=27.84 S 3.5"X3.0" BOX CULVERT INV EL=27.66
ES-107	168+02.7	31.6 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=32.56 THROAT EL=32.01 N 36"RCP INV EL=27.63 S 36"RCP INV EL=27.67
ES-108	168+01.6	39.1 LT	GRATE INLET EL=31.82 W 36"RCP INV EL=27.30 S 36"RCP INV EL=27.39
ES-109	166+80.0	40.1 LT	CONFLICT BOX TOP EL=32.19 W 36"RCP INV EL=26.79 E 36"RCP INV EL=26.87 N-S 8"VCP THROUGH BOX SANITARY TOP EL=29.03
ES-110	168+56.5	35.1 RT	END OF PIPE 36"RCP INV EL=28.39
ES-111	169+38.7	36.0 RT	GRATE INLET EL=33.92 E 36"RCP INV EL=29.79 W 36"RCP INV EL=29.74 UNDER CONSTRUCTION
ES-112	171+02.6	33.1 RT	GRATE INLET EL=36.48 E 36"CMP INV EL=32.23 W 36"RCP INV EL=31.52 UNDER CONSTRUCTION
ES-113	171+48.8	32.9 RT	GRATE INLET EL=36.62 W 36"CMP INV EL=33.06 SE 36"RCP INV EL=33.09
ES-114	171+69.4	62.2 RT	INLET WITH MANHOLE MANHOLE RIM EL=37.07 WEIR EL=33.22 NW 36"RCP INV EL=33.27
ES-115	177+02.6	172.2 RT	END OF PIPE 10"PVC INV EL=45.09
ES-116	177+01.6	203.3 RT	END OF PIPE 10"PVC INV EL=45.26
ES-117	192+97.7	11.9 RT	GRATE INLET EL=58.86 N 30"X19"RCP INV EL=55.44
ES-118	192+97.7	19.0 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=59.20 THROAT EL=58.38 N 30"X19"RCP INV EL=55.15 S 30"X19"RCP INV EL=55.16
ES-119	192+98.0	26.0 LT	MANHOLE RIM EL=59.28 S 30"X19"RCP INV EL=55.02 E 24"ADS INV EL=55.01
ES-120	193+30.4	39.7 LT	MANHOLE RIM EL=59.29 W 24"ADS INV EL=55.03 N 24"ADS INV EL=55.05
ES-121	193+32.5	177.7 LT	END OF PIPE 24"ADS INV EL=53.21
ES-122	196+01.3	209.7 LT	END OF PIPE 18"DIP INV EL=53.86 CONNECTS TO 18"ADS
ES-123	197+49.1	159.7 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=58.27 THROAT EL=57.22 W 18"DIP INV EL=55.17 E 12"DIP INV EL=55.76
ES-124	197+82.3	152.9 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=58.40 THROAT EL=57.51 W 12"DIP INV EL=55.83 N 12"DIP INV EL=55.97
ES-125	198+27.9	230.9 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=58.23 THROAT EL=57.20 S 12"DIP INV EL=56.12
ES-126	199+50.2	24.6 LT	CURB INLET TOP EL=61.06 GRATE EL=60.27 S 18"RCP INV EL=54.44 NW 6"PVC INV EL=57.22 E 18"RCP INV EL=54.32
ES-127	199+49.8	18.4 RT	CURB INLET TOP EL=61.12 GRATE EL=60.37 N 18"RCP INV EL=54.57 W 6"PVC INV EL=57.47
ES-128	201+88.6	32.6 LT	CURB INLET TOP EL=60.16 GRATE EL=59.39 E 18"RCP INV EL=52.84 E 6"PVC INV EL=56.79 S 18"RCP INV EL=52.78 W 18"RCP INV EL=53.68 W 6"PVC INV EL=56.91
ES-129	201+89.0	38.1 RT	CURB INLET TOP EL=59.97 GRATE EL=59.28 N 18"RCP INV EL=52.88 E 6"PVC INV EL=56.97 W 6"PVC INV EL=56.96
ES-130	203+10.9	33.4 LT	MANHOLE WTH CONFLICT MANHOLE RIM EL=58.71 W 18"RCP INV EL=50.53 E 18"RCP INV EL=51.96 N-S 12"DIP SANITARY CONFLICT TOP OF PIPE EL=52.53 E 18"RCP INV EL=51.96 W 18"RCP INV EL=50.53
ES-131	204+18.7	38.0 LT	CURB INLET TOP EL=57.00 THROAT EL=56.59 E 24"RCP INV EL=49.98 E 6"PVC INV EL=53.43 S 18"RCP INV EL=49.82 W 18"RCP INV EL=50.00 W 6"PVC INV EL=53.36
ES-132	204+22.6	38.3 RT	CURB INLET TOP EL=57.92 GRATE EL=57.20 N 18"RCP INV EL=53.06 E 6"PVC INV EL=53.34 W 6"PVC INV EL=54.40
ES-133	137+52.0	68.0 RT	MITERED END SECTION NE 15"RCP INV EL=11.52
ES-134	137+14.7	107 RT	CONTROL STRUCTYRE TOP EL=14.30 BOTTOM OF BOX EL=7.59 NW 36" RCP INV EL=7.68 NE 6" PVC INV EL=9.06 SE 6" PVC INV EL=8.90
ES-135	137+83.4	130 RT	MITERED END SECTION SE 30"RCP INV EL=11.87
ES-136	137+13	68 LT	13'X7.5' ARCHED CMP CULVERT WITH FLAT BOTTOM AND 1' DIRT INSIDE PIPE S INV EL=1.08 S CREEK BOTTOM EL=2.1 N INV EL=1.17 N CREEK BOTTOM EL=2.2
ES-137	138+53	191 LT	13'X7.5' ARCHED CMP CULVERT WITH FLAT BOTTOM AND 1' DIRT INSIDE PIPE W INV EL=1.39 W CREEK BOTTOM EL=2.4 E INV EL=1.44 E CREEK BOTTOM EL=2.6
ES-138	137+54.6	43.0 RT	MANHOLE RIM EL=17.01 E 15"RCP INV EL=11.89 S 15"RCP INV EL=11.86
ES-139	137+00.0	19.2 LT	END OF PIPE 12"X18" ECMP INV EL=8.75
ES-140	136+72.5 136+90.4	0 (BEGIN) 0 (END)	BRIDGE ARCHED CULVERT 18' WIDE X 13' TALL OPENING AT CENTER OF ARCH N CL CREEK EL=2.1 S CL CREEK EL=1.9
ES-141	204+72.2	70.0 LT	MANHOLE RIM EL=55.63 N 24"RCP INV EL=49.56 S 36"RCP INV EL=49.56 NW RCP UNABLE TO MEASURE DUE TO OFFSET
ES-142	205+54.7	36.5 LT	MANHOLE RIM EL=55.58 E 42"RCP INV EL=49.04 W 42"RCP INV EL=49.04 N 36"RCP INV EL=49.09
ES-143	207+00.2	36.8 LT	MANHOLE RIM EL=54.63 W 42"RCP INV EL=48.22 E 42"RCP INV EL=48.21 N 18"RCP INV EL=48.28 S 18"RCP INV EL=49.63
ES-144	206+98.5	53.5 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=55.01 THROAT EL=54.17 S 18"RCP INV EL=48.54
ES-145	207+00.1	38.0 RT	CURB INLET TOP EL=55.13 GRATE EL=54.77 N 18"RCP INV EL=50.25 SE 6"PVC INV EL=52.80
ES-146	207+12.4	48.5 RT	GRATE INLET TOP EL=54.17 NW 6"PVC INV EL=52.89
ES-147	208+83.7	45.4 RT	MANHOLE RIM EL=54.15 S 15"RCP INV EL=48.67 E 15"RCP INV EL=48.34 E END OF E PIPE NOT FOUND
ES-148	209+22.5	37.4 LT	MANHOLE RIM EL=53.48 W 42"RCP INV EL=47.15 E 42"RCP INV EL=46.88 N 15"RCP INV EL=49.71
ES-149	209+20.9	53.8 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=53.87 THROAT EL=53.09 S 15"RCP INV EL=49.72
ES-150	209+96.6	50.3 LT	HEADWALL TOP EL=48.30 S 36"RCP INV EL=48.23
ES-151	209+90.1	38.4 LT	CURB INLET TOP EL=53.61 GRATE EL=52.84 S 42"RCP INV EL=46.53 W 42"RCP INV EL=46.53
ES-152	209+98.6	38.5 LT	CURB INLET TOP EL=53.61 GRATE EL=52.84 N 36"RCP INV EL=47.45 S 42"RCP INV EL=46.59 E 24"RCP INV EL=47.63
ES-153	209+89.8	38.3 RT	CURB INLET TOP EL=53.55 GRATE EL=52.80 N 42"RCP INV EL=46.08 S 42" RCP INV EL=46.08
ES-154	209+97.3	38.2 RT	CURB INLET TOP EL=53.52 GRATE EL=52.80 N 42"RCP INV EL=46.12 S 42"RCP INV EL=46.12
ES-155	209+94.1	49.4 RT	HEADWALL TOP EL=50.30 (W) N 42"RCP INV EL=45.20 (E) N 42"RCP INV EL=45.39 15"RCP FROM ES-147 APPEARS TO TIE INTO W PIPE MID RUN
ES-156	211+74.2	38.4 LT	CURB INLET TOP EL=54.18 GRATE EL=53.38 W 24"RCP INV EL=48.16 S 15"RCP INV EL=48.15
ES-157	211+73.7	36.4 RT	CURB INLET TOP EL=54.06 GRATE EL=53.37 N 15"RCP INV EL=48.26 SE 6"PVC INV EL=51.55
ES-158	137+83.4	130 RT	GRATE INLET TOP EL=52.86 NW 6"PVC INV EL=51.57
ES-159	206+36.4	48.5 RT	GRATE INLET TOP EL=54.55 NE 6"PVC INV EL=52.84
ES-160	204+76.9	38.6 LT	MANHOLE RIM EL=56.11 W 24"RCP INV EL=49.37 S 24"RCP INV EL=49.37 E 42"RCP INV EL=49.37 N 36"RCP INV EL=49.37
ES-161	204+75.6	31.9 RT	MAHNOLE WITH SANITARY CONFLICT MANHOLE RIM EL=56.19 S 24"RCP INV EL=49.39 N 24"RCP INV EL=49.29 E-W 12"DIP SANITARY CASING TOP EL=50.93
ES-162	204+73.5	77.9 RT	CURB INLET TOP EL=55.97 GRATE EL=55.20 N 24"RCP INV EL=49.66 E 18" RCP INV EL=49.74
ES-163	205+52.6	79.1 RT	CURB INLET TOP EL=55.64 GRATE EL=54.84 W 18"RCP INV EL=49.94
ES-164	144+68.6	443.2 LT	HEADWALL TOP EL=9.99 S 54"RCP INV EL=4.24
ES-165	144+78.8	426.9 LT	MANHOLE RIM EL=11.15 N 54"RCP INV= S 54"RCP INV= BOLTED SHUT UNABLE TO OPEN
ES-166	144+78.7	392.1 LT	HEADWALL WITH CONC SKIMMER TOP EL=10.45 N 54"RCP INV EL=4.24 SKIMMER EL=6.04
ES-143	207+00.2	36.8 LT	MANHOLE RIM EL=54.63 W 42"RCP INV EL=48.22 E 42"RCP INV EL=48.21 N 18"RCP INV EL=48.28 S 18"RCP INV EL=49.63
ES-152	209+98.6	38.5 LT	CURB INLET TOP EL=53.61 GRATE EL=52.84 N 36"RCP INV EL=47.45 S 42"RCP INV EL=46.59 E 24"RCP INV EL=47.63
ES-154	209+97.3	38.2 RT	CURB INLET TOP EL=53.52 GRATE EL=52.80 N 42"RCP INV EL=46.12 S 42"RCP INV EL=46.12
ES-157	211+73.7	36.4 RT	CURB INLET TOP EL=54.06 GRATE EL=53.37 N 15"RCP INV EL=48.26 SE 6"PVC INV EL=51.55

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	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

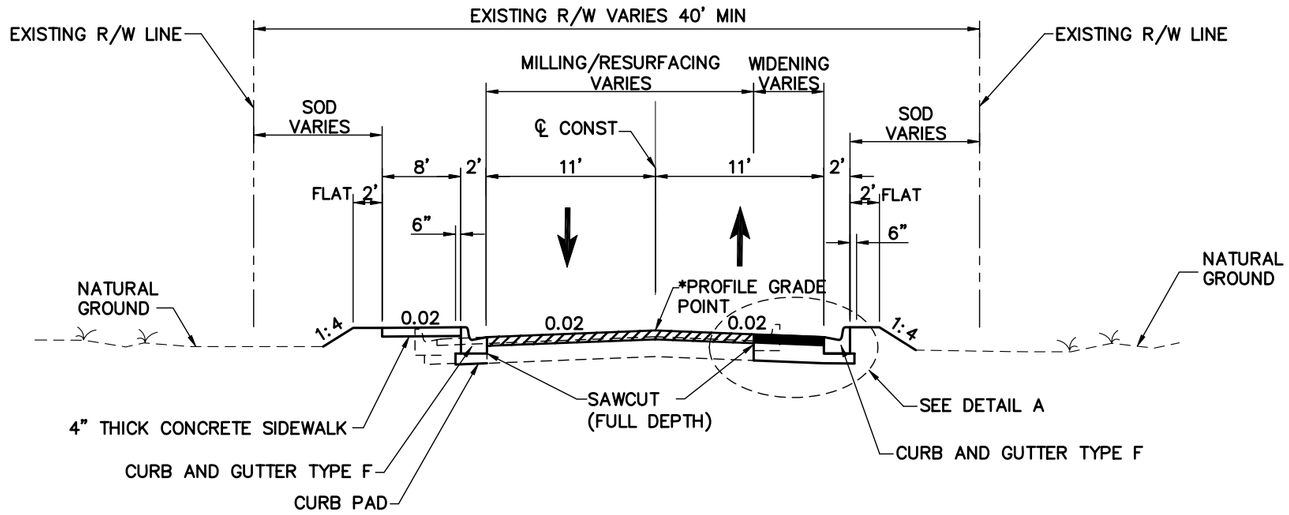
APPROVED BY:

SUNSET POINT ROAD

EXISTING DRAINAGE STRUCTURES

SHEET NO.
6
OF 43 SHEETS

F:\PROJECTS\50795\CADD\Plans\EDRNSHTS.dwg LAYOUT:PLAN1 Last Saved:Jan. 20, 09 Plot Date: 6/4/2009 9:31 AM By: muncy, russell m.



* PROFILE GRADE POINT TO BE ESTABLISHED AT 50 FT. INTERVALS AND SHOWN ON FINAL DESIGN CROSS-SECTIONS

SUNSET POINT ROAD
FROM US ALT. 19 TO DOUGLAS AVE
TYPICAL SECTION #1
WIDENING AND MILLING/RESURFACING
STA 1100+50 TO STA 1125+45.82
NTS

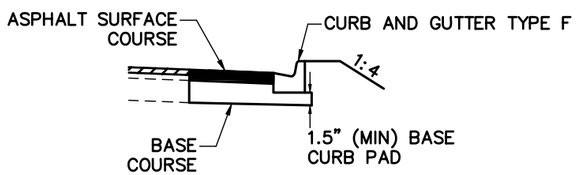
NOTE: SIDE SLOPES TO BE 1:4 STANDARD, (1:3 MAX) OR TO SUIT PROPERTY OWNER.

PAVEMENT WIDENING - SUNSET POINT ROAD PAVEMENT STRUCTURE
4.5" TYPE SP-12.5 (TRAFFIC C)
ASPHALT SURFACE COURSE (2 LIFTS)
4.5" ASPHALT BASE COURSE (TYPE SP-12.5) (2 LIFTS) OR
9.0" CRUSHED CONCRETE BASE COURSE AT CONTRACTOR'S OPTION

MILLING/RESURFACING - SUNSET POINT ROAD PAVEMENT STRUCTURE
1" MILLING DEPTH (AVG)
3" (MIN.) TYPE SP-12.5 (TRAFFIC C) ASPHALT SURFACE COURSE (2 LIFTS)

TRAFFIC DATA

CURRENT YEAR = 2008 AADT = 6,778
DESIGN YEAR = 2025 AADT = 7,696
K = 10.00% D = 58.00% T = 2.00% (24 HOUR)
DESIGN SPEED = 35 MPH



DETAIL A
PAVEMENT WIDENING
NTS

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	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
TYPICAL SECTION (1)

SHEET NO. 7 OF 43 SHEETS

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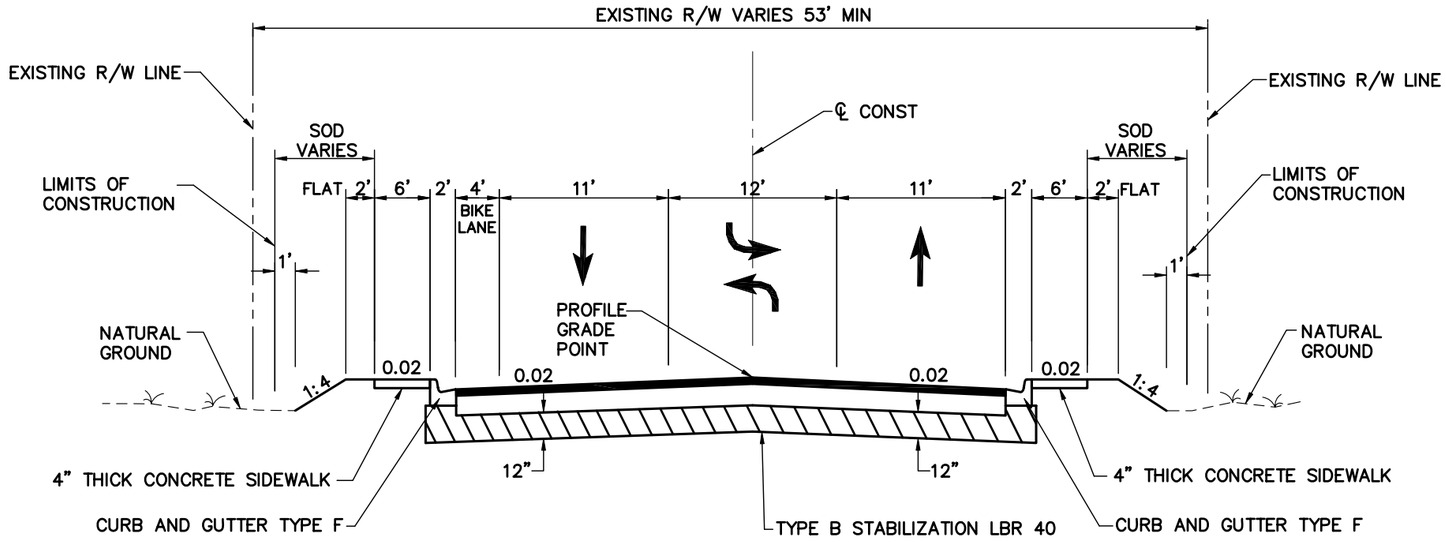

SUNSET POINT ROAD
FROM DOUGLAS AVE. TO BETTY LANE
TYPICAL SECTION #2
NEW CONSTRUCTION
STA 1125+45.82 TO STA 1138+50
NTS

NOTE: SIDE SLOPES TO BE 1:4 STANDARD, (1:3 MAX) OR TO SUIT PROPERTY OWNER.

NEW CONSTRUCTION – SUNSET POINT ROAD PAVEMENT STRUCTURE
3" TYPE SP-12.5 (TRAFFIC C)
ASPHALT SURFACE COURSE (2 LIFTS)
10.5" LIMEROCK BASE COURSE (MIN LBR 100)
12" STABILIZATION (MIN LBR 40)

TRAFFIC DATA

CURRENT YEAR = 2008 AADT = 8,514
ESTIMATED DESIGN YEAR = 2025 AADT = 9,667
K = 10.00% D = 58.00% T = 2.00% (24 HOUR)
DESIGN SPEED = 45 MPH

XREF: BORDER

REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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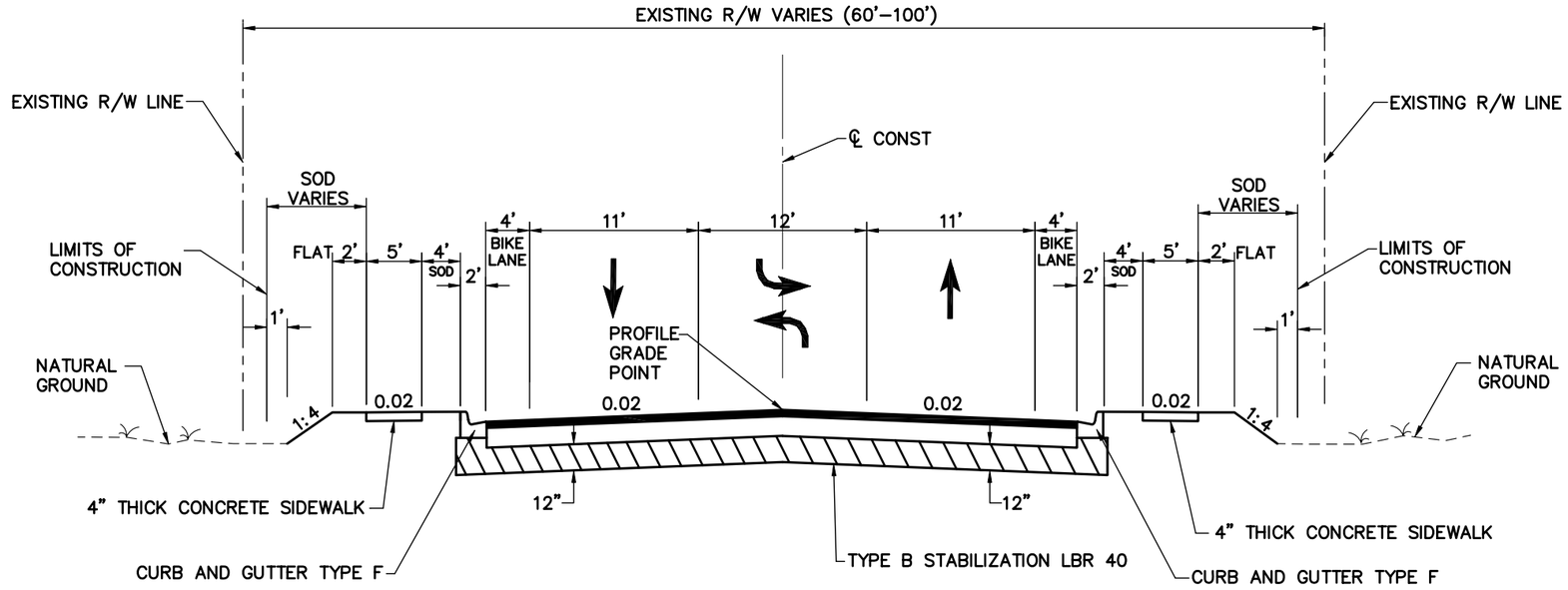
	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
TYPICAL SECTION (2)

SHEET NO. 8 OF 43 SHEETS

F:\PROJECTS\30795\76\CADD\Plans\TYPSR001.dwg LAYOUT:SH102 Last Saved: Jan. 22, 09 Plot Date: 6/4/2009 9:32 AM By: muncy, russell m.



NEW CONSTRUCTION – SUNSET POINT ROAD PAVEMENT STRUCTURE

3" TYPE SP–12.5 (TRAFFIC C)
ASPHALT SURFACE COURSE (2 LIFTS)
10.5" LIMEROCK BASE COURSE (MIN LBR 100)
12" STABILIZATION (MIN LBR 40)

TRAFFIC DATA

CURRENT YEAR = 2008 AADT = 12,274
ESTIMATED DESIGN YEAR = 2025 AADT = 13,936
K = 10.00% D = 58.00% T = 2.00% (24 HOUR)
DESIGN SPEED = 45 MPH

SUNSET POINT ROAD
FROM BETTY LANE TO HIGHLAND AVE.
TYPICAL SECTION #3
NEW CONSTRUCTION
STA 1138+50 TO STA 1165+20
NTS

NOTE: SIDE SLOPES TO BE 1:4 STANDARD, (1:3 MAX) OR TO SUIT PROPERTY OWNER.

XREF: BORDER

REVISIONS				REVISIONS			
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DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

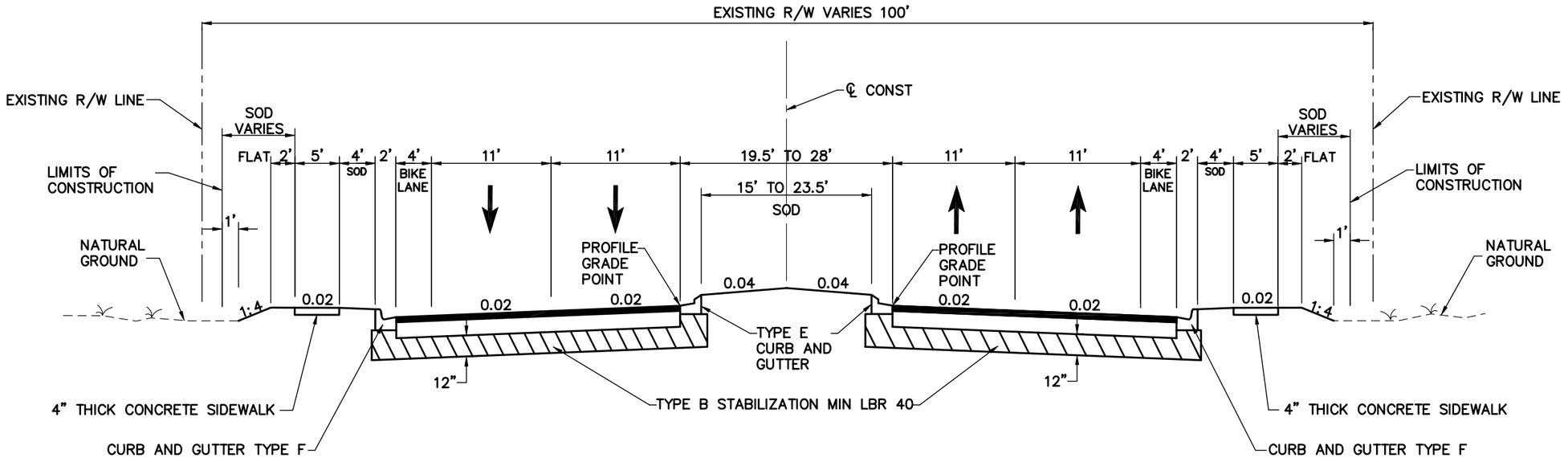
APPROVED BY:

SUNSET POINT ROAD

TYPICAL SECTION (3)

SHEET NO. 9 OF 43 SHEETS

F:\PROJECT\507576\CADD\Plans\TYPSR001.dwg LAYOUT:SH103 Last Saved: Jan. 22, 09 Plot Date: 6/4/2009 9:32 AM By: muncy, russell m.



SUNSET POINT ROAD
FROM HIGHLAND AVE. TO WEST OF KEENE ROAD
TYPICAL SECTION #4
NEW CONSTRUCTION
STA 1165+20 TO STA 1201+09
NTS

NEW CONSTRUCTION – SUNSET POINT ROAD PAVEMENT STRUCTURE
3" TYPE SP–12.5 (TRAFFIC C)
ASPHALT SURFACE COURSE (2 LIFTS)
10.5" LIMEROCK BASE COURSE (MIN LBR 100)
12" STABILIZATION (MIN LBR 40)

TRAFFIC DATA

CURRENT YEAR = 2008 AADT = 17,126
ESTIMATED DESIGN YEAR = 2025 AADT = 19,445
K = 10.00% D = 58.00% T = 2.00% (24 HOUR)
DESIGN SPEED = 45 MPH

NOTE: SIDE SLOPES TO BE 1:4 STANDARD, (1:3 MAX) OR TO SUIT PROPERTY OWNER.

XREF: BORDER

REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD

TYPICAL SECTION (4)

SHEET NO. 10 OF 43 SHEETS

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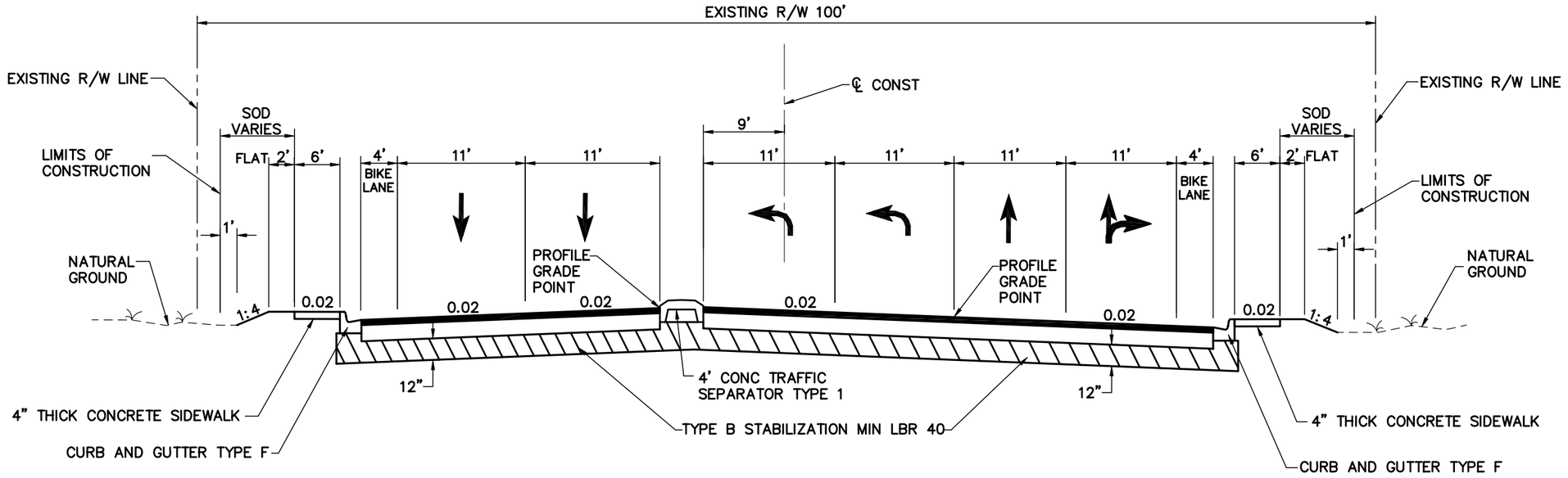

NEW CONSTRUCTION – SUNSET POINT ROAD PAVEMENT STRUCTURE

3" TYPE SP-12.5 (TRAFFIC C)
ASPHALT SURFACE COURSE (2 LIFTS)
10.5" LIMEROCK BASE COURSE (MIN LBR 100)
12" STABILIZATION (MIN LBR 40)

SUNSET POINT ROAD
TYPICAL SECTION #5
NEW CONSTRUCTION
DUAL LEFT TURN LANES
WEST OF KEENE ROAD
STA 1201+09 TO STA 1204+74
NTS

NOTE: SIDE SLOPES TO BE 1:4 STANDARD, (1:3 MAX) OR TO SUIT PROPERTY OWNER.

XREF: BORDER

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APPROVED BY:

SUNSET POINT ROAD

TYPICAL SECTION (5)

SHEET NO. 11 OF 43 SHEETS

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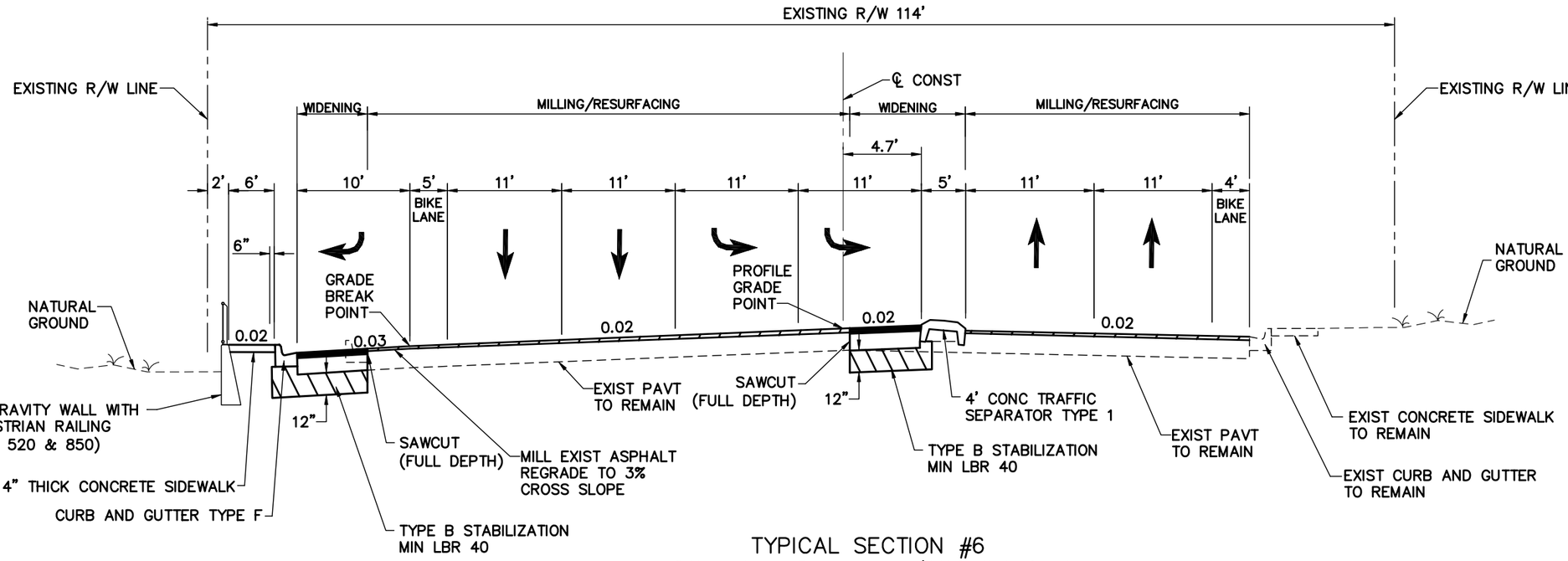

TYPICAL SECTION #6
WIDENING AND MILLING/RESURFACING
DUAL LEFT TURN LANES
EAST OF KEENE ROAD
STA 1205+50 TO STA 1211+00
NTS

PAVEMENT WIDENING – SUNSET POINT ROAD PAVEMENT STRUCTURE
3" TYPE SP-12.5 (TRAFFIC C)
ASPHALT SURFACE COURSE (2 LIFTS)
10.5" LIMEROCK BASE COURSE (MIN LBR 100)
12" STABILIZATION (MIN LBR 40)

MILLING/RESURFACING – SUNSET POINT ROAD PAVEMENT STRUCTURE
1.5" MILLING DEPTH (AVG)
1.5" TYPE SP-12.5 (TRAFFIC C) ASPHALT SURFACE COURSE

XREF BORDER

REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

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SUNSET POINT ROAD

TYPICAL SECTION (6)

SHEET NO. 12 OF 43 SHEETS

F:\PROJECT\507957\6\CADD\Plans\TYPS6001.dwg LAYOUT:SH106 Last Saved: Jan. 22, 09 Plot Date: 6/4/2009 9:32 AM By: muncy, russell m.

EXISTING SIGNAL POLE/MAST ARM TO REMAIN

CITY OF CLEARWATER
EDGEWATER PARK

STA 1100+00, 1.19' LT ℄ CONST =
STA 100+00, ℄ SURVEY
BEGIN PROJECT

40'R

EDGEWATER DRIVE (U.S. ALT 19) (S.R. 595)

N05°56'44"E

SURVEY BASELINE

℄ SURVEY

S87°11'16"E

℄ CONST

E-W ℄ W 1/2 SECTION 3-29-15

STA 1100+50
BEGIN MILLING &
RESURFACING

WIDENING

EXISTING SIGNAL POLE/MAST ARM TO REMAIN

TYPE F C & G

EXIST R/W

8' CONC SIDEWALK

MILLING & RESURFACING (TYP.)

CURB AND GUTTER

TYPE F C & G

EXIST R/W

VACANT LOT 03/29/15/88092/000/0020

03/29/15/88092/000/0090

03/29/15/88092/000/0100

03/29/15/88092/000/0041

03/29/15/88092/000/0020

LOT 4 LOT 5 LOT 6 LOT 7 LOT 8 LOT 9 LOT 10

1100 1101 1102 1103 1104

STEVENSON CREEK
(TIDAL WATERS MHW EL=1.3±)

(MEAN HIGH WATER LINE WAS NOT LOCATED AS PART OF THIS SURVEY)

0 10 20 40
Feet

PROFILE GRADE NOTE: THE PROPOSED PROFILE GRADE ELEVATION FROM STA 1100+50 TO STA 1125+45.82 WILL BE DETERMINED AND SHOWN ON 50 FT. CROSS-SECTIONS OF FINAL DESIGN PLANS. IT WILL VARY, BUT WILL BE AT LEAST 2 INCHES ABOVE EXISTING GRADE.

BEGIN PROJECT
STA 1100+00

PVI 1100+50
BEGIN MILLING &
RESURFACING

EXIST GROUND ⊙ ℄ CONST

SHW

VERTICAL 0 1 2

12 10 8 6 4 2 0 -2

6.6 5.2 4.5 4.0 3.6 3.3

1100 1101 1102 1103 1104 1105

XREF: BORDER_HIGH
XREF: AERIAL2006_ECW10:
XREF: TOPOBRD01:
XREF: DSGNBRD01:
XREF: BORDER:
XREF: PROFBRD01:

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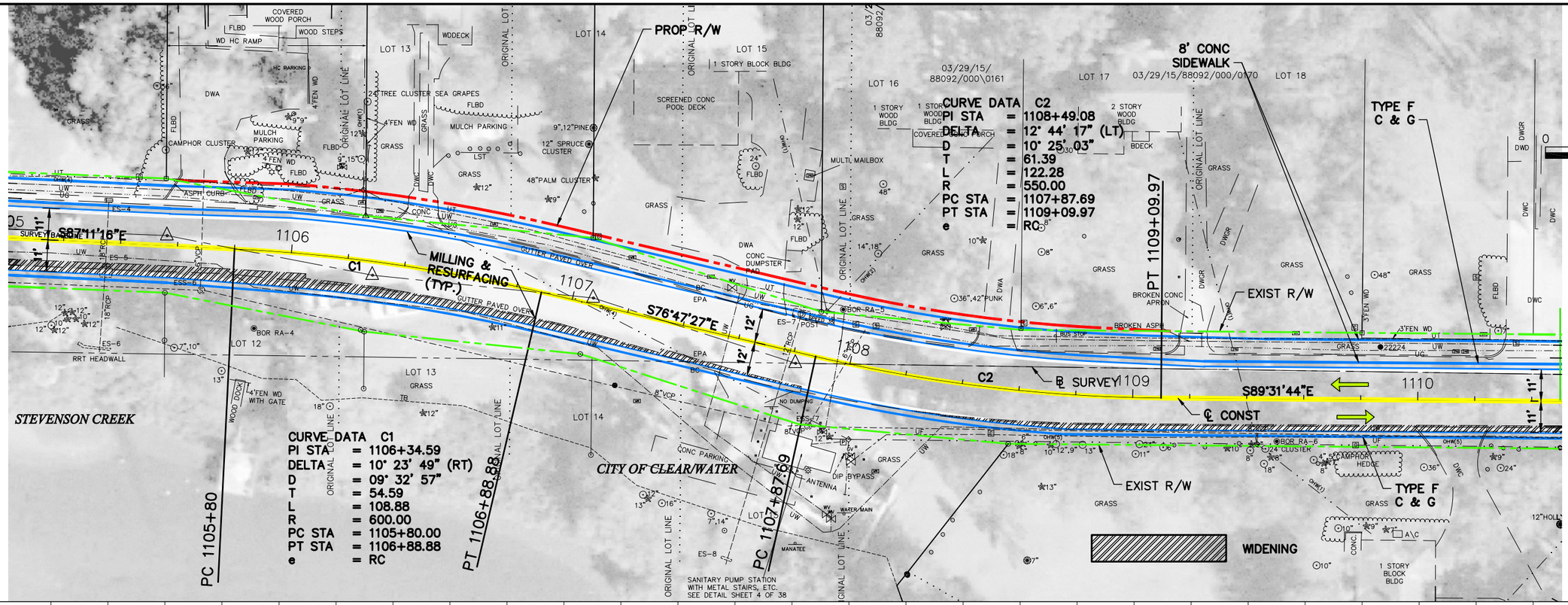
	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

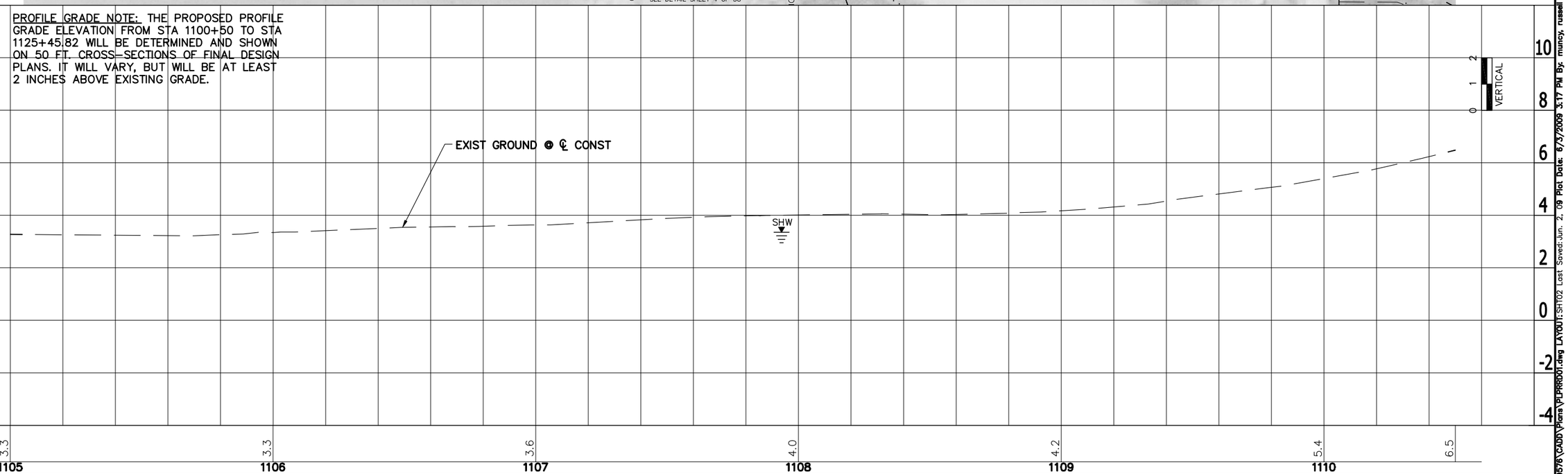
APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY PLAN AND PROFILE (1)

SHEET NO.
13
OF 43 SHEETS



PROFILE GRADE NOTE: THE PROPOSED PROFILE GRADE ELEVATION FROM STA 1100+50 TO STA 1125+45.82 WILL BE DETERMINED AND SHOWN ON 50 FT. CROSS-SECTIONS OF FINAL DESIGN PLANS. IT WILL VARY, BUT WILL BE AT LEAST 2 INCHES ABOVE EXISTING GRADE.



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American Consulting Engineers of Florida, LLC
129 6th Ave. North
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Certificate of Authorization No. 9302

PINELLAS COUNTY, FLORIDA
Department of Public Works
ENGINEERING DEPARTMENT
440 COURT STREET
CLEARWATER, FLORIDA 33756-5136
PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

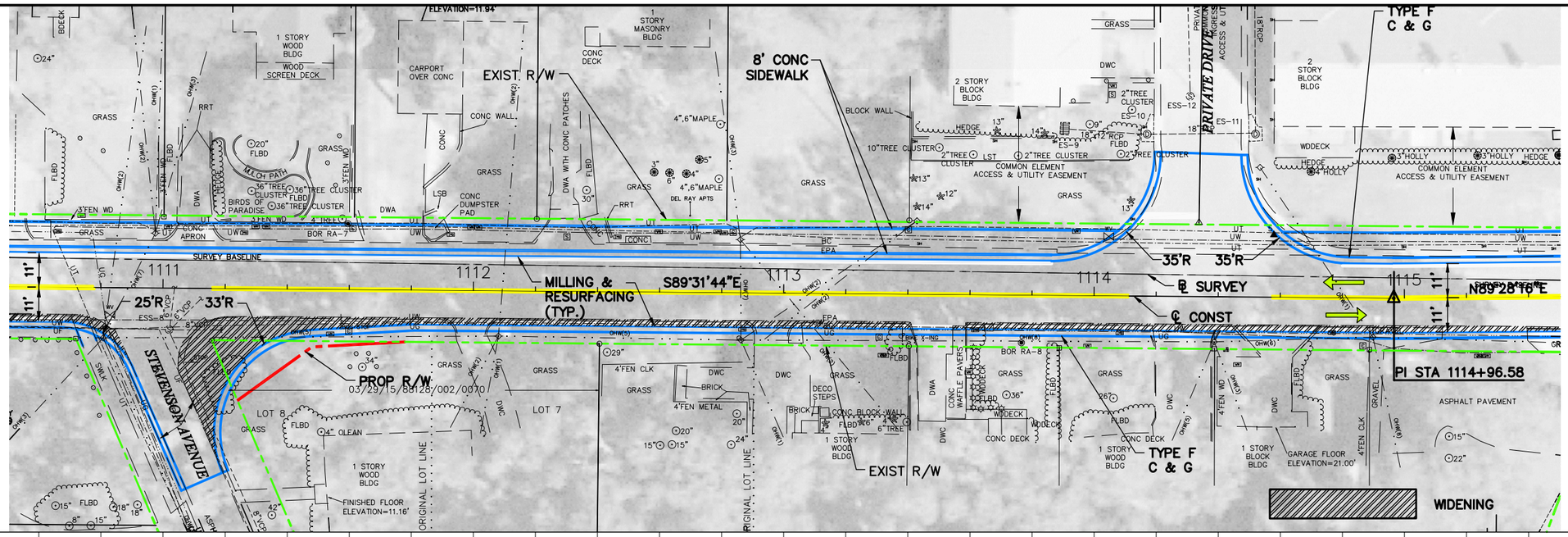
APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY
PLAN AND PROFILE (2)

SHEET NO. 14 OF 43 SHEETS

XREF: PROTBRD01; XREF: BORDER; XREF: DSGNBRD01; XREF: TOPOBRD01; XREF: AERIAL2006.ECW(0; XREF: BORDER HIGH

F:\PROJECT\3079576\CADD\Plans\PLPRB001.dwg LAYOUT:SHT02 Last Saved:Jun. 2, 09 Plot Date: 6/3/2009 3:17 PM By: muncy, russell m.



PROFILE GRADE NOTE: THE PROPOSED PROFILE GRADE ELEVATION FROM STA 1100+50 TO STA 1125+45.82 WILL BE DETERMINED AND SHOWN ON 50 FT. CROSS-SECTIONS OF FINAL DESIGN PLANS. IT WILL VARY, BUT WILL BE AT LEAST 2 INCHES ABOVE EXISTING GRADE.

REVISIONS				REVISIONS			
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PHONE (727) 464-3251

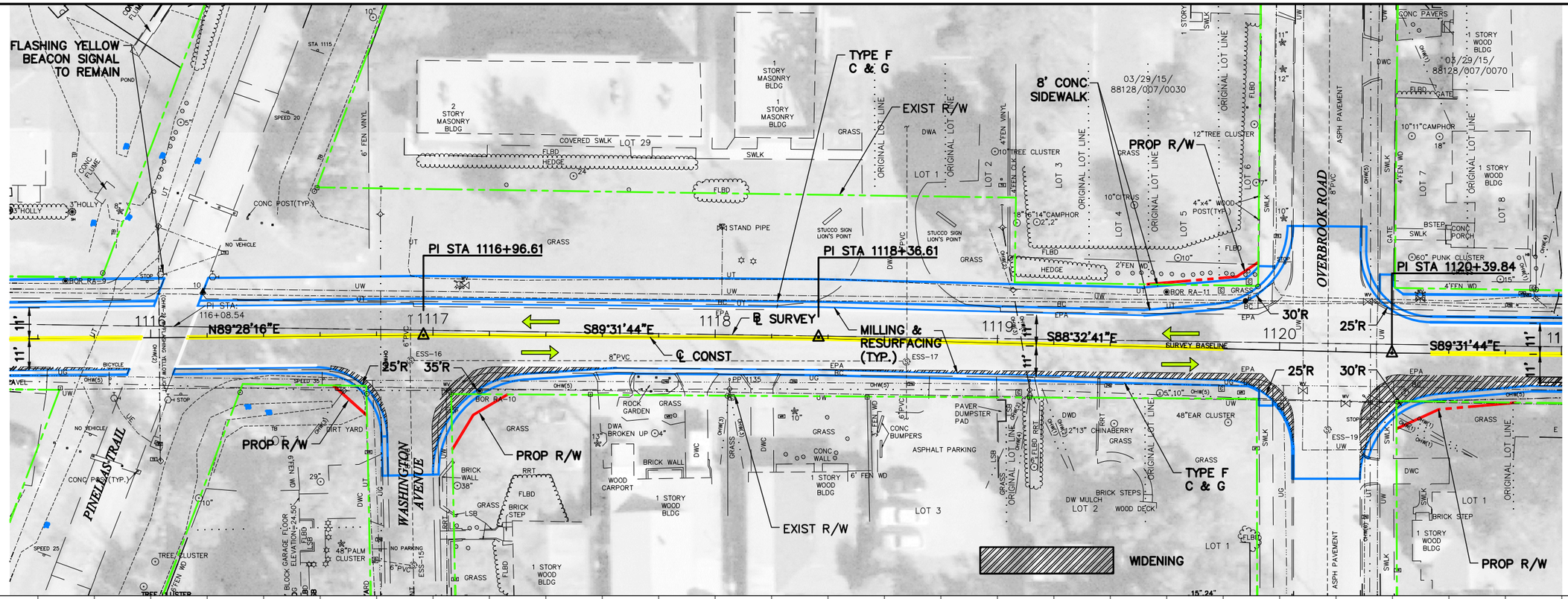
	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY PLAN AND PROFILE (3)

SHEET NO. 15 OF 43 SHEETS

XREF: PROFROD01: XREF: BORDER: XREF: DSGNROD01: XREF: TOPOROD01: XREF: AERIAL2006 ECWID: XREF: BORDER HIGH
F:\PROJECT\3079576\CADD\Plans\PLPRR001.dwg LAYOUT:SH103 Last Saved:Jun. 2, 09 Plot Date: 6/3/2009 3:17 PM By: muncy, russell m.



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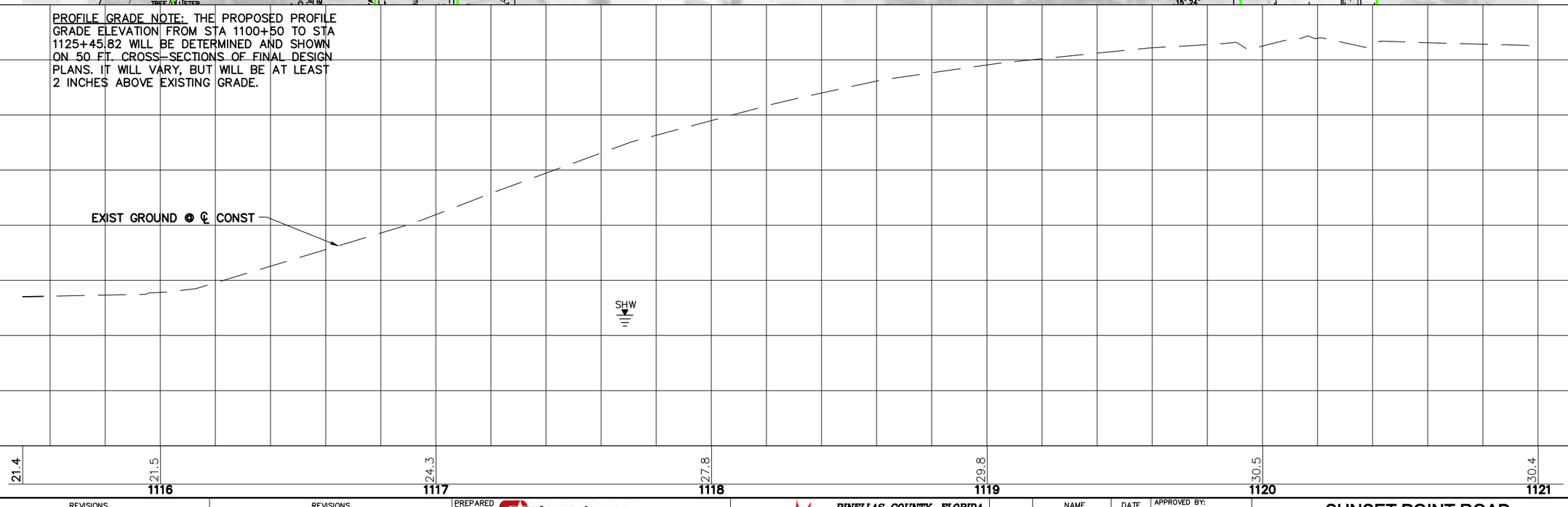

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Pinellas County PUBLIC WORKS

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	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

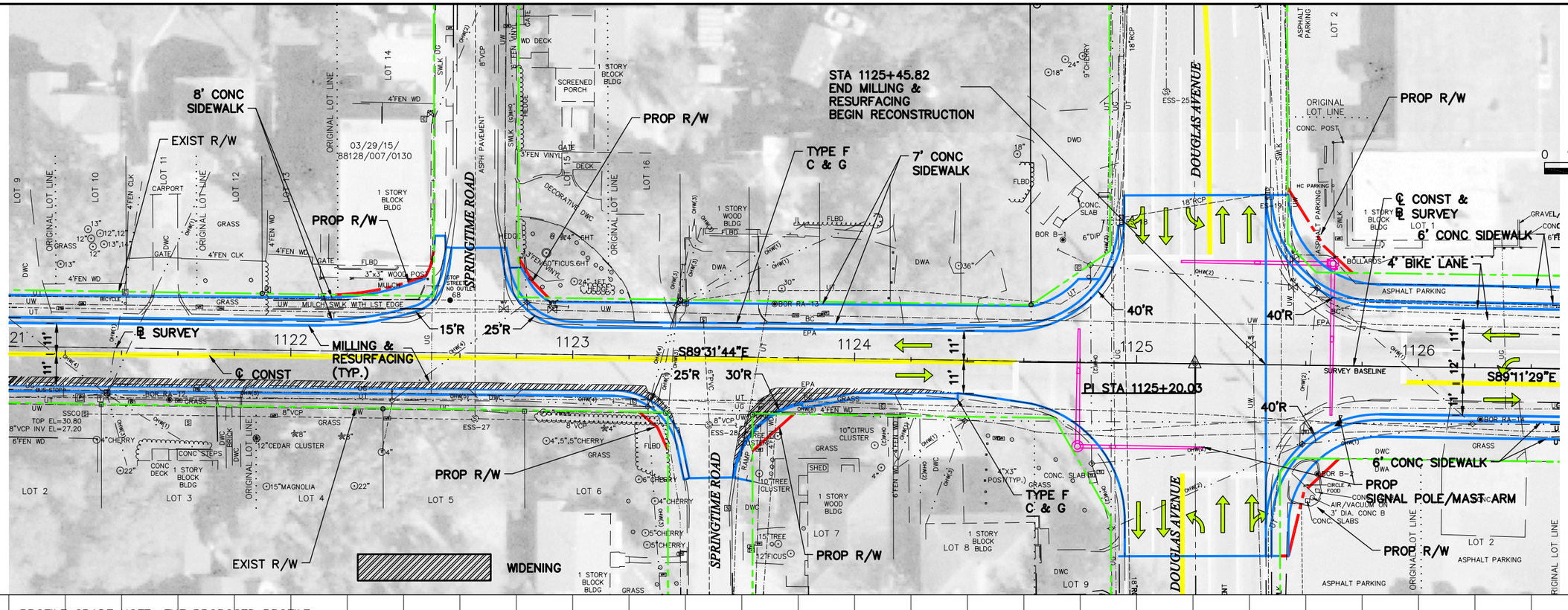
APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY PLAN AND PROFILE (4)

SHEET NO. 16 OF 43 SHEETS

XREF: BORDER_HIGH XREF: AERIAL2006_FCWIO XREF: TOPOROO01 XREF: DSGNROO01 XREF: BORDER XREF: PROFROO01

F:\PROJECT\507957\6\CADD\Plans\PLPRR001.dwg LAYOUT:SH104 Last Saved: Jun. 2, 09 Plot Date: 6/3/2009 3:17 PM By: muncy, russell m.



PROFILE GRADE NOTE: THE PROPOSED PROFILE GRADE ELEVATION FROM STA 1100+50 TO STA 1125+45.82 WILL BE DETERMINED AND SHOWN ON 50 FT. CROSS-SECTIONS OF FINAL DESIGN PLANS. IT WILL VARY, BUT WILL BE AT LEAST 2 INCHES ABOVE EXISTING GRADE.

REVISIONS				REVISIONS			
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	NAME	DATE
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DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY PLAN AND PROFILE (5)

SHEET NO. 17 OF 43 SHEETS

XREF: PROFILE01; XREF: BORDER; XREF: DSGNBD01; XREF: TOPOBD01; XREF: AERIAL2006.ECW(G; XREF: BORDER HIGH

F:\PROJECT\507957\CADD\Plans\PLPRF001.dwg LAYOUT:SH105 Last Saved: Jun. 2, 09 Plot Date: 6/3/2009 3:18 PM By: muncy, russell m.

CURVE DATA C3
PI STA = 1131+72.53
DELTA = 03° 57' 45" (RT)
D = 02° 43' 42"
T = 72.50
L = 144.94
R = 2100.00
PC STA = 1131+00.03
PRC STA = 1132+44.97
e = NC

4' BIKE LANE
6' CONC SIDEWALK
EXIST R/W
TYPE F C & G
6' CONC SIDEWALK
S89°11'29"E
35'R
35'R
℄ CONST & ℄ SURVEY
PC 1131+00.03
6' CONC SIDEWALK
EXIST R/W
6' CONC SIDEWALK
TYPE F C & G
SYLVAN DRIVE
COLE'S ROAD
ASPH PAVEMENT
PINELAND DRIVE UNIMPROVED (NOT OPEN)
1127
1128
1129
1130
1131
C3
LOT 3
LOT 5
LOT 6
BOR RA-16
BOR RA-17
BOR RA-18
BOR RA-19
FINISHED FLOOR ELEVATION=18.33'
0 10 20 40
Feet

180' VC
PVI STA 1129+00
PVI EL 22.45
A.D. = -1.68
K = 107.26
PVC 1128+10
EL 22.81
PVT 1129+90
EL 20.58
220' VC
LP EL = 18.59
LP 131+82.23
PVI STA 1131+00
PVI EL 18.30
A.D. = 2.38
K = 92.55
PGL
-0.40%
EXIST GROUND ℄ CONST
-2.075%
0.30%
SHW
PGL SHW LIMIT TO PROVIDE 1' MINIMUM CLEARANCE TO BASE COURSE
VERTICAL

REVISIONS				REVISIONS			
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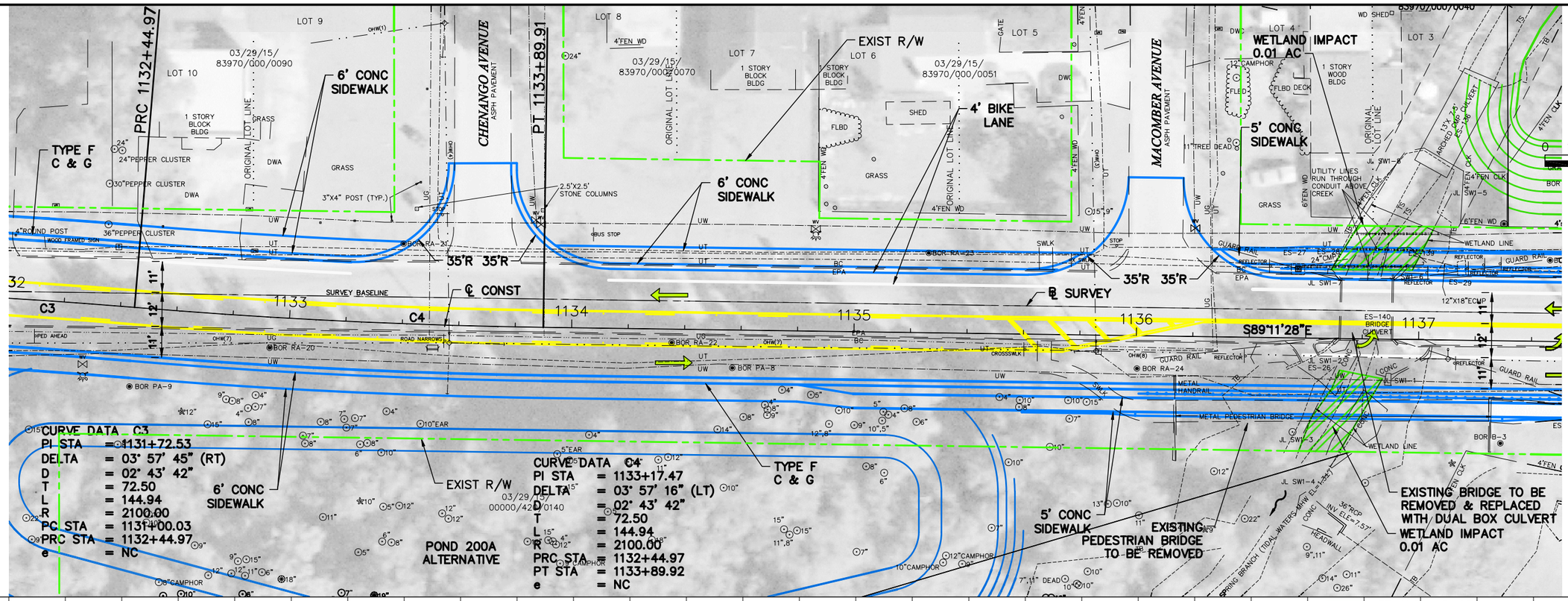
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

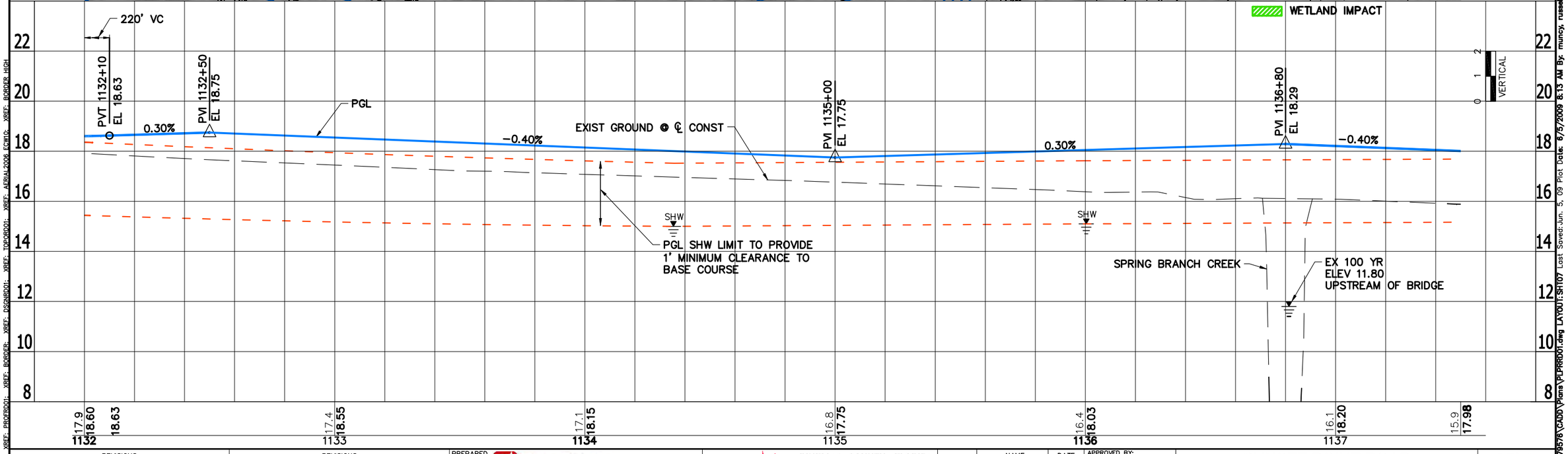
APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY
PLAN AND PROFILE (6)

SHEET NO. 18 OF 43 SHEETS

F:\PROJECT\5079576\CADD\Plans\PLPRR001.dwg LAYOUT:SHT06 Last Saved: Jun. 2, 09 Plot Date: 6/5/2009 3:18 PM By: muncy, russell m.
XREF: PROFROD01: XREF: BORDER: XREF: DSGNROD01: XREF: TOPOROD01: XREF: AERIAL2006.ECW10: XREF: BORDER HIGH





WETLAND IMPACT

REVISIONS					REVISIONS			
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CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY PLAN AND PROFILE (7)

SHEET NO. 19 OF 43 SHEETS

XREF: BORDER_HIGH XREF: AERIAL2006_ECW10: XREF: TOPOBOD01: XREF: DSGNBOD1: XREF: BORDER: XREF: PROFBOD01:
F:\PROJECT\507976\CADD\Plans\PLPRBD01.dwg LAYOUT:SH107 Last Saved:Jun. 5, 09 Plot Date: 8/5/2009 8:13 AM By: muncy, russell m.

03/29/15/
LOT 2 83978/000/0010

FLOODPLAIN COMPENSATION SITE FPC-2 ALTERNATIVE

PROP SIGNAL POLE/MAST ARM

5' CONC SIDEWALK

BETTY LANE ASPHALT PAVEMENT

EXIST R/W

6' CONC SIDEWALK

4' BIKE LANE

TYPE F C & G

1 STORY BLOCK BLDG

1 STORY WOOD BLDG

2 STORY WOOD BLDG

FINISHED FLOOR ELEVATION=18.29'

FINISHED FLOOR ELEVATION=14.41'

UNKNOWN MANHOLE RIM EL=15.08 FULL OF MUCK BOTTOM OF STRUCTURE EL=9.43

ASPHALT PAVEMENT TO BUILDING

DIRT AND BROKEN ASPHALT

CONC PAVERS

GRAVEL

50'R

50'CR

40'R

45'R

45'R

PI STA 1138+53.54

SURVEY BASELINE N89°49'54"E

℄ SURVEY

℄ CONST

1138

1139

1140

1141

1142

NO PARKING

BUS STOP

SANITARY LIFT STATION

GRASS

SIGN HUNSINGER SCHOOL

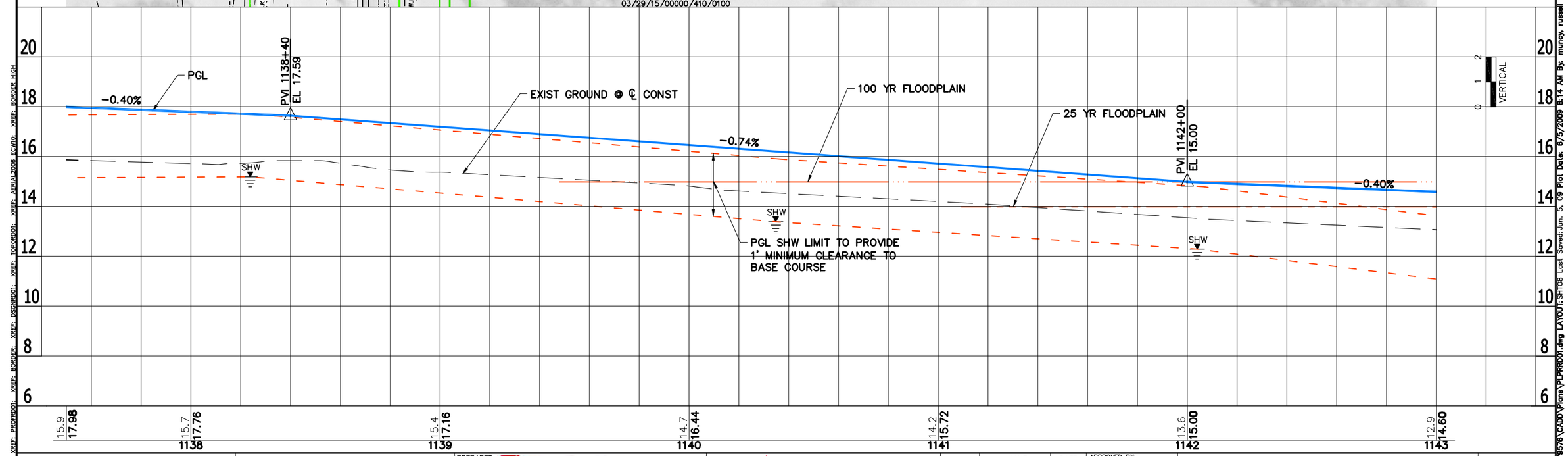
+86.30 21' RT BEGIN TRANSITION

FLOODPLAIN COMPENSATION SITE FPC-1 ALTERNATIVE

EXIST R/W

03/29/15/00000/410/0100

0 10 20 40
Feet



REVISIONS				REVISIONS			
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Pinellas County PUBLIC WORKS

PINELLAS COUNTY, FLORIDA
Department of Public Works
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PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY
PLAN AND PROFILE (8)

SHEET NO. 20 OF 43 SHEETS

XREF: BORDER_HIGH XREF: AERIAL2006_ECW10: XREF: TOPOBOD1: XREF: DSGNBOD1: XREF: BORDER: XREF: PROFBOD1:

F:\PROJECT\30795\76\CADD\Plans\PLPRB001.dwg LAYOUT:SH108 Last Saved:Jun. 5, 09 Plot Date: 6/5/2009 8:14 AM By: muncy, russell m.

03/29/15/55548/000/0180

03/29/15/55548/000/0190

CITY OF CLEARWATER
PROPOSED POND SITE

WETLAND IMPACT
0.06 AC

+99.86
15' LT
BEGIN
TRANSITION

EXIST R/W

6' CONC
SIDEWALK

4' BIKE
LANE

TYPE F
C & G

PI STA 1138+53.54

N89°49'54"E

S89°11'28"E

SURVEY BASELINE

℄ CONST & ℄ SURVEY

+39.60
15' RT
END
TRANSITION

+99.86
15' RT
BEGIN
TRANSITION

TYPE F
C & G

4' BIKE
LANE

WETLAND IMPACT
0.25 AC

EXIST R/W

6' CONC
SIDEWALK

FLOODPLAIN COMPENSATION
SITE FPC-3 ALTERNATIVE

WETLAND IMPACT

100 YR FLOODPLAIN

25 YR FLOODPLAIN

PGL

EXIST GROUND @ ℄ CONST

PVI 1143+50
EL 14.40

PVI 1145+00
EL 14.85

PVI 1146+70
EL 14.34

−0.40%

0.30%

−0.30%

0.40%

SHW

SHW

PGL SHW LIMIT TO PROVIDE
1' MINIMUM CLEARANCE TO
BASE COURSE

EXIST
38"X24" ERCP

VERTICAL

REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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PINELLAS COUNTY, FLORIDA
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DRAWN	RMM	1/09
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SUPERVISED:	MARTY L. MORLAN, P.E.	

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SUNSET POINT ROAD
PRELIMINARY
PLAN AND PROFILE (9)

SHEET NO.
21
OF 43 SHEETS

XREF: PROFROD01; XREF: BORDER; XREF: DSGNRD01; XREF: TOPOROD01; XREF: AERIAL2006 ECW10; XREF: BORDER HIGH

F:\PROJECT\507957\6\CADD\Plans\PLPRRD01.dwg LAYOUT:SHT09 Last Saved:Jun. 5, 09 Plot Date: 6/5/2009 9:38 AM By: muncy, russell m.

WETLAND IMPACT

EXIST R/W

03/29/15/55548/000/0090

LOT 20

ORIGINAL LOT LINE

CHURCH SIGN

FLBD

PROP SIGNAL POLE/MAST ARM

TYPE F C & G

KINGS HIGHWAY

PROPOSED SIGNAL POLE/MAST ARM

5' CONC SIDEWALK

FINISHED FLOOR ELEVATION=18.96 CONC PLANTER

1 STORY BLOCK BLDG

FINISHED FLOOR ELEVATION=19.29'

GARAGE ELEVATION=18.58'

HEDGE

12"WILLOW

12"CEDAR

8"PVC

ESS-46

0 10 20 40

Feet

6' CONC SIDEWALK

+ 99.72 21' LT END TRANSITION

4' BIKE LANE

BUS STOP SHELTER

CONC PAD

BOR RA-37

ES-53

BOR RA-39

50'R

46'R

PI STA 1151+86.12

BOR B-7

BOR RA-41

1149

1150

1151

1152

1153

S89°11'28"E

SURVEY BASELINE

50'CR (TYP.)

S89°30'16"E

+ 99.72, 21' RT END TRANSITION

ASPH PAVEMENT

SPEED XING AHEAD

BOR RA-36

BOR B-6

BOR RA-38

KINGS HWY REC CENTER

50'R

48'R

BOR RA-40

ES-59

ES-60

ES-57

ES-56

ES-58

18"RCP

48"RCP

ESS-47

ESS-48

8"VCP

WETLAND IMPACT 0.25 AC

JL W3-4

JL W2-3

SPEED 35

HITING GOLF BALLS PROHIBITED

6' CONC SIDEWALK

4' BIKE LANE

WETLANDS

FLOODPLAIN COMPENSATION SITE FPC-3 ALTERNATIVE

03/29/15/00000/410/0100

POND 300B ALTERNATIVE

WETLAND LINE

EXIST R/W

PROPOSED SIGNAL POLE/MAST ARM

TYPE F C & G

5' CONC SIDEWALK

25Y R FLOODPLAIN

100 YR FLOODPLAIN

PVI 1149+60 EL 15.50

PGL

PVC 1150+50 EL 15.23

200' VC

LP EL = 15.18

LP 1150+82.88

PVI STA 1151+50

PVI EL 14.93

A.D. = 1.82

K = 109.60

PVT 1152+50 EL 16.45

PVI 1153+40 EL 17.83

0.40%

-0.30%

1.52%

1.05%

SHW

PGL SHW LIMIT TO PROVIDE 1' MINIMUM CLEARANCE TO BASE COURSE

VERTICAL

11.8 15.06 | 11.9 15.26 | 12.6 15.38 | 15.23 15.20 15.19 15.18 15.18 13.9 15.19 15.21 15.24 15.28 15.33 15.39 15.45 15.53 15.61 15.70 15.5 15.81 15.92 16.04 16.17 16.31 16.45 | 17.2 17.22 | 18.4 18.46

1149 1150 1151 1152 1153 1154

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PHONE (727) 464-3251

	NAME	DATE
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DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY
PLAN AND PROFILE (10)

SHEET NO. 22 OF 43 SHEETS

XREF: BORDER_HIGH XREF: AERIAL2006.FCW10 XREF: TOPOROD01 XREF: DSGNROD01 XREF: BORDER XREF: PROFROD01

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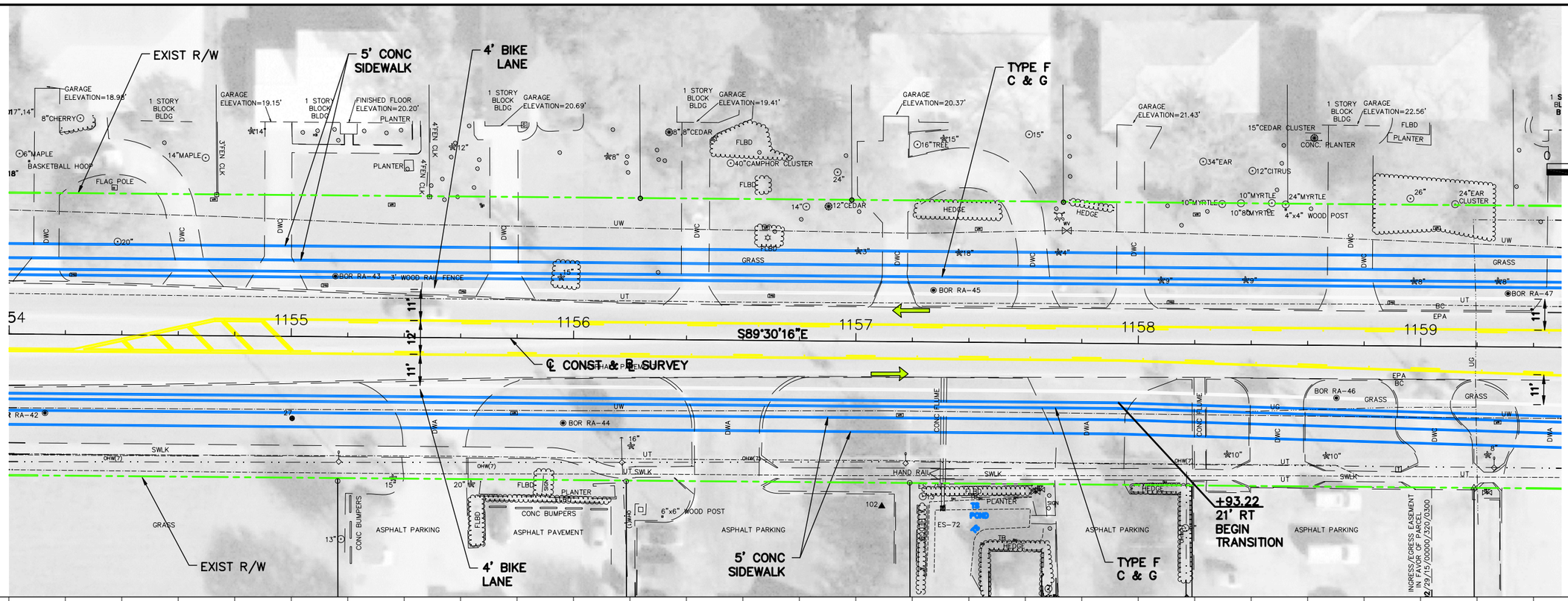

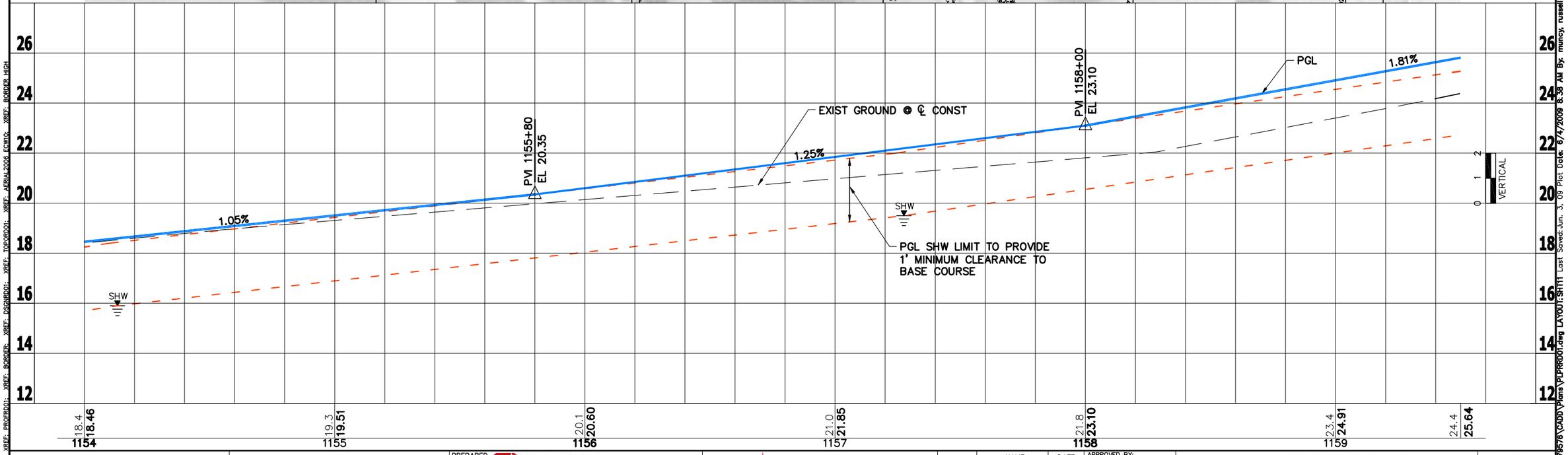

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DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY
PLAN AND PROFILE (11)

SHEET NO. 23 OF 43 SHEETS

XREF: PROFROD01; XREF: BORDER; XREF: DSGNROD01; XREF: TOPOROD01; XREF: AERIAL2006.ECW(G; XREF: BORDER HIGH

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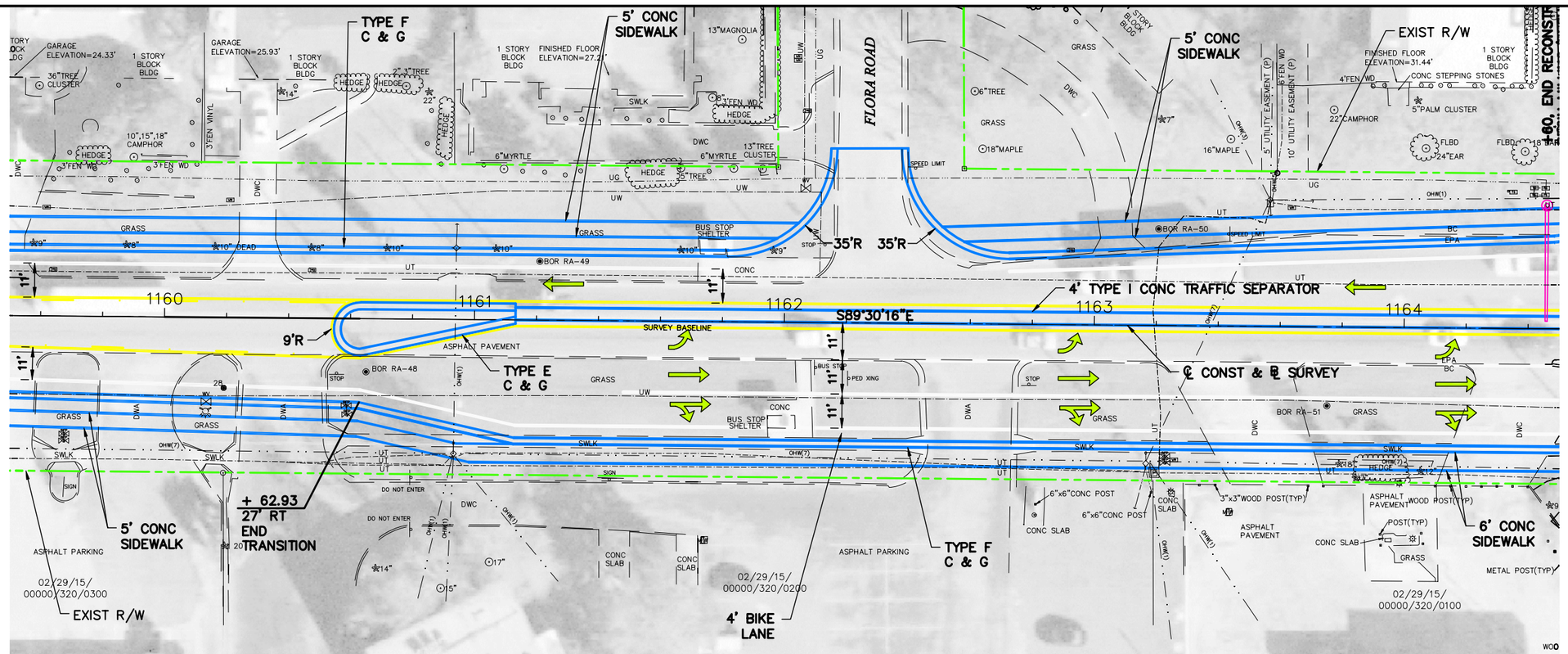

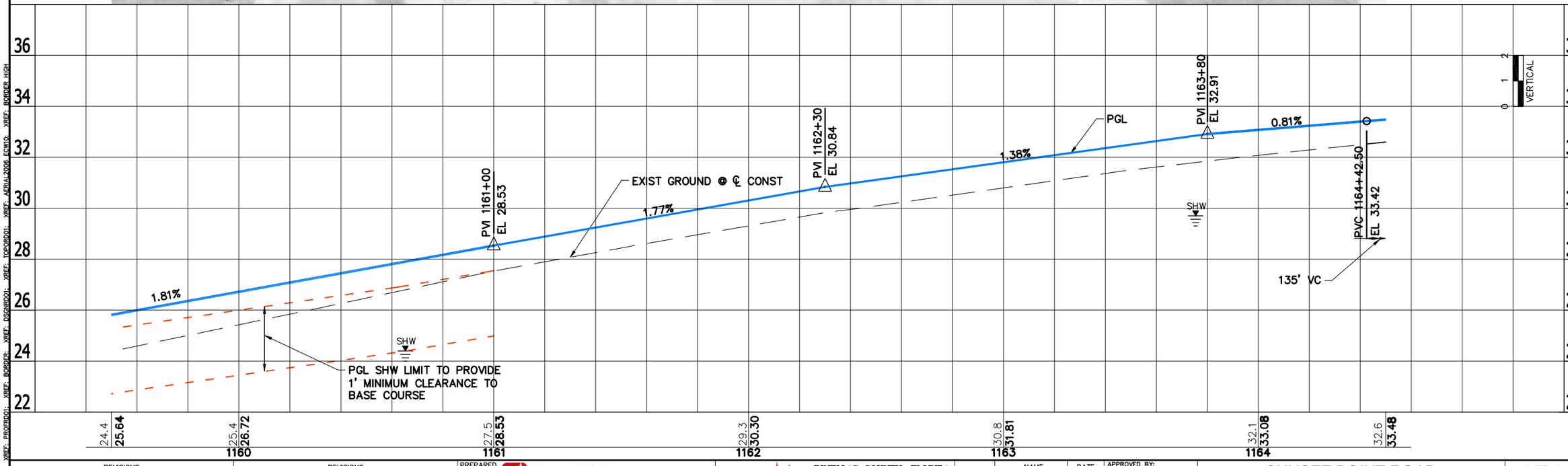

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NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

PREPARED BY:
American Consulting Engineers of Florida, LLC
129 6th Ave. North
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Phone: (727) 499-5762 Fax: (727) 499-5751
Certificate of Authorization No. 9302

PINELLAS COUNTY, FLORIDA
Department of Public Works
ENGINEERING DEPARTMENT
440 COURT STREET
CLEARWATER, FLORIDA 33756-5136
PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY PLAN AND PROFILE (12)

SHEET NO. 24 OF 43 SHEETS

XREF: BORDER_HIGH XREF: AERIAL2006_ECWI0: XREF: TOPOGRID01: XREF: DSGNGRD01: XREF: BORDER: XREF: PROFGRD01:
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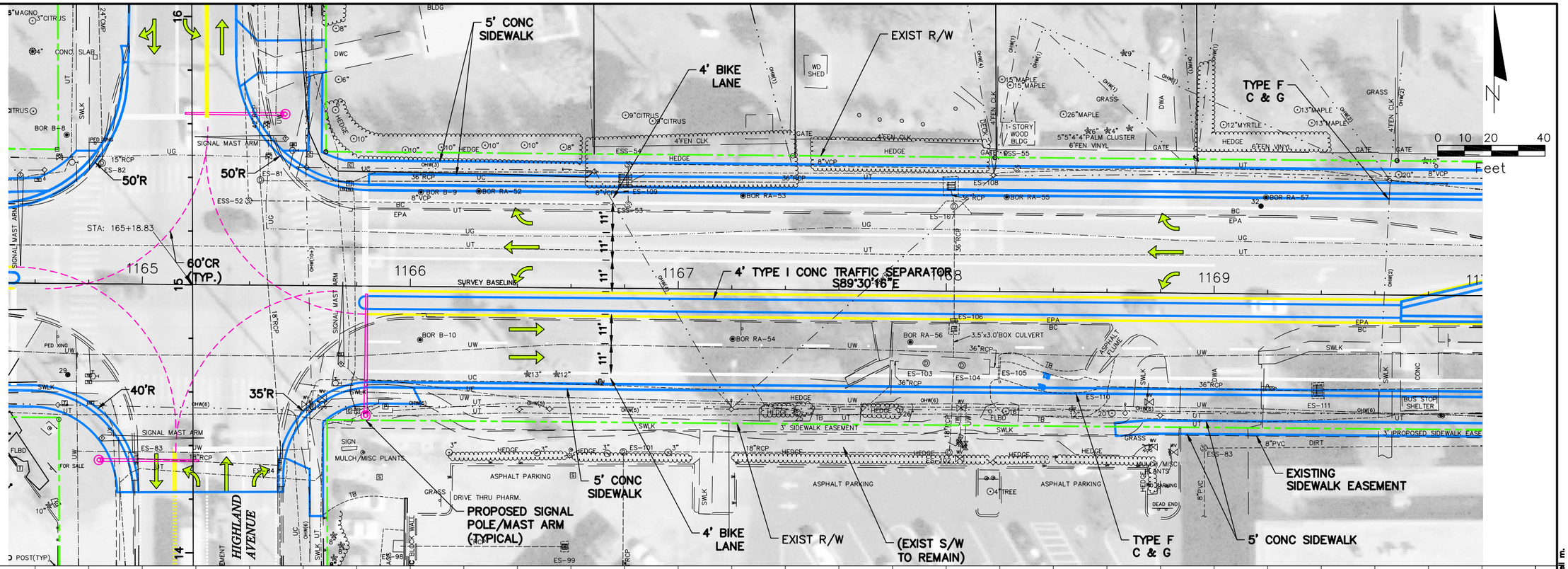

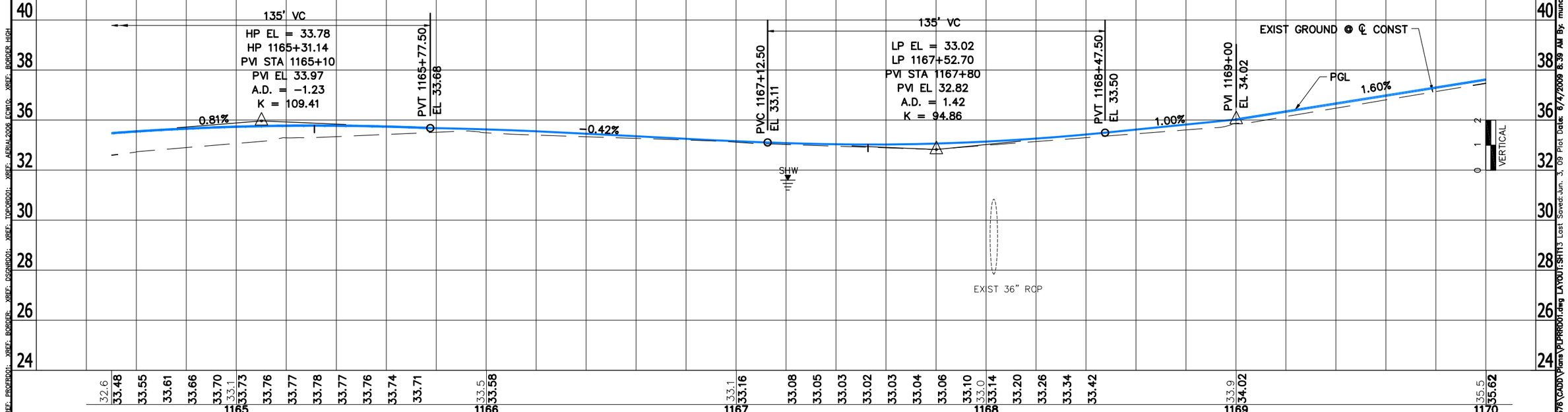

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NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY PLAN AND PROFILE (13)

SHEET NO. 25 OF 43 SHEETS

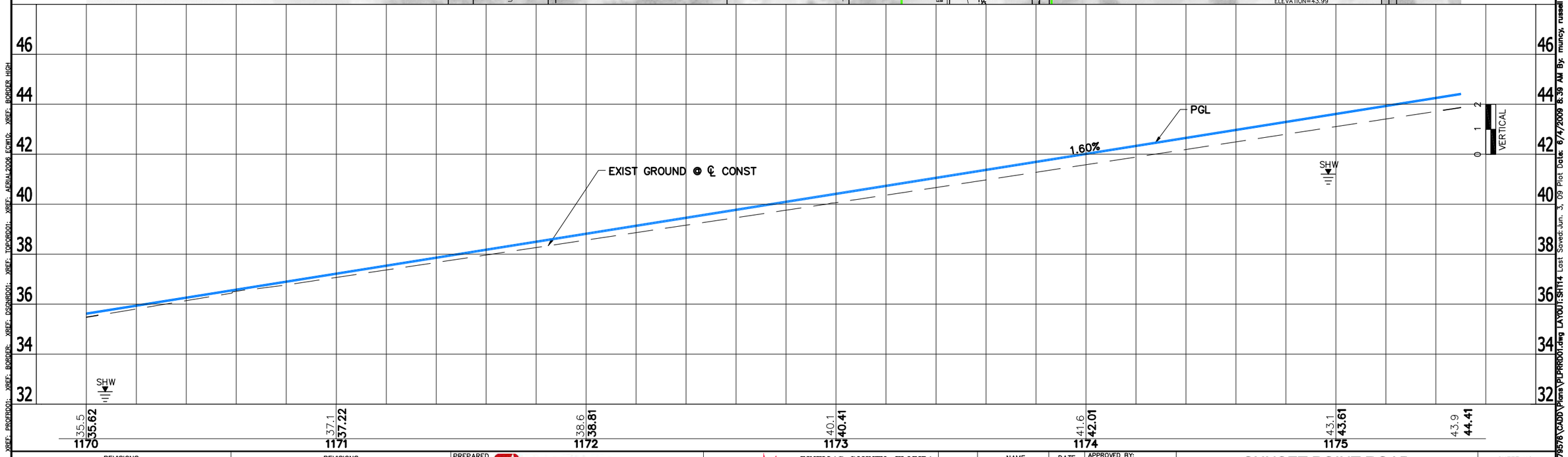
XREF: BORDER_HIGH XREF: AERIAL2006 ECW1G: XREF: TOPOR001: XREF: DSNAR001: XREF: BORDER: XREF: PROFR001:

F:\PROJECT\507957\CADD\Plans\PLPRR001.dwg LAYOUT:SHT13 Last Saved: Jun. 3, 09 Plot Date: 6/4/2009 8:39 AM By: muncy, russel m.

EXIST R/W
1 STORY SHED WOOD
6'FEN VINYL
8'FEN VINYL
5' CONC SIDEWALK
4"
10' DRAINAGE & UTILITY EASEMENT (P)
5' DRAINAGE & UTILITY EASEMENT (P)
BRICK PLANTER
24"
1 STORY BLOCK BLDG
18"TREE
6'FEN WD
SOUVENIR DRIVE
GARAGE ELEVATION=42.02'
1 STORY BLOCK BLDG
GARAGE ELEVATION=43.12'
1 STORY BLOCK BLDG
GARAGE ELEVATION=44.23'
TYPE F C & G
48"AVOCADO
20"CAMPHOR
4' BIKE LANE
BRICK
HEDGE
6,7.5"TREE CLUSTER
24"
14"TREE
GATE
6'FEN VINYL
3"
10"TREE
13" 5"4"TREE
6'FEN VINYL
8"4"4"TREE CLUSTER
3"3"PALM CLUSTER
5"MYRTLE
HEDGE
3'FEN WD
ESS-57
8"VCP
ESS-56
26"12"PINE
PLANTER
MISC ROCKS/PLANTS
17"
22"
18"
15"
PLANTER
MULCH
17"
GRASS
TELEPHONE MARKER
24"
BOR RA-58
27"
12"10"CAMPHOR
7"CAMPHOR
BOR RA-60
23"CAMPHOR
14"6"
26"
16"
BOR RA-64
2' TYPE I CONC TRAFFIC SEPARATOR
BOR RA-62
1171
1172
1173
1174
1175
SURVEY BASELINE
℄ CONST & ℄ SURVEY
S89°30'16"E
50'CR
35'R
35'R
TYPE E C & G
BOR RA-65
BOR RA-67
BC
EPA
11'
6'
BOR RA-59
BOR RA-61
BOR RA-63
BOR RA-66
2' TYPE I CONC TRAFFIC SEPARATOR
SWLK
UW
UT
36"RCP
36"CMP
ES-113
ES-112
ESS-59
8"VCP
50'CR
35'R
35'R
20"
16"
ESS-84
8"PVC
ESS-85
ESS-86
4' BIKE LANE
EXISTING SIDEWALK EASEMENT
5' CONC SIDEWALK
10' WATER EASEMENT (P)
30' DRAINAGE & UTILITY EASEMENT (P)
3' EASEMENT (P)
ES-114
STEPPING STONES
FLBD
PLANTER
GARAGE
1 STORY ELEVATION=40.11'
1 STORY BLOCK BLDG
TYPE F C & G
20"11"TREE
13"
ESS-58
10"
30"
4"5"
13"
11"
26"18"
EXIST R/W
3"
1 STORY BLOCK BLDG
GARAGE ELEVATION=41.12'
DWC
7"MAPLE
WEST DRIVE
5,5"TREE
8"TREE
4"
3'FEN VINYL
12"
HEDGE
5'FEN VINYL
GRASS
5"PALM CLUSTER
MULCH
7"
GATE
1 STORY BLOCK BLDG
GARAGE ELEVATION=43.09'
1 STORY BLOCK BLDG
FINISHED FLOOR ELEVATION=43.99'
1 STORY BLOCK BLDG
3' EASEMENT (P)

0 10 20 40
Feet

N



REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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American Consulting Engineers of Florida, LLC
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Certificate of Authorization No. 9302

Pinellas County PUBLIC WORKS
PINELLAS COUNTY, FLORIDA
Department of Public Works
ENGINEERING DEPARTMENT
440 COURT STREET
CLEARWATER, FLORIDA 33756-5136
PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY PLAN AND PROFILE (14)

SHEET NO. 26 OF 43 SHEETS

F:\PROJECT\507576\CADD\Plans\PLPRR001.dwg LAYOUT:SH14 Last Saved:Jun. 3, 09 Plot Date: 6/4/2009 8:39 AM By: muncy, russell m.
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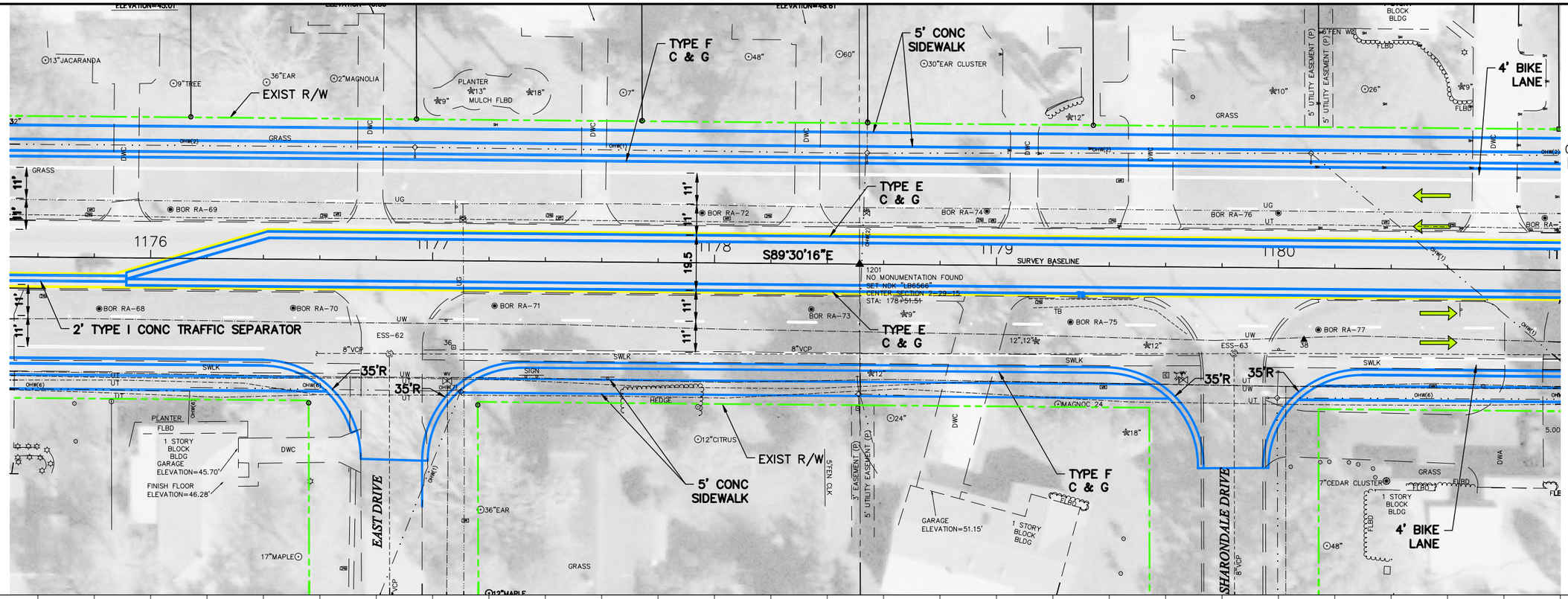

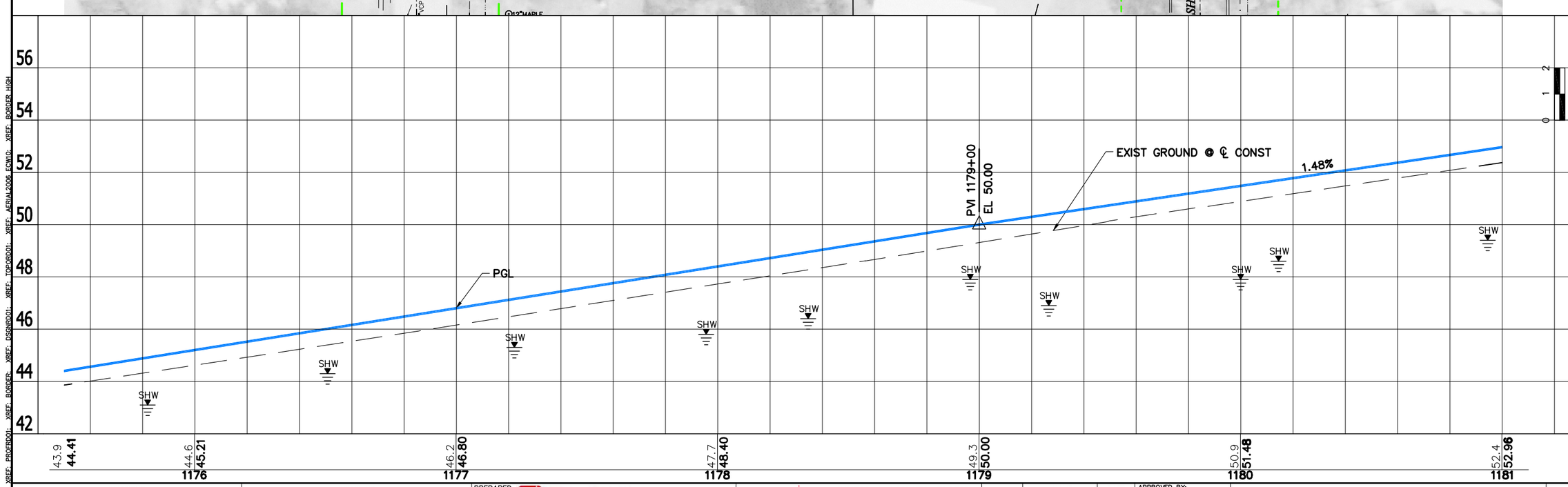

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PHONE (727) 464-3251

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DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

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SUNSET POINT ROAD
PRELIMINARY
PLAN AND PROFILE (15)

SHEET NO.
27
OF 43 SHEETS

XREF: PROFBOD1; XREF: BORDER; XREF: DSGNBOD1; XREF: TOPOBOD1; XREF: AERIAL2006 ECWID; XREF: BORDER_HIGH

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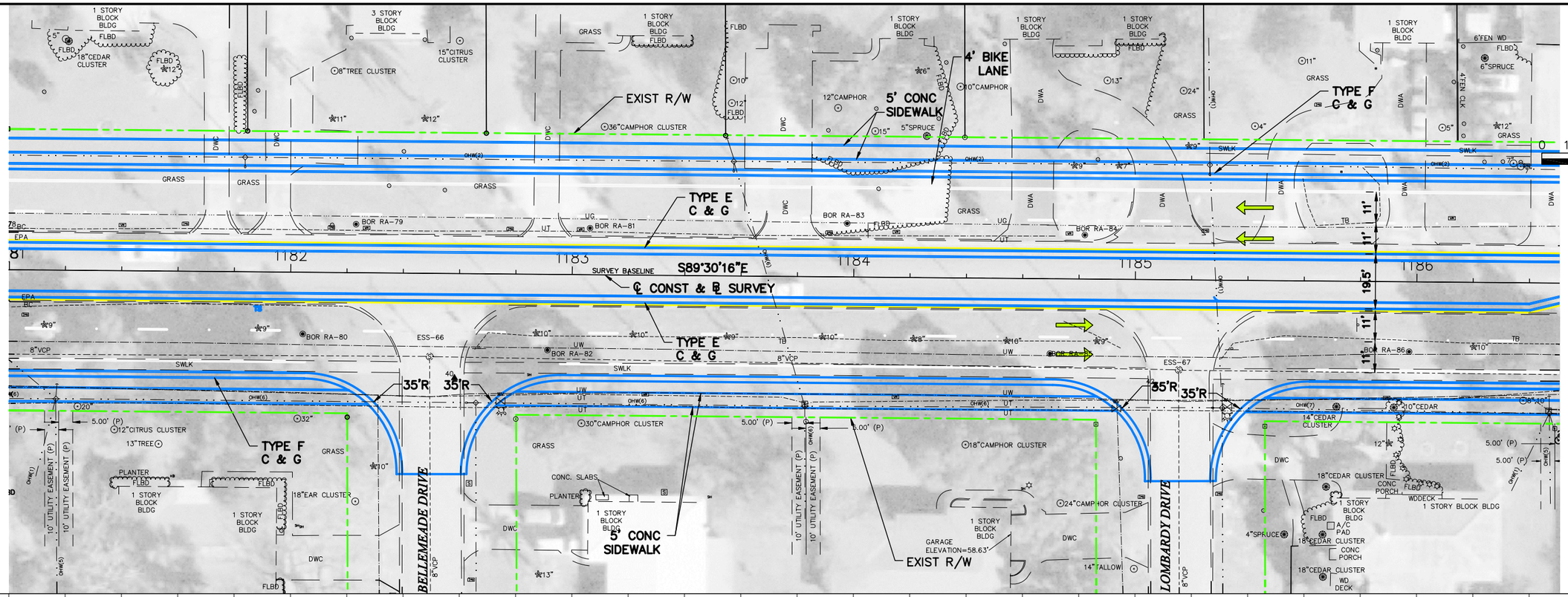

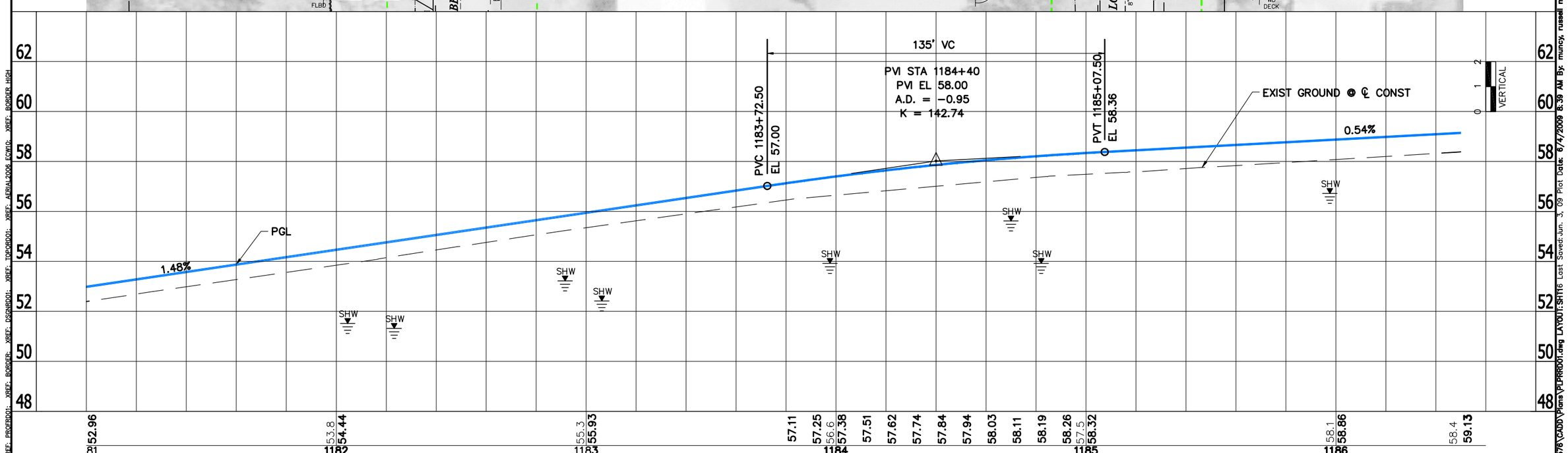

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	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

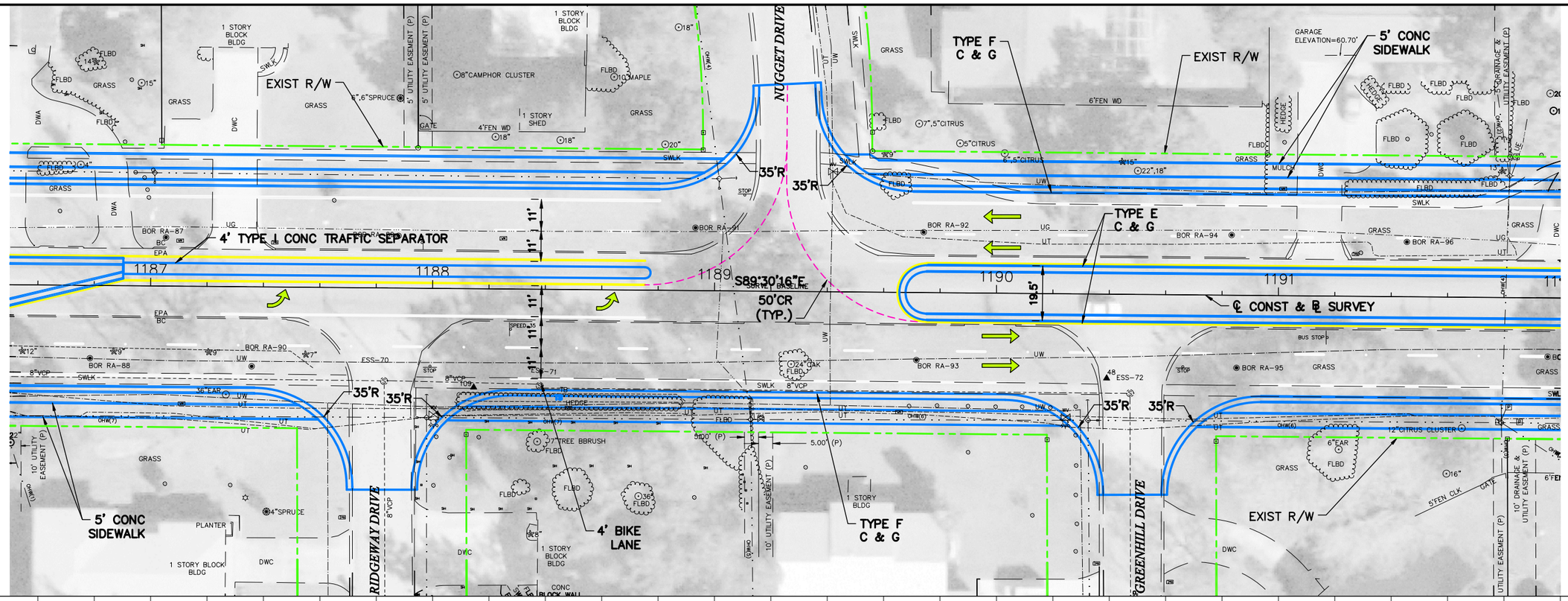
APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY
PLAN AND PROFILE (16)

SHEET NO. 28 OF 43 SHEETS

F:\PROJECT\507957\CADD\Plans\PLPRR001.dwg LAYOUT:SHT16 Last Saved: Jun. 3, 09 Plot Date: 6/4/2009 8:39 AM By: murncy, russell m.

XREF: PRORR001; XREF: BORDER; XREF: DSGNRD01; XREF: TOPORD01; XREF: AERIAL2006 ECW1C; XREF: BORDER HIGH



REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

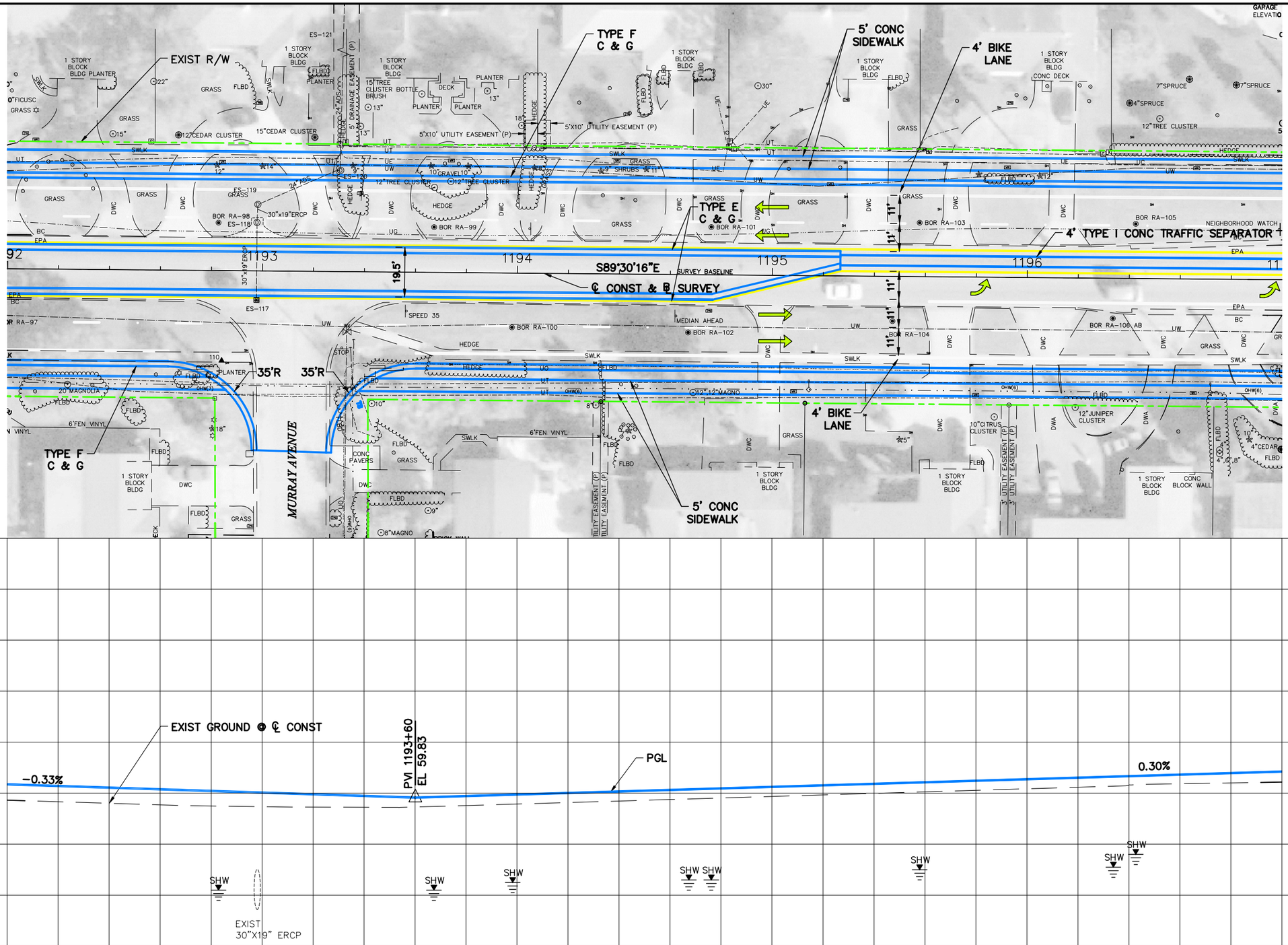
APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY PLAN AND PROFILE (17)

SHEET NO. 29 OF 43 SHEETS

XREF: PROFROD01: XREF: BORDER: XREF: DSGNROD01: XREF: TOPOROD01: XREF: AERIAL2006.ECW10: XREF: BORDER_HIGH

F:\PROJECT\30795\76\CADD\Plans\PLPRR001.dwg LAYOUT:SHT17 Last Saved: Jun. 3, 09 Plot Date: 6/4/2009 8:39 AM By: muncy, russell m.



REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY PLAN AND PROFILE (18)

SHEET NO. 30 OF 43 SHEETS

F:\PROJECT\507957\CADD\Plans\PLPRR001.dwg LAYOUT:SHT18 Last Saved: Jun. 3, 09 Plot Date: 6/4/2009 8:40 AM By: muncy, russel m.
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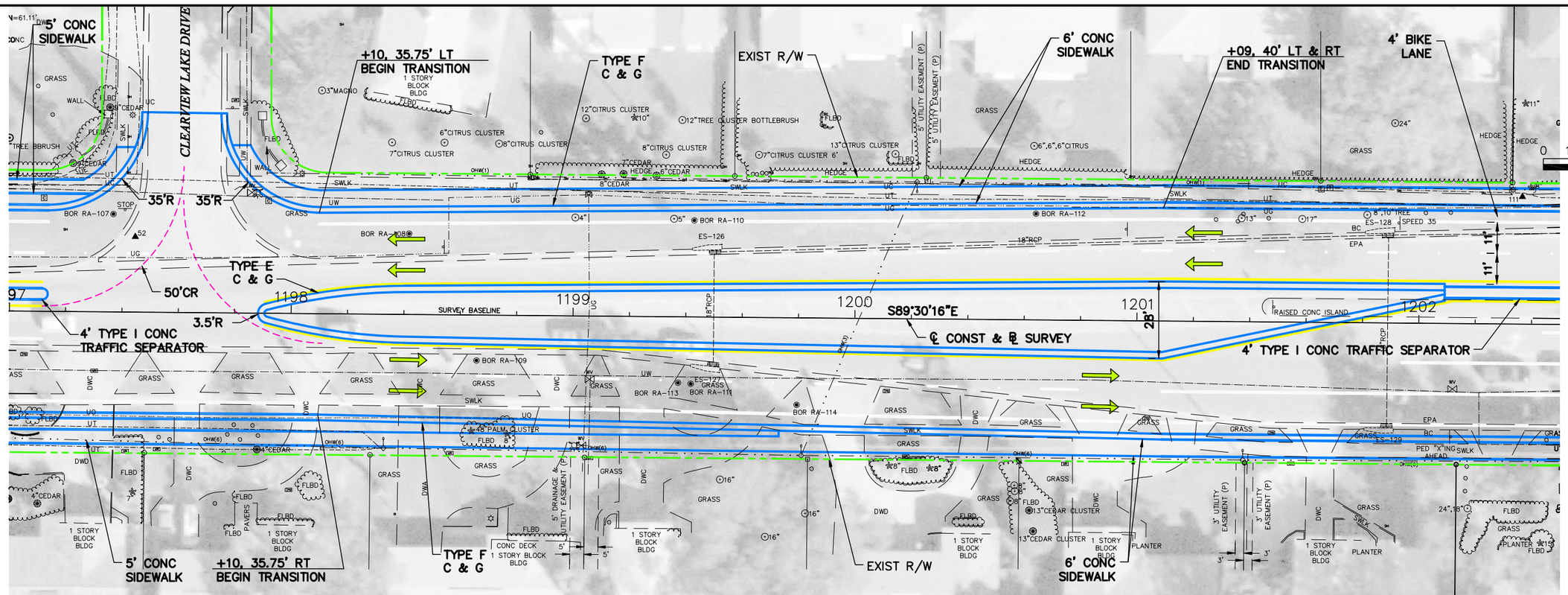

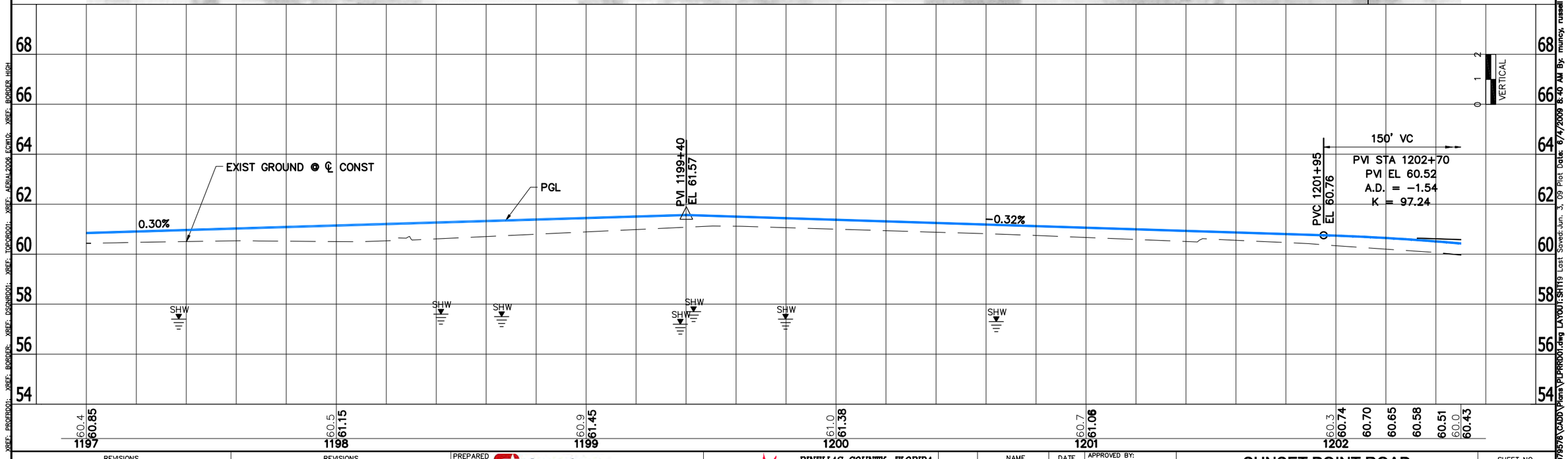

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	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY PLAN AND PROFILE (19)

SHEET NO. 31 OF 43 SHEETS

XREF: BORDER_HIGH XREF: AERIAL2006.ECW(1): XREF: TOPOGRD01: XREF: DSGNGRD01: XREF: BORDER: XREF: PROFGRD01:
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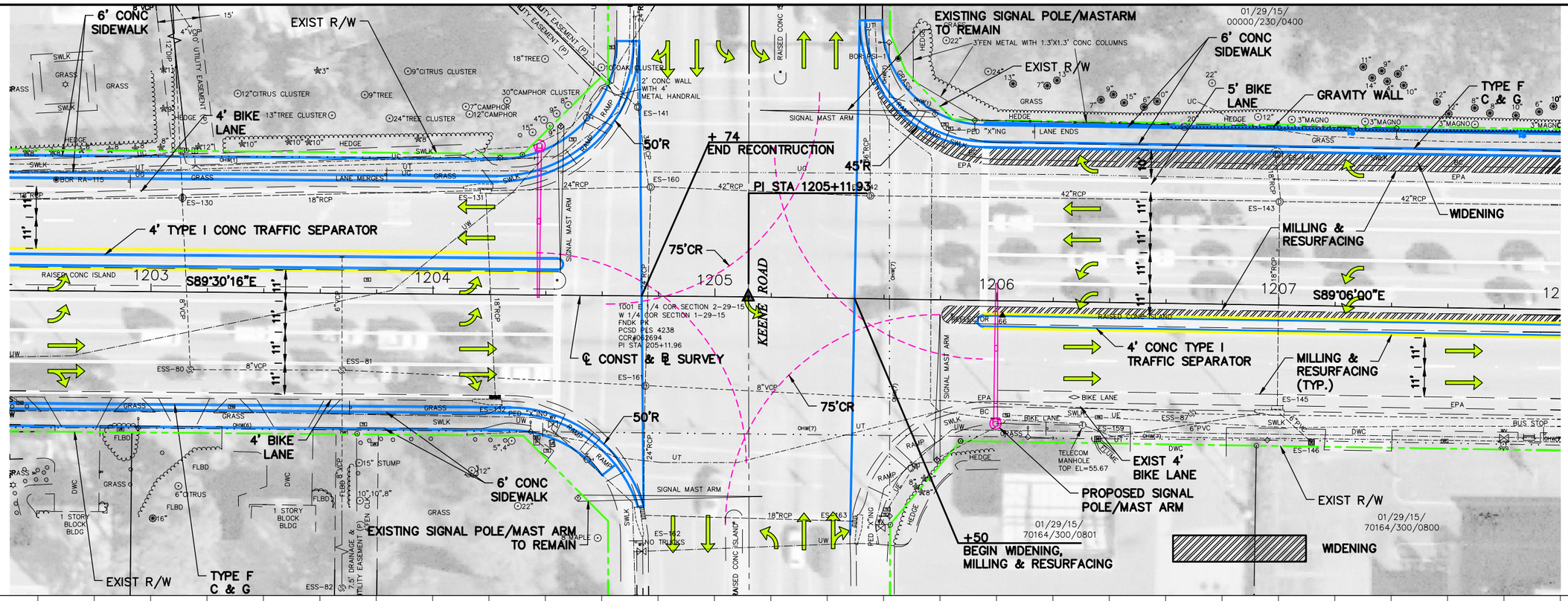

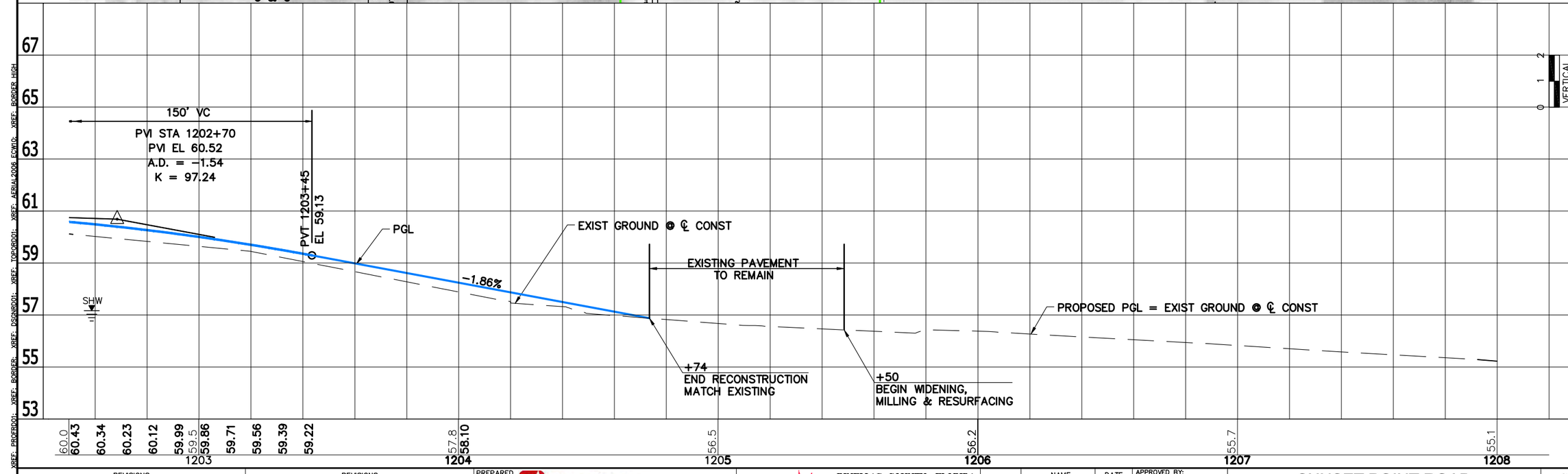

REVISIONS				REVISIONS			
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	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY PLAN AND PROFILE (20)

SHEET NO. 32 OF 43 SHEETS

XREF: PROFROD01: XREF: BORDER: XREF: DSGNROD01: XREF: TOPOROD01: XREF: AERIAL2006 ECW1G: XREF: BORDER_HIGH

F:\PROJECT\507957\6\CADD\Plans\PLPRR001.dwg LAYOUT:SH120 Last Saved: Jun. 3, 09 Plot Date: 6/4/2009 8:40 AM By: muncy, russell m.

01/29/15/
00000/230/0400

GRAVITY WALL
6' CONC SIDEWALK
5' BIKE LANE
WIDENING
3'FEN METAL WITH 2'X2' CONC COLUMNS
TYPE F C & G
EXIST R/W
8"BBRUSH CLUSTER
12"OAK CLUSTER
DWA (EXIT)
DWA (ENTRANCE)
CONC CURB LANDSCAPE ISLAND
SIGN "BREYLEY APARTMENTS"
3'FEN METAL WITH 2'X2' CONC COLUMNS
FLBD ON BERM
HEDGE
GRASS
SWLK
EPA
CONC APRON
STOP
PED "X"ING AHEAD
3' METAL GUARDRAIL
42"RCP
24"RCP
15"RCP
ES-148
ES-149
ES-150
ES-151
ES-152
ES-153
ES-154
ES-155
ES-156
ES-157
ES-158
ESS-88
ESS-89
STA 1211+00, ℄ CONST
END PROJECT
50936
END SURVEY
213+96.28 50.00 LT
END SURVEY
215+17.19 50.00 RT
MILLING & RESURFACING
WIDENING
4' TYPE I CONC TRAFFIC SEPARATOR
MILLING & RESURFACING
+00
END MILLING & RESURFACING
MATCH EXISTING PAVEMENT
SURVEY BASELINE
℄ CONST
S89°06'00"E
RAISED CONC ISLAND
GRASS MEDIAN
BIKE LANE
SLOPED CONC
DENSE BRAZILLIAN PEPPERS
DRAINAGE EASEMENT
(OR5302, PG962)
ORIGINAL LOT LINE
EXIST R/W
WIDENING
01/29/15/
70164/300/0800
01/29/15/
70164/300/0700
01/29/15/
70164/300/0703
01/29/15/
70164/300/0600
1208
1209
1210
1211
1212
1213

N
0 10 20 40
Feet

PROPOSED PGL
EXIST GROUND @ ℄ CONST
STA 1211+00, ℄ CONST
END PROJECT
+00
END MILLING & RESURFACING
MATCH EXISTING PAVEMENT
VERTICAL
0 1 2
55.1
54.3
53.9
54.1
53.3

REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD
PRELIMINARY
PLAN AND PROFILE (21)

SHEET NO.
33
OF 43 SHEETS

XREF: PROFROD01: XREF: BORDER: XREF: DSGNROD01: XREF: TOPOROD01: XREF: AERIAL2006 ECWID: XREF: BORDER HIGH

F:\PROJECT\307976\CADD\Plans\PLPRR001.dwg LAYOUT:SHT21 Last Saved: Jun. 3, 09 Plot Date: 6/4/2009 8:41 AM By: muncy, russell m.

+60, END RECONSTRUCTION
BEGIN MILLING/RESURFACING
& WIDENING

EXIST R/W

+7.70
16.5' LT
BEGIN TAPER

WIDENING

+75.87
14.78' LT
END TAPER
END WIDENING

STA 20+17.5
END MILLING &
RESURFACING
END PROJECT

MILLING &
RESURFACING

+7.07
16.5' RT
BEGIN TAPER

WIDENING

+22.36
13.42' RT
END TAPER
END WIDENING

(SEE PLAN &
PROFILE (13)
FOR CONTINUATION)

CONC DRIVEWAY

EXIST R/W

WIDENING

ERIN DRIVE

BYRAM DRIVE

SIGNAL MAST ARM

50'R

30'R 30'R

16.5'

11'

ASPH PAVEMENT

0 10 20 40
Feet

STA 15+00 ℄ CONST HIGHLAND AVE =
STA 1165+18.80 ℄ CONST SUNSET POINT RD

+00 33.97

+31 33.35

-2.00%

-2.90%

PGL

END RECONSTRUCTION
BEGIN MILLING/RESURFACING
+60, MATCH EXISTING GRADE

EXISTING GRADE
AT ℄ CONST
HIGHLAND AVE
(PROPOSED PROFILE)

STA 20+17.5
END MILLING &
RESURFACING
END PROJECT

VERTICAL 0 1 2

15: 33.3 / 33.97
16: 30.9 / 31.25
17: 29.0 / 29.00
18: 27.5 / 27.50
19: 26.0 / 26.00
20: 24.0 / 24.00

REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

PREPARED BY:
American Consulting Engineers of Florida, LLC
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Certificate of Authorization No. 9302

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ENGINEERING DEPARTMENT
440 COURT STREET
CLEARWATER, FLORIDA 33756-5136
PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	8/08
DRAWN	RMM	8/08
CHECKED	JWK	8/08
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

HIGHLAND AVENUE
PRELIMINARY
PLAN AND PROFILE (22)

SHEET NO.
34
OF 43 SHEETS

XREF: BORDER_HIGH XREF: AERIAL2006 ECW:0: XREF: TOPOR001: XREF: DSGNR001: XREF: BORDER_ PROFR001:

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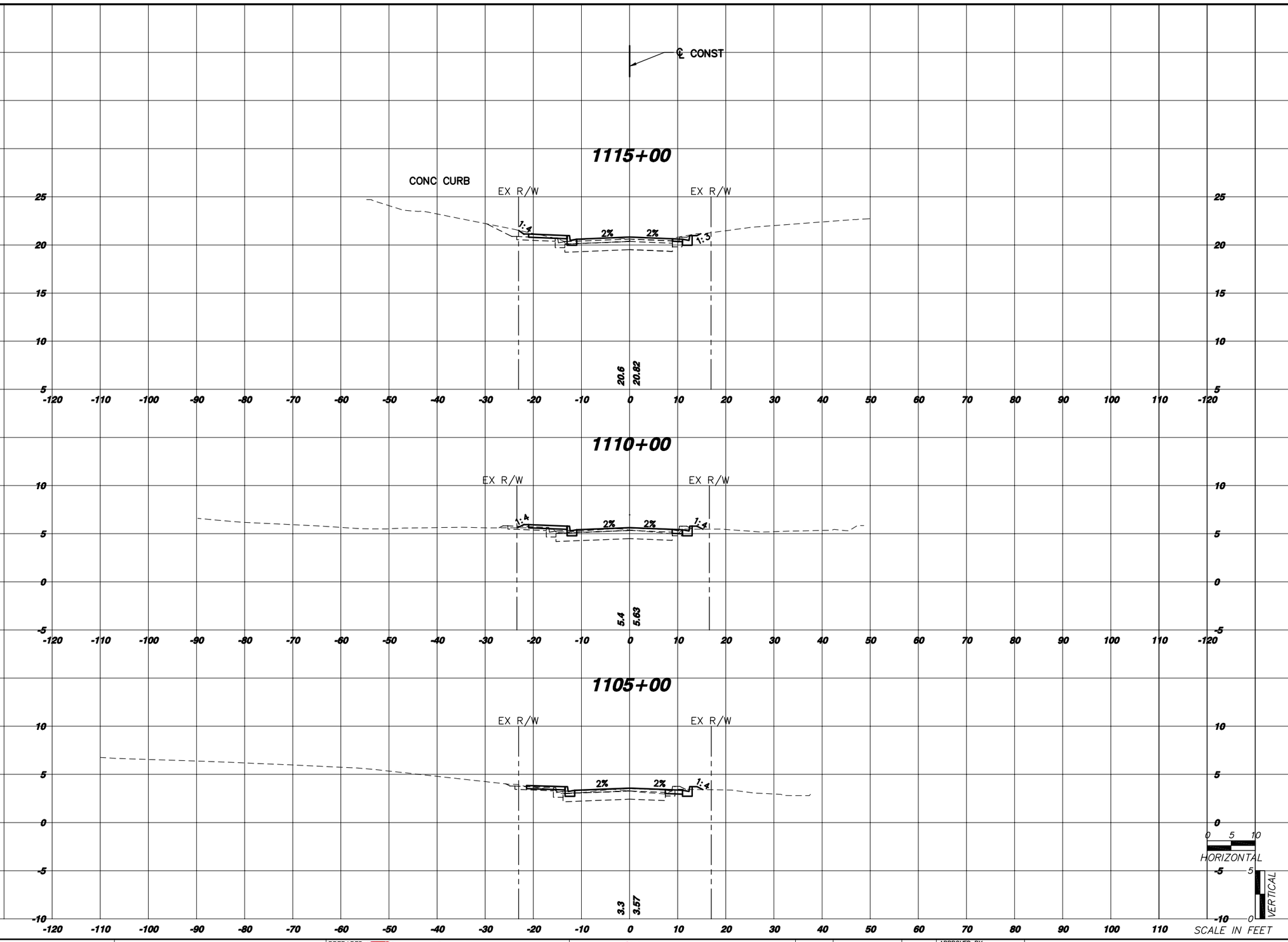

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CHECKED	JWK	1/09
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SUNSET POINT ROAD

CROSS SECTIONS (1)

SHEET NO. 35 OF 43 SHEETS

XREF BORDER; XREF XSECR001

F:\PROJECT\5079576\CADD\Plans\XSEC-PLOT500.dwg LAYOUT:SH101 Last Saved:Jan. 20, 09 Plot Date: 6/4/2009 9:29 AM By: muncy, russell m.

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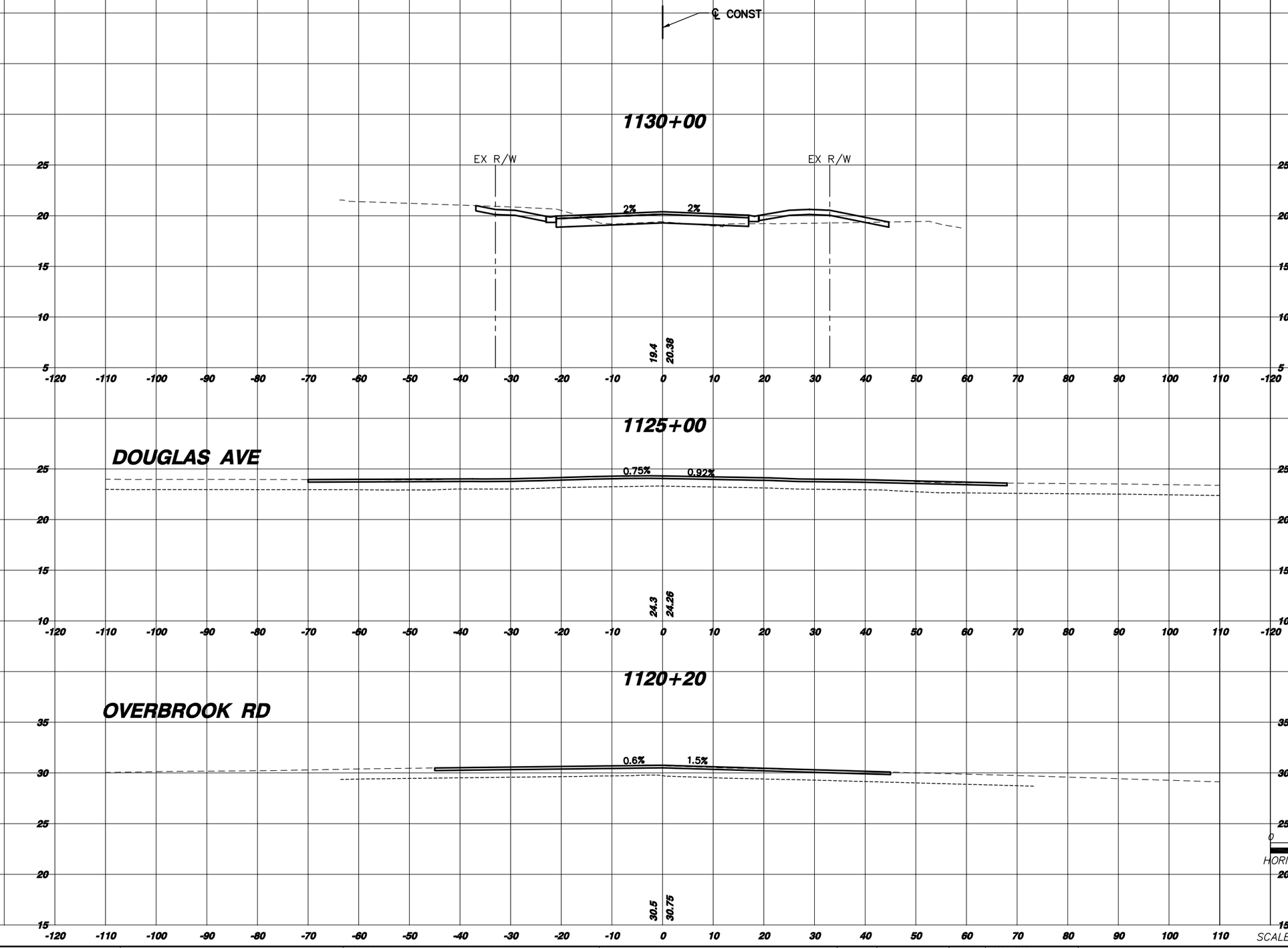

XREF: BORDER; XREF: XSECR01

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	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD

CROSS SECTIONS (2)

SHEET NO. 36 OF 43 SHEETS

F:\PROJECT\507957\CADD\Plans\XSECPLOT600.dwg LAYOUT:SH02 Last Saved:Jan. 20, 09 Plot Date: 6/4/2009 9:29 AM By: muncy, russell m.

SUBSOIL EXC.		CUT		FILL	
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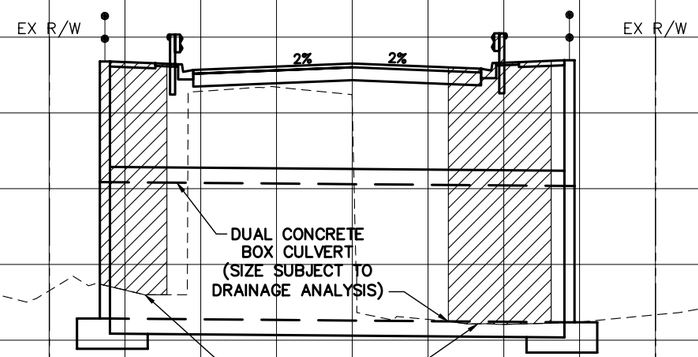
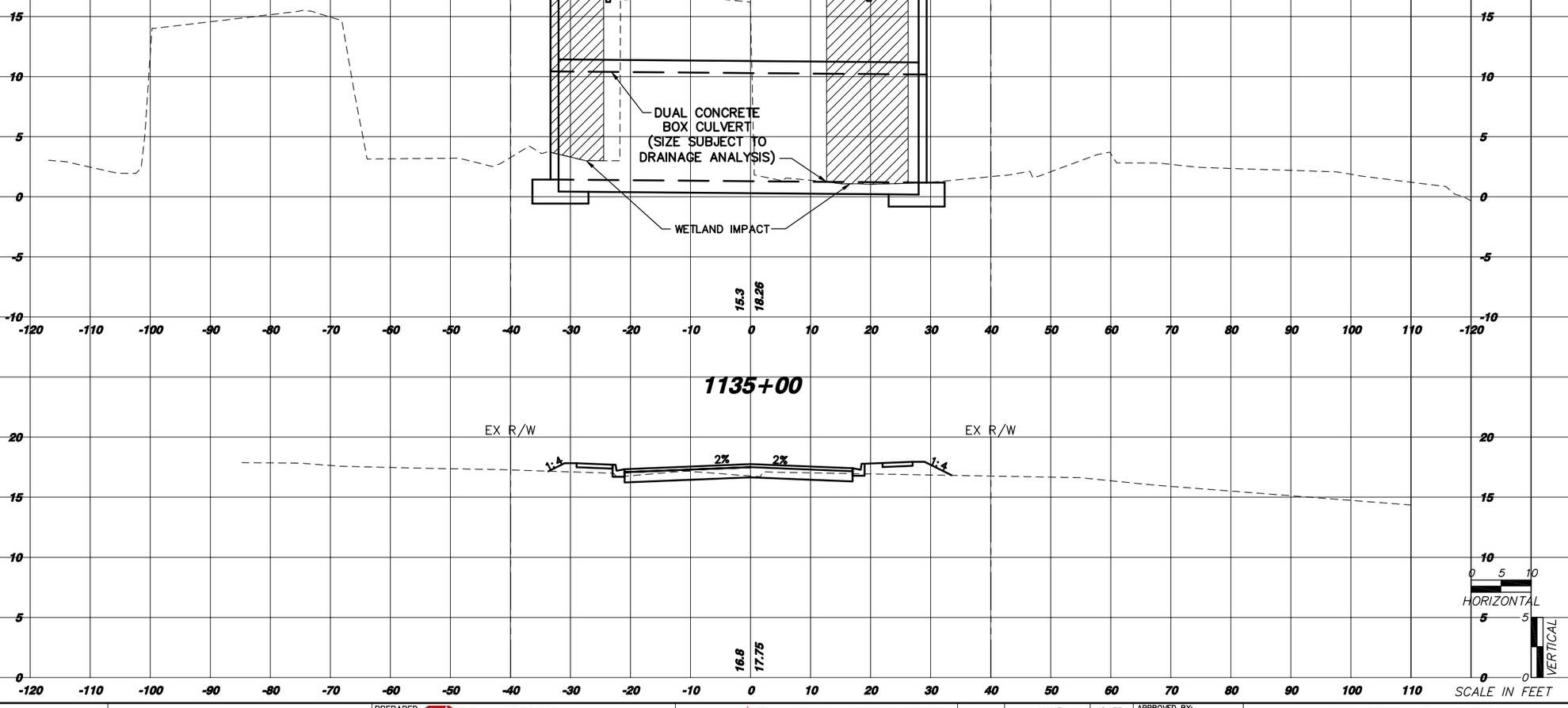
SPRING BRANCH CREEK CULVERT CROSSING

1136+80



1135+00



XREF: BORDER; XREF: XSECB001

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PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD

CROSS SECTIONS (3)

SHEET NO. 37 OF 43 SHEETS

SUBSOIL EXC.		CUT		FILL	
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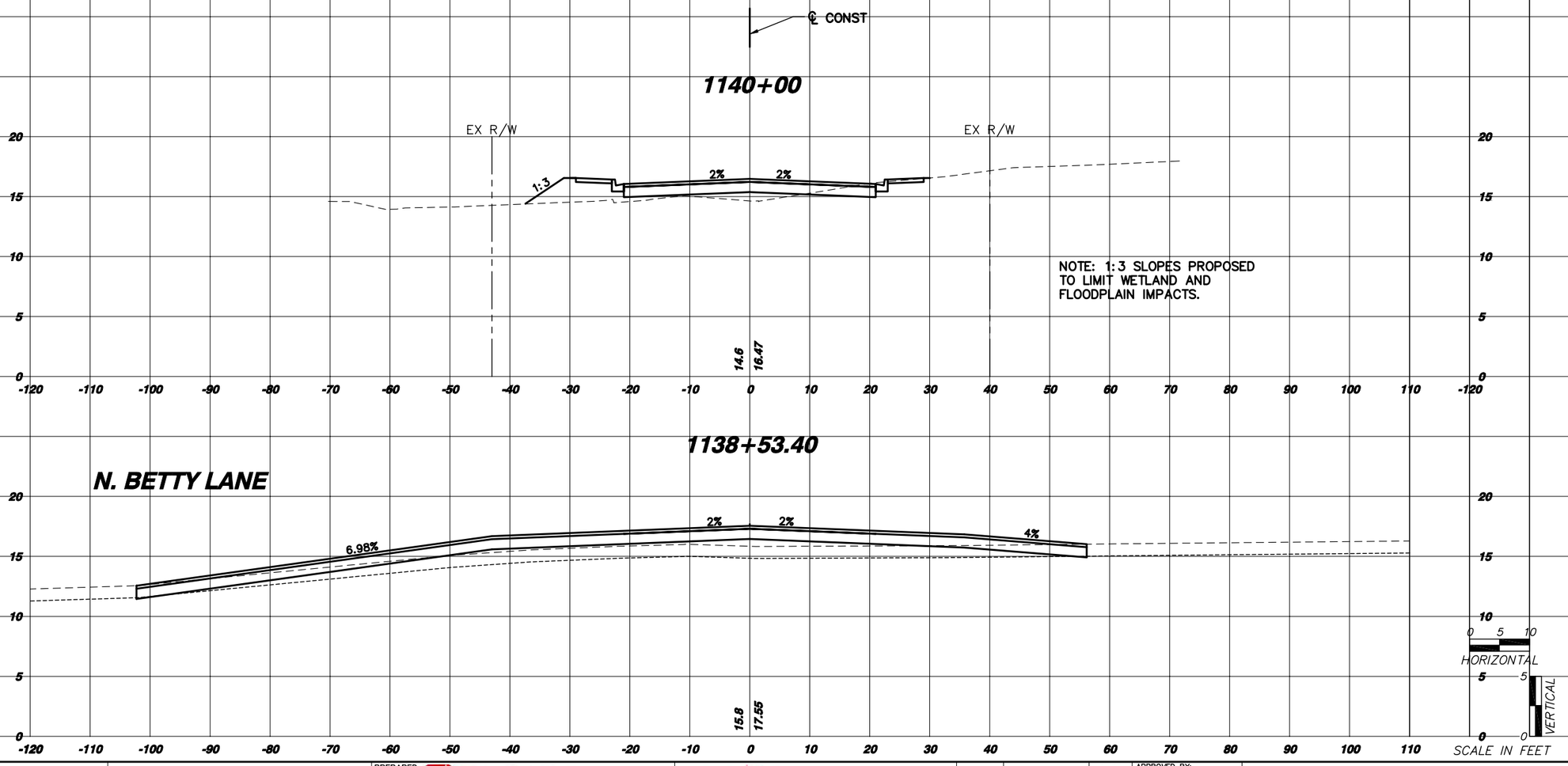

XREF: BORDER; XREF: XSECBD01

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NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD

CROSS SECTIONS (4)

SHEET NO. 38 OF 43 SHEETS

SUBSOIL EXC.		CUT		FILL	
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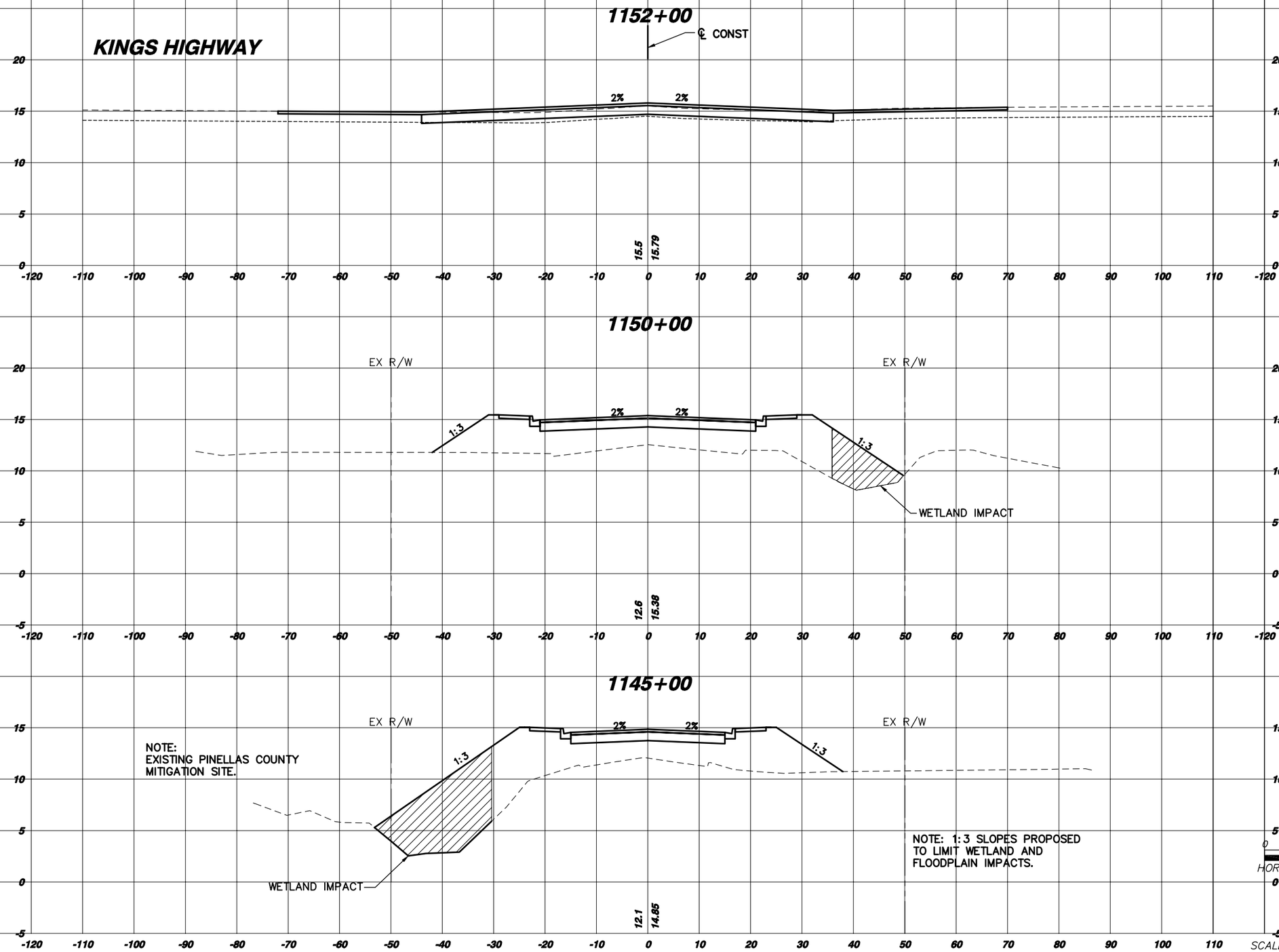

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NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

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SUNSET POINT ROAD

CROSS SECTIONS (5)

SHEET NO. 39 OF 43 SHEETS

XREF: BORDER; XREF; XSECR001

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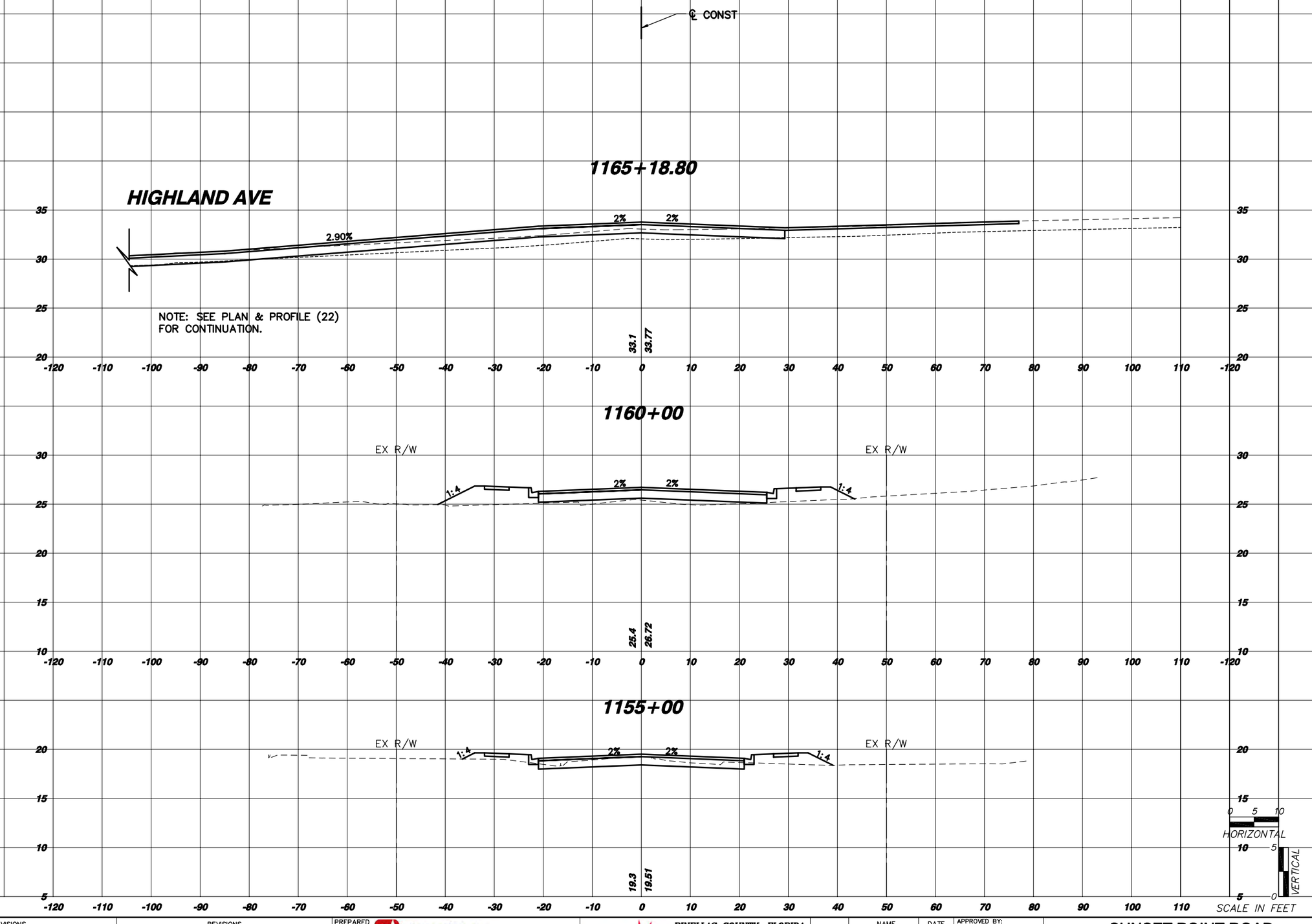

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	NAME	DATE
DESIGNED	RMM	1/09
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CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

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SUNSET POINT ROAD

CROSS SECTIONS (6)

SHEET NO. 40 OF 43 SHEETS

XREF BORDER; XREF XSECB001

F:\PROJECT\507957\6\CADD\Plans\XSEC-PLOT500.dwg LAYOUT:SH106 Last Saved:Jan. 20, 09 Plot Date: 6/4/2009 9:29 AM By: muncy, russell m.

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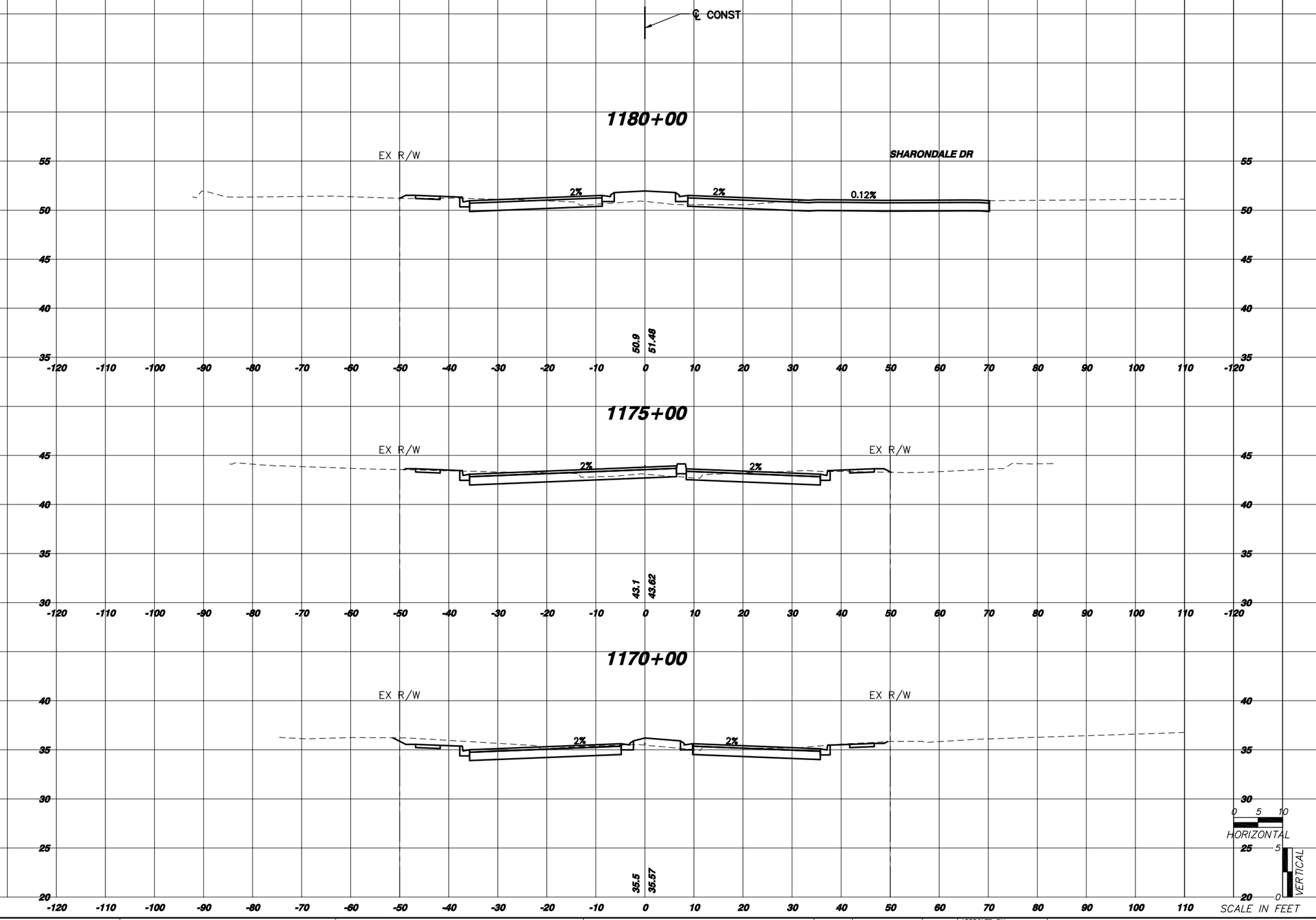

XREF BORDER; XREF XSECRD01

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	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
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CROSS SECTIONS (7)

SHEET NO. 41 OF 43 SHEETS

F:\PROJECT\5079576\CADD\Plans\XSECP-LOT500.dwg LAYOUT:SH107 Last Saved:Jan. 20, 09 Plot Date: 6/4/2009 9:29 AM By: muncy, russell m.

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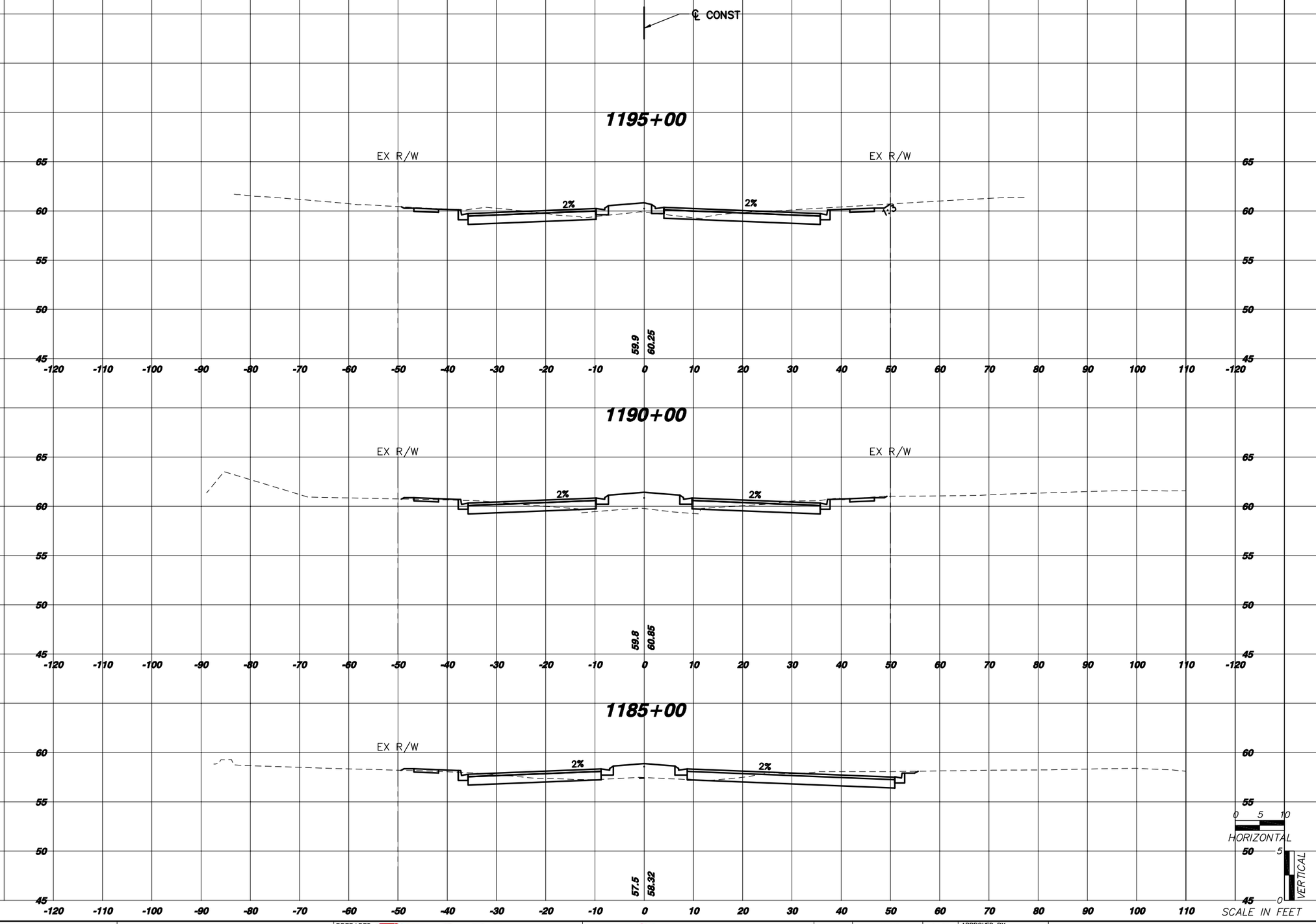

XREF BORDER; XREF XSECRD01

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NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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Pinellas County PUBLIC WORKS

PINELLAS COUNTY, FLORIDA
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440 COURT STREET
CLEARWATER, FLORIDA 33756-5136
PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

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SUNSET POINT ROAD

CROSS SECTIONS (8)

SHEET NO. 42 OF 43 SHEETS

F:\PROJECT\507957\6\CADD\Plans\XSEC-PLOT500.dwg LAYOUT:SH108 Last Saved:Jan. 20, 09 Plot Date: 6/4/2009 9:29 AM By: muncy, russell m.

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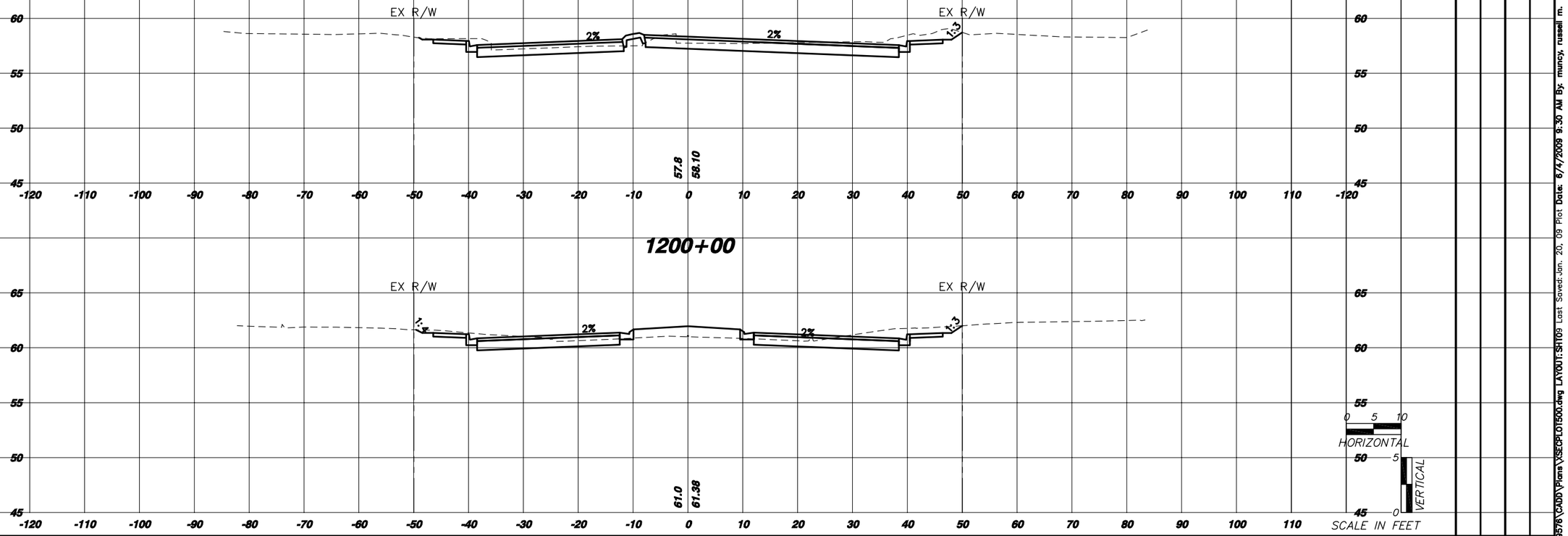

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CLEARWATER, FLORIDA 33756-5136
PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	1/09
DRAWN	RMM	1/09
CHECKED	JWK	1/09
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD

CROSS SECTIONS (9)

SHEET NO. 43 OF 43 SHEETS

Appendix I

Access Management Plan

XREF: TOPO&RD01; XREF: BORDER_EXBT; XREF: DSGN&RD01; XREF: AERIAL2006 ECW10

F:\PROJECT\507576\CADD\Exhibits\ACCESS MGMT.dwg LAYOUT:SH101 Last Saved:Nov. 5, 08 Plot Date: 11/5/2008 3:19 PM By: hill, sean m.

REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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CLEARWATER, FLORIDA 33756-5136
PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	8/08
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CHECKED	JWK	8/08
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APPROVED BY:

SUNSET POINT ROAD

ACCESS MANAGEMENT PLAN (1)

SHEET NO. 1 OF 6 SHEETS

XREF: TOPOROD01; XREF: BORDER_EXT; XREF: DSQNROD01; XREF: AERIAL2006.ECW10

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	NAME	DATE
DESIGNED	RMM	8/08
DRAWN	RMM	8/08
CHECKED	JWK	8/08
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD

ACCESS MANAGEMENT PLAN (2)

SHEET NO. 2 OF 6 SHEETS

BARBARA AVE

WILSON RD

KINGS HIGHWAY

KINGS HIGHWAY

NO PROPOSED ACCESS MODIFICATIONS

STATE ST

BETTY LANE

BETTY LANE

0 50 100 200

SCALE : FEET

LEGEND

- RIGHT OF WAY
- PROPOSED YELLOW PAVEMENT STRIPE
- PROPOSED WHITE PAVEMENT STRIPE
- PROPOSED ACCESS DIRECTION
- PROPOSED SOD MEDIAN
- PROPOSED CONCRETE MEDIAN

XREF: TOPOBDO1; XREF: BORDER_EXB1; XREF: DSGNBDO1; XREF: AERIAL2006 ECW10

F:\PROJECTS\50795\76\CADD\Exhibits\ACCESS MGMT.dwg LAYOUT:SHT03 Last Saved:Nov. 5, 08 Plot Date: 11/5/2008 3:22 PM By: hill, sean m.

REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	8/08
DRAWN	RMM	8/08
CHECKED	JWK	8/08
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD

ACCESS MANAGEMENT PLAN (3)

SHEET NO. 3 OF 6 SHEETS

XREF: TOPO800; XREF: BORDER_EXBT; XREF: DSGNR001; XREF: AERIAL2006 ECW10

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REVISIONS				REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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	NAME	DATE
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DRAWN	RMM	8/08
CHECKED	JWK	8/08
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SUNSET POINT ROAD

ACCESS MANAGEMENT PLAN (4)

SHEET NO. 4 OF 6 SHEETS

MURRAY AVENUE

GREENHILL DRIVE

NUGGET DRIVE

RIDGEWAY DRIVE

LOMBARDY DRIVE

BELLEMEADE DRIVE

SHARONDALE DRIVE

EAST DRIVE

ALGONQUIN DR

PICARDY CIR

ELIZABETH LN

SOUTH DR.

GREENLEA DRIVE

0 50 100 200

SCALE : FEET

LEGEND

- RIGHT OF WAY
- PROPOSED YELLOW PAVEMENT STRIPE
- PROPOSED WHITE PAVEMENT STRIPE
- PROPOSED ACCESS DIRECTION
- PROPOSED SOD MEDIAN
- PROPOSED CONCRETE MEDIAN

XREF: TOPORD01; XREF: BORDER_EXT; XREF: DSGNRD01; XREF: AERIAL2006 ECW10

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	NAME	DATE
DESIGNED	RMM	8/08
DRAWN	RMM	8/08
CHECKED	JWK	8/08
SUPERVISED:	MARTY L. MORLAN, P.E.	

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SUNSET POINT ROAD

ACCESS MANAGEMENT PLAN (5)

SHEET NO. 5 OF 6 SHEETS

END PROJECT

NO PROPOSED ACCESS MODIFICATIONS

MONTCLAIR RD

KEENE ROAD

CLEARVIEW LAKE DRIVE

STARLIGHT DR

ALGONQUIN DR

TOWNSEND ST.

THAMES ST.

PRINCE PHILIP ST.

BENTLEY ST.

GREENLEA DRIVE

CARLISLE ST

0 50 100 200

SCALE : FEET

LEGEND

- RIGHT OF WAY
- PROPOSED YELLOW PAVEMENT STRIPE
- PROPOSED WHITE PAVEMENT STRIPE
- PROPOSED ACCESS DIRECTION
- PROPOSED SOD MEDIAN
- PROPOSED CONCRETE MEDIAN

XREF: TOPORD01: XREF: BORDER_EXB1: XREF: DSGNRD01: XREF: AERIAL2006 ECW10

F:\PROJECTS\07957\CADD\Exhibits\ACCESS MGMT.dwg LAYOUT:SHT06 Last Saved:Nov. 5, 08 Plot Date: 11/5/2008 3:24 PM By: hill, sean m.

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NO.	DATE	DESCRIPTION	APPROVED	NO.	DATE	DESCRIPTION	APPROVED

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CLEARWATER, FLORIDA 33756-5136
PHONE (727) 464-3251

	NAME	DATE
DESIGNED	RMM	8/08
DRAWN	RMM	8/08
CHECKED	JWK	8/08
SUPERVISED:	MARTY L. MORLAN, P.E.	

APPROVED BY:

SUNSET POINT ROAD

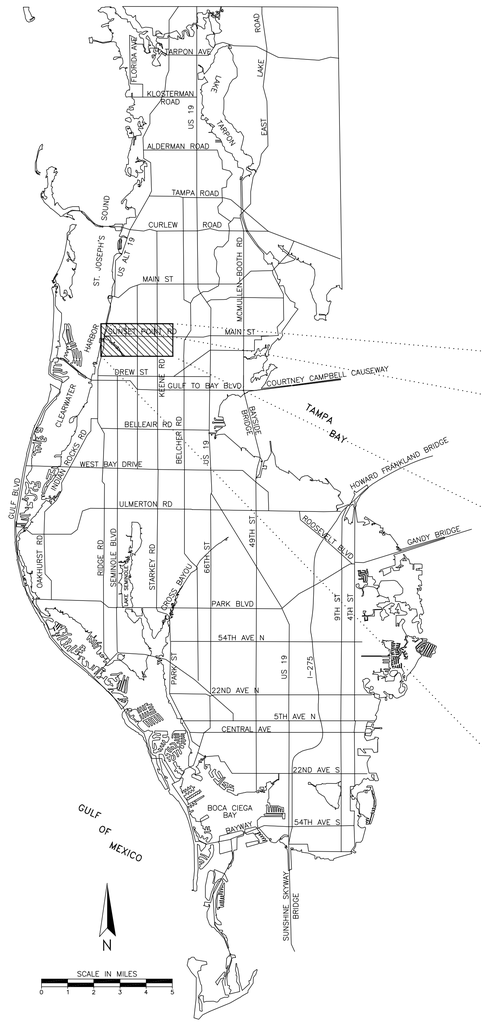
ACCESS MANAGEMENT PLAN (6)

SHEET NO. 6 OF 6 SHEETS

Appendix J

Existing Right of Way Maps

PINELLAS COUNTY MAP



PINELLAS COUNTY PUBLIC WORKS
DIVISION OF SURVEY AND MAPPING
STATE OF FLORIDA

Pinellas County Government is committed to progressive public policy, superior public service, courteous public contact, judicious exercise of authority and sound management of public resources, to meet the needs and concerns of our citizens today and tomorrow.

"Our Public Works Mission is to serve the citizens and visitors of Pinellas County by providing, implementing, operating, and maintaining coastal, surface water, and transportation programs, in a professional manner, which support economic and community growth".

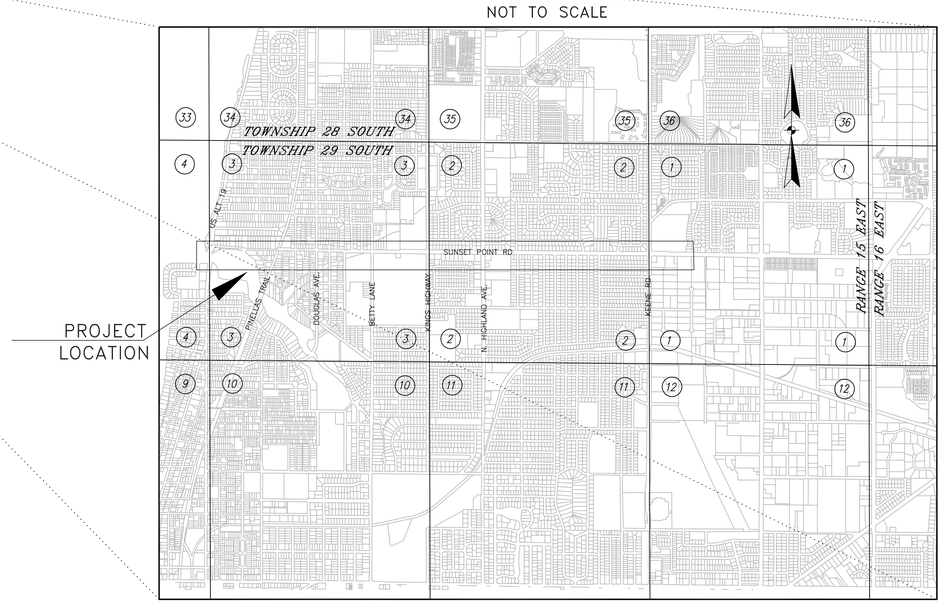
RIGHT–OF–WAY MAP OF:

SUNSET POINT ROAD (C.R. 576)
from EDGEWATER DRIVE (U.S. ALT. 19)
to 650 LF EAST (more or less) of KEENE ROAD (C.R. 1)

THE SURVEY DEPICTED HERE IS NOT COVERED BY PROFESSIONAL LIABILITY INSURANCE.

VICINITY MAP

NOT TO SCALE



SECTIONS 1, 2 & 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SHEET INDEX

1	COVER SHEET / VICINITY MAP / GRAPHIC SYMBOLS
2–3	LAND SURVEYOR REPORT / ALIGNMENT / ABBREVIATIONS MONUMENTATION TABLE
4	KEY SHEET
5–21	DETAIL SHEETS

REVISION DATES

GRAPHIC SYMBOLS:

CENTERLINE	SANITARY SEWER GRAVITY LINE	CENTERLINE	SHRUB
CONTOUR LINE	FORCE MAIN (SANITARY SEWER)	SURVEY LINE	PALM TREE
EXISTING TOPOGRAPHIC FEATURE	GAS LINE	PROPERTY LINE	DECIDUOUS TREE (OAK UNLESS OTHERWISE ANNOTATED)
JURISDICTION LINE	HOT OIL LINE	DELTA ANGLE	EVERGREEN TREE
CONSTRUCTION REFERENCE LINE	RECLAIMED WATER LINE	FIRE HYDRANT	WATER VALVE
RIGHT–OF–WAY (EXISTING)	POTABLE WATER	GUY WIRE	RECLAIMED WATER VALVE
RIGHT–OF–WAY LINE (PROPOSED) (EXISTING W/ ACQUISITION)	UNKNOWN UTILITY	SEWER MANHOLE	GATE VALVE
PROPERTY OR DEED LINE	FOUND CONCRETE MONUMENT	TELEPHONE MANHOLE	GAS VALVE
EASEMENT LINE	FOUND NAIL & DISC/CAP BRASS DISC	DRAINAGE MANHOLE	WATER METER
SECTION LINE	FOUND IRON ROD	RECLAIMED WATER MANHOLE	RECLAIMED WATER METER
ORIGINAL LOT LINE/FORMER OWNERSHIP LINE/ VACATED EASEMENTS	FOUND IRON PIPE	TRAFFIC SIGNAL PULL BOX	GRATE INLET
TREE LINE	FOUND PINCH PIPE	SPRINKLER HEAD	BENCHMARK
FENCE LINE	SET CONCRETE MONUMENT	TRAFFIC SIGNAL POLE	TARGET
CABLE TELEVISION	SET NAIL & DISC/CAP BRASS DISC	UNDERDRAIN BOX	MONITOR WELL
TELEPHONE LINE	SET IRON ROD	POLE/POST	TELEPHONE BOX
TRAFFIC CONTROL LINE	XCUT (FOUND)	UTILITY POLE	SANITARY CLEANOUT
ELECTRIC POWER LINE/CABLE	XCUT (SET)	LIGHT POLE	ELECTRIC METER
DRAINAGE (STORM SEWER) PIPE	OWNER IDENTIFICATION	MAILBOX	ELECTRIC PEDESTAL
	SUBDIVISION BLOCK DESIGNATION		IRRIGATION CONTROL VALVE
			PCWS BOX
			CABLE TV BOX
			FLORIDA POWER BOX
			GEO–TECH BORING
			WETLAND POINT

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Certificate of Authorization No. LB6566
State of Florida

DATE

SEAL

PROJECT NO.: 920476	DRAWING NO.: RWsh01	
CONTRACT NO.: 067–0500–A(DM)	FILE NO.: SFN 1029	
	SHEET 01 OF 21	RWSH01.DWG

SURVEYOR REPORT:

1. Type of Survey: Specific Purpose Survey (Chapter 61G17-6.004(11) Florida Administrative Code) to delineate the existing right of way per record instruments.

2. Survey Date: Last date of field efforts – 1/05/2009. McKim & Creed field books 117A,120 AND 123. Date of Computations: January 2008 through January 2009.

3. BEARINGS AND COORDINATE values shown hereon are based on a Topographic and Specific Purpose Survey completed for SFN 1029, limits being Sunset Point Road (C.R. 576), from Edgewater Drive (U.S. Alt. 19) to Keene Road (C.R. 1). The horizontal datum is based on the State Plane Coordinate System for the West Zone of Florida, North American Datum, 1983/1990 adjustment (NAD 83/90);

City of Clearwater Engineering Department – Land Survey Division Vertical and Horizontal Control Network. Bearing basis being South 69°13'19" East.

Found 4"X 4" concrete monument with bronze disk stamped "CLEARWATER BM J-06" (Northing = 1,332,586.771 ft., Easting = 399,832.921 ft.)

Found 4"X 4" concrete monument with bronze disk stamped "CLEARWATER BM I-09" (Northing = 1,329,827.870 ft., Easting = 407,104.140 ft.)

The following are N.G.S. monuments used:

PCDSM GPS 78 / PID – DF5853; SPC FL W. – (Northing = 1,318,386.22 ft. Easting 388,811,.87 ft.)

PCDSM GPS 13 / PID – DF5792; SPC FL W. – (Northing = 1,303,336.85 ft. Easting 432,174.88 ft.)

4. ACCURACY STATEMENT: All measurements were performed in strict accordance with the Minimum Technical Standards set forth in Chapter 61G17-6, Florida Administrative Code.

5. PERFORMANCE: It is the sole purpose of this survey to delineate existing right of way along the project limits.

6. SURVEY METHODS: Horizontal Control for this survey was established using Global Positioning System (GPS) methods with real time kinematic sessions using precise navigation set at the 95% confidence level. The maximum positional uncertainty is computed to be 0.08 feet (24 millimeters) using the algebraic sum mean of the processed positions and obtained vector lengths.

7. SURVEY TECHNICIANS: Doug Mitchell (CST level 1), Aaron Stevens, James Troiso, Jason Adams CST Computer II (0407-2982).
8. RESPONSIBILITY: The undersigned, Earl W. Ramer, PSM, is the responsible Surveyor and Mapper for this Specific Purpose Survey for Right of Way delineation.

9. Not valid without the Signature and the original raised Seal of a Florida Surveyor and Mapper.

10. The Construction Reference Lines shown hereon are calculated reference lines and are not monumented in the field.

11. Additions or deletions to survey maps or reports by other then the signed party or parties is prohibited without written consent of the signing party or parties.

12. Not based on abstract of title. Selected record instruments were provided by Pinellas County. Not a boundary survey. Other easements and/or restrictions may exist.

13. Neither map nor the report is full and complete without the other.

Surveyor and Mapper in responsible charge:

EARL W. RAMER, P.S.M.
State of Florida
Professional Surveyor and Mapper
License Number 3612
Not valid without signature and original raised
Seal of a Florida Surveyor and Mapper

ALIGNMENT (CONSTRUCTION REFERENCE LINE):

Alignment: SURVEY BASELINE
Desc: SUNSET POINT ROAD

Pt#	PI Station	Northing	Easting	Distance	Direction
42000	100+00	1330010.8008	399402.9869		
	(675+62.28 EDGEWATER DRIVE)			556.29'	S 87-40-14 E
42001	105+56.29	1329988.1895	399958.8208		
				73.31'	S 79-06-30 E
42002	106+29.61	1329974.3365	400030.8150		
				77.93'	S 84-06-02 E
42003	107+07.54	1329966.3263	400108.3341		
				74.50'	S 72-06-38 E
42004	107+82.04	1329943.4399	400179.2364		
				826.49'	S 89-09-45 E
42005	116+08.54	1329931.3582	401005.6414		
				912.60'	S 89-09-45 E
72	125+21.13	1329918.0180	401918.1370		
				2665.02'	S 89-11-28 E
1200	151+86.15	1329880.3906	404582.8914		
				5325.81'	S 89-30-16 E
1001	205+11.96	1329834.3240	409908.5010		
				2699.03'	S 89-06-10 E
51204	232+10.99	1329792.0600	412607.2030		

Alignment: SURVEY BASELINE
Desc: EDGEWATER DRIVE

904	663+24.33	1328779.5099	399274.7587		
				1675.67'	S 05-56-44 W
21273	680+00.00	1330446.1710	399448.3268		

MONUMENTATION/CONTROL POINT COORDINATES:

POINT#	NORTHING (FT.)	EASTING (FT.)	STATION	OFFSET	DESCRIPTION
3	1330041.438	399461.409	100+57.13	-32.98	FNDK PK HLA LB6969
71	1329899.276	403250.364	138+53.49	-0.06	FRRS XCUT15
72	1329918.018	401918.137	125+21.13	0.00	FIR 3/4"
500	1329976.137	409129.587	N/A	N/A	FCM 4X4
501	1330005.415	409219.846	N/A	N/A	FCM 4X4
503	1330065.184	409239.251	N/A	N/A	FCM 4X4
505	1329889.696	409281.483	198+84.49	-49.94	FIR 5/8
506	1329889.193	409353.988	199+56.99	-50.07	FIR 5/8
507	1329888.543	409421.924	200+24.93	-50.00	FIR 5/8
508	1329887.494	409561.806	201+64.82	-50.16	FIR YC 1/2 LB6225
510	1329788.294	409454.722	200+58.60	49.95	FPPIPE 1
511	1329788.827	409379.757	199+83.63	50.06	FCM 4 DIA
512	1329789.448	409300.734	199+04.60	50.13	FIR YC 1/2 RLS 3035
513	1329790.373	409224.556	198+28.42	49.86	FIR YC 1/2 RLS 2512
514	1329791.102	409144.540	197+48.40	49.82	FIR 1/2
515	1329792.207	408989.416	195+93.27	50.06	FIR 5/8
516	1329792.955	408909.393	195+13.25	50.00	FIP 3/4
517	1329793.557	408829.352	194+33.20	50.10	FIP 1
518	1329892.168	408954.080	195+57.07	-49.58	FIR 5/8 LEANING
521	1329787.541	409534.741	201+38.62	50.01	FIP 3/4
522	1329786.954	409609.801	202+13.68	49.95	FIP 1
523	1329785.765	409769.680	203+73.56	49.75	FIR YC 5/8 PLS 4495
524	1329884.737	409828.284	204+31.31	-49.71	FIR YC 1/2 LB 6225
525	1329886.212	409709.209	203+12.23	-50.16	FIR YC 5/8 PLS 8865
526	1329886.816	409629.878	202+32.89	-50.08	FIR 5/8
527	1329795.749	408577.840	191+81.68	50.08	FCM 4X4
529	1329895.647	408578.814	191+81.79	-49.81	FIR YC 5/8 LB 5539
530	1329896.372	408492.854	190+95.83	-49.80	FIR 5/8
531	1329897.717	408352.714	189+55.68	-49.93	FIR YC 1/2 POLARIS 6113
532	1329904.417	408352.679	189+55.59	-56.63	FCM 4X4
533	1330018.357	408273.365	N/A	N/A	FIP 1
534	1329904.266	408292.693	188+95.61	-55.96	FCM 4 DIA
535	1329898.132	408292.595	188+95.56	-49.82	FCM 4X4
536	1329898.877	408191.509	187+94.47	-49.69	FIR 5/8
537	1329901.590	408100.554	187+03.50	-51.62	FCM 4X4
538	1329897.719	408063.637	186+49.47	51.71	FCM 4X4
539	1329795.481	408414.586	190+18.44	51.76	FCM 4X4
540	1329794.933	408474.518	190+78.37	51.79	FCM 4X4
542	1329610.281	408415.279	N/A	N/A	FPPIPE 1
543	1329690.529	408414.688	N/A	N/A	FIP 3/4
544	1329690.032	408474.789	N/A	N/A	FIR 1/2
545	1329609.995	408474.919	N/A	N/A	FCM 4X4
547	1329893.177	408803.304	194+06.29	-49.29	FIR 1/2
548	1329794.830	408677.942	192+81.79	50.13	FCM 4X4
552	1329630.038	408678.225	N/A	N/A	FIP 1
553	1329704.622	408677.683	N/A	N/A	FIP 3/4
554	1329996.843	408341.914	N/A	N/A	FIR 5/8 SET IN CONC
555	1330081.422	408312.352	N/A	N/A	FCM 4X4
556	1330084.865	408277.134	N/A	N/A	FND LB 3889
557	1329797.334	408208.533	188+12.38	51.69	FCM 4X4
558	1329799.541	407942.653	185+46.49	51.78	FCM 4X4
559	1329615.146	407882.607	N/A	N/A	FIP 1
560	1329614.567	407942.784	N/A	N/A	FCM 3X3
563	1329800.262	407882.659	184+86.49	51.58	FCM 4X4
564	1329801.186	407779.678	183+83.50	51.55	FIR 5/8
565	1329802.102	407676.571	182+80.39	51.52	FIR 5/8
566	1329802.794	407616.716	182+20.53	51.35	FIP 1/2
567	1329904.493	407581.370	181+84.31	-50.03	FIP 1
568	1329903.669	407666.152	182+69.10	-49.94	FIP 1
569	1329902.837	407751.168	183+54.12	-49.85	FIP 1
570	1329902.209	407836.134	184+39.08	-49.95	FIR 5/8
571	1329695.504	407882.987	N/A	N/A	FIR 5/8
572	1329694.588	407942.712	N/A	N/A	FIR YC 1/2 PLS 4466
575	1329612.716	408149.149	N/A	N/A	FIR YC 5/8 LS 2129
576	1329692.879	408148.807	N/A	N/A	FCM 4X4
577	1329692.403	408208.886	N/A	N/A	FIP 1/2
578	1329612.151	408208.870	N/A	N/A	FIR 1/2
581	1329617.860	407617.214	N/A	N/A	FPPIPE 1
582	1329697.888	407617.004	N/A	N/A	FIP 1/2
583	1329617.095	407676.919	N/A	N/A	FIP 1
585	1329697.123	407676.926	N/A	N/A	FIP 1
586	1329905.218	407496.171	180+99.11	-50.02	FCM 4 DIA
587	1329906.588	407330.999	179+33.93	-49.96	FIP 1
589	1329615.134	407350.922	N/A	N/A	FIR 5/8
590	1329695.102	407350.679	N/A	N/A	FIR 5/8
591	1329699.558	407410.985	N/A	N/A	FPPIPE 1/2
592	1329619.395	407411.020	N/A	N/A	FIP 1
594	1329810.469	406782.880	173+86.66	50.88	FPPIPE 1
595	1329809.891	406852.688	174+56.47	50.86	FCM 4X4

POINT#	NORTHING (FT.)	EASTING (FT.)	STATION	OFFSET	DESCRIPTION
596	1329809.229	406917.735	175+21.52	50.96	FCM 4X4
597	1329808.652	406982.764	175+86.55	50.97	FIR 5/8
598	1329808.151	407052.698	176+56.49	50.87	FIP 1
599	1329807.407	407112.696	177+16.49	51.09	FIP 1
601	1329907.468	407251.015	178+53.94	-50.15	FIR 5/8
602	1329907.546	407251.011	178+53.94	-50.23	FIP 3/4
603	1329908.211	407171.042	177+73.96	-50.20	FIP 3/4
604	1329908.199	407170.967	177+73.89	-50.19	FIR 5/8
605	1329908.217	407170.913	177+73.84	-50.21	FIR 5/8
606	1329908.823	407090.980	176+93.90	-50.12	FIP 1
607	1329909.593	407010.949	176+13.87	-50.20	FIP 1
608	1329910.797	406850.849	174+53.76	-50.02	FIP 1
609	1329911.732	406750.935	173+53.84	-50.09	FCM 4X4
610	1330031.719	406750.384	N/A	N/A	FIR YC 1/2 ILLEG
612	1330012.146	406690.644	N/A	N/A	FIP 1
613	1329912.140	406690.978	172+93.88	-49.98	FCM 4 DIA
614	1329912.980	406580.978	171+83.88	-49.87	FCM 4X4
615	1329914.096	406474.875	170+77.77	-50.06	FCM 4X4
616	1329812.309	406581.249	171+85.02	50.79	FCM 4X4
618	1329810.550	406722.665	173+26.45	51.32	FCM 4X4
619	1329690.880	406722.990	N/A	N/A	FCM 4X4
622	1329690.424	406782.996	N/A	N/A	FIP 3/4
623	1329811.683	406652.812	172+56.59	50.80	FCM 4X4
625	1329806.171	407247.550	178+51.35	51.16	FCM 4X4
626	1329806.704	407190.785	177+94.58	51.12	FIR YC 5/8 LB 7494
628	1330092.033	406690.424	N/A	N/A	FIP 1
632	1329687.199	407112.792	N/A	N/A	FIR 5/8
633	1329687.311	407112.916	N/A	N/A	FIR YC 5/8 LB 7494
635	1329915.058	406364.989	169+67.88	-50.08	FIP 3/4
636	1329915.787	406289.952	168+92.84	-50.16	FPPIPE 1
637	1329916.212	406214.885	168+17.77	-49.93	FIP 1/2
639	1329916.875	406139.510	167+42.40	-49.94	FIR 5/8
640	1329368.455	405866.478	N/A	N/A	FPPIPE 3/4
641	1329218.331	405861.145	N/A	N/A	FNL IN LIMEROCK
643	1329202.884	405966.775	N/A	N/A	FCM 4X4 LS 2827
644	1329400.282	405966.186	N/A	N/A	FIR 5/8
645	1329512.357	405966.054	N/A	N/A	FXCUT
646	1329612.514	405965.899	N/A	N/A	FIR 5/8
647	1329672.146	405965.657	N/A	N/A	FIR 5/8
648	1329818.634	405865.600	164+69.35	50.65	FIR YC 5/8 PLS 2865
649	1329643.594	405865.867	N/A	N/A	FIR YC 1/2 LB 5776
650	1329568.747	405866.004	N/A	N/A	FIR 1/2 BENT
653	1330213.552	405963.606	N/A	N/A	FIP 3/4
654	1330103.401	405964.176	N/A	N/A	FCM 4X4
655	1330053.324	405964.330	N/A	N/A	FIP 3/4
656	1329919.232	405864.951	164+67.83	-49.92	FCM 3X3
657	1330029.272	405864.636	N/A	N/A	FIR 1 1/4
658	1330109.293	405864.434	N/A	N/A	FPPIPE 1
659	1330189.322	405864.085	N/A	N/A	FIP 1
660	1330274.308	405863.710	N/A	N/A	FIP 1
661	1330514.193	405863.013	N/A	N/A	FCM 4 DIA
664	1330508.504	405962.808	N/A	N/A	FIP 1
665	1330383.492	405963.133	N/A	N/A	FIP 1
666	1329918.328	405965.187	165+68.07	-49.89	FIP 1
667	1330359.372	405863.394	N/A	N/A	FIP 1
668	1329823.087	405415.583	160+19.31	50.09	FIR YC 1/2 PLS 4466
669	1329824.009	405315.633	159+19.35	50.04	FNDK PLS 4466
670	1329825.829	405115.815	157+19.53	49.95	FIR 1/8
671	1329925.885	405095.323	156+98.17	-49.92	FIP 1
672	1329925.137	405170.233	157+73.08	-49.82	FIP 1
673	1329921.634	405594.858	161+97.72	-49.99	FCM 4X4
674	1329919.765	405755.754	163+58.63	-49.51	FIR 5/8 BENT
675	1329919.674	405755.857	163+58.73	-49.42	FIP 1
677	1329921.102	405654.797	162+57.67	-49.98	FCM 4X4
678	1330036.669	405594.446	N/A	N/A	FCM 4X4
681	1330106.224	405654.116	N/A	N/A	FIP 1
682	1329826.456	404913.174	155+16.89	51.07	FIR YC 1/2 LB 6423
683	1329826.356	405015.380	156+19.09	50.29	FIR YC 1/2 LB 6492
684	1329926.515	405020.372	156+23.22	-49.90	FIP 1
685	1329927.072	404945.746	155+48.59	-49.81	FCM 4X4
686	1329927.790	404870.373	154+73.21	-49.88	FCM 4X4
687	1329928.337	404795.336	153+98.17	-49.78	FCM 4X4
688	1329929.230	404715.187	153+18.02	-49.98	FIP 1
689	1329930.008	404615.312	152+18.14	-49.89	FXCUT
690	1329930.878	404552.641	151+55.19	-50.05	FIR 5/8
691	1329830.747	404549.933	151+53.90	50.10	FNDK LB 021
692	1329830.032	404612.893	152+16.59	50.09	FIR YC ABZ 3000
693	1329830.009	404613.041	152+16.74	50.11	FPPIPE 3/4
694	1329828.691	404748.063	153+51.76	50.26	FPPIPE 3/4

ABBREVIATIONS:

(C)	CALCULATED DATA
(M)	MEASURED (IN FIELD)
(P)	PLAT DATA
(R)	RECORD DATA
60D	NAIL 60D
A	ARC
AC	ACRE(S)
AHD	AHEAD
AVE	AVENUE
BK	BACK
BLDG	BUILDING
BLVD	BOULEVARD
C#	CURVE NUMBER
CALC	CALCULATED
CC#####	CERTIFIED CORNER NUMBER
CH	CHORD
CL	CENTERLINE
CM	CONCRETE MONUMENT
CO	COUNTY
CONC	CONCRETE
COR	CORNER
CR	COUNTY ROAD
CRL#	CONSTRUCTION REFERENCE LINE NUMBER
D	DELTA
DB	DEED BOOK
DEP	DEPARTMENT OF ENVIRONMENTAL PROTECTION
DEPT	DEPARTMENT
DESC	DESCRIPTION
DIA	DIAMETER
DNR	DEPARTMENT OF NATURAL RESOURCES
DOC	DEGREE OF CURVE
DOT	DEPT OF TRANSPORTATION
E	EAST OR EASTING
E-W	EAST-WEST
EQ	EQUATION
ESMT	EASEMENT
EX	EXTERNAL
FAC	FLORIDA ADMINISTRATIVE CODE
FCM	FOUND CONCRETE MONUMENT
FEN	FENCE
FIR	FOUND IRON ROD
FIRC	FOUND IRON ROD AND CAP
FPKD	FOUND PK NAIL AND DISK
FND	FOUND
FNS	FOUND NAIL AND SHINER
FOC	FOUND ORANGE CAP
FOP	FOUND OPEN PIPE
FPPIPE	FOUND PINCHED PIPE
FRC	FOUND RED CAP
FRRS	FOUND RAILROAD SPIKE
FS	FLORIDA STATUTES
FT	FEET
FYC	FOUND YELLOW CAP
GEO	GEODETIC
GPS	GLOBAL POSITIONING SYSTEM
HWY	HIGHWAY
ID	IDENTIFICATION
IP	IRON PIPE
IR	IRON ROD
L	ARC LENGTH
LN	LANE
LT	LEFT
MISC	MISCELLANEOUS
MON	MONUMENT
MTS	MINIMUM TECHNICAL STANDARDS
N	NORTH OR NORTHING
N/A	NOT APPLICABLE
N-S	NORTH-SOUTH
NE	NORTHEAST
NO	NUMBER
NTS	NOT TO SCALE
NW	NORTHWEST
O/A	OVERALL
OC	ORANGE CAP
OP	OPEN PIPE
OR	OFFICIAL RECORD
PB	PLAT BOOK
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PCED	PINELLAS COUNTY ENGINEERING DEPT
PCRC	PINELLAS COUNTY RED CAP
PCSD	PINELLAS COUNTY SURVEY DIVISION
PI	POINT OF INTERSECTION
PID	PROJECT IDENTIFICATION NUMBER
PK	PK (TRADE MARK)
PL	PROPERTY LINE
PLS	PROFESSIONAL LAND SURVEYOR
PNT	POINT
POB	POINT OF BEGINNING
POC	POINT ON CURVE
POT	POINT ON TANGENT
PPIPE	PINCHED PIPE
PRC	POINT OF REVERSE CURVATURE
PSM	PROFESSIONAL SURVEYOR AND MAPPER
PT	POINT OF TANGENCY
R	RADIUS
R#	REVISION NUMBER
RC	RED CAP
REF	REFERENCE
RLS	REGISTERED LAND SURVEYOR
RP	RADIUS POINT
RR	RAILROAD
RRS	RAILROAD SPIKE
RT	RIGHT
ROW	RIGHT-OF-WAY
R/W	RIGHT-OF-WAY
S	SOUTH
SCM	SET CONCRETE MONUMENT
SE	SOUTHEAST
SEC ##-##-##	SECTION, TOWNSHIP, RANGE
SFN	SURVEY FILE NUMBER
SIRC	SET IRON ROD "TBE LB 6668"
SPKD	SET PK AND DISK "TBE LB 6668"
SQ	SQUARE
SR	STATE ROAD
SRD	STATE ROAD DEPARTMENT
ST	STREET
STA	STATION
STY	STORY
SW	SOUTHWEST
T	TANGENT
TERR	TERRACE
W	WEST
W/	WITH
W/O	WITHOUT
YC	YELLOW CAP
°	DEGREE
+-	MORE OR LESS (PLUS OR MINUS)
"	INCHES (IN DISTANCES) SECONDS (IN BEARINGS)
'	FEET (IN DISTANCES)
'	MINUTES (IN BEARINGS)

REVISIONS	BY	DATE

SURVEY BOOK No.:		
SURVEY DIVISION	BY	DATE
SURVEYED	DM	11/2008
TECHNICIAN	JMA	12/2008
CHECKED	EWR	12/2008
DESIGN DIVISION		
DESIGNED		
DRAWN		
CHECKED		

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

RIGHT-OF-WAY MAP

McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
Internet Site: http://www.mckimcreed.com

EARL W. RAMER, P.S.M.
FLORIDA PROFESSIONAL SURVEYOR AND MAPPER
LICENSE NO. 3612

DATE

DATE: 1/06/2008
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 2 OF 21 RWSH02.DWG

MONUMENTATION/CONTROL POINT COORDINATES:

POINT#	NORTHING (FT.)	EASTING (FT.)	STATION	OFFSET	DESCRIPTION
695	1329700.077	404613.208	N/A	N/A	FIR 5/8
696	1329649.987	404613.322	N/A	N/A	FIR 5/8
697	1329600.266	404613.643	N/A	N/A	FIP 1
698	1329469.911	404613.770	N/A	N/A	FCM 6X6
699	1329409.672	404614.745	N/A	N/A	FND ANGLE IRON
700	1329328.901	404613.984	N/A	N/A	FIP 1/2
703	1330044.930	404614.945	N/A	N/A	FIP 1
704	1330149.963	404614.572	N/A	N/A	FIR 1/2
705	1330200.056	404614.332	N/A	N/A	FCM 4 DIA
706	1330299.986	404613.863	N/A	N/A	FCM 4 DIA
707	1330370.006	404613.741	N/A	N/A	FPPIPE 1
708	1330510.216	404613.321	N/A	N/A	FIR YC 5/8 RLS 2650
709	1330580.287	404612.579	N/A	N/A	FIR YC 1/2 ILLEG
710	1330580.292	404612.917	N/A	N/A	FIR 1/2
712	1330440.629	404613.422	N/A	N/A	FIP 1
713	1329936.936	404120.269	147+22.78	−50.00	FIR YC 1/2 LB 4113
714	1329939.337	403923.765	145+26.26	−49.63	FIR YC 5/8 LB 2863
715	1329944.194	403594.656	141+97.11	−49.84	FIR YC 5/8 PCSD
716	1329928.157	403529.255	141+31.95	−32.88	FIP 1
717	1329930.322	403346.231	139+48.91	−32.46	FIR 1/2
718	1329930.773	403346.266	139+48.94	−32.91	FNDK LB 4019
719	1329929.418	403220.431	138+23.13	−29.78	FIR 1/2
720	1329849.347	403220.595	138+24.43	50.27	FIR YC 1/2 RLS 2512
721	1329848.577	403280.478	138+84.32	50.19	FIR YC 1/2 LB 624
722	1330129.888	403279.392	N/A	N/A	FIR OC 1/2 PLS 5083
723	1330285.060	403278.762	N/A	N/A	FIR 1/2 SET IN CONC
724	1330335.047	403278.546	N/A	N/A	FIR 5/8
725	1330385.071	403278.412	N/A	N/A	FIR 5/8
726	1330534.898	403277.916	N/A	N/A	FCM 3X3
728	1330270.035	403220.620	N/A	N/A	FCM 6 DIA
729	1330220.098	403220.547	N/A	N/A	FND ANGLE IRON IN CONC
730	1330170.088	403219.685	N/A	N/A	FTBAR
731	1330120.131	403219.432	N/A	N/A	FIR 5/8
735	1329932.645	403033.855	136+36.53	−30.37	FIR 5/8
736	1330023.040	403034.026	N/A	N/A	FND ANGLE IRON
737	1330072.898	403033.839	N/A	N/A	FND ANGLE IRON
738	1330172.980	403033.875	N/A	N/A	FND ANGLE IRON
740	1330023.698	402973.602	N/A	N/A	FIR 1/2
741	1329933.468	402973.966	135+76.64	−30.35	FND ANGLE IRON
742	1329934.711	402884.586	134+87.25	−30.33	FND ANGLE IRON
743	1329954.995	402884.582	134+86.96	−50.61	FND ANGLE IRON
744	1329955.905	402794.040	133+96.41	−50.24	FIR YC 1/2 RLS 3035
745	1329937.336	402734.029	133+36.67	−30.83	FND ANGLE IRON
746	1329937.883	402634.247	132+36.89	−29.97	FCM 4X4
747	1329941.736	402584.343	131+86.94	−33.12	FCM 4X4
748	1329938.661	402584.049	131+86.69	−30.04	FCM 4X4
754	1329931.527	403128.596	137+31.28	−30.59	FIR 1/2
755	1329858.108	402615.314	132+19.08	50.06	FIR 5/8
756	1330176.437	402793.630	N/A	N/A	FPPIPE 3/4
757	1330176.389	402793.591	N/A	N/A	FIP 1/2
759	1330077.298	402734.130	N/A	N/A	FND ANGLE IRON
760	1330077.389	402734.348	N/A	N/A	FCM 2X2
761	1329943.337	402468.795	130+71.38	−33.09	FPPIPE 1
762	1330073.204	402468.692	N/A	N/A	FXCUT
764	1330161.622	402427.784	N/A	N/A	FIR 1/2
765	1330096.593	402427.874	N/A	N/A	FIR 1/2
766	1329943.890	402427.856	130+30.43	−33.06	FIR 5/8 SET IN CONC 6X6
767	1329945.831	402268.686	128+71.25	−32.75	FCM 4 DIA
768	1329881.074	402198.045	128+01.53	32.98	FPPIPE 3/4
769	1329764.345	402198.515	N/A	N/A	FIR 5/8
770	1329880.220	402259.158	128+62.65	32.97	FIP 1 1/2
771	1329879.458	402309.376	129+12.88	33.03	FIR YC 1/2 LB 6962
772	1329878.849	402359.403	129+62.91	32.93	FIR YC 1/2 LB 6962
773	1329878.189	402409.442	130+12.95	32.88	FIR 1/2
774	1329877.419	402455.260	130+58.77	33.01	FIP 1 1/2
775	1329763.396	402258.305	N/A	N/A	FIR 5/8
777	1329948.964	402068.375	126+70.92	−33.06	FIR 5/8
778	1329948.260	402118.548	127+21.09	−33.06	FIR 5/8
779	1329884.307	402097.484	127+00.94	31.17	FIP 1
780	1329664.606	401948.546	N/A	N/A	FIP 1
781	1329743.330	401885.975	N/A	N/A	FIP 1
782	1329823.371	401888.056	124+92.44	95.07	FIR YC 1/2 LB 2129
783	1329899.929	401761.128	123+64.40	20.38	FCM 4X4
784	1329900.487	401730.372	123+33.64	20.27	FIR 1/2
785	1329901.163	401680.284	122+83.55	20.33	FCM 4X4
786	1329901.969	401630.042	122+33.30	20.25	FIP 1/2
787	1329944.433	401488.396	120+91.05	−20.13	FIR 1/2
788	1329942.905	401587.246	121+89.91	−20.04	FIP 1/2
789	1329940.636	401735.620	123+38.30	−19.94	FIP 1
790	1329938.896	401859.926	124+62.62	−20.02	FIP 3/4
791	1330065.255	401888.686	N/A	N/A	FIR 1/2
792	1330208.309	401950.177	N/A	N/A	FIP 3/4
793	1330321.123	401949.711	N/A	N/A	FIP 1/2
794	1330583.180	401948.700	N/A	N/A	FCM 6X4
796	1330517.587	401891.910	N/A	N/A	FIR YC 5/8 LB 6947
798	1330470.811	401883.817	N/A	N/A	FCM 4X4
799	1330320.775	401950.266	N/A	N/A	FIP 1/2
800	1330433.598	401949.879	N/A	N/A	FIP 1/2
802	1330414.023	401884.491	N/A	N/A	FND ANGLE IRON
803	1330364.806	401883.521	N/A	N/A	FIP 3/4
804	1329564.516	401948.705	N/A	N/A	FIR 5/8
805	1329693.218	401888.187	N/A	N/A	FIR YC 5/8 LB 2129
806	1329543.256	401888.902	N/A	N/A	FIR 5/8
807	1329393.608	401889.079	N/A	N/A	FIP 1/2
809	1329324.721	401949.070	N/A	N/A	FIP 1
812	1330069.486	401678.222	N/A	N/A	FCM 4X4
814	1330067.128	401648.172	N/A	N/A	FIR 5/8
817	1330171.085	401648.522	N/A	N/A	FIP 1/2
818	1329765.695	401730.828	N/A	N/A	FIR 1/2
819	1329765.610	401731.341	N/A	N/A	FIP 1/2
821	1329695.156	401761.280	N/A	N/A	FIR 1/2
822	1329745.212	401761.100	N/A	N/A	FIR 1/2
823	1329945.556	401389.808	119+92.46	−19.81	FIR 1/2
824	1329955.676	401302.057	119+04.57	−28.64	FIR 1/2
825	1329908.054	401029.126	116+32.36	22.95	FIR 5/8
826	1329907.546	401073.995	116+77.23	22.81	FIR 1X1
827	1329907.445	401103.892	117+07.13	22.47	FIR YC 1/2 RLS 4032
828	1329907.335	401153.226	117+56.46	21.86	FCM 4X4
829	1329906.769	401201.793	118+05.03	21.71	FIR 5/8

POINT#	NORTHING (FT.)	EASTING (FT.)	STATION	OFFSET	DESCRIPTION
830	1329906.332	401251.292	118+54.53	21.43	FCM 4X4
831	1329906.315	401308.795	119+12.02	20.60	FCM 4X4
832	1329765.077	401389.651	N/A	N/A	FIR 5/8
833	1329700.135	401439.272	N/A	N/A	FIP 1/2
834	1329804.875	401439.159	N/A	N/A	FCM 4X4
835	1329903.471	401530.141	121+33.39	20.21	FCM 4X4
836	1329904.920	401438.843	120+42.08	20.10	FIR 5/8
837	1330070.215	401439.495	N/A	N/A	FIP 3/4
838	1330070.013	401439.491	N/A	N/A	FIP 1
839	1330144.134	401440.073	N/A	N/A	FIP 3/4
841	1330169.461	401391.915	N/A	N/A	FIP 1 1/2
842	1330119.672	401391.434	N/A	N/A	FIP 1/2
843	1330070.606	401390.325	N/A	N/A	FIP 1/2
844	1329699.973	401389.744	N/A	N/A	FCM 4X4
847	1329814.483	400993.573	N/A	N/A	FIR 5/8
848	1329710.028	400954.278	N/A	N/A	FIR 5/8
850	1329980.471	401056.322	116+58.50	−49.84	FCM 4X4
851	1329979.278	401055.435	116+57.63	−48.64	FIR 5/8
853	1329909.613	400965.373	115+68.59	22.33	FCM 4X4
854	1329909.904	400886.198	114+89.42	23.20	FCM 4X4
855	1329910.158	400836.236	114+39.46	23.67	FCM 4X4
856	1329910.449	400786.252	113+89.48	24.11	FCM 4X4
857	1329910.999	400737.786	113+41.01	24.27	FIR 5/8
858	1329911.781	400638.054	112+41.28	24.95	FIR 5/8 BENT
860	1329813.728	401075.983	N/A	N/A	FIR 5/8
861	1329706.700	401076.844	N/A	N/A	FXCUT
863	1329702.593	401108.079	N/A	N/A	FIR YC 5/8 ALLEN ILLEG
864	1329752.582	401107.063	N/A	N/A	FCM 4X4
866	1329912.813	400513.144	N/A	N/A	FIR 5/8
867	1329792.853	400520.904	N/A	N/A	FCM 4X4
868	1329751.419	400549.632	N/A	N/A	FIP 1
871	1329913.433	400469.392	110+72.61	25.76	FCM 4X4
872	1329951.940	400617.892	112+20.53	−14.91	FIR 5/8
873	1329952.612	400497.769	111+00.41	−13.82	FCM 4X4
874	1329954.112	400377.978	109+80.61	−13.57	FCM 4X4
875	1329955.672	400258.278	108+60.90	−13.38	FCM 3X3
876	1329987.380	400108.216	107+05.26	−20.93	FCM 4X4
877	1329995.099	400028.432	106+23.34	−19.94	FNDK RLS 3138
878	1330013.990	399818.384	104+14.92	−20.07	FCM 4X4
879	1329951.491	399957.880	105+62.30	36.21	FIR 5/8 ILLEG
880	1329934.551	400027.708	106+30.61	39.89	FIR RC 1/2 WITNESS RLS 3035
881	1329955.124	400026.670	106+29.17	19.65	FIR 5/8
882	1329911.303	400107.432	107+23.58	52.64	FIR RC 1/2 WIT RLS 3035
883	1329884.776	400154.288	107+76.32	63.49	FIR 1/2
884	1329869.437	400218.506	108+22.39	73.42	FIR 1/2
885	1329869.145	400218.488	108+22.38	73.31	FIP 3/4 PLASTIC CAP
886	1329869.544	400218.241	108+22.13	73.32	FIP 3/4 IRON ELBOW
887	1329915.150	400253.770	108+56.98	27.20	FIR 1/2 IN FIP 3/4
888	1329955.368	399732.972	103+31.97	41.97	FIR RC 5/8 WIT LB 6707
889	1329955.716	399732.966	103+31.95	41.63	FIR 1/2 BENT
890	1329947.429	399817.991	104+17.24	46.45	FIR 1/2
891	1330008.231	399958.485	105+55.14	−20.01	FCM 4X4
892	1330035.976	399599.652	101+95.48	−33.15	FIR YC 5/8 LB 6969
893	1330039.198	399521.652	101+17.41	−33.20	FIR YC 5/8 LB 6707
894	1330277.645	399465.290	N/A	N/A	FCM 4X4
896	1329978.441	399436.837	100+35.14	30.96	FIR YC 5/8 HLA LB 6969
897	1329988.636	399456.214	100+54.08	19.98	FIR YC 5/8 HLA LB 6969
898	1329986.215	399434.042	N/A	N/A	FNDK HLA LB 6969
899	1329982.883	399599.239	101+97.22	19.91	FIR YC 5/8 6707
902	1331214.072	404576.713	N/A	N/A	FRRS
904	1328779.510	399274.759	N/A	N/A	FNDK PK "WILSON MILLER LB043"
905	1328553.408	404585.858	N/A	N/A	FIR 5/8
1001	1329834.324	409908.501	205+11.96	0.00	FNDK PK PCSD PLS4238
1002	1332474.700	409913.788	N/A	N/A	FNDK PK PCSD PLS4238
1003	1332547.683	404570.663	N/A	N/A	FPPIPE 1"
1004	1332580.349	401909.172	N/A	N/A	FCM BD PCED
1005	1327227.817	404588.710	N/A	N/A	FRRS
1006	1327275.614	399268.140	N/A	N/A	FNDK PK LB043
1122	1327246.357	401923.185	N/A	N/A	FCM
1123	1332509.441	407242.722	N/A	N/A	FRRS
1200	1329880.391	404582.891	151+86.15	0.00	SNDK LB6566
1201	1329857.336	407248.151	178+51.51	0.00	SNDK "LB6566"
1203	1329956.587	399279.939	N/A	N/A	CALC
1204	1329955.974	399321.872	N/A	N/A	CALC
1205	1329955.460	399357.007	N/A	N/A	CALC
1206	1329982.315	399359.804	N/A	N/A	CALC
1207	1330295.758	399399.976	N/A	N/A	CALC
1208	1330277.681	399452.103	N/A	N/A	CALC
1209	1330267.684	399451.068	N/A	N/A	CALC
1210	1330062.917	399445.785	100+40.64	−53.81	CALC
1211	1329922.054	400180.383	107+83.50	21.36	CALC
1212	1329948.822	400980.166	115+82.81	−17.08	CALC
1213	1329911.000	401030.024	116+33.22	20.00	CALC
1214	1329977.002	401304.004	119+06.20	−50.00	CALC
1215	1329947.005	401303.566	119+06.20	−20.00	CALC
1216	1329905.747	401389.341	119+92.57	20.00	CALC
1217	1329945.035	401438.305	120+40.96	−20.00	CALC
1218	1329941.968	401648.105	122+50.78	−20.00	CALC
1219	1329941.529	401678.104	122+80.78	−20.00	CALC
1220	1329898.746	401868.173	124+71.45	20.00	CALC
1221	1329863.449	401888.240	124+92.04	55.00	CALC
1222	1329958.009	401888.002	124+90.42	−39.54	CALC
1223	1330517.666	401886.118	N/A	N/A	CALC
1224	1330473.484	401949.267	N/A	N/A	CALC
1225	1330168.439	401950.294	N/A	N/A	CALC
1226	1329960.557	401950.994	125+53.38	−43.00	CALC
1227	1329950.416	401961.027	125+63.56	−33.00	CALC
1228	1329880.213	402258.209	128+61.70	33.00	CALC
1229	1329876.018	402555.278	131+58.80	33.00	CALC
1230	1329858.169	402615.314	132+19.08	50.00	CALC
1231	1329936.500	402734.076	133+36.73	−30.00	CALC
1232	1329931.788	403280.237	138+82.90	−33.00	CALC
1233	1329927.352	403594.415	141+97.11	−33.00	CALC
1234	1329818.428	405965.626	165+69.37	50.00	CALC
1235	1330464.328	405863.544	N/A	N/A	CALC
1236	1330323.461	405964.012	N/A	N/A	CALC
1237	1329806.446	407350.867	179+54.66	50.00	CALC
1238	1329805.927	407410.867	180+14.67	50.00	CALC
1239	1329804.146	407616.712	182+20.52	50.00	CALC

POINT#	NORTHING (FT.)	EASTING (FT.)	STATION	OFFSET	DESCRIPTION
1240	1329803.627	407676.714	182+80.52	50.00	CALC
1241	1329801.846	407882.657	184+86.47	50.00	CALC
1242	1329801.327	407942.658	185+46.48	50.00	CALC
1243	1329799.546	408148.527	187+52.35	50.00	CALC
1244	1329799.027	408208.528	188+12.36	50.00	CALC
1245	1329797.245	408414.513	190+18.35	50.00	CALC
1246	1329796.726	408474.514	190+78.35	50.00	CALC
1247	1329794.447	408737.943	193+41.79	50.00	CALC
1248	1329891.238	409109.428	197+12.42	50.00	CALC
1249	1329911.240	409129.601	197+32.42	70.17	CALC
1250	1329910.369	409189.601	197+92.43	69.82	CALC
1251	1329890.373	409209.428	198+12.43	50.00	CALC
1252	1329785.013	409828.612	204+32.50	50.00	CALC
1253	1329754.754	409858.677	204+62.83	80.00	CALC
1254	1329912.245	409856.154	204+58.94	77.46	CALC
1255	1329909.751	409858.652	204+61.46	75.00	CALC
1256	1329927.750	409958.688	205+60.67	94.20	CALC
1257	1329914.149	409964.366	205+66.56	80.69	CALC
1258	1329897.192	409981.024	205+83.49	64.00	CALC
1261	1329879.590	401948.210	125+51.74	38.00	CALC
1262	1329884.520	401953.200	125+56.66	33.00	CALC
1263	1329910.359	401073.826	116+77.02	20.00	CALC
1264	1329841.209	403816.382	144+20.27	50.00	CALC
1265	1329839.515	403936.370	145+40.27	50.00	CALC
1266	1327199.638	407253.327	N/A	N/A	SNDK LB6566
21273	1330446.171	399448.327	N/A	N/A	FNDK
37828	1330267.698	399457.481	N/A	N/A	FND LB6707
37832	1330017.434	399733.684	103+30.15	−20.06	FCM 4X4
37833	1329946.700	400103.687	107+04.94	20.00	FIR 1/2 BENT
37834	1329954.535	400027.860	106+38.09	11.21	FIR YC 5/8 LB3035
37835	1329968.206	399958.008	105+59.27	19.77	FIR YC 5/8 LB3889
37836	1329961.531	400188.298	107+90.84	−18.22	FIR 5/8
37838	1329977.391	399733.292	103+31.39	19.95	FIR YC 5/8 LB 6707
37840	1329951.463	400737.945	113+40.58	−16.18	FIR 1/2
37842	1329950.732	400831.263	114+33.90	−16.82	FNDK LS 1225 PCP
37843	1329950.333	400980.460	115+83.08	−18.60	FIR YC 5/8 PLS 2865 EYRE
41957	1329792.126	400636.703	N/A	N/A	FIR 5/8
41962	1329790.033	400736.039	N/A	N/A	FCM 2X2
41965	1329790.082	400836.115	N/A	N/A	FIR 1/2
43321	1327170.874	409914.927	N/A	N/A	FNDK PK PCSD BD "PSM6197"
1300	1329891.834	410323.378	209+25.89	−64.00	CALC
1301	1329877.049	410373.370	209+76.10	−50.00	CALC
1303	1329768.589	410912.823	215+17.19	50.00	CALC
1305	1329774.985	410502.550	211+06.87	50.00	CALC
1306	1329778.347	410288.577	208+92.87	50.00	CALC
50936	1329870.845	410793.531	213+96.31	−50.37	FCM 4X4 LS 1762
50940	1329774.067	410582.982	211+87.30	49.68	FCIR 5/8 LB 3889
50951	1329783.179	409983.670	205+87.92	49.96	FIR 1/2 LB 5115
50952	1329783.144	409983.773	205+88.02	49.99	FIR 1/2 LB 5776
51192	1329781.505	410088.644	206+92.91	49.99	FIRC 1/2 RLS 107
51193	1329753.464	409958.853	205+63.57	80.06	FIRC 1/2 LB 5776 FORESIGHT
51203	1332442.482	412593.170	N/A	N/A	FOP 1/2
51204	1329792.060	412607.203	232+10.99	0.00	FPKD LB3935 G&O
51205	1327139.917	412621.186	N/A	N/A	FND DISK PCED

REVISIONS	BY	DATE

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CHECKED	EWR	12/2008
DESIGN DIVISION		
DESIGNED		
DRAWN		
CHECKED		

SUNSET POINT ROAD
FROM EDGEWATER DRIVE
TO KEENE ROAD

RIGHT-OF-WAY MAP

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Clearwater, Florida, 33756
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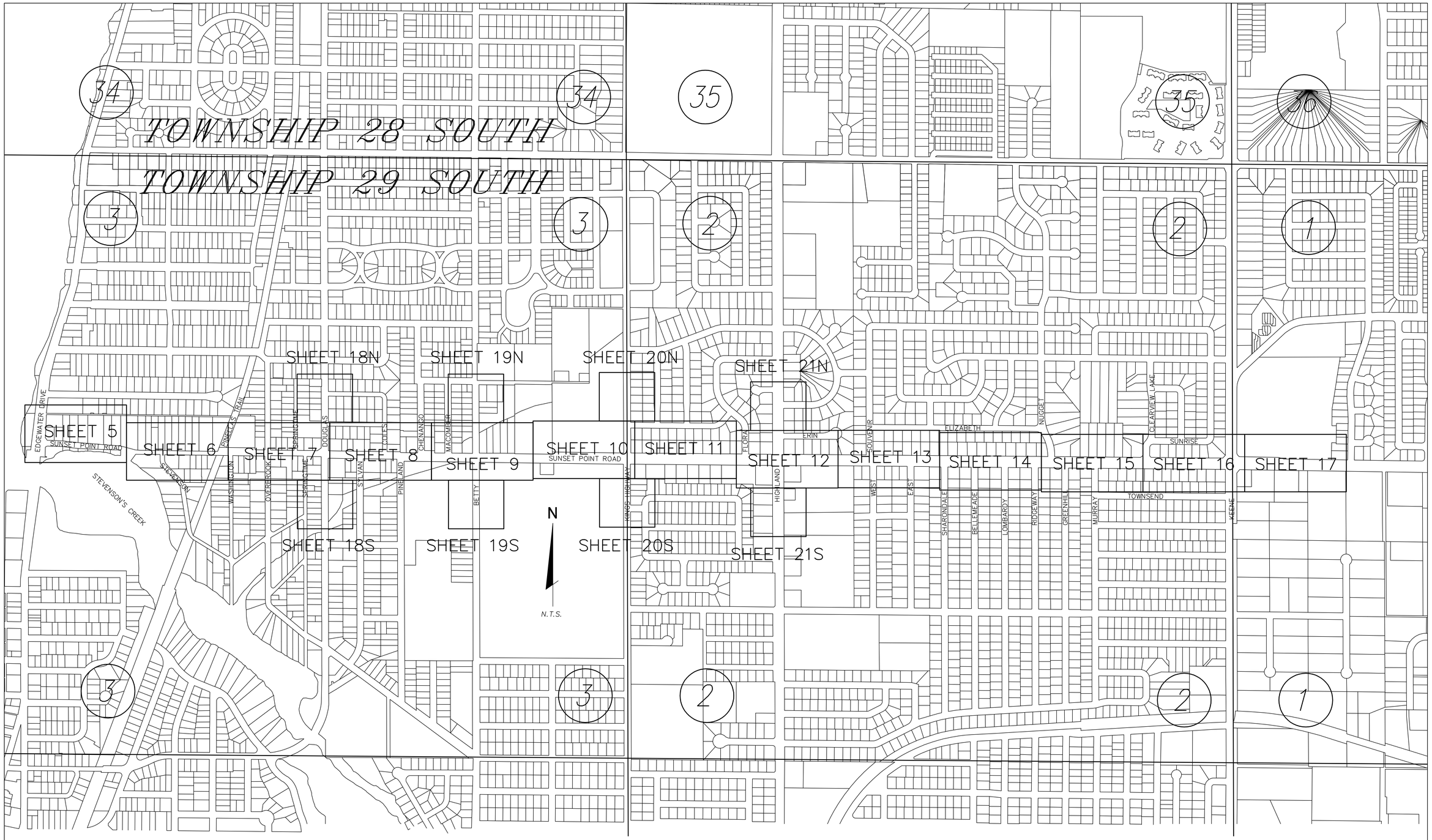
Certificate of Authorization No. LB6566
Internet Site: http://www.mckimcreed.com

EARL W. RAMER, P.S.M.
FLORIDA PROFESSIONAL SURVEYOR AND MAPPER
LICENSE NO. 3612

DATE

DATE: 1/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 3 OF 21 | RWSH03.DWG



REVISIONS	BY	DATE

SURVEY BOOK No.:		
SURVEY DIVISION	BY	DATE
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TECHNICIAN	JMA	12/2008
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SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE RD

RIGHT-OF-WAY MAP

KEY SHEET

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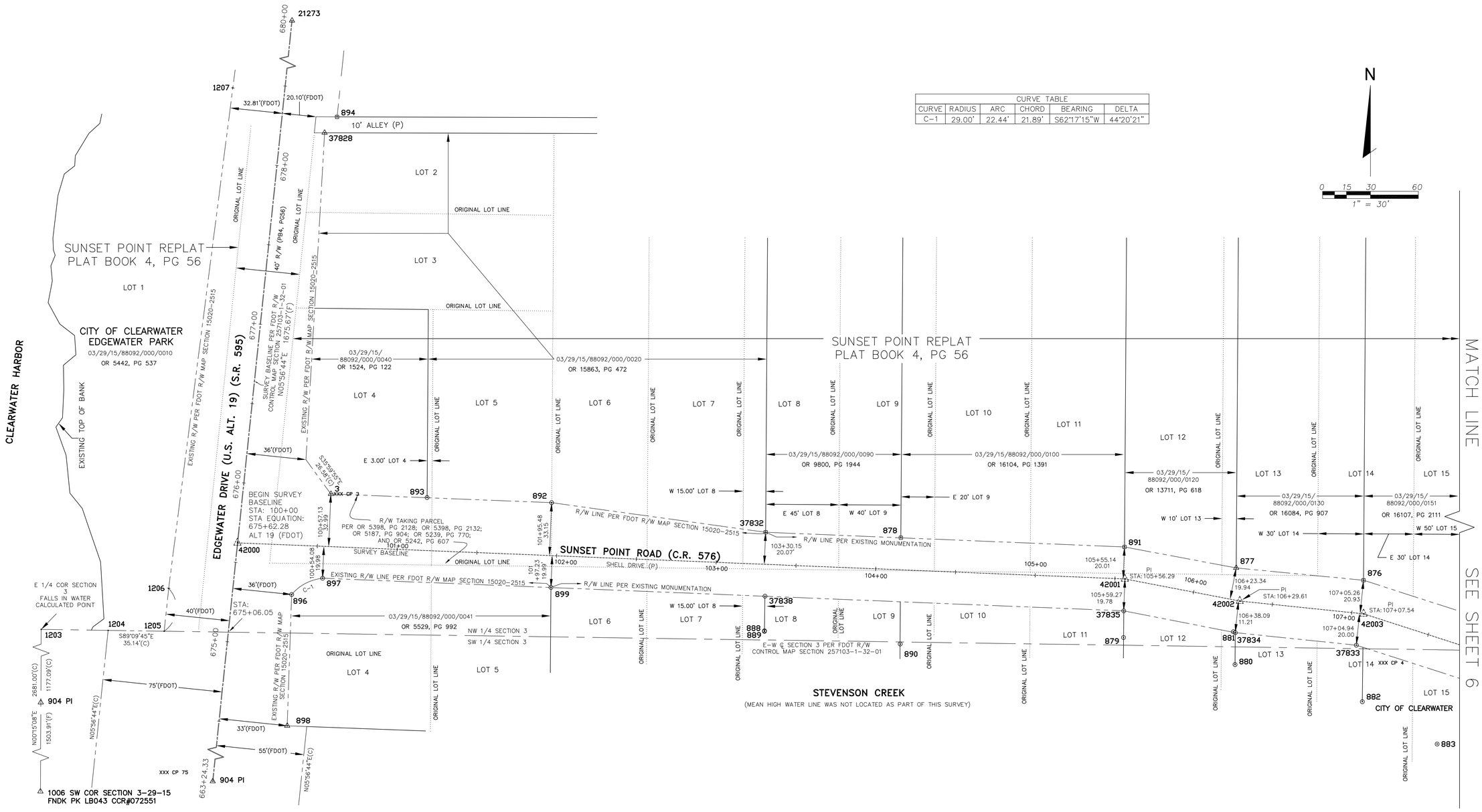
PROJECT I.D. 920476
SURVEY FILE NO.: SFN1029
SHEET: 4 OF 21 RWKEYSHT.DWG

NW1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SW1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

REVISIONS	BY	DATE

SURVEY BOOK No.:		
SURVEY DIVISION	BY	DATE
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DRAWN		
CHECKED		

SUNSET POINT RD
FROM EDGEWATER DR
TO KEENE RD

RIGHT-OF-WAY
MAP

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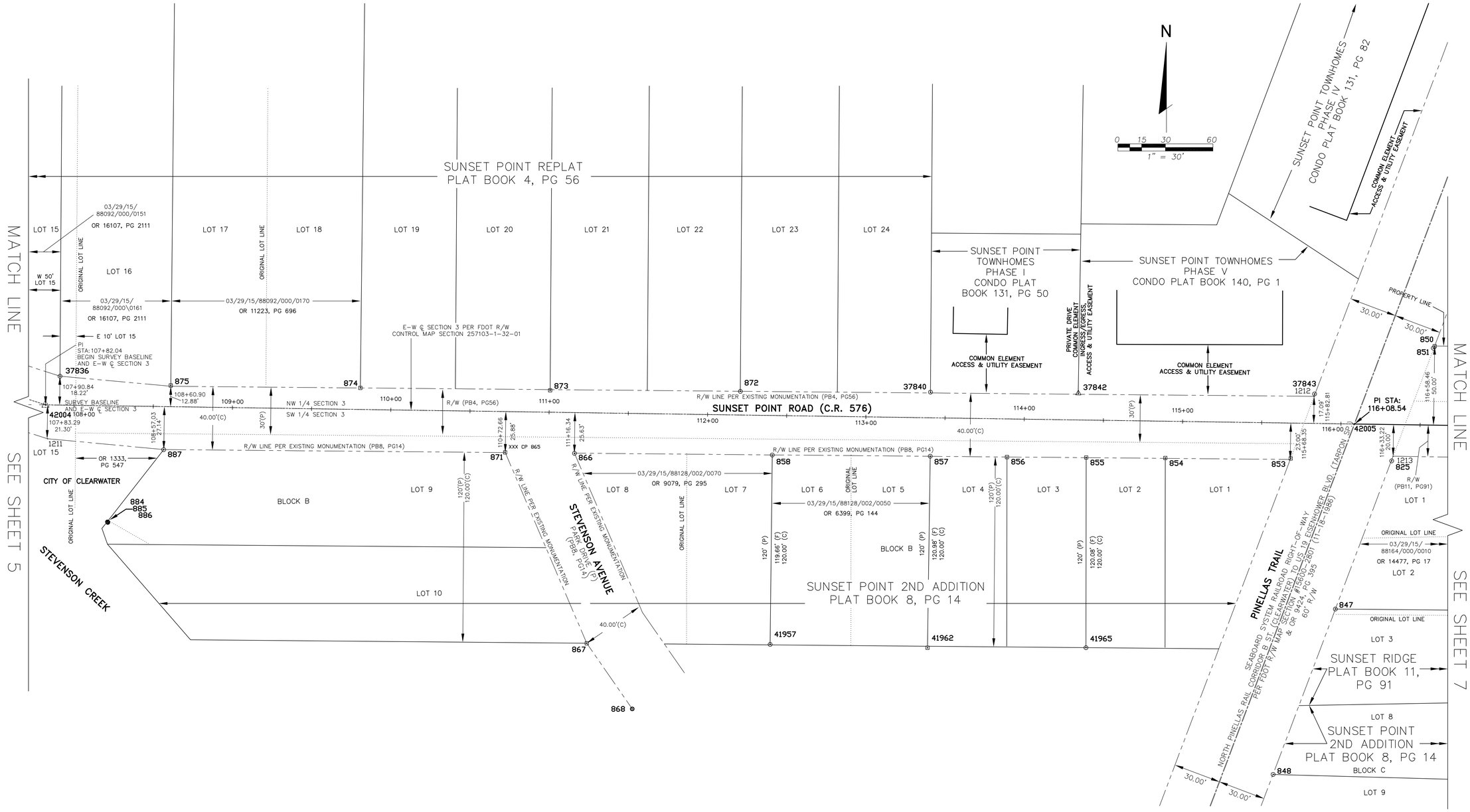
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 5 OF 21 | RWMAP.DWG

NW1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SW1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

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SUNSET POINT RD FROM EDGEWATER DR TO KEENE RD

RIGHT-OF-WAY MAP

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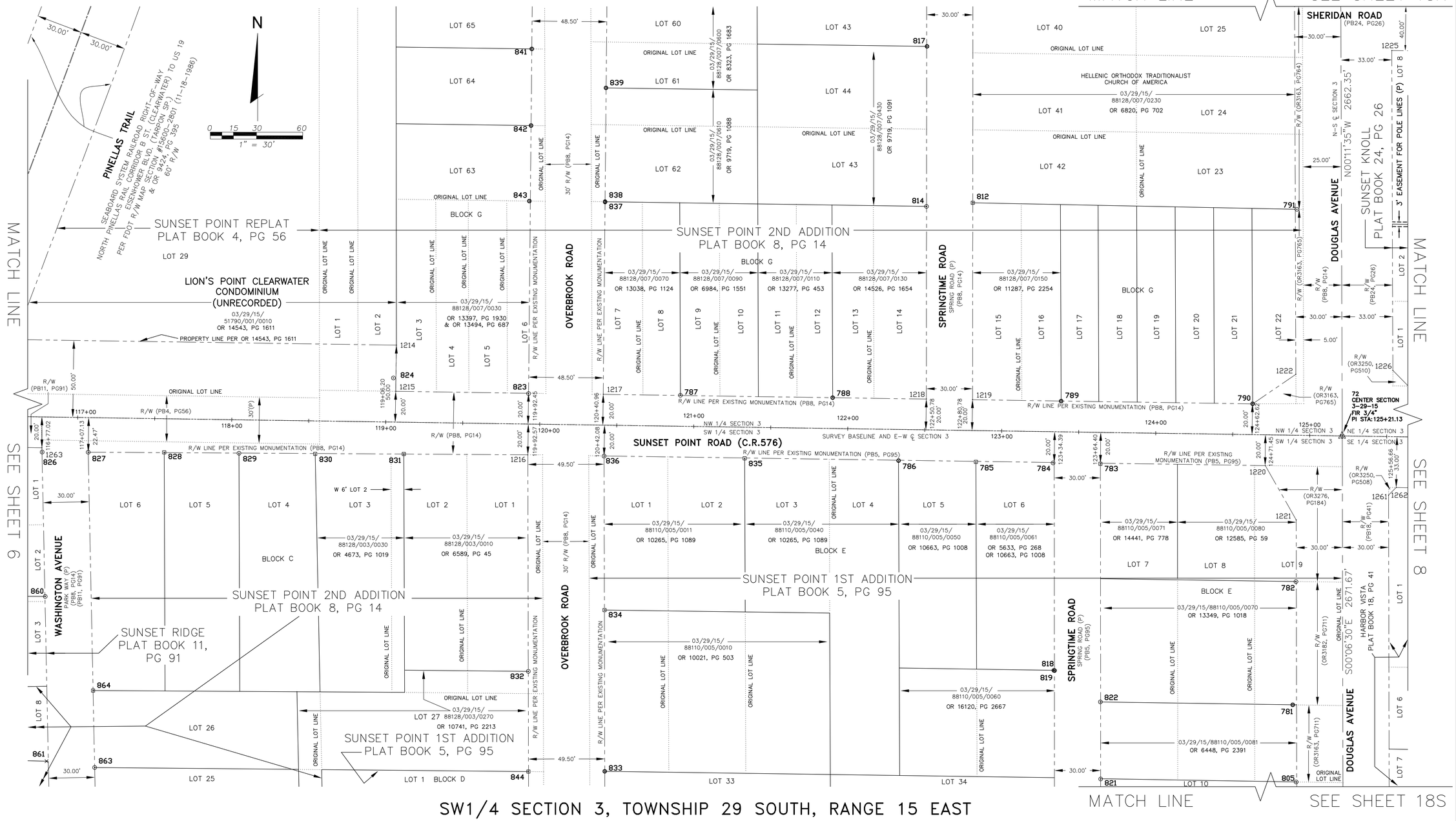
SURVEY FILE NO.: SFN 1029
SHEET: 6 OF 21 | RWMAP.DWG

NW1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SW1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

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SURVEY DIVISION	BY	DATE
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DESIGNED		
DRAWN		
CHECKED		

SUNSET POINT RD
FROM EDGEWATER DR
TO KEENE RD

RIGHT-OF-WAY
MAP

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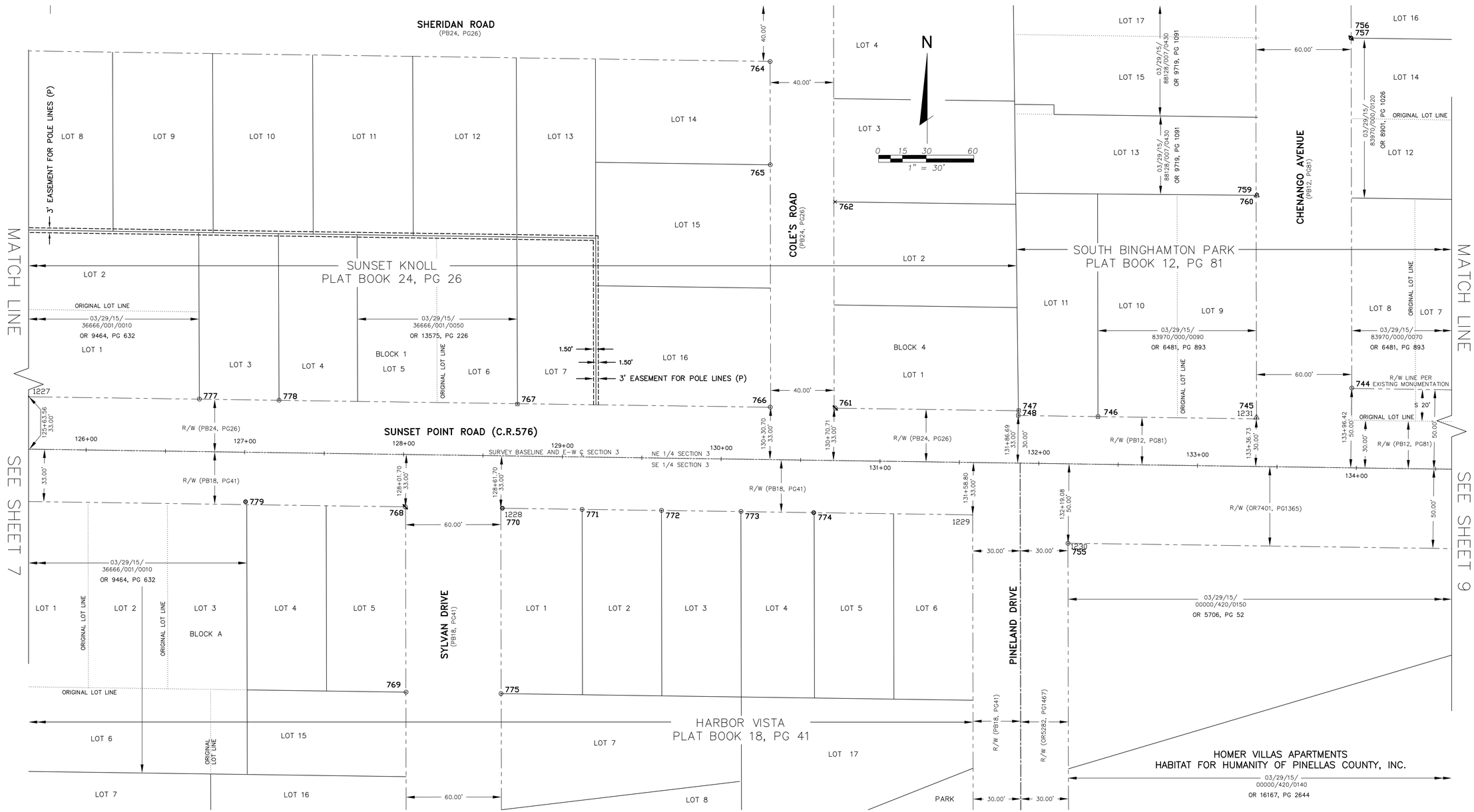
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 7 OF 21 | RWMAP.DWG

NE1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SE1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

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SURVEY DIVISION	BY	DATE
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CHECKED		

SUNSET POINT RD
FROM EDGEWATER DR
TO KEENE RD

RIGHT-OF-WAY
MAP

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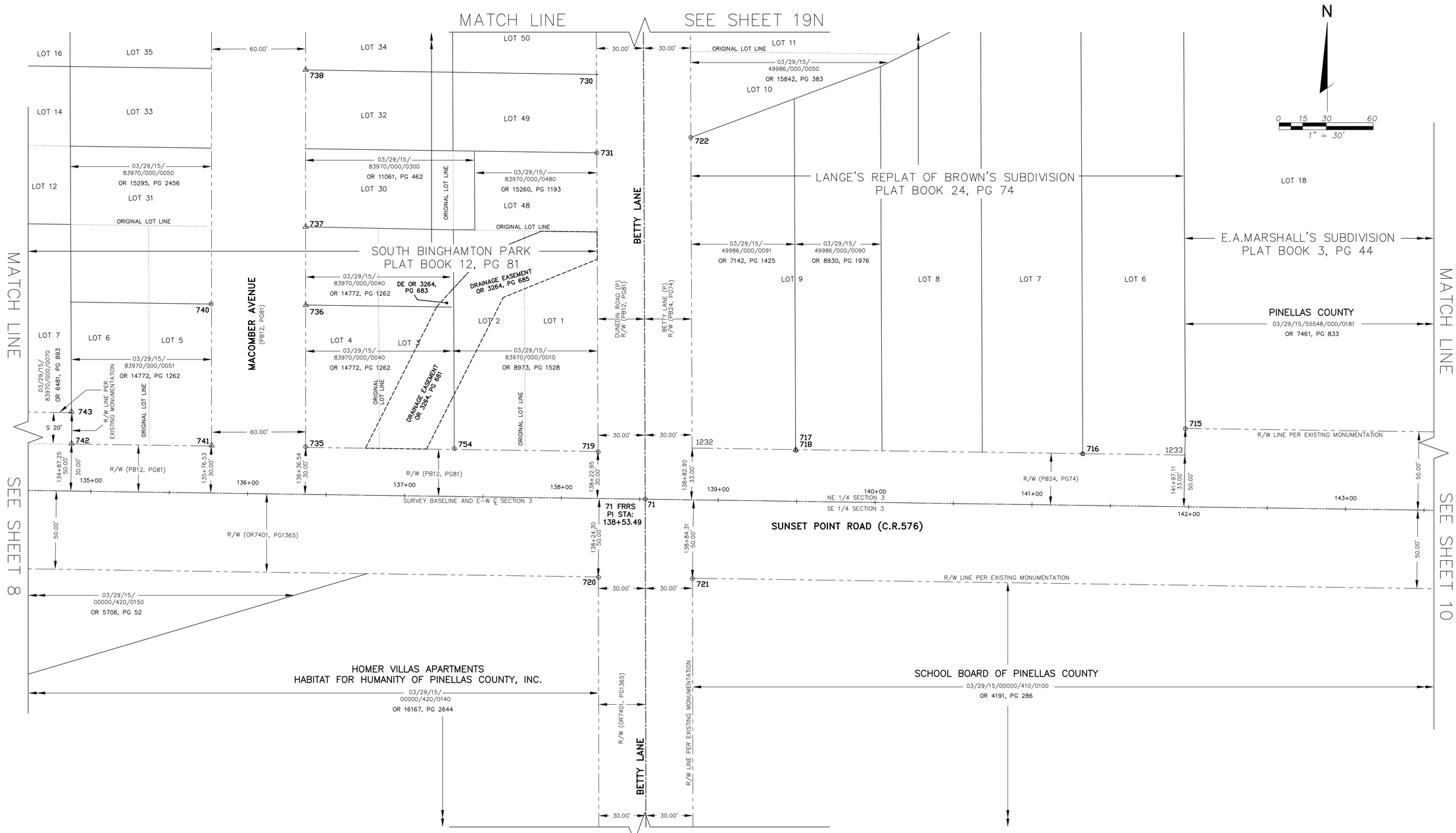
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 8 OF 21 | RWMAP.DWG

NE1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SE1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

REVISIONS	BY	DATE

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SURVEY DIVISION	BY	DATE
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SUNSET POINT RD
FROM EDGEWATER DR
TO KEENE RD

RIGHT-OF-WAY
MAP

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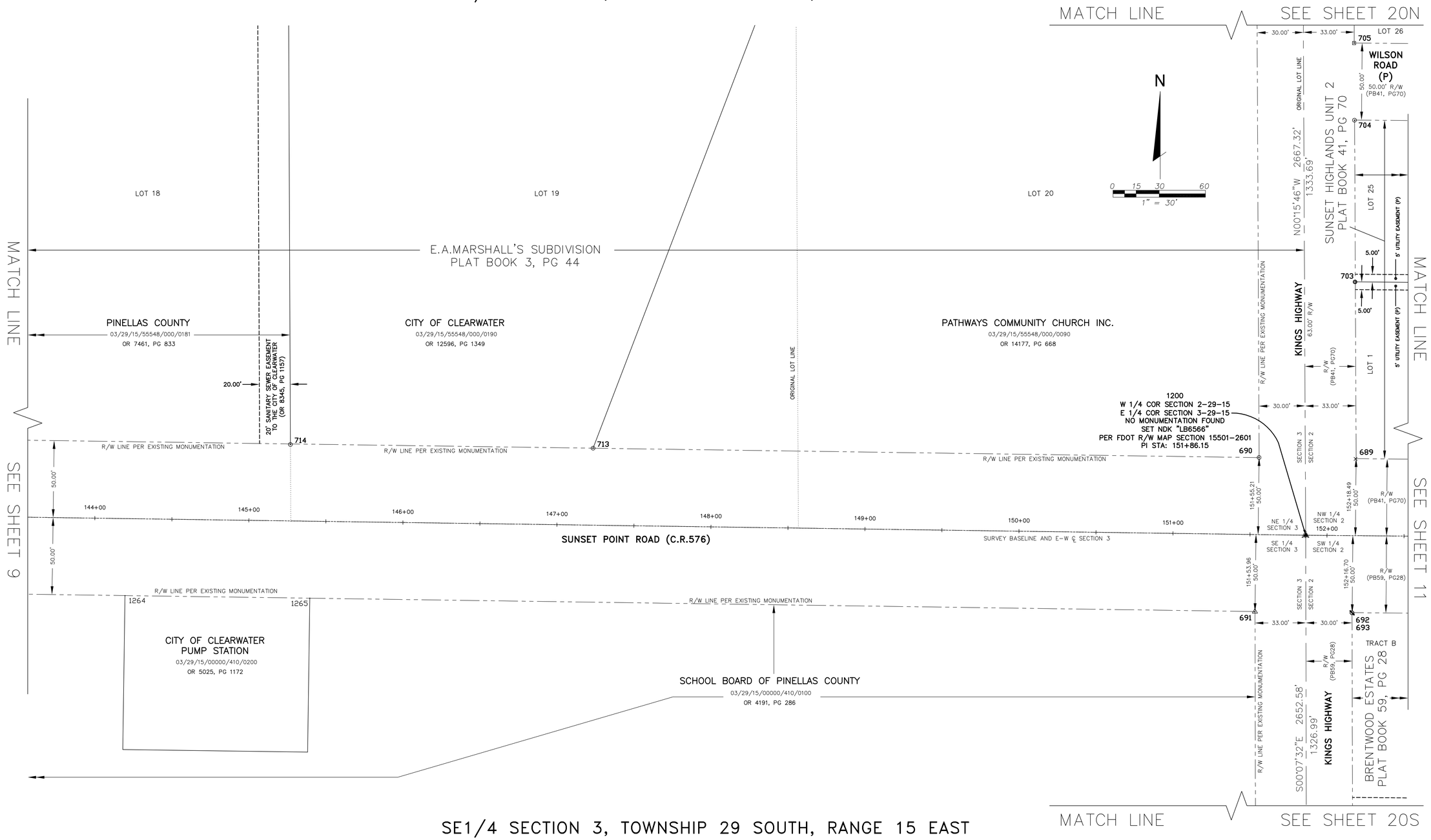
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 9 OF 21 | RWMAP.DWG

NE1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SE1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

REVISIONS	BY	DATE

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SUNSET POINT RD
FROM EDGEWATER DR
TO KEENE RD

RIGHT-OF-WAY
MAP

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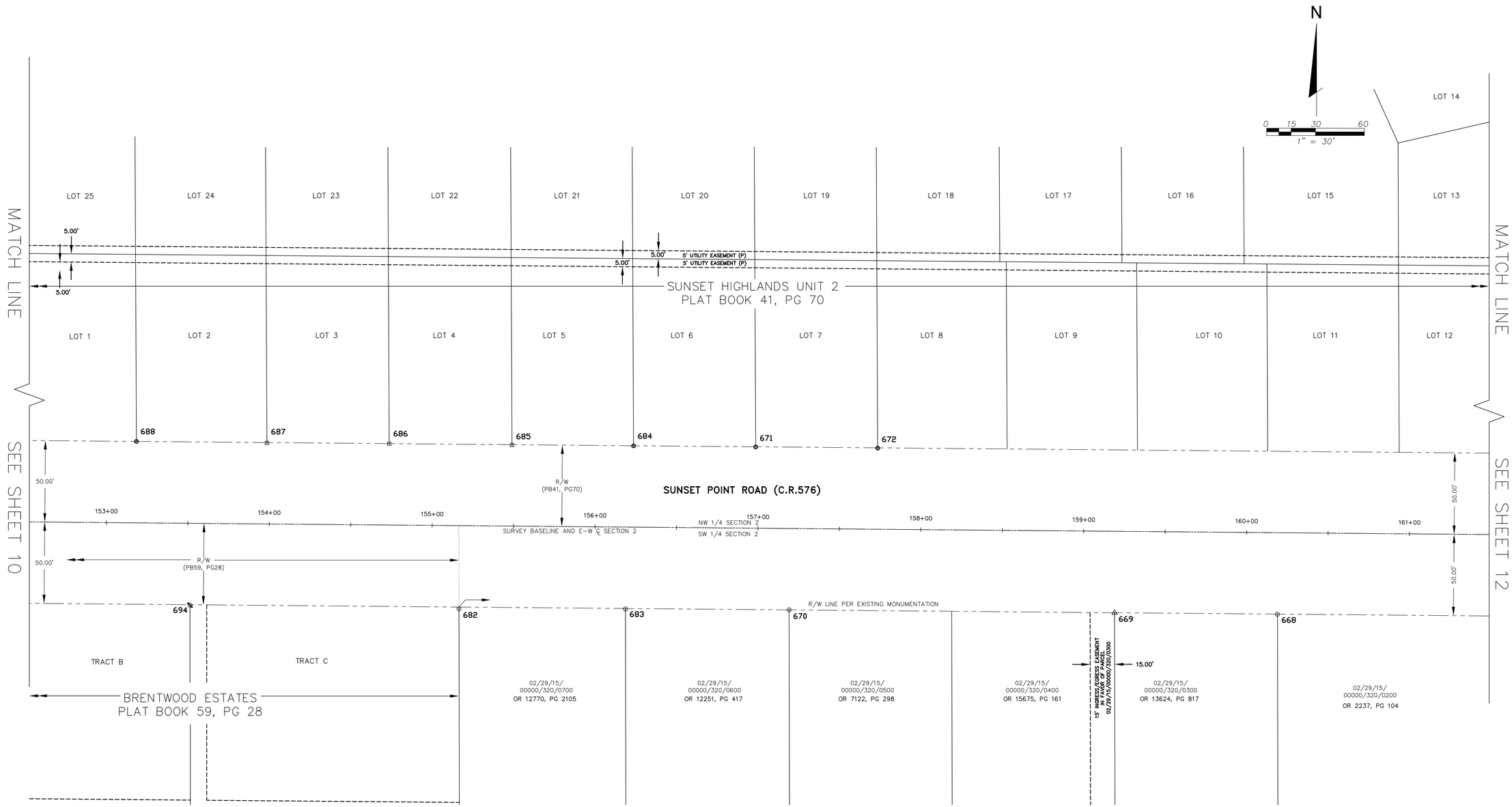
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 10 OF 21 | RWMAP.DWG

NW1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SW1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

REVISIONS	BY	DATE

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SURVEY DIVISION	BY	DATE
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SUNSET POINT RD
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TO KEENE RD

RIGHT-OF-WAY
MAP

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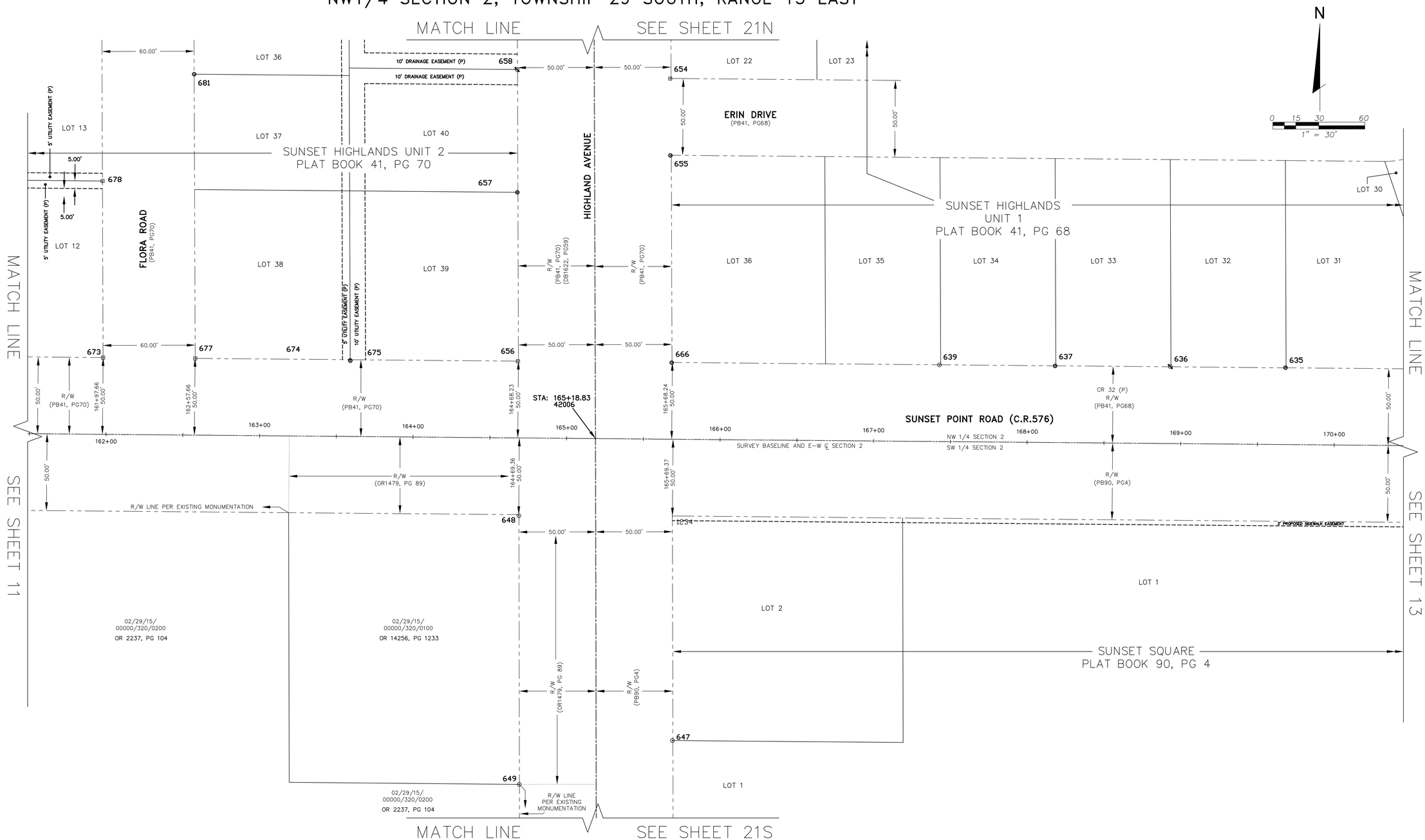
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 11 OF 21 RWMAP.DWG

NW1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SW1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

REVISIONS	BY	DATE

SURVEY BOOK No.:		
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SUNSET POINT RD
FROM EDGEWATER DR
TO KEENE RD

RIGHT-OF-WAY
MAP

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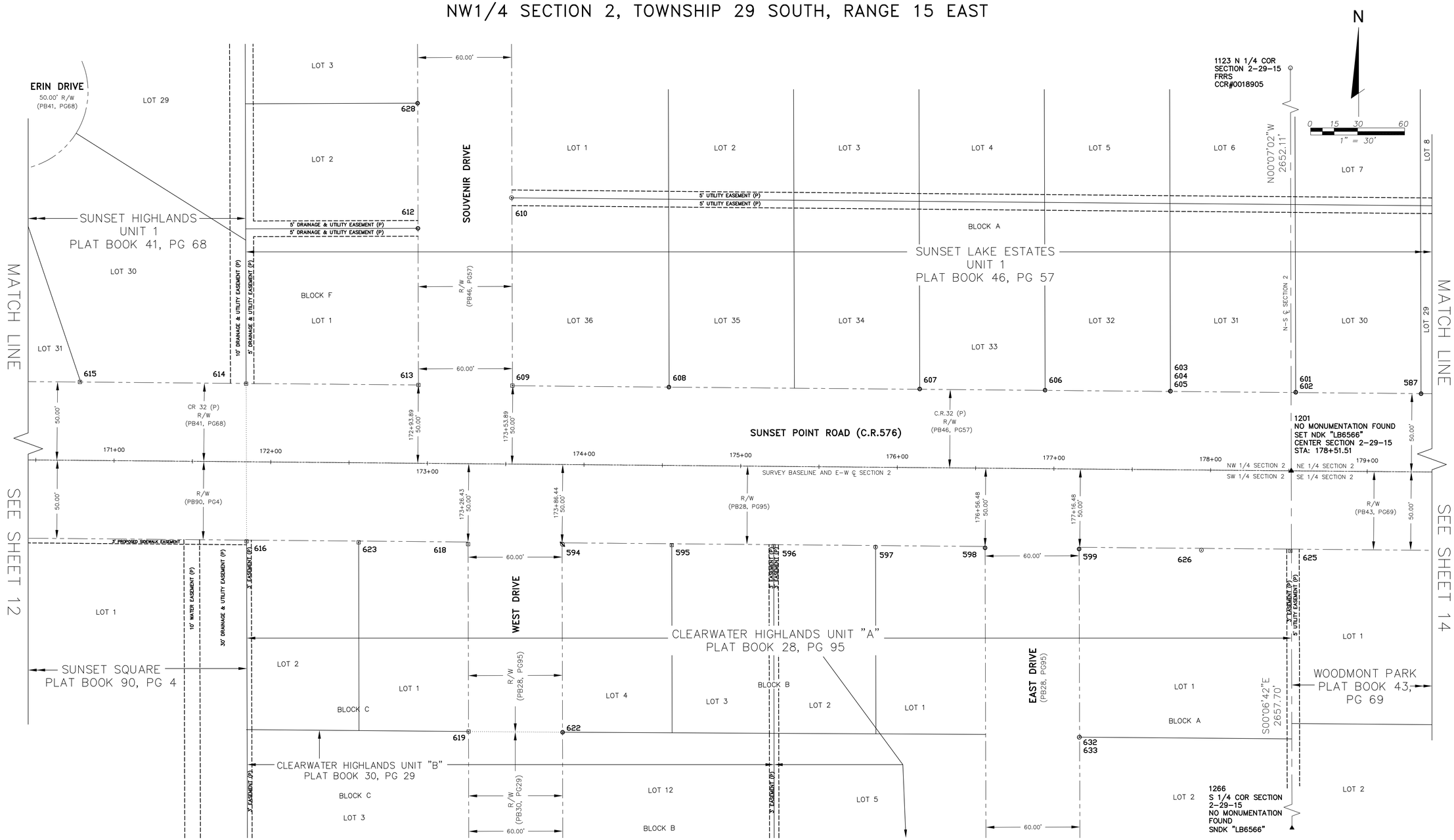
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 12 OF 21 RWMAP.DWG

NW1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SW1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

REVISIONS	BY	DATE

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SUNSET POINT RD
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TO KEENE RD

RIGHT-OF-WAY
MAP

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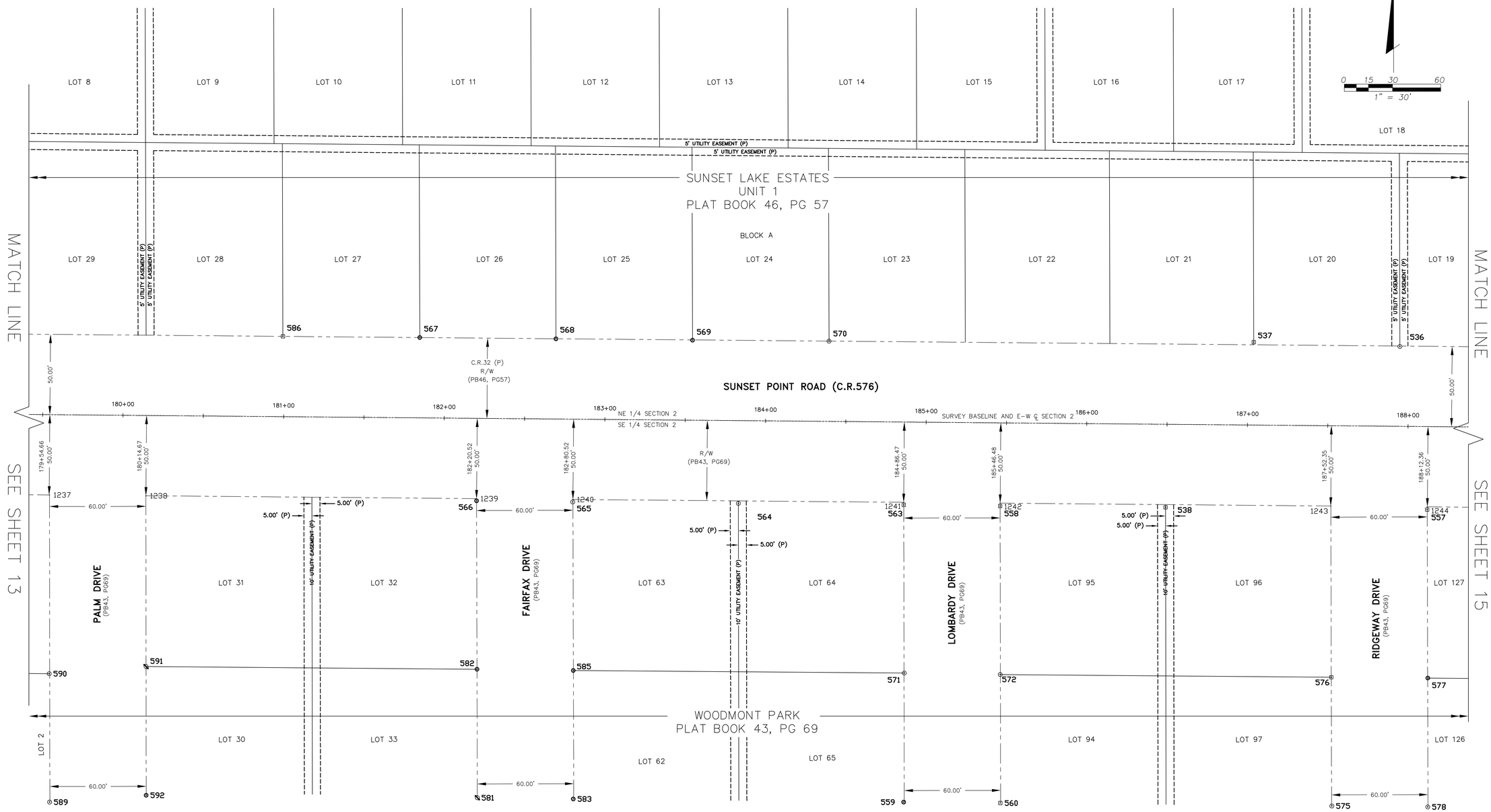
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 13 OF 21 | RWMAP.DWG

NE1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SE1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

REVISIONS	BY	DATE

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SUNSET POINT RD
FROM EDGEWATER DR
TO KEENE RD

RIGHT-OF-WAY
MAP

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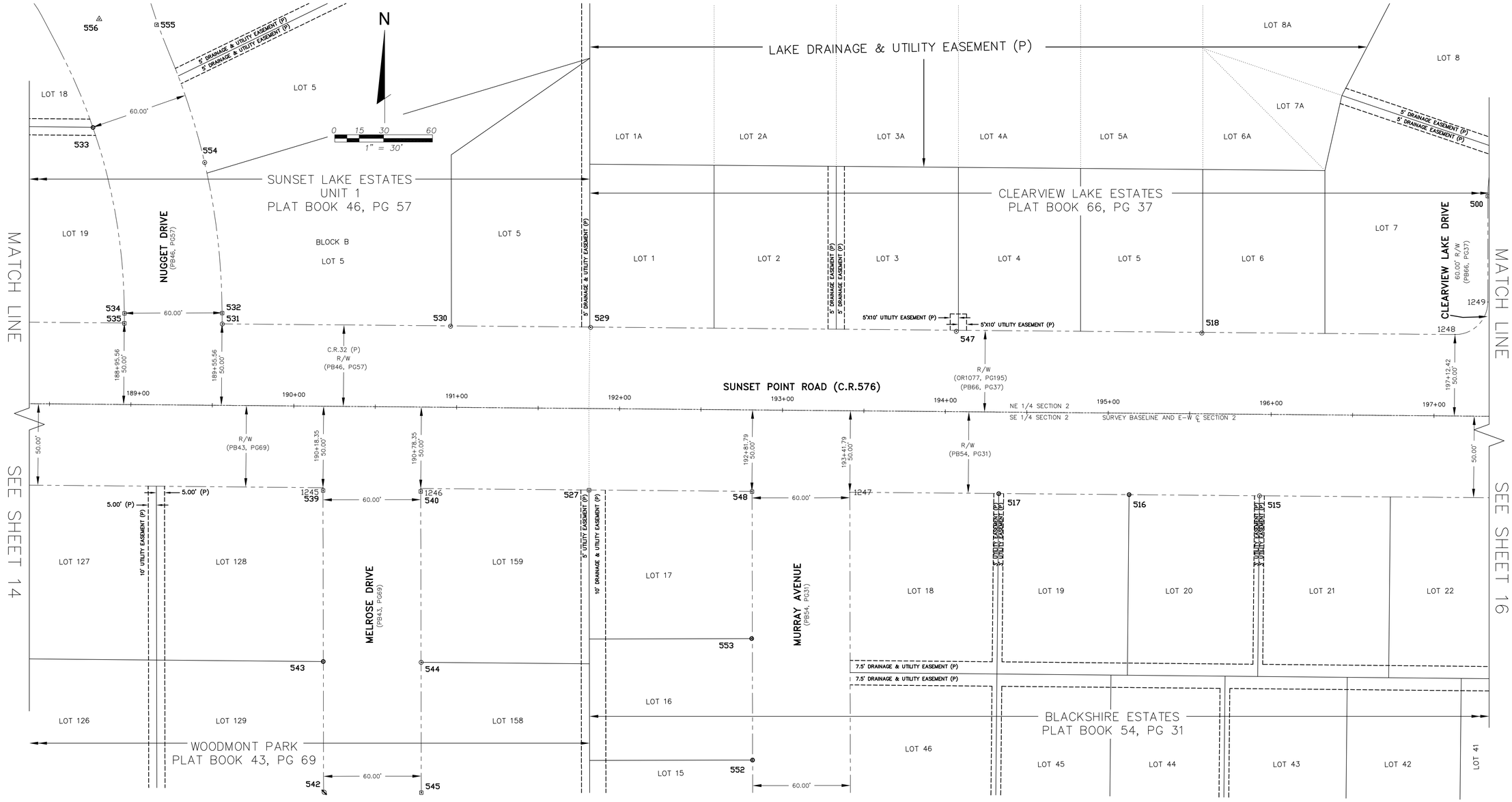
SURVEY FILE NO.: SFN 1029
SHEET: 14 OF 21 | RWMAP.DWG

NE1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SE1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

REVISIONS	BY	DATE

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SUNSET POINT RD
FROM EDGEWATER DR
TO KEENE RD

RIGHT-OF-WAY
MAP

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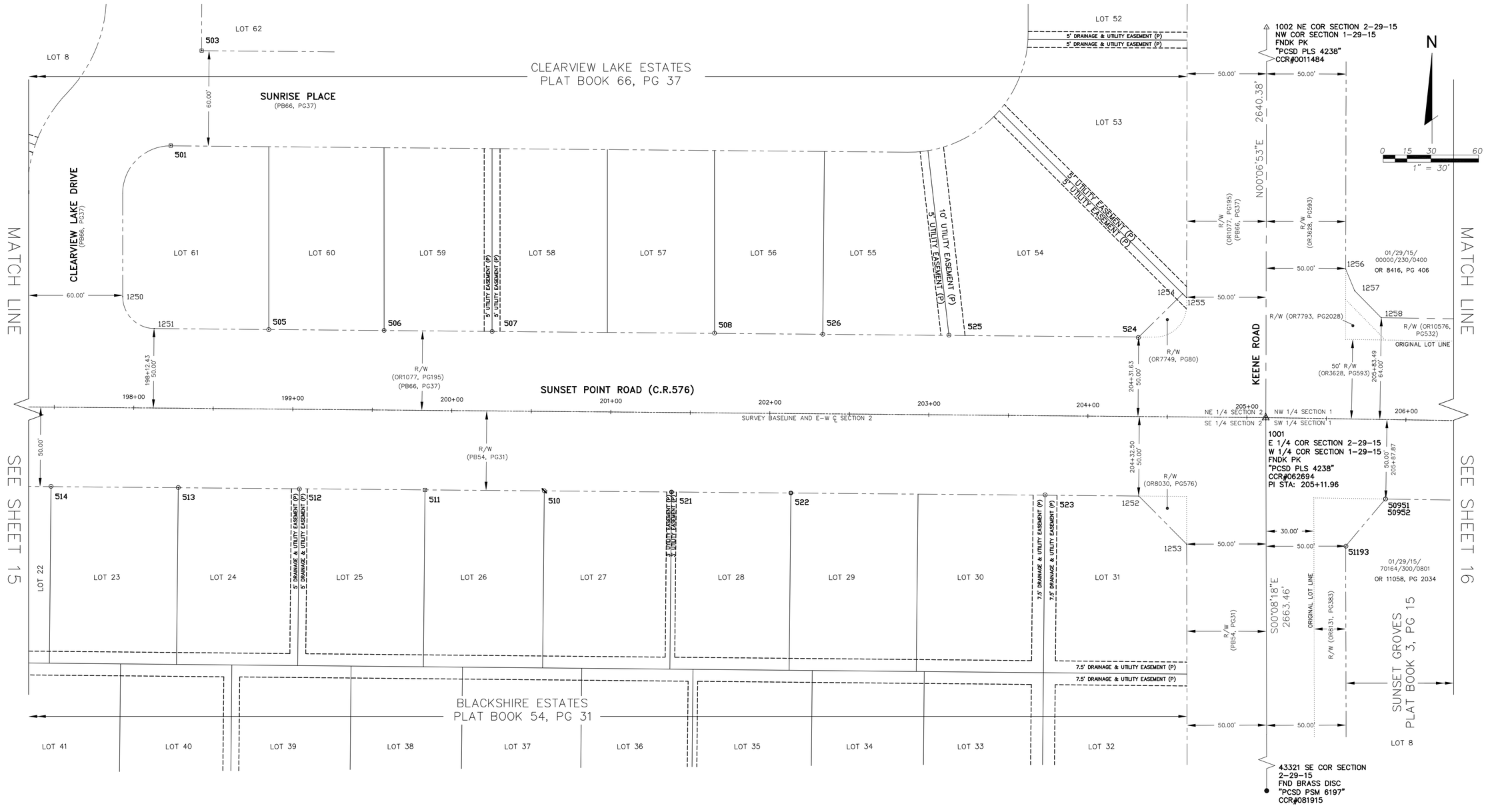
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 15 OF 21 | RWMAP.DWG

NE1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

NW1/4 SECTION 1



SE1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SW1/4 SECTION 1

REVISIONS	BY	DATE

SURVEY BOOK No.:		
SURVEY DIVISION	BY	DATE
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DRAWN		
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SUNSET POINT RD FROM EDGEWATER DR TO KEENE RD

RIGHT-OF-WAY MAP

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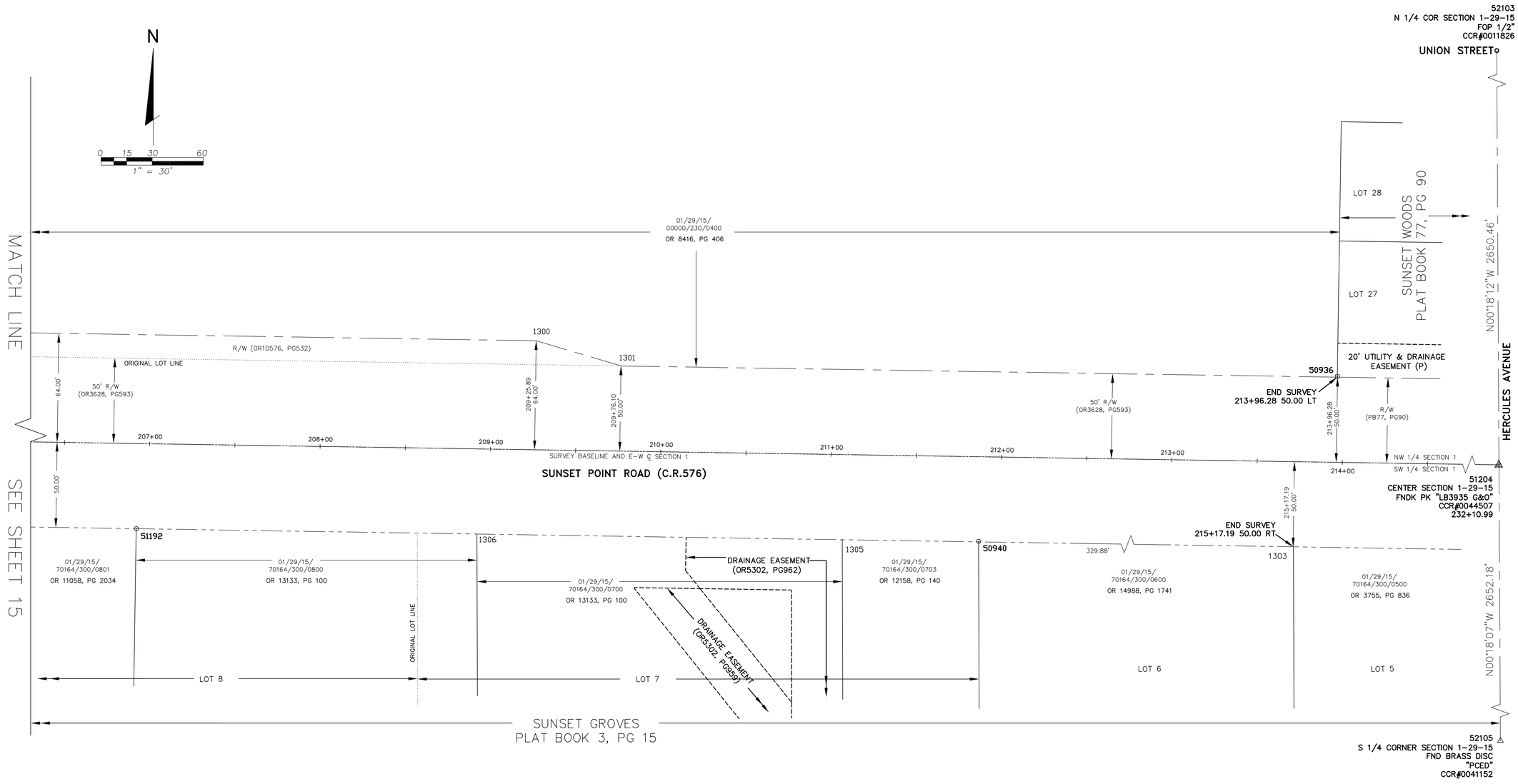
DATE: 1/06/2009

PROJECT I.D. 920476

SURVEY FILE NO.: SFN 1029

SHEET: 16 OF 21 RWMAP.DWG

NW1/4 SECTION 1, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SW1/4 SECTION 1, TOWNSHIP 29 SOUTH, RANGE 15 EAST

REVISIONS	BY	DATE

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DESIGNED		
DRAWN		
CHECKED		

SUNSET POINT RD
FROM EDGEWATER DR
TO KEENE RD

RIGHT–OF–WAY
MAP

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Internet Site: http://www.mckimcreed.com

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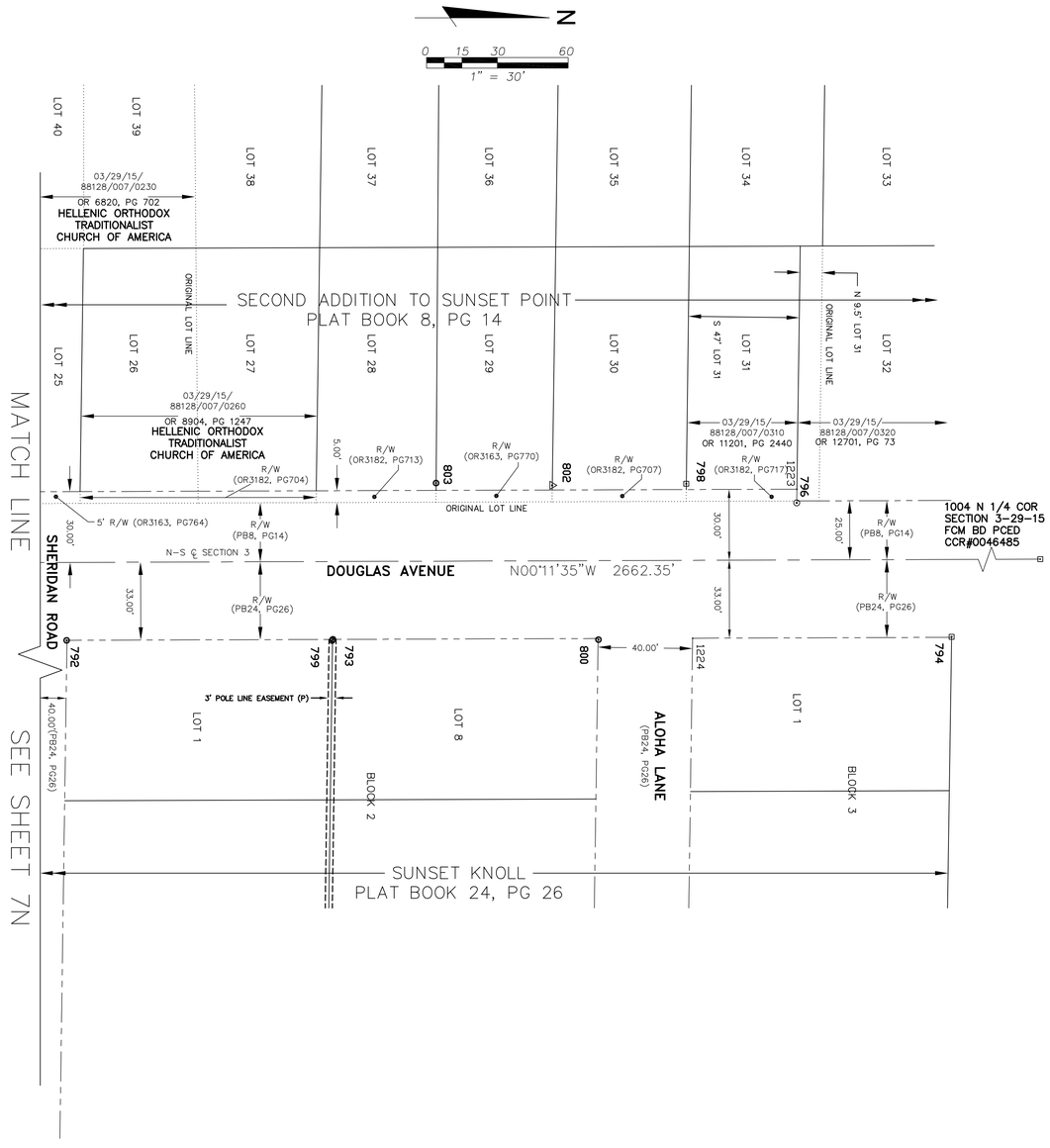
FLORIDA PROFESSIONAL SURVEYOR AND MAPPER
LICENSE NO. 3612

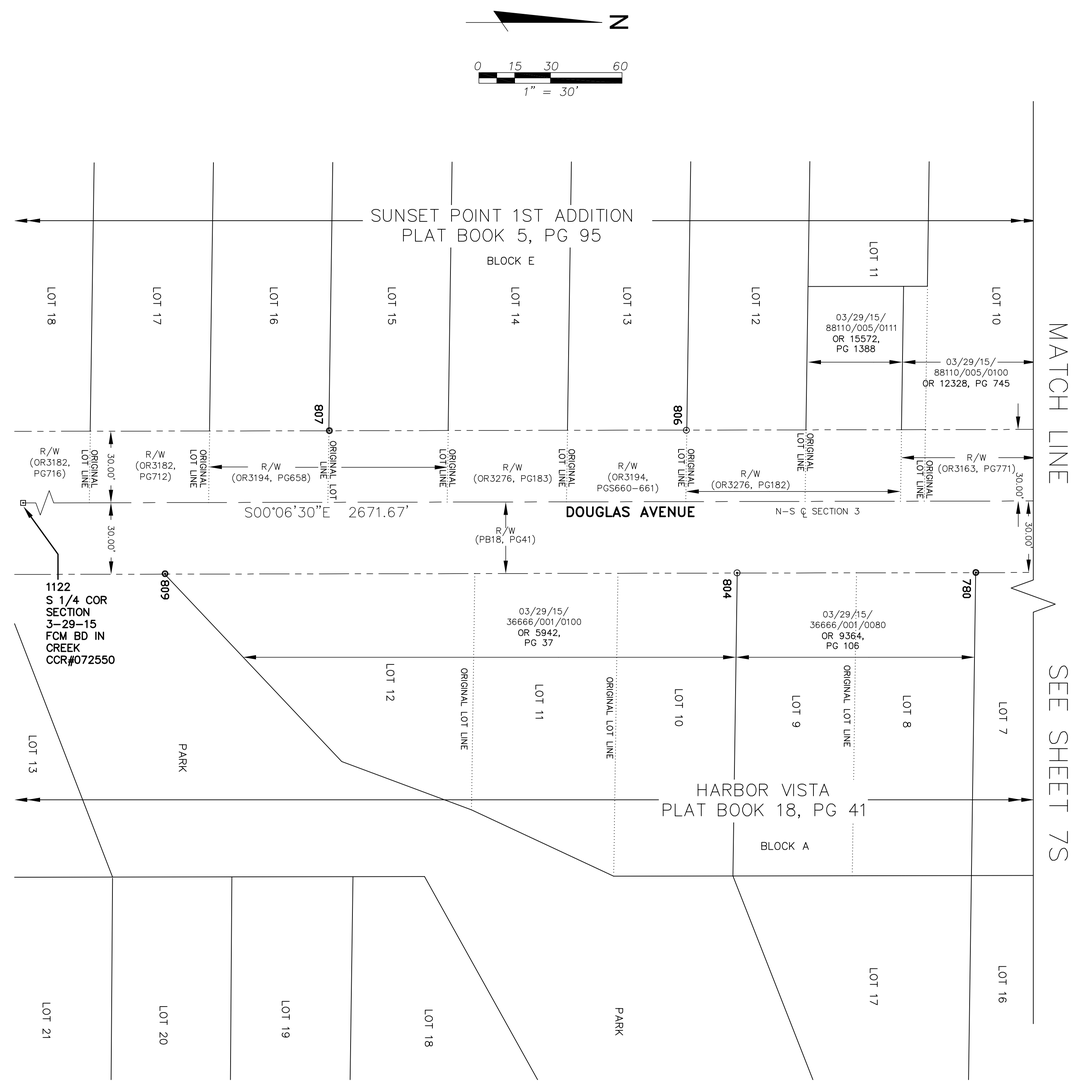
DATE

DATE: 1/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 17 OF 21 | RWMAP.DWG

NE1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SE1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



NW1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SW1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

REVISIONS	BY	DATE

SURVEY BOOK No.:		
SURVEY DIVISION	BY	DATE
SURVEYED	DM	11/2008
TECHNICIAN	JMA	12/2008
CHECKED	EWR	12/2008
DESIGN DIVISION		
DESIGNED		
DRAWN		
CHECKED		

SUNSET POINT RD FROM EDGEWATER DR TO KEENE RD

RIGHT-OF-WAY MAP

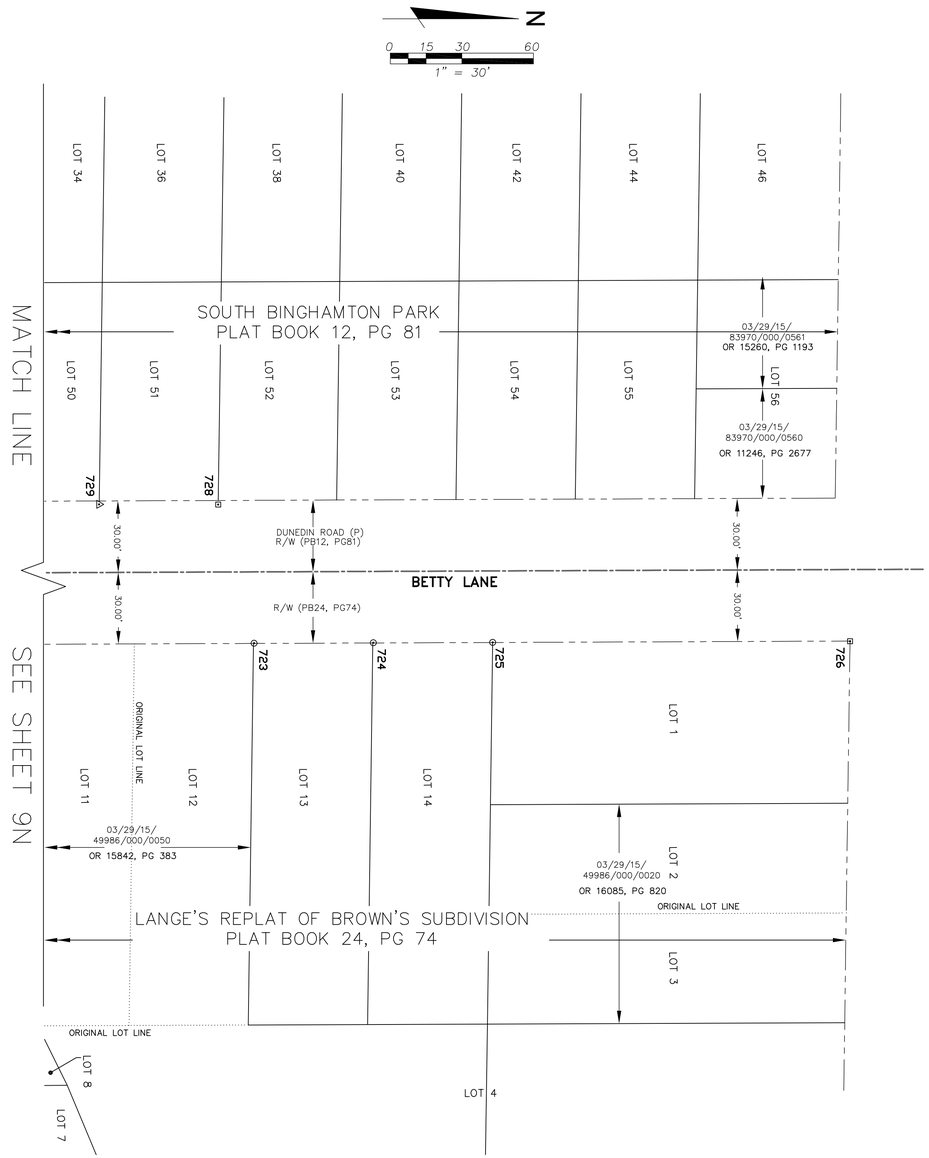
McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
Internet Site: http://www.mckimcreed.com

EARL W. RAMER, P.S.M.
FLORIDA PROFESSIONAL SURVEYOR AND MAPPER
LICENSE NO. 3612

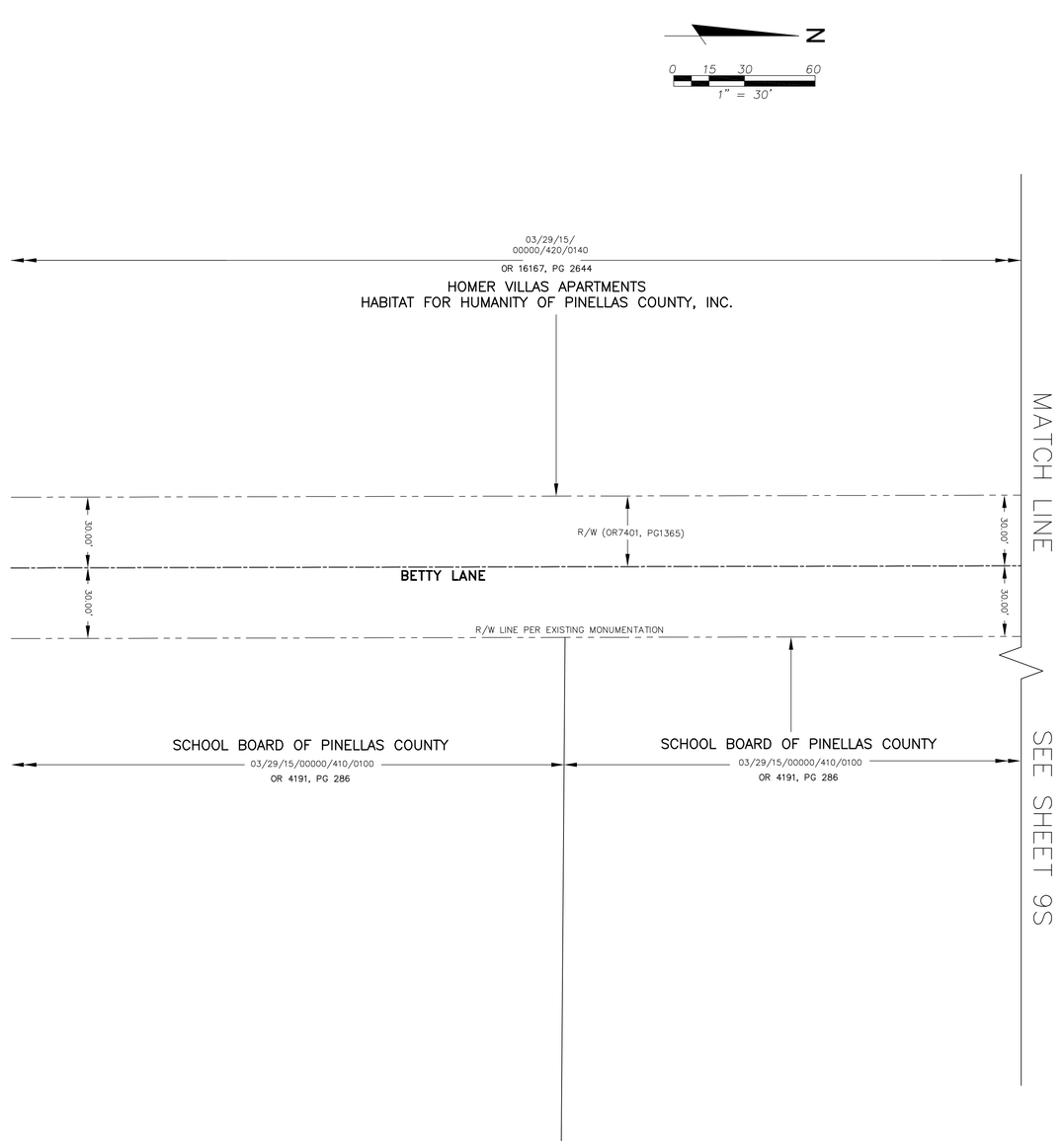
DATE

DATE: 1/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 18 OF 21 | RWMAP.DWG

NE1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SE1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



REVISIONS	BY	DATE

SURVEY BOOK No.:		
SURVEY DIVISION	BY	DATE
SURVEYED	DM	11/2008
TECHNICIAN	JMA	12/2008
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DESIGN DIVISION		
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SUNSET POINT RD FROM EDGEWATER DR TO KEENE RD

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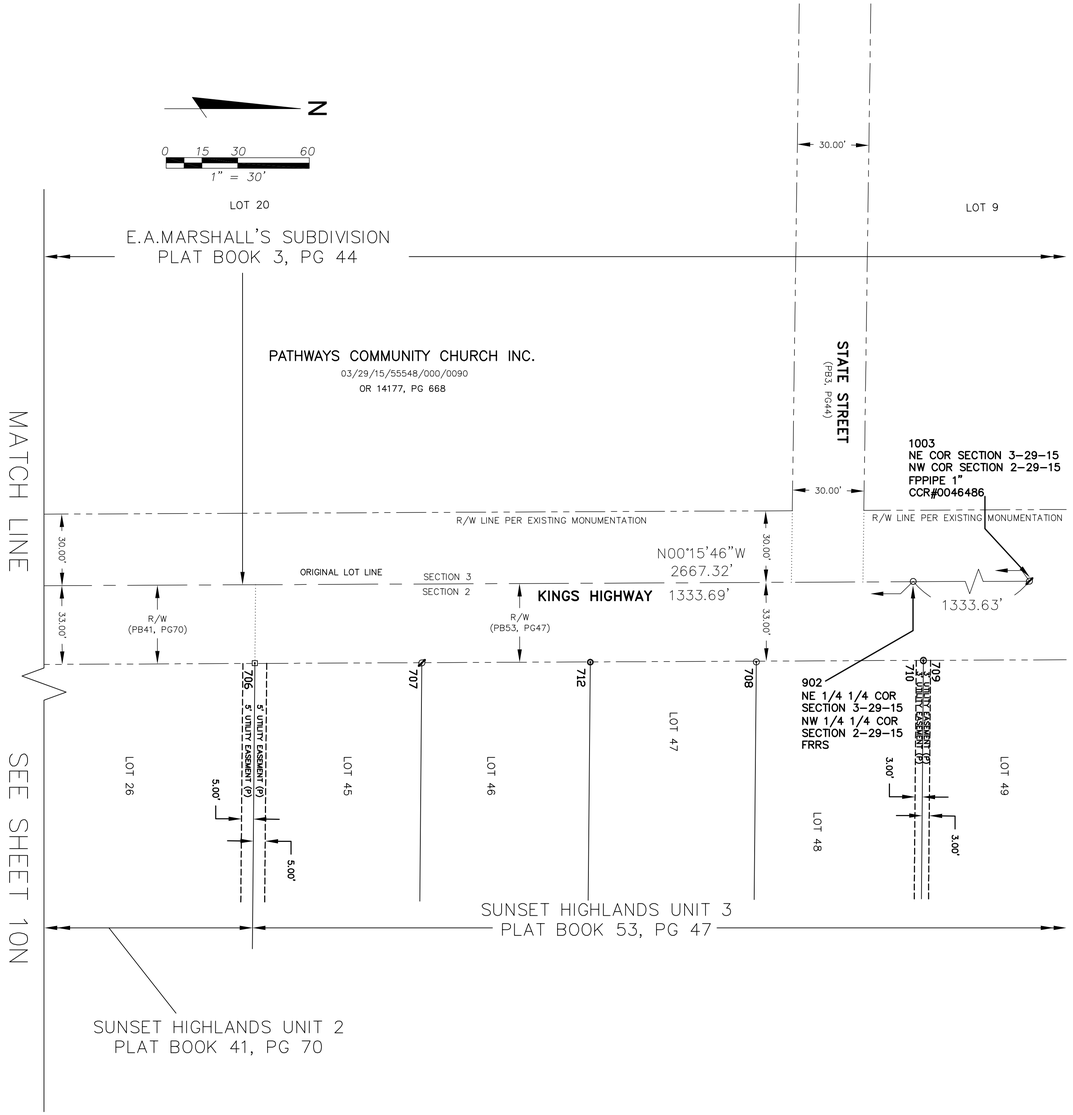
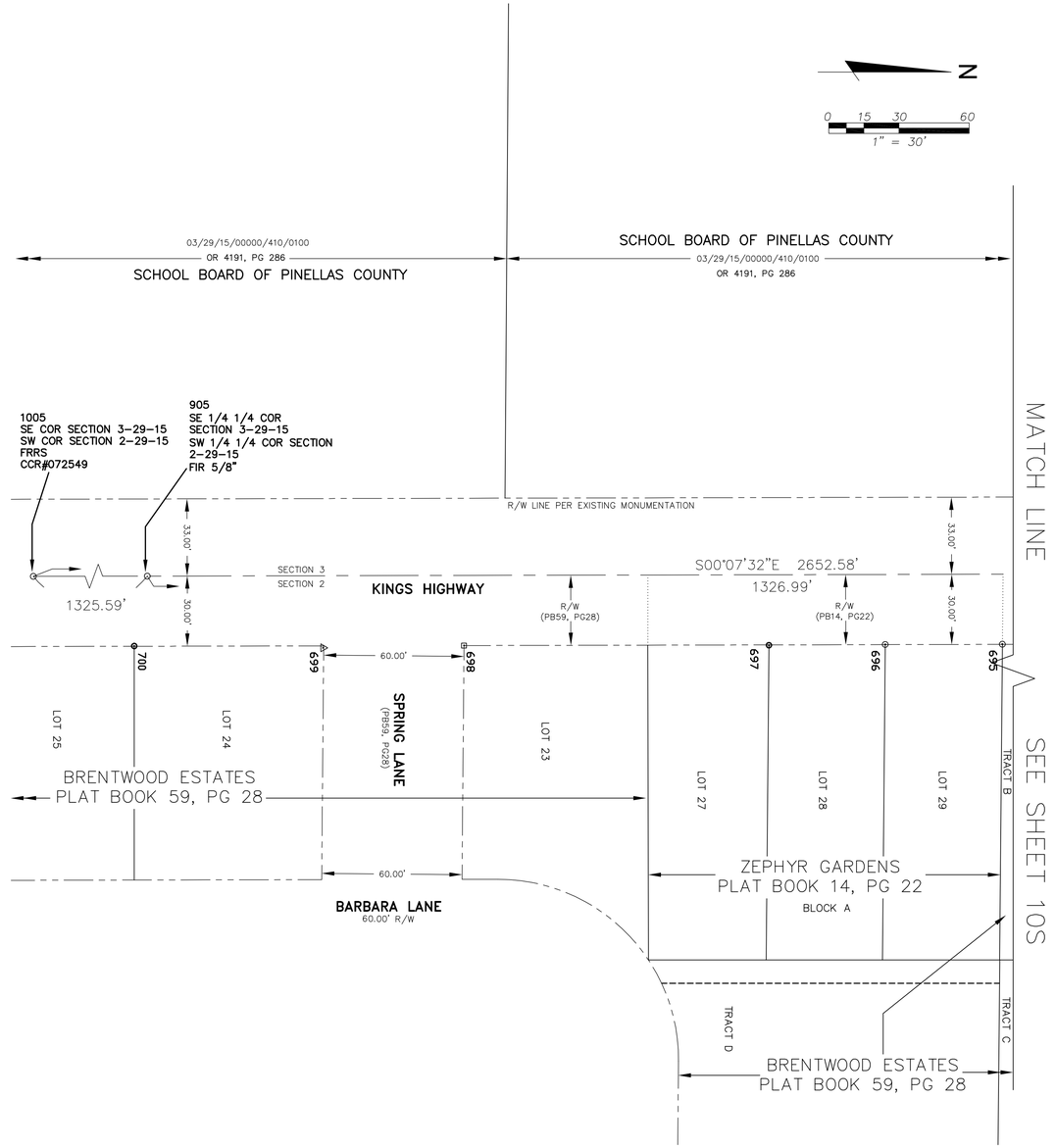
DATE: 1/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 19 OF 21 | RWMAP.DWG

NW1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST



NE1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SW1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SE1/4 SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

REVISIONS	BY	DATE

SURVEY BOOK No.:		
SURVEY DIVISION	BY	DATE
SURVEYED	DM	11/2008
TECHNICIAN	JMA	12/2008
CHECKED	EWR	12/2008
DESIGN DIVISION		
DESIGNED		
DRAWN		
CHECKED		

SUNSET POINT RD FROM EDGEWATER DR TO KEENE RD

RIGHT-OF-WAY MAP

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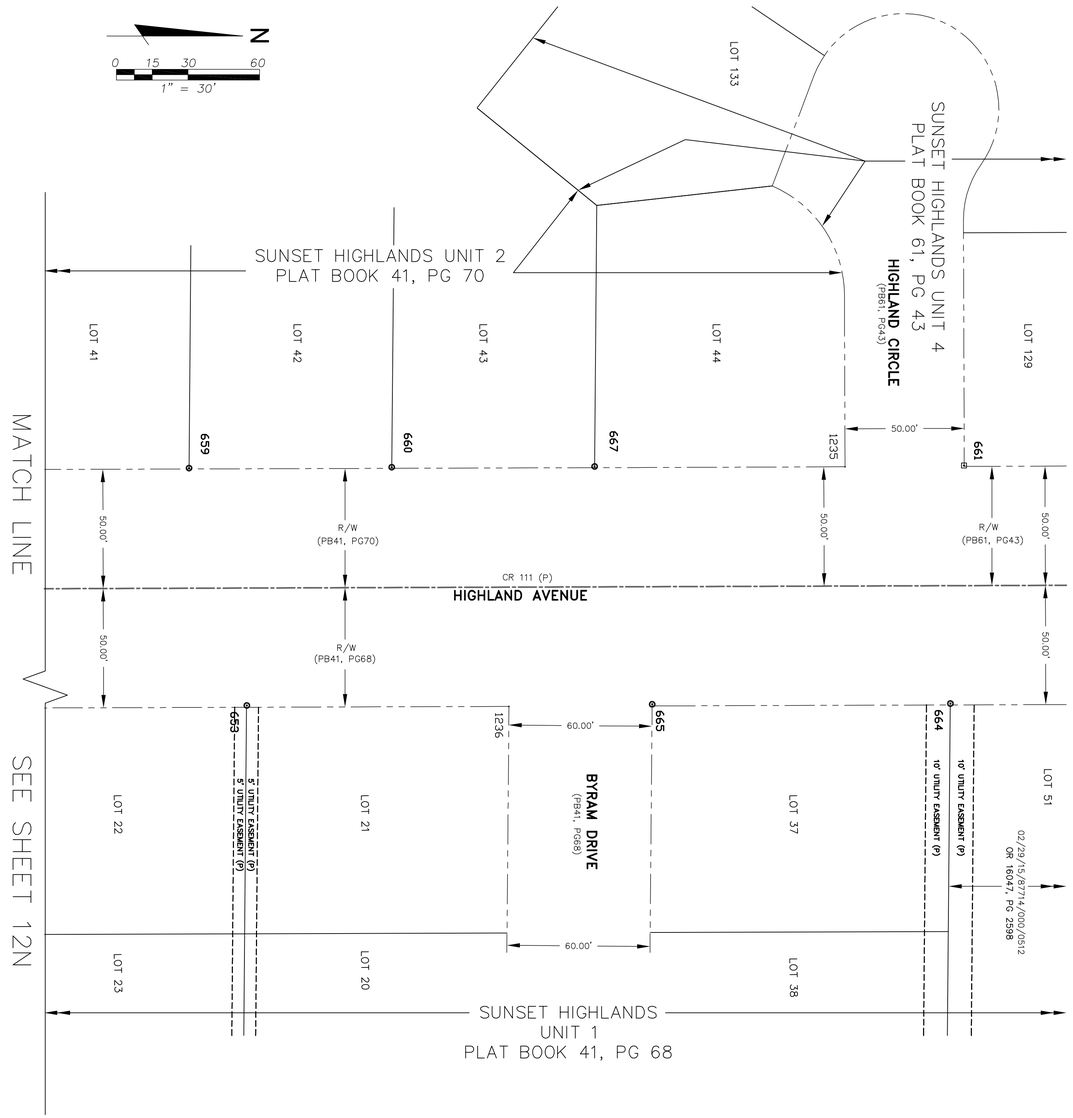
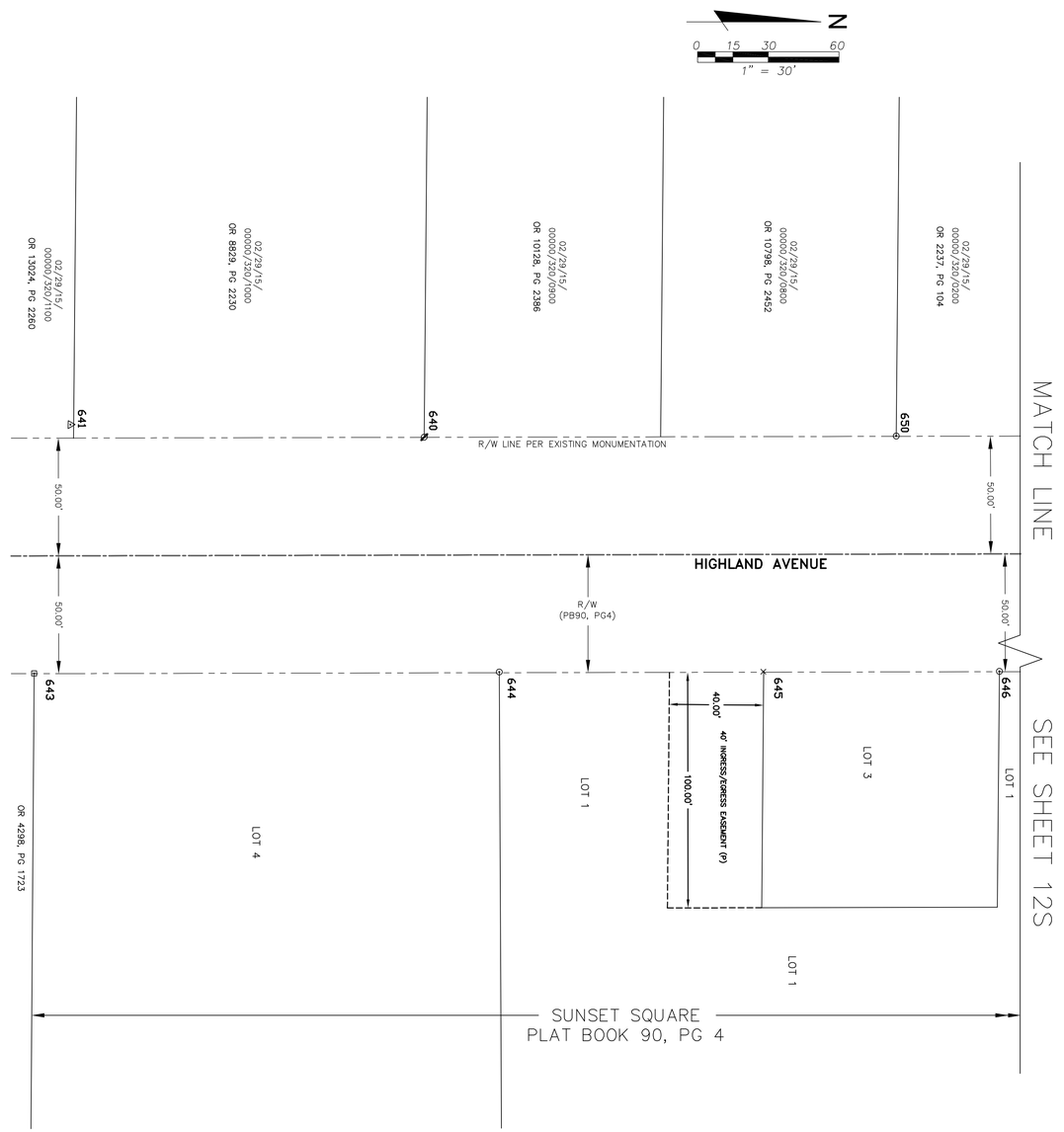
DATE: 1/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 20 OF 21 | RWMAP.DWG

NW1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SW1/4 SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST



REVISIONS	BY	DATE

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SURVEY DIVISION	BY	DATE
SURVEYED	DM	11/2008
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SUNSET POINT RD FROM EDGEWATER DR TO KEENE RD

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DATE: 1/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 21 OF 21 | RWMAP.DWG

Appendix K

Topographic Survey

PINELLAS COUNTY PUBLIC WORKS
DIVISION OF SURVEY AND MAPPING
STATE OF FLORIDA

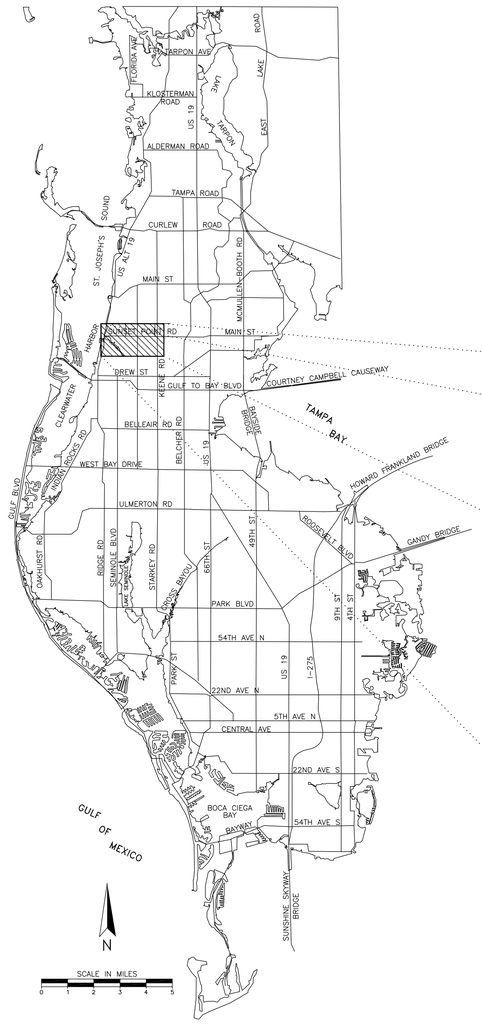
Pinellas County Government is committed to progressive public policy, superior public service, courteous public contact, judicious exercise of authority and sound management of public resources, to meet the needs and concerns of our citizens today and tomorrow.

"Our Public Works Mission is to serve the citizens and visitors of Pinellas County by providing, implementing, operating, and maintaining coastal, surface water, and transportation programs, in a professional manner, which support economic and community growth".

TOPOGRAPHIC SURVEY OF:
SUNSET POINT ROAD (C.R. 576)
from EDGEWATER DRIVE (U.S. ALT. 19)
to 650 LF EAST (more or less) of KEENE ROAD (C.R. 1)

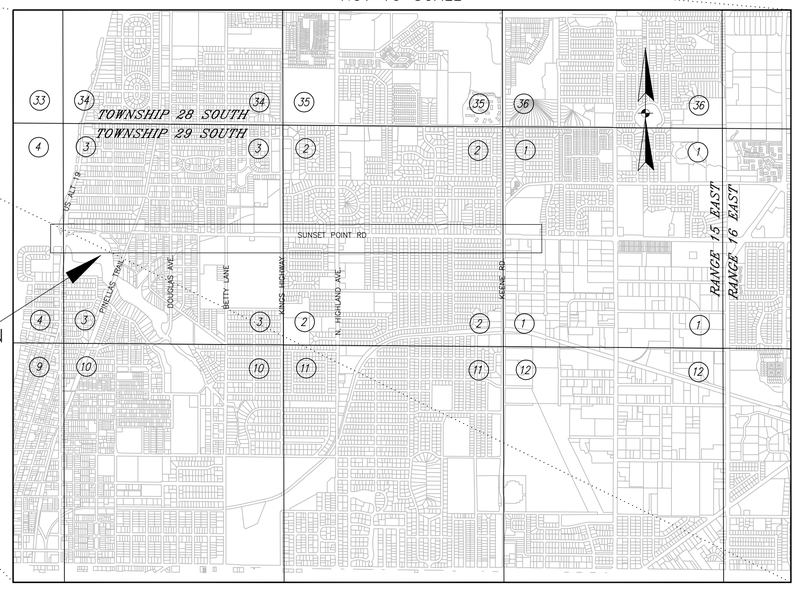
THE SURVEY DEPICTED HERE IS NOT COVERED BY PROFESSIONAL LIABILITY INSURANCE.

PINELLAS COUNTY MAP



VICINITY MAP

NOT TO SCALE



SECTIONS 1, 2 & 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SHEET INDEX

1	COVER SHEET / VICINITY MAP / GRAPHIC SYMBOLS
2	LAND SURVEYOR REPORT/ ALIGNMENTS / CONTROL POINTS / ABBREVIATIONS
3	MONUMENTATION POINTS
4	STORM DRAINAGE STRUCTURES
5	SANITARY SEWER STRUCTURES / DETAILS
6	WETLAND POINTS / SOIL BORING LOCATIONS
7	KEY SHEET
8–42	TOPOGRAPHIC SURVEY DETAIL SHEETS

REVISION DATES

GRAPHIC SYMBOLS:

CENTERLINE
CONTOUR LINE
EXISTING TOPOGRAPHIC FEATURE
JURISDICTION LINE
CONSTRUCTION REFERENCE LINE
RIGHT-OF-WAY (EXISTING)
RIGHT-OF-WAY LINE (PROPOSED) (EXISTING W/ ACQUISITION)
PROPERTY OR DEED LINE
EASEMENT LINE
SECTION LINE
ORIGINAL LOT LINE/FORMER OWNERSHIP LINE/ VACATED EASEMENTS
FENCE LINE
CABLE TELEVISION
TELEPHONE LINE
TRAFFIC CONTROL LINE
ELECTRIC POWER LINE/CABLE
DRAINAGE (STORM SEWER) PIPE

SANITARY SEWER GRAVITY LINE
FORCE MAIN (SANITARY SEWER)
GAS LINE
HOT OIL LINE
RECLAIMED WATER LINE
POTABLE WATER
UNKNOWN UTILITY
TREE LINE/HEDGE LINE
FOUND CONCRETE MONUMENT
FOUND NAIL & DISC/CAP BRASS DISC
FOUND IRON ROD
FOUND IRON PIPE
FOUND PINCH PIPE
SET CONCRETE MONUMENT
SET NAIL & DISC/CAP BRASS DISC
SET IRON ROD
XCUT (FOUND)
OWNER IDENTIFICATION
SUBDIVISION BLOCK DESIGNATION

CENTERLINE
SURVEY LINE
PROPERTY LINE
FIRE HYDRANT
GUY WIRE
SEWER MANHOLE
TELECOMMUNICATIONS MANHOLE
DRAINAGE MANHOLE
RECLAIMED WATER MANHOLE
TRAFFIC SIGNAL PULL BOX
SPRINKLER HEAD
TRAFFIC SIGNAL POLE
UNDERDRAIN BOX
POLE/POST
UTILITY POLE
LIGHT POLE
MAILBOX

SHRUB
PALM TREE
DECIDUOUS TREE (OAK UNLESS OTHERWISE ANNOTATED)
EVERGREEN TREE (PINE UNLESS OTHERWISE ANNOTATED)
WATER VALVE
RECLAIMED WATER VALVE
GATE VALVE
GAS VALVE
WATER METER
RECLAIMED WATER METER
GRATE INLET
BENCHMARK
MONITOR WELL
TELECOMMUNICATIONS BOX
SANITARY CLEANOUT
ELECTRIC METER

POWER BOX
IRRIGATION CONTROL VALVE
CABLE TV BOX/VAULT
GEO-TECH BORING
WETLAND POINT
BENCH
SIGN
ELECTRICAL OUTLET
WATERLINE BACK FLOW PREVENTER
PEDESTRIAN POLE
UTILITY POLE WITH LIGHT

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State of Florida

DATE

SEAL

PROJECT NO.: 920476	*DRAWING NO.: SH01*	
CONTRACT NO.: 067-0500-A(DM)	*FILE NO.: SFN 1029*	
	SHEET 01 OF 42	*SH01.DWG*

ALIGNMENT:

Alignment: SURVEY BASELINE
Desc: SUNSET POINT ROAD

Pt#	PI Station	Northing	Easting	Distance	Direction
42000	100+00	1330010.8008	399402.9869		
	(675+62.28 EDGEWATER DRIVE)			556.29'	S 87-40-14 E
42001	105+56.29	1329988.1895	399958.8208		
				73.31'	S 79-06-30 E
42002	106+29.61	1329974.3365	400030.8150		
				77.93'	S 84-06-02 E
42003	107+07.54	1329966.3263	400108.3341		
				74.50'	S 72-06-38 E
42004	107+82.04	1329943.4399	400179.2364		
				826.49'	S 89-09-45 E
42005	116+08.54	1329931.3582	401005.6414		
				912.60'	S 89-09-45 E
72	125+21.13	1329918.0180	401918.1370		
				2665.02'	S 89-11-28 E
1200	151+86.15	1329880.3906	404582.8914		
				5325.81'	S 89-30-16 E
1001	205+11.96	1329834.3240	409908.5010		
				2699.03'	S 89-06-10 E
51204	232+10.99	1329792.0600	412607.2030		

Alignment: SURVEY BASELINE
Desc: EDGEWATER DRIVE

904	663+24.33	1328779.5099	399274.7587		
				1675.67'	S 05-56-44 W
21273	680+00.00	1330446.1710	399448.3268		

SURVEYOR REPORT:

1. Type of Survey: Topographic Survey (Chapter 61G17-6 F.A.C.) to establish the geographic location of existing conditions to facilitate the roadway improvements on SUNSET POINT ROAD (S.R.576) FROM EDGEWATER DRIVE (U.S. ALT 19) to 650LF EAST (more or less) of KEENE ROAD (C.R. 1) (SFN 1029).
2. Survey Date: December 2008
   Date of Computations: December 2008
3. Project Control and Coordinate values shown on the Topographic Survey (to establish geographic location of existing features to facilitate the design of roadway improvements) at Sunset Point Road (C.R.576) from Edgewater Drive (U.S. Alt 19) to Keene Road (C.R. 1) (SFN 1029) are based on and further described as: Horizontal: State Plane Coordinate System for the West Zone of Florida, North American Datum 1983, 1990 Adjustment.
   The project control network was established using GPS simultaneous Static Triangulation holding the following City of Clearwater Vertical and Horizontal Control Network Designations: J-06, I-09, I-10.

1	1332586.7710	399832.9206	7.25	FND BRASS DISK STAMPED "J-06" SET IN CONCRETE
36	1329827.8700	407104.1400	46.62	FND BRASS DISK STAMPED "I-09" SET IN CONCRETE
66	1329827.7000	409998.5200	56.70	FND BRASS DISK STAMPED "I-10" SET IN CONCRETE

   The City of Clearwater Vertical and Horizontal Control Network was established using G.P.S. Simultaneous Rapid Static Triangulation, utilizing the following three published N.G.S. monuments as follows:
   N.G.S. Data Sheet / Retrieval Date – July 23 , 2003 / Designation – PCDSM GPS 78 / PID – DF5853
   N.G.S. Data Sheet / Retrieval Date – August 12 , 2003 / Designation – PCDSM GPS 46 / PID – DF5779
   N.G.S. Data Sheet / Retrieval Date – February 24 , 2005 / Designation – PCDSM GPS 13 / PID – DF5792
4. PARENT BENCHMARKS are City of Clearwater Benchmark Designations "I-06" (found brass disk) holding an elevation of 11.58' and "I-10" (found concrete monument with brass disk) holding an elevation of 56.70' North American Vertical Datum 1988. Vertical control values were established using differential 3-wire leveling techniques.
5. ACCURACY STATEMENT: All measurements, distances, elevations and features shown were performed in strict accordance with the Minimum Technical Standards set forth in Chapter 61G17-6, F.A.C.
6. Control Points 3-69, 75 AND 100-111 serve as the project Control and Benchmarks for this survey as tabulated on this sheet.
7. Abbreviation legend appears upon this sheet of the survey map.
8. INTENDED FEATURES: Topographical features such as trees, buildings, roadway surfaces, driveways, sidewalks, fences, aboveground utilities and known underground utilities are shown, however, other utilities may exist. Subsurface Utilities are shown at a Quality Level B with specific verified vertical and horizontal (Vvh) locates at a Quality Level A as shown on survey and tabled on this sheet.
9. The SURVEY REFERENCE LINE(S) shown hereon are calculated reference lines only.
10. SURVEY TECHNICIANS: J. Adams CST Computer II (0407-2982), C. Fesler.
11. Not a Boundary Survey. Right-of-way, easements, land lines and property lines shown hereon are from the Sunset Point Road Right-of-way Map as prepared as part of SFN1029, by McKim & Creed dated 1/06/2009. Easements and Property lines shown are a graphic representation only and have not been field verified.
12. Not based on an abstract of title. Record instruments were provided. Other easements and/or restrictions may exist.
13. RESPONSIBILITY: The undersigned, Earl W. Ramer L.S., is the responsible Surveyor and Mapper for all features and data contained on this Survey and Map.
14. Not valid without the Signature and the original raised Seal of a Florida Licensed Surveyor and Mapper.
15. Additions or deletions to survey maps or reports by other than the signing party or parties is prohibited without written consent of the signing party or parties.
16. Neither the map nor the report is full and complete without the other.
17. Measurements are taken to the nearest hundredth and calculations are shown to three decimal places.
18. Sunset Point Road (C.R.576) is a variable width Right-of-way per Sunset Point Road Right-of-way Map as prepared as part of SFN1029, by McKim & Creed dated 1/06/2009.
19. THE SURVEY DEPICTED HERE IS NOT COVERED BY PROFESSIONAL LIABILITY INSURANCE.

CONTROL POINT COORDINATES:

POINT#	NORTHING	EASTING	ELEVATION	STATION	OFFSET	DESCRIPTION
3	1330041.438	399461.409	5.71	100+57.13	-32.98	FNDK PK HLA LB6969
4	1329935.701	400115.804	3.56	107+24.06	26.85	SIR RC LB6566 TRAV
5	1329946.772	400855.383	20.06	114+58.07	-13.21	SND PK LB6566 TRAV
6	1329940.463	401385.348	30.46	119+88.07	-14.65	SIR RC LB6566 TRAV
7	1329896.535	401968.789	23.51	125+72.08	20.76	SND PK LB6566 TRAV
8	1329891.794	402107.758	16.79	127+24.38	937.97	SND PK LB6566 TRAV
9	1329568.038	401415.329	24.71	120+23.49	357.29	SND PK LB6566 TRAV
10	1330044.017	401414.236	30.19	120+15.44	-118.61	SND PK LB6566 TRAV
11	1330196.163	401892.719	24.91	124+91.65	-277.74	SIR RC LB6566 TRAV
12	1329884.597	402232.134	20.48	128+35.57	28.98	SND PK LB6566 TRAV
13	1329926.977	402461.641	18.41	130+64.45	-16.63	SND PK LB6566 TRAV
14	1330190.322	402440.864	23.31	130+39.96	-279.65	SND PK LB6566 TRAV
15	1329923.322	402738.149	17.91	133+40.99	-16.88	SIR RC LB6566 TRAV
16	1330172.025	402764.314	17.40	133+63.64	-265.92	SND PK LB6566 TRAV
17	1329921.201	403014.829	16.64	136+17.67	-18.66	SND PK LB6566 TRAV
18	1330165.847	403004.124	15.78	136+03.51	-263.13	SND PK LB6566 TRAV
19	1329862.315	403231.664	16.40	138+35.31	37.15	SIR RC LB6566 TRAV
20	1329646.319	403231.740	16.70	138+38.44	253.12	SND PK LB6566 TRAV
21	1330137.908	403237.891	10.70	138+37.65	-238.50	SIR RC LB6566 TRAV
22	1329865.734	403631.730	14.54	142+35.29	28.08	SIR RC LB6566 TRAV
23	1329863.222	404087.115	10.21	146+90.67	24.16	SIR RC LB6566 TRAV
24	1329826.009	404561.228	15.55	151+65.26	54.68	SIR RC LB6566 TRAV
25	1329483.759	404565.418	16.66	151+74.28	396.83	SIR RC LB6566 TRAV
26	1330185.103	404603.878	15.83	152+04.50	-304.88	SND PK LB6566 TRAV
27	1329848.684	404897.064	18.61	155+00.59	28.98	SIR RC LB6566 TRAV
28	1329850.477	405415.805	26.35	160+19.29	22.70	SIR RC LB6566 TRAV
29	1329835.277	405868.941	33.32	164+72.54	33.98	SIR RC LB6566 TRAV
30	1329357.35	405884.682	37.32	164+92.42	511.76	SIR RC LB6566 TRAV
31	1330368.868	405931.519	23.71	165+30.50	-500.12	SND PK LB6566 TRAV
32	1329898.105	406314.198	33.89	169+17.24	-32.68	SIR RC LB6566 TRAV
33	1329830.231	406743.001	40.49	173+65.61	31.47	SND PK LB6566 TRAV
34	1330156.426	406732.489	38.77	173+33.28	-294.61	SND PK LB6566 TRAV
35	1329592.745	406742.303	41.04	173+47.97	268.95	SND PK LB6566 TRAV
36	1329501.648	407091.722	46.40	176+98.16	357.02	SND PK LB6566 TRAV
37	1329830.568	407405.727	51.49	180+09.31	25.40	SND PK LB6566 TRAV
38	1329498.330	407371.957	51.45	179+78.42	357.92	SND PK LB6566 TRAV
39	1329816.668	407654.827	54.66	182+58.52	37.14	SND PK LB6566 TRAV
40	1329484.229	407638.278	55.67	182+44.85	369.71	SND PK LB6566 TRAV
41	1329813.924	407903.794	57.82	185+07.50	37.73	SND PK LB6566 TRAV
42	1329560.975	407904.171	58.73	185+10.07	290.67	SND PK LB6566 TRAV
43	1329822.936	408007.302	60.26	188+19.92	26.10	SIR RC LB6566 TRAV
44	1329536.503	408174.677	60.35	187+80.78	312.80	SND PK LB6566 TRAV
45	1329883.481	408345.349	60.02	189+48.44	-35.63	SIR RC LB6566 TRAV
46	1329483.882	408239.145	58.35	188+39.97	-296.89	SND PK LB6566 TRAV
47	1330145.671	408435.680	59.83	190+39.34	29.81	SND PK LB6566 TRAV
48	1329817.252	408437.275	61.79	190+43.82	363.15	SND PK LB6566 TRAV
49	1329483.882	408707.062	61.41	193+12.99	290.81	SND PK LB6566 TRAV
50	1329553.889	408695.647	59.14	192+99.30	28.03	SND PK LB6566 TRAV
51	1329816.784	409141.358	60.28	197+44.56	-26.69	SND PK LB6566 TRAV
52	1329867.660	409213.163	58.49	198+14.86	-201.02	SND PK LB6566 TRAV
53	1330041.369	409913.379	58.96	205+11.40	-628.55	SND PK LB6566 TRAV
54	1330462.856	409911.424	58.75	205+03.83	-1277.61	SND PK LB6566 TRAV
55	1331111.964	409903.201	56.80	205+07.72	110.55	SND PK LB6566 TRAV
56	1329723.806	409905.111	58.28	205+21.32	811.75	SND PK LB6566 TRAV
57	1329022.519	403232.170	18.95	138+46.59	799.68	FCM PCDSM GPS 66
58	1329099.695	403868.738	13.99	138+53.54	-872.66	SIR RC LB6566 TRAV
59	1330771.781	401887.869	25.53	124+80.24	-726.32	SIR RC LB6566 TRAV
60	1330644.860	401944.566	11.47	125+59.45	842.12	SND PK LB6566 TRAV
61	1329075.433	401944.096	18.06	125+52.29	368.38	SND PK LB6566 TRAV
62	1329549.233	400965.398	21.23	115+70.01	117.68	SND PK LB6566 TRAV
63	1329814.253	401131.307	25.54	117+28.93	-361.56	SND PK LB6566 TRAV
64	1330291.126	399418.258	6.78	NA	NA	SIR RC LB6566 TRAV
65	1330387.226	399940.540	28.30	122+56.58	-18.65	SND PK LB6566 TRAV
66	1329940.540	401653.886	27.06	122+55.64	-463.24	SND PK LB6566 TRAV
67	1330385.093	401659.445	8.49	NA	NA	SND PK LB6566 TRAV
68	1329867.117	399352.331	11.05	116+18.66	-12.49	SND PK LB6566 BM
69	1330385.093	401015.948	21.82	114+58.59	-48.59	SND PK LB6566 BM
100	1329943.699	401887.869	25.53	124+80.24	-726.32	SIR RC LB6566 TRAV
101	1329889.608	409134.950	60.34	197+37.96	58.31	SND PK LB6566 BM
102	1329817.553	405105.919	20.82	157+09.70	58.31	SND PK LB6566 BM
103	1329896.723	406333.601	33.99	169+37.26	58.52	SND PK LB6566 BM
104	1329889.020	403143.918	16.17	137+47.20	11.68	SND PK LB6566 BM
105	1329901.870	403947.196	10.82	145+50.22	-12.50	SND PK LB6566 BM
106	1329901.050	404348.451	11.03	149+51.44	-17.34	SND PK LB6566 BM
107	1329895.564	402691.894	17.57	132+95.13	11.52	SND PK LB6566 BM
108	1329818.118	407779.405	57.82	183+83.08	34.62	SND PK LB6566 BM
109	1329814.064	408211.196	60.74	188+14.89	34.94	SND PK LB6566 BM
110	1329809.621	408680.572	59.67	192+84.29	35.32	SND PK LB6566 BM
111	1329881.800	409633.344	59.71	202+36.40	-45.09	SND PK LB6566 BM

ABBREVIATIONS:

(C)	CALCULATED DATA
(M)	MEASURED (IN FIELD)
(P)	PLAT DATA
(R)	RECORD DATA
60D	NAIL 60D
A	ARC
AC	ACRE(S)
ADS	AMERICAN DRAINAGE SYSTEMS
ADS##	ADS, DIA INCHES
ADS##I	ADS, DIA INCHES, INVERT
ADSPF	AMERICAN DRAINAGE SYSTEMS PERFORATED
ADSPF##	ADS PERFORATED, DIA INCHES
ADSPF##I	ADS PERFORATED, DIA INCHES, INVERT
AHD	AHEAD
ASPH	ASPHALT
AUS	AUSTRALIAN
AVE	AVENUE
BC	BACK OF CURB
BK	BACK
BFLPR	BACKFLOW PREVENTOR
BLDG	BUILDING
BLVD	BOULEVARD
BM	BENCHMARK
BNCH	BENCH
BOXC	BOX CULVERT
BRAZ	BRAZILIAN PEPPER
BRCD	BARRICADE
BRG	BEARING
BRUSH	BRUSH LINE
BTMSHOT	BOTTOM SHOT
C#	CURVE NUMBER
C/O	CARE OF
CALC	CALCULATED
CATV	CABLE TELEVISION
CB	CATCH BASIN
CBS	CONCRETE BLOCK STRUCTURE
CC#####	CERTIFIED CORNER NUMBER
CH	CHORD
CIR	CIRCLE
CL	CENTERLINE
CLK	CHAINLINK FENCE
CLMED	CENTERLINE OF MEDIAN
CLPI	CENTERLINE, PI OF
CLRR	CENTERLINE OF RAILROAD
CLSP	CENTERLINE OF SPILLWAY
CM	CONCRETE MONUMENT
CMP	CORR METAL PIPE
CMP##	CORR METAL PIPE, DIA INCHES
CMP##I	CORR METAL PIPE, DIA INCHES, INVERT
CO	COUNTY
CONC	CONCRETE
CONDO	CONDOMINIUM
CONST	CONSTRUCTION
COR	CORNER
CORR	CORRUGATED
CPP	CORR POLYETHYLENE PIPE
CPP##	CORR POLYETHYLENE PIPE, DIA INCHES
CPP##I	CORR POLYETHYLENE PIPE, DIA INCHES, INVERT
CR	COUNTY ROAD
CRL#	CONSTRUCTION REFERENCE LINE NUMBER
D	DELTA
DB	DEED BOOK
DEM	DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
DEP	DEPARTMENT OF ENVIRONMENTAL PROTECTION
DEPT	DEPARTMENT
DER	DEPARTMENT OF ENVIRONMENTAL REGULATIONS
DESC	DESCRIPTION
DIA	DIAMETER
DIPD	DUCTILE IRON PIPE, DRAINAGE
DIPD##	DUCTILE IRON PIPE, DRAINAGE, DIA INCHES
DIPD##I	DUCTILE IRON PIPE, DRAINAGE, DIA INCHES, INVERT
DIPS	DUCTILE IRON PIPE, SEWER
DIPS##	DUCTILE IRON PIPE, SEWER, DIA INCHES
DIPW	DUCTILE IRON PIPE, WATER
DIPW##	DUCTILE IRON PIPE, WATER, DIA INCHES
DNR	DEPARTMENT OF NATURAL RESOURCES
DOC	DEGREE OF CURVE
DOT	DEPT OF TRANSPORTATION
DR	DRAINAGE
DSCO	DRAINAGE SYSTEM CLEANOUT
DW	DRIVEWAY
DWA	DRIVEWAY, ASPHALT
DWB	DRIVEWAY, BRICK
DWC	DRIVEWAY, CONCRETE
DWD	DRIVEWAY, DIRT
DWG	DRAWING
DWGR	DRIVEWAY GRAVEL
DWGS	DRIVEWAY, GRASS
DWM	DRIVEWAY, MARL
DWS	DRIVEWAY, STONE
E	EAST OR EASTING
E-W	EAST-WEST
EASE	EASEMENT
EB	ELECTRICAL BOX
ECMP	ELLIPT CMP
ECMP##	ELLIPT CMP, DIA INCHES
ECMP##I	ELLIPT CMP, DIA INCHES, INV
EL	ELEVATIION
ELEV	ELEVATION
ELLIPT	ELLIPTICAL
ENDW	ENDWALL
EP	EDGE OF PAVEMENT
EPA	EDGE OF PAVEMENT, ASPHALT
EPC	EDGE OF PAVEMENT, CONCRETE
EQ	EQUATION
EQUIP	EQUIPMENT
ER	EDGE OF ROAD
ERCP	ELLIPT RCP
ERCP##	ELLIPT RCP, DIA INCHES
ERCP##I	ELLIPT RCP, DIA INCHES, INV
ERD	EDGE OF ROAD, DIRT
ERG	EDGE OF ROAD, GRAVEL
ERM	EDGE OF ROAD, MARL
ERSH	EDGE OF ROAD, SHELL
ES	EXISTING STORM
ESMT	EASEMENT
ESS	EXISTING SANITARY SEWER
ET AL	AND OTHERS
EX	EXTERNAL
FAC	FLORIDA ADMINISTRATIVE CODE
FCM	FOUND CONCRETE MONUMENT
FEN	FENCE
FIR	FOUND IRON ROD
FL	FLOWLINE
FLBD	FLOWERBED
FLEL	FLOOR ELEV
FM	FORCE MAIN
FNC	FOUND NAIL AND CAP
FNDK	FOUND NAIL AND DISK
FND	FOUND
FNS	FOUND NAIL AND SHINER
FOC	FOUND ORANGE CAP
FOP	FOUND OPEN PIPE
FPPIPE	FOUND PINCHED PIPE
FRC	FOUND RED CAP
FRRS	FOUND RAILROAD SPIKE
FRVT	FOUND RIVET
FS	FLORIDA STATUTES
FT	FEET
FXDL	FLEXIBLE DELINEATOR
FYC	FOUND YELLOW CAP
GEO	GEODETIC
GLINE	GAS LINE
GP	GROUND POINT
GPR	GROUND PENETRATING RADAR
GPS	GLOBAL POSITIONING SYSTEM
GTANK	GAS TANK
GVLV	GAS VALVE
H	HILLSBORDUGH
HB	HOSE BIB
HED	HEDGE
H2O	WATER
HW	HEADWALL
HWM	HIGH WATER MARK
HWY	HIGHWAY
ID	IDENTIFICATION
INV	INVERT
IP	IRON PIPE
IR	IRON ROD
JBOX	JUNCTION BOX
JDL	JURISDICTIONAL LINE
JR	JUNIOR
L	ARC LENGTH
LIFT	LIFT STATION
LL	LOT LINE
LN	LANE
LSB	LANDSCAPE BLOCKS
LST	LANDSCAPE TIMBERS
LT	LEFT
MES	MITERED END SECTION
MH	MANHOLE
MHW	MEAN HIGH WATER
MISC	MISCELLANEOUS
MLW	MEAN LOW WATER
MID-ORD	MIDDLE ORDINATE
MON	MONUMENT
MTS	MINIMUM TECHNICAL STANDARDS
MWELL	MONITOR WELL
N	NORTH OR NORTHING
N/A	NOT APPLICABLE
N/S	NAIL AND SHINER
N-S	NORTH-SOUTH
NE	NORTHEAST
NO	NUMBER
NOS	NATIONAL OCEANIC SURVEY
NTS	NOT TO SCALE
NW	NORTHWEST
O/A	OVERALL
OC	ORANGE CAP
OHU	OVERHEAD UTILITY (NUMBER OF LINES)
OHW	ORDINARY HIGH WATER
OP	OPEN PIPE
OR	OFFICIAL RECORD
PB	PLAT BOOK
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PCED	PINELLAS COUNTY ENGINEERING DEPT
PCRC	PINELLAS COUNTY RED CAP
PCSD	PINELLAS COUNTY SURVEY DIVISION
PE	POLYETHYLENE
PEAST	PEASTONE
PI	POINT OF INTERSECTION
PID	PARCEL IDENTIFICATION NUMBER
PK	PK (TRADE MARK)
PL	PROPERTY LINE
PLNTR	PLANTER
PLS	PROFESSIONAL LAND SURVEYOR
PNT	POINT
PO	POST OFFICE
POB	POINT OF BEGINNING
POC	POINT ON CURVE
POOLEQUIP	POOL EQUIPMENT, ETC
POT	POINT ON TANGENT
PP########	POWER POLE NUMBER
PPIPE	PINCHED PIPE
PRC	POINT OF REVERSE CURVATURE
PSM	PROFESSIONAL SURVEYOR AND MAPPER
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
PVC##	PVC PIPE, DIA INCHES
PVC##I	PVC PIPE, DIA INCHES, INVERT
PWRBX	POWER BOX
PWRTRANS	POWER TRANSFORMER
R	RADIUS
R##	REVISION NUMBER
RC	RED CAP
RCMH	RECLAIMED WATER MANHOLE
RCMETER	RECLAIMED WATER METER
RCP	REINFORCED CONC PIPE
RCP##	REINFORCED CONC PIPE, DIA INCHES
RCP##I	REINFORCED CONC PIPE, DIA, INVERT
RCVALVE	RECLAIMED WATER VALVE
RCWL	RECLAIMED WATER LINE
RD	ROAD
REF	REFERENCE
REINF	REINFORCED
RLS	REGISTERED LAND SURVEYOR
RP	RADIUS POINT
RPRP	RIPRAP
RR	RAILROAD
RRS	RAILROAD SPIKE
RRT	RAILROAD TIE
RT	RIGHT
ROW	RIGHT-OF-WAY
RVT	RIVET
R/W	RIGHT-OF-WAY
S	SOUTH
BDECK	BRICK DECK
FLBD	FLOWER BED
SB	STRONG BACK
SCM	SET CONCRETE MONUMENT
SE	SOUTHEAST
SEC ##-##-##	SECTION, TOWNSHIP, RANGE
SFN	SURVEY FILE NUMBER
SGP	SUBMERGED GROUND POINT
SH	SPRINKLER HEAD
SHV	SPRINKLER HEAD VALVE
SIR	SET IRON ROD
SL	SURVEY LINE
SNC	SET NAIL AND CAP
SND	SET NAIL AND DISK
SNS	SET NAIL AND SHINER
SOC	SET ORANGE CAP
SP	SIGNAL POLE
SPLWY	SPILLWAY
SQ	SQUARE
SR	STATE ROAD
SRD	STATE ROAD DEPARTMENT
SS	SANITARY SEWER
SSCO	SANITARY SEWER CLEANOUT
SSMH	SANITARY SEWER MANHOLE
SSVNT	SANITARY SEWER VENT
ST	STREET
STA	STATION
STY	STORY
SUBT	SUBDIVISION TIE
SW	SOUTHWEST
SWB	SIDEWALK, BACK
SWBR	SIDEWALK, BRICK
SWF	SIDEWALK, FACE
SWLK	SIDEWALK (CONC. UNLESS OTHERWISE NOTED)
SYC	SET YELLOW CAP
T	TANGENT
TB	TOP OF BANK
TBAR	T-BAR PROPERTY MONUMENT
TEL	TELEPHONE
TELB	TELEPHONE BOX
TELMH	TELEPHONE MANHOLE
TELU	TELEPHONE LINE, UNDERGROUND
TERR	TERRACE
TGT	TARGET
THRT	THROAT
TS	TOE OF SLOPE
TSM	TRAFFIC SIGNAL METER
TSTHOLE	TEST HOLE
TSWIRE	TRAFFIC SIGNAL WIRE
UG##	UNDERGROUND CABLE TELEVISION
UDH##	UNDERGROUND DRAIN PIPE
UDBX	UNDERDRAIN BOX
UE##	UNDERGROUND ELECTRIC
UF##	UNDERGROUND SEWER FORCE MAIN
UG##	UNDERGROUND GAS
UO##	UNDERGROUND HOT OIL
UQ##	UNDERGROUND UNKNOWN
UR##	UNDERGROUND RECLAIMED WATER
US##	UNDERGROUND SEWER GRAVITY
UT##	UNDERGROUND TELEPHONE
UTIL	UTILITY
UW##	UNDERGROUND WATER
UX##	UNDERGROUND TRAFFIC SIGNAL WIRE
VCP	VITRIFIED CLAY PIPE
VCP##	VCP, DIA INCHES, INVERT
VPIP	VERTICAL PIPE
Vvh	VERIFIED VERTICAL AND HORIZONTAL
W	WEST
W/	WITH
W/O	WITHOUT
WBNCH	BENCH, WOOD
WL	WATERLINE
XWLK	CROSS WALK
YB	YELLOW BOOK
YC	YELLOW CAP
°	DEGREE
+-	MORE OR LESS (PLUS OR MINUS)
"	INCHES (IN DISTANCES)
"	SECONDS (IN BEARINGS)
'	FEET (IN DISTANCES)
'	MINUTES (IN BEARINGS)
WD	WOOD
HC	HANDICAP

REVISIONS	BY	DATE

SURVEY BOOK No.: M&C 117,120,123

SURVEY DIVISION	BY	DATE
SURVEYED	DM	1/09
TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	.	.
DRAWN	.	.
CHECKED	.	.

TOPOGRAPHIC SURVEY of SUNSET POINT ROAD from EDGEWATER DRIVE to KEENE ROAD

LAND SURVEYOR REPORT, ALIGNMENT, CONTROL POINTS AND ABBREVIATIONS

McKIM&CREED
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Certificate of Authorization No. LB6566
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EARL W. RAMER, P.S.M.
Florida Professional Surveyor and Mapper
License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 02 of 42 | SHO2.dwg

MONUMENTATION COORDINATES:

POINT#	NORTHING (FT.)	EASTING (FT.)	STATION	OFFSET	DESCRIPTION
3	1330041.438	399461.409	100+57.13	-32.98	FNDK PK HLA LB6969
71	1329899.276	403250.364	138+53.49	-0.06	FRRS XCUT15
72	1329918.018	401918.137	125+21.13	0.00	FIR 3/4"
500	1329976.137	409129.587	N/A	N/A	FCM 4X4
501	1330005.415	409219.846	N/A	N/A	FCM 4X4
503	1330065.184	409239.251	N/A	N/A	FCM 4X4
505	1329889.696	409281.483	198+84.49	-49.94	FIR 5/8
506	1329889.193	409353.988	199+56.99	-50.07	FIR 5/8
507	1329888.543	409421.924	200+24.93	-50.00	FIR 5/8
508	1329887.494	409561.806	201+64.82	-50.16	FIR YC 1/2 LB6225
510	1329788.294	409454.722	200+58.60	49.95	FPPIPE 1
511	1329788.827	409379.757	199+83.63	50.06	FCM 4 DIA
512	1329789.448	409300.734	199+04.60	50.13	FIR YC 1/2 RLS 3035
513	1329790.373	409224.556	198+28.42	49.86	FIR YC 1/2 RLS 2512
514	1329791.102	409144.540	197+48.40	49.82	FIR 1/2
515	1329792.207	408989.416	195+93.27	50.06	FIR 5/8
516	1329792.955	408909.393	195+13.25	50.00	FIP 3/4
517	1329793.557	408829.352	194+33.20	50.10	FIP 1
518	1329892.168	408954.080	195+57.07	-49.58	FIR 5/8 LEANING
521	1329787.541	409534.741	201+38.62	50.01	FIP 3/4
522	1329786.954	409609.801	202+13.68	49.95	FIP 1
523	1329785.765	409769.680	203+73.56	49.75	FIR YC 5/8 PLS 4495
524	1329884.737	409828.284	204+31.31	-49.71	FIR YC 1/2 LB 6225
525	1329886.212	409709.209	203+12.23	-50.16	FIR YC 5/8 PLS 8865
526	1329886.816	409629.878	202+32.89	-50.08	FIR 5/8
527	1329795.749	408577.840	191+81.68	50.08	FCM 4X4
529	1329895.647	408578.814	191+81.79	-49.81	FIR YC 5/8 LB 5539
530	1329896.372	408492.854	190+95.83	-49.80	FIR 5/8
531	1329897.717	408352.714	189+55.68	-49.93	FIR YC 1/2 POLARIS 6113
532	1329904.417	408352.679	189+55.59	-56.63	FCM 4X4
533	1330018.357	408273.365	N/A	N/A	FIP 1
534	1329904.266	408292.693	188+95.61	-55.96	FCM 4 DIA
535	1329898.132	408292.595	188+95.56	-49.82	FCM 4X4
536	1329898.877	408191.509	187+94.47	-49.69	FIR 5/8
537	1329901.590	408100.554	187+03.50	-51.62	FCM 4X4
538	1329798.719	408045.637	186+49.47	51.71	FCM 4X4
539	1329795.481	408414.586	190+18.44	51.76	FCM 4X4
540	1329794.933	408474.518	190+78.37	51.79	FCM 4X4
542	1329610.281	408415.279	N/A	N/A	FPPIPE 1
543	1329690.529	408414.688	N/A	N/A	FIP 3/4
544	1329690.032	408474.789	N/A	N/A	FIR 1/2
545	1329609.995	408474.919	N/A	N/A	FCM 4X4
547	1329893.177	408803.304	194+06.29	-49.29	FIR 1/2
548	1329794.830	408677.942	192+81.79	50.13	FCM 4X4
552	1329630.038	408678.225	N/A	N/A	FIP 1
553	1329704.622	408677.683	N/A	N/A	FIP 3/4
554	1329996.843	408341.914	N/A	N/A	FIR 5/8 SET IN CONC
555	1330081.422	408312.352	N/A	N/A	FCM 4X4
556	1330084.865	408277.134	N/A	N/A	FND LB 3889
557	1329797.334	408208.533	188+12.38	51.69	FCM 4X4
558	1329799.541	407942.653	185+46.49	51.78	FCM 4X4
559	1329615.146	407882.607	N/A	N/A	FIP 1
560	1329614.567	407942.784	N/A	N/A	FCM 3X3
563	1329800.262	407882.659	184+86.49	51.58	FCM 4X4
564	1329801.186	407779.678	183+83.50	51.55	FIR 5/8
565	1329802.102	407676.571	182+80.39	51.52	FIR 5/8
566	1329802.794	407616.716	182+20.53	51.35	FIP 1/2
567	1329904.493	407581.370	181+84.31	-50.03	FIP 1
568	1329903.669	407666.152	182+69.10	-49.94	FIP 1
569	1329902.837	407751.168	183+54.12	-49.85	FIP 1
570	1329902.209	407836.134	184+39.08	-49.95	FIR 5/8
571	1329695.504	407882.987	N/A	N/A	FIR 5/8
572	1329694.588	407942.712	N/A	N/A	FIR YC 1/2 PLS 4466
575	1329612.716	408149.149	N/A	N/A	FIR YC 5/8 LS 2129
576	1329692.879	408148.807	N/A	N/A	FCM 4X4
577	1329692.403	408208.886	N/A	N/A	FIP 1/2
578	1329612.151	408208.870	N/A	N/A	FIR 1/2
581	1329617.860	407617.214	N/A	N/A	FPPIPE 1
582	1329697.888	407617.004	N/A	N/A	FIP 1/2
583	1329617.095	407676.919	N/A	N/A	FIP 1
585	1329697.123	407676.986	N/A	N/A	FIP 1
586	1329905.218	407496.171	180+99.11	-50.02	FCM 4 DIA
587	1329906.588	407330.999	179+33.93	-49.96	FIP 1
589	1329615.134	407350.922	N/A	N/A	FIR 5/8
590	1329695.102	407350.679	N/A	N/A	FIR 5/8
591	1329699.558	407410.985	N/A	N/A	FPPIPE 1/2
592	1329619.395	407411.020	N/A	N/A	FIP 1
594	1329810.469	406782.880	173+86.66	50.88	FPPIPE 1
595	1329809.891	406852.688	174+56.47	50.86	FCM 4X4
596	1329809.229	406917.735	175+21.52	50.96	FCM 4X4
597	1329808.652	406982.764	175+86.55	50.97	FIR 5/8
598	1329808.151	407052.698	176+56.49	50.87	FIP 1
599	1329807.407	407112.696	177+16.49	51.09	FIP 1
601	1329907.468	407251.015	178+53.94	-50.15	FIR 5/8
602	1329907.546	407251.011	178+53.94	-50.23	FIP 3/4
603	1329908.211	407171.042	177+73.96	-50.20	FIP 3/4
604	1329908.199	407170.967	177+73.89	-50.19	FIR 5/8
605	1329908.217	407170.913	177+73.84	-50.21	FIR 5/8
606	1329908.823	407090.980	176+93.90	-50.12	FIP 1
607	1329909.593	407010.949	176+13.87	-50.20	FIP 1
608	1329910.797	406850.849	174+53.76	-50.02	FIP 1
609	1329911.732	406750.935	173+53.84	-50.09	FCM 4X4
610	1330031.719	406750.384	N/A	N/A	FIR YC 1/2 ILLEG
612	1330012.146	406690.644	N/A	N/A	FIP 1
613	1329912.140	406690.978	172+93.88	-49.98	FCM 4 DIA
614	1329912.980	406580.978	171+83.88	-49.87	FCM 4X4
615	1329914.096	406474.875	170+77.77	-50.06	FCM 4X4
616	1329812.309	406581.249	171+85.02	50.79	FCM 4X4
618	1329810.550	406722.665	173+26.45	51.32	FCM 4X4
619	1329690.880	406722.990	N/A	N/A	FCM 4X4
622	1329690.424	406782.996	N/A	N/A	FIP 3/4
623	1329811.683	406652.812	172+56.59	50.80	FCM 4X4
625	1329806.171	407247.550	178+51.35	51.16	FCM 4X4
626	1329806.704	407190.785	177+94.58	51.12	FIR YC 5/8 LB 7494
628	1330092.033	406690.424	N/A	N/A	FIP 1
632	1329687.199	407112.792	N/A	N/A	FIR 5/8
633	1329687.311	407112.916	N/A	N/A	FIR YC 5/8 LB 7494
635	1329915.058	406364.989	169+67.88	-50.08	FIP 3/4
636	1329915.787	406289.952	168+92.84	-50.16	FPPIPE 1
637	1329916.212	406214.885	168+17.77	-49.93	FIP 1/2
639	1329916.875	406139.510	167+42.40	-49.94	FIR 5/8
640	1329368.455	405866.478	N/A	N/A	FPPIPE 3/4

POINT#	NORTHING (FT.)	EASTING (FT.)	STATION	OFFSET	DESCRIPTION
641	1329218.331	405861.145	N/A	N/A	FNL IN LIMEROCK
643	1329202.884	405966.775	N/A	N/A	FCM 4X4 LS 2827
644	1329400.282	405966.186	N/A	N/A	FIR 5/8
645	1329512.357	405966.054	N/A	N/A	FXCUT
646	1329612.514	405965.899	N/A	N/A	FIR 5/8
647	1329672.146	405965.657	N/A	N/A	FIR 5/8
648	1329818.634	405865.600	164+69.35	50.65	FIR YC 5/8 PLS 2865
649	1329643.594	405865.867	N/A	N/A	FIR YC 1/2 LB 5776
650	1329568.747	405866.004	N/A	N/A	FIR 1/2 BENT
653	1330213.552	405963.606	N/A	N/A	FIP 3/4
654	1330103.401	405964.176	N/A	N/A	FCM 4X4
655	1330053.324	405964.330	N/A	N/A	FIP 3/4
656	1329919.232	405864.951	164+67.83	-49.92	FCM 3X3
657	1330029.272	405864.636	N/A	N/A	FIP 1 1/4
658	1330109.293	405864.434	N/A	N/A	FPPIPE 1
659	1330189.322	405864.085	N/A	N/A	FIP 1
660	1330274.308	405863.710	N/A	N/A	FIP 1
661	1330514.193	405863.013	N/A	N/A	FCM 4 DIA
664	1330508.504	405962.808	N/A	N/A	FIP 1
665	1330383.492	405963.133	N/A	N/A	FIP 1
666	1329918.328	405965.187	165+68.07	-49.89	FIP 1
667	1330359.372	405863.394	N/A	N/A	FIP 1
668	1329823.087	405415.583	160+19.31	50.09	FIR YC 1/2 PLS 4466
669	1329824.009	405315.633	159+19.35	50.04	FNDK PLS 4466
670	1329825.829	405115.815	157+19.53	49.95	FIR 1/8
671	1329925.885	405015.323	156+98.17	-49.92	FIP 1
672	1329925.137	405170.233	157+73.08	-49.82	FIP 1
673	1329921.634	405594.858	161+97.72	-49.99	FCM 4X4
674	1329919.765	405755.754	163+58.63	-49.51	FIR 5/8 BENT
675	1329919.674	405755.857	163+58.73	-49.42	FIP 1
677	1329921.102	405654.797	162+57.67	-49.98	FCM 4X4
678	1330036.669	405594.446	N/A	N/A	FCM 4X4
681	1330106.224	405654.116	N/A	N/A	FIP 1
682	1329826.456	404913.174	155+16.89	51.07	FIR YC 1/2 LB 6423
683	1329826.356	405015.380	156+19.09	50.29	FIR YC 1/2 LB 6492
684	1329926.515	405020.372	156+23.22	-49.90	FIP 1
685	1329927.072	404945.746	155+48.59	-49.81	FCM 4X4
686	1329927.790	404870.573	154+73.21	-49.88	FCM 4X4
687	1329928.337	404795.336	153+98.17	-49.78	FCM 4X4
688	1329929.230	404715.187	153+18.02	-49.98	FIP 1
689	1329930.008	404615.312	152+18.14	-49.89	FXCUT
690	1329930.878	404552.641	151+55.19	-50.05	FIR 5/8
691	1329830.747	404549.933	151+53.90	50.10	FNDK LB 021
692	1329830.032	404612.893	152+16.59	50.09	FIR YC ABZ 3000
693	1329830.009	404613.041	152+16.74	50.11	FPPIPE 3/4
694	1329828.691	404748.063	153+51.76	50.26	FPPIPE 3/4
695	1329700.077	404613.208	N/A	N/A	FIR 5/8
696	1329649.987	404613.322	N/A	N/A	FIR 5/8
697	1329600.266	404613.643	N/A	N/A	FIP 1
698	1329469.911	404613.770	N/A	N/A	FCM 6X6
699	1329409.672	404614.745	N/A	N/A	FND ANGLE IRON
700	1329328.901	404613.984	N/A	N/A	FIP 1/2
703	1330044.930	404614.945	N/A	N/A	FIP 1
704	1330149.963	404614.572	N/A	N/A	FIR 1/2
705	1330200.056	404614.332	N/A	N/A	FCM 4 DIA
706	1330299.986	404613.863	N/A	N/A	FCM 4 DIA
707	1330370.006	404613.741	N/A	N/A	FPPIPE 1
708	1330510.216	404613.321	N/A	N/A	FIR YC 5/8 RLS 2650
709	1330580.287	404612.579	N/A	N/A	FIR YC 1/2 ILLEG
710	1330580.292	404612.917	N/A	N/A	FIR 1/2
712	1330440.629	404613.422	N/A	N/A	FIP 1
713	1329936.936	404120.269	147+22.78	-50.00	FIR YC 1/2 LB 4113
714	1329939.337	403923.765	145+26.26	-49.63	FIR YC 5/8 LB 2863
715	1329940.194	403924.656	141+97.11	-49.84	FIR YC 5/8 PCSD
716	1329928.157	403529.255	141+31.95	-32.88	FIP 1
717	1329930.322	403346.231	139+48.91	-32.46	FIR 1/2
718	1329930.773	403346.266	139+48.94	-32.91	FNDK LB 4019
719	1329929.418	403220.431	138+23.13	-29.78	FIR 1/2
720	1329849.347	403220.595	138+24.43	50.27	FIR YC 1/2 RLS 2512
721	1329848.577	403220.478	138+84.32	50.19	FIR YC 1/2 LB 624
722	1330129.888	403279.392	N/A	N/A	FIR DC 1/2 PLS 5083
723	1330285.060	403278.762	N/A	N/A	FIR 1/2 SET IN CONC
724	1330335.047	403278.546	N/A	N/A	FIR 5/8
725	1330385.071	403278.412	N/A	N/A	FIR 5/8
726	1330534.898	403277.916	N/A	N/A	FCM 3X3
728	1330270.035	403220.620	N/A	N/A	FCM 6 DIA
729	1330220.098	403220.547	N/A	N/A	FND ANGLE IRON IN CONC
730	1330170.088	403219.685	N/A	N/A	FTBAR
731	1330120.131	403219.432	N/A	N/A	FIR 5/8
735	1329932.645	403033.855	136+36.53	-30.37	FIR 5/8
736	1330023.040	403034.026	N/A	N/A	FND ANGLE IRON
737	1330072.898	403033.839	N/A	N/A	FND ANGLE IRON
738	1330172.980	403033.875	N/A	N/A	FND ANGLE IRON
740	1330023.698	402973.602	N/A	N/A	FIR 1/2
741	1329933.468	402973.966	135+76.64	-30.35	FND ANGLE IRON
742	1329934.711	402884.586	134+87.25	-30.33	FND ANGLE IRON
743	1329954.995	402884.582	134+86.96	-50.61	FND ANGLE IRON
744	1329955.905	402794.040	133+96.41	-50.24	FIR YC 1/2 RLS 3035
745	1329937.336	402734.029	133+36.67	-30.83	FND ANGLE IRON
746	1329937.883	402634.247	132+36.89	-29.97	FCM 4X4
747	1329941.736	402584.343	131+86.94	-33.12	FCM 4X4
748	1329938.661	402584.049	131+86.69	-30.04	FCM 4X4
754	1329931.527	403128.596	137+31.28	-30.59	FIR 1/2
755	1329858.108	402615.314	132+19.08	50.06	FIR 5/8
756	1330176.437	402793.630	N/A	N/A	FPPIPE 3/4
757	1330176.389	402793.591	N/A	N/A	FIP 1/2
758	1330077.298	402734.130	N/A	N/A	FND ANGLE IRON
760	1330077.389	402734.348	N/A	N/A	FCM 2X2
761	1329943.337	402468.795	130+71.38	-33.09	FPPIPE 1
762	1330073.204	402468.692	N/A	N/A	FXCUT
764	1330161.622	402427.784	N/A	N/A	FIR 1/2
765	1330096.593	402427.874	N/A	N/A	FIR 1/2
766	1329943.890	402427.856	130+30.43	-33.06	FIR 5/8 SET IN CONC6X6
767	1329945.831	402268.686	128+71.25	-32.75	FCM 4 DIA
768	1329881.074	402198.045	128+01.53	32.98	FPPIPE 3/4
769	1329764.345	402198.515	N/A	N/A	FIR 5/8
770	1329880.220	402259.158	128+62.65	32.97	FIP 1 1/2
771	1329879.458	402309.376	129+12.88	33.03	FIR YC 1/2 LB 6962
772	1329878.849	402359.403	129+62.91	32.93	FIR YC 1/2 LB 6962
773	1329878.189	402409.442	130+12.95	32.88	FIR 1/2
774	1329877.419	402455.260	130+58.77	33.01	FIP 1 1/2
775	1329763.396	402258.305	N/A	N/A	FIR 5/8
777	1329948.964	402068.375	126+70.92	-33.06	FIR 5/8

POINT#	NORTHING (FT.)	EASTING (FT.)	STATION	OFFSET	DESCRIPTION
778	1329948.260	402118.548	127+21.09	-33.06	FIR 5/8
779	1329884.307	402097.484	127+00.94	31.17	FIP 1
780	1329664.606	401948.546	N/A	N/A	FIP 1
781	1329743.330	401885.975	N/A	N/A	FIP 1
782	1329823.371	401888.056	124+92.44	95.07	FIR YC 1/2 LB 2129
783	1329899.929	401761.128	123+64.40	20.38	FCM 4X4
784	1329900.487	401730.372	123+33.64	20.27	FIR 1/2
785	1329901.163	401680.284	122+83.55	20.33	FCM 4X4
786	1329901.969	401630.042	122+33.30	20.25	FIP 1/2
787	1329944.433	401488.396	120+91.05	-20.13	FIR 1/2
788	1329942.905	401387.246	121+89.91	-20.04	FIP 1/2
789	1329940.636	401735.620	123+38.30	-19.94	FIP 1
790	1329938.896	401859.926	124+62.62	-20.02	FIP 3/4
791	1330065.255	401888.686	N/A	N/A	FIR 1/2
792	1330208.309	401950.177	N/A	N/A	FIP 3/4
793	1330321.123	401949.711	N/A	N/A	FIP 1/2
794	1330583.180	401948.700	N/A	N/A	FCM 6X4
796	1330517.587	401891.910	N/A	N/A	FIR YC 5/8 LB 6947
798	1330470.811	401883.817	N/A	N/A	FCM 4X4
799	1330320.775	401950.266	N/A	N/A	FIP 1/2
800	1330433.598	401949.879	N/A	N/A	FIP 1/2
802	1330414.023	401884.491	N/A	N/A	FND ANGLE IRON
803	1330364.806	401883.521	N/A	N/A	FIP 3/4
804	1329564.516	401948.705	N/A	N/A	FIR 5/8
805	1329693.218	401888.187	N/A	N/A	FIR YC 5/8 LB 2129
806	1329543.256	401888.902	N/A	N/A	FIR 5/8
807	1329393.608	401889.079	N/A	N/A	FIP 1/2
809	1329324.721	401949.070	N/A	N/A	FIP 1
812	1330069.486	401678.222	N/A	N/A	FCM 4X4
814	1330067.128	401648.172	N/A	N/A	FIR 5/8
817	1330171.085	401648.522	N/A	N/A	FIP 1/2
818	1329765.695	401730.828	N/A	N/A	FIP 1/2
819	1329765.610	401771.341	N/A	N/A	FIP 1/2
821	1329695.156	401761.280	N/A	N/A	FIR 1/2
822	1329745.212	401761.100	N/A	N/A	FIR 1/2
823	1329945.556	401389.808	119+92.46	-19.81	FIR 1/2
824	1329955.676	401302.057	119+04.57	-28.64	FIR 1/2
825	1329908.054	401530.126	121+32.36	22.95	FIR 1/2
826	1329907.546	401073.995	116+77.23	22.81	FIR 1X1
827	1329907.445	401103.892	117+07.13	22.47	FIR YC 1/2 RLS 4032
828	1329907.335	401153.226	117+56.46	21.86	FCM 4X4
829	1329906.769	401201.793	118+05.03	21.71	FIR 5/8
830	1329906.332	401251.292	118+54.53	21.43	FCM 4X4
831	1329906.315	401308.795	119+12.02	20.60	FCM 4X4
832	1329765.077	401389.651	N/A	N/A	FIR 5/8
833	1329700.135	401439.272	N/A	N/A	FIP 1/2
834	1329804.875	401439.159	N/A	N/A	FCM 4X4
835	1329903.471	401530.141	121+33.39	20.21	FCM 4X4
836	1329904.920	401438.843	120+42.08	20.10	FIR 5/8
837	1330070.215	401439.495	N/A	N/A	FIP 3/4
838	1330070.013	401439.491	N/A	N/A	FIP 1
839	1330144.134	401440.073	N/A	N/A	FIP 3/4
841	1330169.461	401391.915	N/A	N/A	FIP 1 1/2
842	1330119.672	401391.434	N/A	N/A	FIP 1/2
843	1330070.606	401390.325	N/A	N/A	FIP 1/2
844	1329699.973	401389.744	N/A	N/A	FCM 4X4
847	1329814.483	400993.573	N/A	N/A	FIR 5/8
848	1329954.278	400954.278	N/A	N/A	FIR 5/8
850	1329980.471	401056.322	116+58.50	-49.84	FCM 4X4
851	1329979.278	401055.435	116+57.63	-48.64	FCM 5/8
853	1329909.613	400965.373	115+68.59	22.33	FCM 4X4
854	1329909.904	400886.198	114+89.42	23.20	FCM 4X4
855	1329910.158	400836.236	114+39.46	23.67	FCM 4X4
856	1329910.449	400788.252	113+89.48	24.11	FCM 4X4
857	1329910.999	400737.786	113+41.01	24.27	FIR 5/8
858	1329911.781	400638.054	112+41.28	24.95	FIR 5/8 BENT
860	1329813.728	401075.983	N/A	N/A	FIR 5/8
861	1329706.700	401076.844	N/A	N/A	FXCUT
863	1329705.593	401108.079	N/A	N/A	FIR YC 5/8 ALLEN ILLEG
864	1329752.582	401107.063	N/A	N/A	FCM 4X4
866	1329912.813	400513.144	N/A	N/A	FIR 5/8
867	1329792.853	400520.904	N/A	N/A	FCM 4X4
868	1329751.419	400549.632	N/A	N/A	FIP 1
871	1329913.433	400469.392	110+72.61	25.76	FCM 4X4
872	1329951.940	400617.892	112+20.53	-14.91	FIR 5/8
873	1329952.612	400497.769	111+00.41	-13.82	FCM 4X4
874	1329954.112	400377.978	109+80.61	-13.57	FCM 4X4
875	1329955.672	400258.278	108+60.90	-13.38	FCM 3X3
876	1329987.380	400108.216	107+05.26	-20.93	FCM 4X4
877	1329995.099	400028.432	106+23.34	-19.94	FNDK RLS 3138
878	1330013.990	399818.384	104+14.92	-20.07	FCM 4X4
879	1329951.491	399957.880	105+62.30	36.21	FIR 5/8 ILLEG
880	1329934.551	400027.708	106+30.61	39.89	FIR RC 1/2 WITNESS RLS3035
881	1329955.124	400026.670	106+29.17	19.65	FIR 5/8
882	1329911.303	400107.432	107+23.58	52.64	FIR RC 1/2 WIT RLS 3035
883	1329884.776	400154.288	107+76.32	63.49	FIP 1/2
884	1329869.437	400218.506	108+22.39	73.42	FIR 1/2
885	1329869.145	400218.488	108+22.38	73.31	FIP 3/4 PLASTIC CAP
886	1329869.544	400218.241	108+22.13	73.32	FIP 3/4 IRON ELBOW
887	1329915.150	400253.770	108+56.98	27.20	FIR 1/2 IN FIP 3/4
888	1329955.368	399732.972	103+31.97	41.97	FIR RC 5/8 WIT LB 6707
889	1329955.716	399732.966	103+31.95	41.63	FIR 1/2 BENT
890	1329947.429	399817.991	104+17.24	46.45	FIR 1/2
891	1330008.231	399958.485	105+55.14	-20.01	FCM 4X4
892	1330035.976	399599.652	101+95.48	-33.15	FIR YC 5/8 LB 6969
893	1330039.198	399521.652	101+17.41	-33.20	FIR YC 5/8 LB 6707
894	1330277.645	399465.290	N/A	N/A	FCM 4X4
896	1329978.441	399436.837	100+35.14	30.96	FIR YC 5/8 HLA LB 6969
897	1329988.636	399456.214	100+54.08	19.98	FIR YC 5/8 HLA LB 6969
898	1329896.215	399434.042	N/A	N/A	FNDK HLA LB 6969
899	1329982.883	399599.239	101+97.22	19.91	FIR YC 5/8 6707
902	1331214.072	404576.713	N/A	N/A	FRRS
904	1328779.510	399274.759	N/A	N/A	FNDK PK' WILMILK LB043'
905	1328553.408	404585.858	N/A	N/A	FIR 5/8
1001	1329834.324	409908.501	205+11.96	0.00	FNDK PK PCSD PLS4238
1002	1332474.700	409913.788	N/A	N/A	FNDK PK PCSD PLS4238
1003	1332547.683	409570.663	N/A	N/A	FPPIPE 1'
1004	1332580.349	401909.172	N/A	N/A	FCM BD PCED
1005	1327227.817	404588.710	N/A	N/A	FRRS
1006	1327275.614	399268.140	N/A	N/A	FNDK PK LB043
1122	1327246.357	401923.185	N/A	N/A	FCM
1123	1332509.441	407242.722	N/A	N/A	FRRS
1200	1329880.391	404582.891	151+86.15	0.00	SNDK LB6566

POINT#	NORTHING (FT.)	EASTING (FT.)	STATION	OFFSET	DESCRIPTION
1201	1329857.336	407248.151	178+51.51	0.00	SNDK 'LB6566'
1202	1327171.361	409914.401	N/A	N/A	SIR 5/8 'LB6566'
1203	1329956.587	399279.939	N/A	N/A	CALC
1204	1329955.974	399321.872	N/A	N/A	CALC
1205	1329955.460	399357.007	N/A	N/A	CALC
1206	1329982.315	399359.804	N/A	N/A	CALC
1207	1330295.758	399399.976	N/A	N/A	CALC
1208	1330277.681	399452.103	N/A	N/A	CALC
1209	1330267.684	399451.068	N/A	N/A	CALC
1210	1330062.917	399445.785	100+40.64	-53.81	CALC
1211	1329922.054	400180.383	107+83.50	21.36	CALC
1212	1329948.822	400980.166	115+82.81	-17.08	CALC
1213	1329911.000	401030.024	116+33.22	20.00	CALC
1214	1329977.002	401304.004	119+06.20	-50.00	CALC
1215	1329947.005	401303.566	119+06.20	-20.00	CALC
1216	1329905.747	401389.341	119+92.57	20.00	CALC
1217	1329945.035	401438.305	120+40.96	-20.00	CALC
1218	1329941.968	401648.105	122+50.78	-20.00	CALC
1219	1329941.529	401678.104	122+80.78	-20.00	CALC
1220	1329898.746	401868.173	124+71.45	20.00	CALC
1221	1329863.449	401888.240	124+92.04	55.00	CALC
1222	1329958.009	401888.002	124+90.42	-39.54	CALC
1223	1330517.666	401886.118	N/A	N/A	CALC
1224	1330473.484	401949.267	N/A	N/A	CALC
1225	1330168.439	401950.294	N/A	N/A	CALC
1226	1329960.557	401950.994	125+53.38	-43.00	CALC
1227	1329950.416	401961.027	125+63.56	-33.00	CALC
1228	1329880.213	402258.209	128+61.70	33.00	CALC
1229	1329876.018	402555.278	131+58.80	33.00	CALC
1230	1329858.169	402615.314	132+19.08	50.00	CALC
1231	1329936.500	402734.076	133+36.73	-30.00	CALC
1232	1329931.788	403280.237	138+82.90	-33.00	CALC
1233	1329927.352	403594.415	141+97.11	-33.00	CALC
1234	1329818.428	405965.626	165+69.37

EXISTING STRUCTURES: DRAINAGE

NUMBER	STATION	OFFSET	DESCRIPTION
ES-1	N/A	N/A	CURB INLET TOP EL=6.52 GRATE EL=5.60 SE 18" RCP INV EL=0.48
ES-2	100+21.5	41.4 RT	CURB INLET TOP EL=7.08 GRATE EL=6.27 NW 18" RCP INV EL=1.25 N 18" RCP INV EL=1.13
ES-3	100+30.2	65.1 LT	GRATE INLET EL=6.14 S 18"RCP INV EL=1.56
ES-4	105+35.3	10.9 LT	GRATE INLET EL=2.66 S 18"RCP INV EL=0.10
ES-5	105+35.3	10.6 RT	CURB INLET TOP EL=3.67 GRATE EL=2.80 N 18"RCP INV EL=(-)0.25 S 18"RCP INV EL=(-)0.24
ES-6	105+34.3	40.5 RT	RAILROAD TIE HEADWALL TOP EL=1.52 18"RCP INV EL=(-)0.55
ES-7	107+78.8	15.3 LT	CURB INLET WITH MANHOLE RIM EL=3.97 THROAT EL=2.99 S 12"RCP INV EL=0.94
ES-8	107+80.4	72.4 RT	CONC HEADWALL TOP EL=0.80 12"RCP INV EL=(-)1.00
ES-9	113+90.1	46.4 LT	GRATE INLET EL=20.90 18"X12"RCP INV EL=19.55
ES-10	114+16.8	45.1 LT	CURB INLET WITH MANHOLE RIM EL=22.58 THROAT EL=21.72 W 18"X12"RCP INV EL=19.56 E 18"RCP INV EL=19.58
ES-11	114+51.7	45.6 LT	CURB INLET WITH MANHOLE RIM EL=22.62 THROAT EL=21.75 W 18"RCP INV EL=19.47 N 18"RCP INV EL=19.53
ES-12	114+50.4	113.2 LT	MANHOLE RIM EL=23.01 S 18"RCP INV EL=19.33 N 18"RCP INV EL=19.40
ES-13	114+60.3	138.5 LT	MANHOLE RIM EL= S 18"RCP INV EL=19.20 N 18"RCP INV EL=19.66 E 38"X24"RCP INV EL=19.04
ES-14	122+56.0	245.6 LT	GRATE INLET EL=26.55 E 12"VCP INV EL=21.99
ES-15	122+69.6	245.1 LT	GRATE INLET EL=26.66 W 12"VCP INV EL=22.07 E 15"RCP INV EL=22.28
ES-16	124+95.2	245.6 LT	CURB INLET TOP EL=24.76 GRATE EL=23.97 W 15"RCP INV EL=20.99 S 18"RCP INV EL=18.59 SE 15"RCP INV EL=18.61
ES-17	125+39.0	224.4 LT	CURB INLET TOP EL=24.35 GRATE EL=23.69 NW 15"RCP INV EL=19.74
ES-18	124+93.5	50.5 LT	CURB INLET TOP EL=24.33 GRATE EL=23.51 N 18"RCP INV EL=17.11 E 18"RCP INV EL=17.02 S 18"RCP INV EL=17.10 W 6"DIP INV EL=19.86
ES-19	125+46.0	60.5 LT	DRAIN INLET TOP EL=23.72 GRATE EL=23.47 W 18"RCP INV EL=18.93
ES-20	125+02.7	211.2 RT	CURB INLET TOP EL=22.72 GRATE EL=22.04 N 18"RCP INV EL=15.20 E 15"RCP INV EL=16.29 S 24"RCP INV EL=15.10 W 6"DIP INV EL=18.66
ES-21	125+46.0	210.4 RT	CURB INLET TOP EL=22.72 GRATE EL=21.89 W 15"RCP INV EL=18.63
ES-22	125+10.7	706.2 RT	CURB INLET TOP EL=8.92 GRATE EL=8.14 N 24"RCP INV EL=2.48 E 24"RCP INV EL=2.81 S 15"RCP INV EL=3.37 W 6"DIP INV EL=3.00
ES-23	125+53.7	704.4 RT	CURB INLET TOP EL=8.91 GRATE EL=8.02 W 24"RCP INV EL=3.12
ES-24	124+95.9	688.1 RT	CONC HEADWALL TOP EL=7.10 TWIN 8' WIDE X 7' TALL BOX CULVERTS INV EL=(-)1.95
ES-25	125+69.0	648.3 RT	CONC HEADWALL TOP EL=6.94 TWIN 8' WIDE X 7' TALL BOX CULVERTS INV EL=(-)1.96
ES-26	136+61.9	17.2 RT	CONCRETE SPILLWAY WITH HEADWALL TOP EL=14.60 THROAT EL=14.08
ES-27	136+57.1	14.4 LT	DRAIN INLET WITH CONFLICT GRATE EL=17.01 E 24"CMP INV EL=10.91 E-W 4"DIP THROUGH BOX TOP EL=14.56

NUMBER	STATION	OFFSET	DESCRIPTION
ES-28	136+74.6	18.2 LT	END OF PIPE 24"CMP INV EL=9.01
ES-29	137+15.1	14.5 LT	DRAIN INLET TOP EL=16.50 THROAT EL=15.38 W 12"X 18" ECMP FILLED WITH DIRT
ES-30	138+37.1	43.2 RT	CURB INLET WITH MANHOLE RIM EL=16.53 THROAT EL=15.53 W 15"RCP INV EL=9.23 E 15"RCP INV EL=12.69
ES-31	138+71.1	43.4 RT	CURB INLET WITH MANHOLE RIM EL=15.88 THROAT EL=15.03 W 15"RCP INV EL=13.15
ES-32	138+36.4	154.9 RT	MANHOLE RIM EL=17.52 NW 30"RCP INV EL=12.06 S 30"RCP INV EL=12.14
ES-33	138+38.4	217.7 RT	CURB INLET WITH MANHOLE RIM EL=16.78 THROAT EL=15.77 N 30"RCP INV EL=12.32 S 30"RCP INV EL=12.34
ES-34	138+40.6	290.4 RT	CURB INLET WITH MANHOLE RIM EL=17.02 THROAT EL=16.07 N 30"RCP INV EL=12.50 S 30"RCP INV EL=12.57
ES-35	138+43.0	472.9 RT	MANHOLE RIM EL=17.90 N 30"RCP INV EL=12.68 S 30"RCP INV EL=12.68
ES-36	138+44.6	603.4 RT	CURB INLET WITH MANHOLE RIM EL=18.22 THROAT EL=17.40 N 30"RCP INV EL=13.29 S 30"RCP INV EL=13.55
ES-37	138+45.4	670.8 RT	MANHOLE RIM EL=18.48 N 30"RCP INV EL=13.85 E 24"RCP INV EL=14.02 S 24"RCP INV EL=14.05
ES-38	138+28.1	180.6 LT	END OF PIPE 30"CMP INV EL=5.48
ES-39	138+76.1	133.2 LT	GRATE INLET EL=10.93 N 12"RCP INV EL=9.49
ES-40	138+73.6	198.8 LT	END OF PIPE 12"CMP INV EL=7.61
ES-41	138+73.9	214.1 LT	END OF PIPE 24"RCP INV EL=6.01
ES-42	138+62.6	403.5 LT	GRATE INLET EL=10.66 N 24"RCP INV EL=7.18 S 24"RCP INV EL=7.10
ES-43	138+28.9	325.9 LT	GRATE INLET EL=10.54 N 24"RCP INV EL=7.10 S 30"CMP INV EL=7.05
ES-44	138+26.7	398.2 LT	MANHOLE RIM EL=10.95 N 24"RCP INV EL=7.29 S 24"RCP INV EL=7.39
ES-45	138+25.6	466.4 LT	GRATE INLET EL=10.57 N 24"RCP INV EL=7.82 S 24"RCP INV EL=7.83
ES-46	138+58.6	538.7 LT	GRATE INLET EL=10.72 N 24"RCP INV EL=7.64 S 24"RCP INV EL=7.73
ES-47	138+57.1	639.2 LT	GRATE INLET EL=10.71 S 24"RCP INV EL=8.10
ES-48	138+24.3	649.1 LT	GRATE INLET EL=11.66 N 18"RCP INV EL=8.58 W 18"RCP INV EL=8.50 S 24"RCP INV EL=8.73
ES-49	146+29.8	17.0 RT	CURB INLET WITH MANHOLE RIM EL=11.10 N 38"X24"RCP INV EL=7.15 S 38"X24"RCP INV EL=7.23
	146+29.9	21.6 RT	CONC HEADWALL TOP EL=7.37 38"X24"RCP INV EL=7.19
ES-50	146+29.8	22.0 LT	CURB INLET WITH MANHOLE RIM EL=9.79 NE 15"RCP INV EL=7.56 NW 38"X24"RCP INV EL=5.81 S 38"X24"RCP INV EL=6.14
	146+39.8	25.4 LT	END OF PIPE 15"RCP INV EL=7.72
	146+20.7	25.2 LT	END OF PIPE 38"X24"RCP INV EL=5.81
ES-51	148+51.3	51.1 RT	END OF PIPE 15"ADS INV EL=8.16
ES-52	148+53.1	71.6 RT	END OF PIPE 15"ADS INV EL=8.97
ES-53	149+36.2	18.4 LT	CURB INLET TOP EL=11.26 GRATE EL=10.56 S 15"RCP INV EL=8.50
ES-54	149+36.1	18.2 RT	CURB INLET TOP EL=11.44 GRATE EL=10.80 N 15"RCP INV EL=8.38 S 24"RCP INV EL=8.40
ES-55	149+36.0	42.6 RT	END OF PIPE 24"RCP INV EL=7.70
ES-56	151+36.3	46.3 RT	END OF PIPE 48"RCP INV EL=8.13
ES-57	151+37.3	41.3 RT	END OF PIPE 18"RCP INV EL=9.14
ES-58	151+54.2	48.6 RT	GRATE INLET EL=15.30 W 48"RCP INV EL=8.57 S 48"RCP INV EL=8.68

NUMBER	STATION	OFFSET	DESCRIPTION
ES-59	151+66.4	39.2 RT	CURB INLET TOP EL=15.40 GRATE EL=14.63 W 18"RCP INV EL=9.65 E 18"RCP INV EL=9.65
ES-60	152+06.7	39.4 RT	CURB INLET TOP EL=15.31 GRATE EL=14.54 W 18"RCP INV EL=10.08
ES-61	151+57.8	194.1 RT	MANHOLE RIM EL=15.77 N 48"RCP INV EL=9.23 S 48"RCP INV EL=9.23 E 24"RCP INV EL=11.21
ES-62	151+70.5	194.4 RT	CURB INLET TOP EL=15.72 GRATE EL=14.97 W 24"RCP INV EL=11.76 E 12"CMP INV EL=12.94
ES-63	152+06.9	193.9 RT	CURB INLET TOP EL=15.83 GRATE EL=15.11 W 12"CMP INV EL=13.32
ES-64	151+63.6	373.7 RT	MANHOLE RIM EL=16.57 N 48"RCP INV EL=9.94 S 48"RCP INV EL=9.94 E 24"CMP INV EL=12.77
ES-65	152+10.5	381.3 RT	GRATE INLET EL=16.10 W 24"CMP INV EL=12.97
ES-66	151+64.9	422.6 RT	CURB INLET WITH MANHOLE MANHOLE EL=16.72 THROAT EL=15.60 N 48"RCP INV EL=9.97 E 36"CMP INV EL=10.10
ES-67	152+06.2	422.2 RT	MANHOLE WTH CONFLICT MANHOLE RIM EL=16.37 W 36"CMP INV EL=10.24 E 36"PVC INV EL=10.44 NW 6"PVC INV EL=11.07 N-S 12"DIP UNKNOWN LINE TOP OF PIPE EL=12.15
ES-68	152+16.0	422.5 RT	CURB INLET WITH MANHOLE MANHOLE RIM EL=16.53 THROAT EL=15.77 W 36"PVC INV EL=10.71 S 24"CMP INV EL=11.25
ES-69	152+14.7	458.1 RT	CURB INLET TOP EL=16.55 GRATE EL=15.77 N 24"CMP INV EL=12.17 S 24"CMP INV EL=11.32 E 6"VCP INV EL=12.59
ES-70	153+29.6	419.5 RT	MANHOLE RIM EL=17.43 W 24"PVC INV EL=12.08 S 30"CMP INV EL=12.83 E 6"PVC INV EL=13.94 SE 18"PVC INV EL=13.16
ES-71	157+31.3	50.3 RT	CONC FLUME WITH ALUMINUM COVER RUNNING UNDER SIDEWALK WITH MES AND 11"WIDE X 3"DEEP WEIR WEIR INV EL=20.55
ES-72	157+31.4	58.8 RT	CONTROL STRUCTURE GRATE EL=22.18 SKIMMER EL=22.15 11"WIDE X 3"DEEP WEIR INV EL=21.43
ES-73	164+75.2	638.0 LT	GRATE INLET EL=17.92 S 53"X34"RCP INV EL=13.25
ES-74	164+76.1	587.2 LT	GRATE INLET EL=19.54 N 53"X34"RCP INV EL=13.71 SE 53"X34"RCP INV EL=14.55
ES-75	165+35.9	524.7 LT	GRATE INLET EL=23.25 NW 53"X34"RCP INV EL=15.59 S 48"RCP INV EL=15.74
ES-76	165+37.4	457.4 LT	GRATE INLET EL=24.61 N 48"RCP INV EL=15.56 S 48"RCP INV EL=15.72
ES-77	164+89.1	355.8 LT	INLET TOP EL=25.87 THROAT EL=24.87 N 15"CMP INV EL=22.80
ES-78	164+78.6	238.9 LT	MANHOLE RIM EL=28.58 S 24"CMP INV EL=23.34 W 15"RCP INV EL=23.28
ES-79	165+39.7	241.2 LT	GRATE INLET EL=27.37 N 48"RCP INV EL=19.74 S 42"RCP INV EL=22.21
ES-80	165+40.5	174.8 LT	GRATE INLET EL=27.95 N 42"RCP INV EL=23.28 S 42"RCP INV EL=23.30
ES-81	165+43.7	39.2 LT	MANHOLE RIM EL=32.13 N 42"RCP INV EL=24.81 E 36"RCP INV EL=24.81 S 18"RCP INV EL=25.96
ES-82	164+84.8	46.3 LT	MANHOLE RIM EL=31.34 S 24"CMP INV EL=25.42 E 24" CMP INV EL=25.53
ES-83	164+97.5	65.2 RT	CURB INLET TOP EL=34.15 GRATE EL=32.32 E 18"RCP INV EL=27.68
ES-84	165+53.5	66.3 RT	CURB INLET TOP EL=33.84 GRATE EL=33.05 W 18"RCP INV EL=27.51 N 18"RCP INV EL=25.98 S 18"RCP INV EL=27.32
ES-85	164+58.5	164.9 RT	UTILITY VAULT W/ GRATE 2"PVC PIPE THROUGH STRUCTURE W/ VALVE GRATE EL=34.85
ES-86	164+84.9	164.2 RT	GRATE INLET EL=34.08 S 8"DIP INV EL=32.54

NUMBER	STATION	OFFSET	DESCRIPTION
ES-87	164+85.9	244.9 RT	GRATE INLET EL=35.20 N 8"DIP INV EL=32.14 E 10"DIP INV EL=32.07 S 10"DIP INV EL=32.10
ES-88	164+99.3	244.0 RT	CURB INLET TOP EL=36.11 GRATE EL=35.35 W 10"DIP INV EL=32.80 E 18"RCP INV EL=29.44
ES-89	164+86.4	312.4 RT	GRATE INLET EL=35.50 N 10"DIP INV EL=32.84
ES-90	165+55.3	243.5 RT	CURB INLET TOP EL=35.69 GRATE EL=34.91 N 18"RCP INV EL=29.02 S 18"RCP INV EL=29.06 W 18"RCP INV EL=29.13
ES-91	165+57.1	436.3 RT	CURB INLET TOP EL=37.01 GRATE EL=36.22 N 18"RCP INV EL=31.35 W 18"RCP INV EL=31.45
ES-92	165+01.5	436.2 RT	CURB INLET TOP EL=37.22 GRATE EL=36.44 E 18"RCP INV EL=31.74 W 8"DIP INV EL=33.95
ES-93	164+88.5	436.9 RT	GRATE INLET EL=36.86 E 8"DIP INV EL=34.68 S 8"DIP INV EL=34.74
ES-94	164+90.1	538.4 RT	GRATE INLET EL=36.78 N 8"DIP INV EL=35.08 S 8"DIP INV EL=35.07
ES-95	164+91.2	617.3 RT	GRATE INLET EL=36.76 N 8"DIP INV EL=35.33
ES-96	165+95.6	192.5 RT	GRATE INLET EL=34.12 SKIMMER EL=34.64 E 18"RCP INV EL=31.43
ES-97	166+18.9	194.1 RT	END OF PIPE 18"RCP INV EL=31.49
ES-98	165+97.2	96.9 RT	END OF PIPE 23"X14"RCP INV EL=31.85
ES-99	166+58.5	96.5 RT	GRATE INLET TOP EL=35.07 E 23"X14"RCP INV EL=32.22
ES-100	166+80.4	139.3 RT	GRATE INLET TOP EL=36.25 N 18"RCP INV EL=28.96
ES-101	166+80.1	61.0 RT	MANHOLE RIM EL=35.47 E 18"RCP INV EL=29.21 S 18"RCP INV EL=29.25
ES-102	168+01.6	60.1 RT	MANHOLE RIM EL=35.40 N 18"RCP INV EL=28.72 W 18"RCP INV EL=28.63
ES-103	167+92.8	26.9 RT	MANHOLE RIM EL=32.72 W 36"RCP INV EL=28.47
	167+79.4	26.1 RT	END OF PIPE AT FLUME 36"RCP INV EL=28.86
ES-104	168+06.2	27.6 RT	MANHOLE RIM EL=32.77 N 3.5'X3.0' BOX CULVERT INV EL=27.95 S 18"RCP INV EL=27.83 E 36"RCP INV EL=28.03
ES-105	168+20.5	28.5 RT	END OF PIPE 36"RCP INV EL=27.97
ES-106	168+03.1	14.0 RT	CURB INLET WITH 2 GRATES GRATE AT FL EL=32.15 GRATE AT BC EL=33.37 N 36"RCP INV EL=27.84 S 3.5'X3.0' BOX CULVERT INV EL=27.66
ES-107	168+02.7	31.6 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=32.56 THROAT EL=32.01 N 36"RCP INV EL=27.63 S 36"RCP INV EL=27.67
ES-108	168+01.6	39.1 LT	GRATE INLET EL=31.82 W 36"RCP INV EL=27.30 S 36"RCP INV EL=27.39
ES-109	166+80.0	40.1 LT	CONFLICT BOX TOP EL=32.19 W 36"RCP INV EL=26.79 E 36"RCP INV EL=26.87 N-S 8"VCP THROUGH BOX SANITARY TOP EL=29.03
ES-110	168+56.5	35.1 RT	END OF PIPE 36"RCP INV EL=28.39
ES-111	169+38.7	36.0 RT	GRATE INLET EL=33.92 E 36"RCP INV EL=29.79 W 36"RCP INV EL=29.74 UNDER CONSTRUCTION
ES-112	171+02.6	33.1 RT	GRATE INLET EL=36.48 E 36"CMP INV EL=32.23 W 36"RCP INV EL=31.52 UNDER CONSTRUCTION
ES-113	171+48.8	32.9 RT	GRATE INLET EL=36.62 W 36"CMP INV EL=33.06 SE 36"RCP INV EL=33.09
ES-114	171+69.4	62.2 RT	INLET WITH MANHOLE MANHOLE RIM EL=37.07 WEIR EL=33.22 NW 36"RCP INV EL=33.27
ES-115	177+02.6	172.2 RT	END OF PIPE 10"PVC INV EL=45.09
ES-116	177+01.6	203.3 RT	END OF PIPE 10"PVC INV EL=45.26
ES-117	192+97.7	11.9 RT	GRATE INLET EL=58.86 N 30"X19"RCP INV EL=55.44

NUMBER	STATION	OFFSET	DESCRIPTION
ES-118	192+97.7	19.0 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=59.20 THROAT EL=58.38 N 30"X19"RCP INV EL=55.15 S 30"X19"RCP INV EL=55.16
ES-119	192+98.0	26.0 LT	MANHOLE RIM EL=59.28 S 30"X19"RCP INV EL=55.02 E 24"ADS INV EL=55.01
ES-120	193+30.4	39.7 LT	MANHOLE RIM EL=59.29 W 24"ADS INV EL=55.03 N 24"ADS INV EL=55.05
ES-121	193+32.5	177.7 LT	END OF PIPE 24"ADS INV EL=53.21
ES-122	196+01.3	209.7 LT	END OF PIPE 18"DIP INV EL=53.86 CONNECTS TO 18"ADS
ES-123	197+49.1	159.7 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=58.27 THROAT EL=57.22 W 18"DIP INV EL=55.17 E 12"DIP INV EL=55.76
ES-124	197+82.3	152.9 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=58.40 THROAT EL=57.51 W 12"DIP INV EL=55.83 N 12"DIP INV EL=55.97
ES-125	198+27.9	230.9 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=58.23 THROAT EL=57.20 S 12"DIP INV EL=56.12
ES-126	199+50.2	24.6 LT	CURB INLET TOP EL=61.06 GRATE EL=60.27 S 18"RCP INV EL=54.44 NW 6"PVC INV EL=57.22 E 18"RCP INV EL=54.32
ES-127	199+49.8	18.4 RT	CURB INLET TOP EL=61.12 GRATE EL=60.37 N 18"RCP INV EL=54.57 W 6"PVC INV EL=57.47
ES-128	201+88.6	32.6 LT	CURB INLET TOP EL=60.16 GRATE EL=59.39 E 18"RCP INV EL=52.84 E 6"PVC INV EL=56.79 S 18"RCP INV EL=52.78 W 18"RCP INV EL=53.68 W 6"PVC INV EL=56.91
ES-129	201+89.0	38.1 RT	CURB INLET TOP EL=59.97 GRATE EL=59.28 N 18"RCP INV EL=52.88 E 6"PVC INV EL=56.97 W 6"PVC INV EL=56.96
ES-130	203+10.9	33.4 LT	MANHOLE WTH CONFLICT MANHOLE RIM EL=58.71 W 18"RCP INV EL=50.53 E 18"RCP INV EL=51.96 N-S 12"DIP SANITARY CONFLICT TOP OF PIPE EL=52.53 E 18"RCP INV EL=51.96 W 18"RCP INV EL=50.53
ES-131	204+18.7	38.0 LT	CURB INLET TOP EL=57.00 THROAT EL=56.59 E 24"RCP INV EL=49.98 E 6"PVC INV EL=53.43 S 18"RCP INV EL=49.82 W 18"RCP INV EL=50.00 W 6"PVC INV EL=53.36
ES-132	204+22.6	38.3 RT	CURB INLET TOP EL=57.92 GRATE EL=57.20 N 18"RCP INV EL=53.06 E 6"PVC INV EL=53.34 W 6"PVC INV EL=54.40
ES-133	137+52.0	68.0 RT	MITERED END SECTION NE 15"RCP INV EL=11.52
ES-134	137+14.7	107 RT	CONTROL STRUCTYRE TOP EL=14.30 BOTTOM OF BOX EL=7.59 NW 36" RCP INV EL=7.68 NE 6" PVC INV EL=9.06 SE 6" PVC INV EL=8.90
ES-135	137+83.4	130 RT	MITERED END SECTION SE 30"RCP INV EL=11.87
ES-136	137+13	68 LT	13'X7.5' ARCHED CMP CULVERT WITH FLAT BOTTOM AND 1' DIRT INSIDE PIPE S INV EL=1.08 S CREEK BOTTOM EL=2.1 N INV EL=1.17 N CREEK BOTTOM EL=2.2
ES-137	138+53	191 LT	13'X7.5' ARCHED CMP CULVERT WITH FLAT BOTTOM AND 1' DIRT INSIDE PIPE W INV EL=1.39 W CREEK BOTTOM EL=2.4 E INV EL=1.44 E CREEK BOTTOM EL=2.6
ES-138	137+54.6	43.0 RT	MANHOLE RIM EL=17.01 E 15"RCP INV EL=11.89 S 15"RCP INV EL=11.86
ES-139	137+00.0	19.2 LT	END OF PIPE 12"X18" ECMP INV EL=8.75
ES-140	136+72.5 136+90.4	0 (BEGIN) 0 (END)	BRIDGE ARCHED CULVERT 18' WIDE X 13' TALL OPENING AT CENTER OF ARCH N CL CREEK EL=2.1 S CL CREEK EL=1.9

NUMBER	STATION	OFFSET	DESCRIPTION
ES-141	204+72.2	70.0 LT	MANHOLE RIM EL=55.63 N 24"RCP INV EL=49.56 S 36"RCP INV EL=49.56 NW RCP UNABLE TO MEASURE DUE TO OFFSET
ES-142	205+54.7	36.5 LT	MANHOLE RIM EL=55.58 E 42"RCP INV EL=49.04 W 42"RCP INV EL=49.04 N 36"RCP INV EL=49.09
ES-143	207+00.2	36.8 LT	MANHOLE RIM EL=54.63 W 42"RCP INV EL=48.22 E 42"RCP INV EL=48.21 N 18"RCP INV EL=48.28 S 18"RCP INV EL=49.63
ES-144	206+98.5	53.5 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=55.01 THROAT EL=54.17 S 18"RCP INV EL=48.54
ES-145	207+00.1	38.0 RT	CURB INLET TOP EL=55.13 GRATE EL=54.77 N 18"RCP INV EL=50.25 SE 6"PVC INV EL=52.80
ES-146	207+12.4	48.5 RT	GRATE INLET TOP EL=54.17 NW 6"PVC INV EL=52.89
ES-147	208+83.7	45.4 RT	MANHOLE RIM EL=54.15 S 15"RCP INV EL=48.67 E 15"RCP INV EL=48.34 E END OF E PIPE NOT FOUND
ES-148	209+22.5	37.4 LT	MANHOLE RIM EL=53.48 W 42"RCP INV EL=47.15 E 42"RCP INV EL=46.88 N 15"RCP INV EL=49.71
ES-149	209+20.9	53.8 LT	CURB INLET WITH MANHOLE MANHOLE RIM EL=53.87 THROAT EL=53.09 S 15"RCP INV EL=49.72
ES-150	209+96.6	50.3 LT	HEADWALL TOP EL=48.30 S 36"RCP INV EL=48.23
ES-151	209+90.1	38.4 LT	CURB INLET TOP EL=53.61 GRATE EL=52.84 S 42"RCP INV EL=46.53 W 42"RCP INV EL=46.53
ES-152	209+98.6	38.5 LT	CURB INLET TOP EL=53.61 GRATE EL=52.84 N 36"RCP INV EL=47.45 S 42"RCP INV EL=46.59 E 24"RCP INV EL=47.63
ES-153	209+89.8	38.3 RT	CURB INLET TOP EL=53.55 GRATE EL=52.80 N 42"RCP INV EL=46.08 S 42" RCP INV EL=46.08
ES-154	209+97.3	38.2 RT	CURB INLET TOP EL=53.52 GRATE EL=52.80 N 42"RCP INV EL=46.12 S 42"RCP INV EL=46.12
ES-155	209+94.1	49.4 RT	HEADWALL TOP EL=50.30 (W) N 42"RCP INV EL=45.20 (E) N 42"RCP INV EL=45.39 15"RCP FROM ES-147 APPEARS TO TIE INTO W PIPE MID RUN
ES-156	211+74.2	38.4 LT	CURB INLET TOP EL=54.18 GRATE EL=53.38 W 24"RCP INV EL=48.16 S 15"RCP INV EL=48.15
ES-157	211+73.7	36.4 RT	CURB INLET TOP EL=54.06 GRATE EL=53.37 N 15"RCP INV EL=48.26 SE 6"PVC INV EL=51.55
ES-158	137+83.4	130 RT	GRATE INLET TOP EL=52.86 NW 6"PVC INV EL=51.57
ES-159	206+36.4	48.5 RT	GRATE INLET TOP EL=54.55 NE 6"PVC INV EL=52.84
ES-160	204+76.9	38.6 LT	MANHOLE RIM EL=56.11 W 24"RCP INV EL=49.37 S 24"RCP INV EL=49.37 E 42"RCP INV EL=49.37 N 36"RCP INV EL=49.37
ES-161	204+75.6	31.9 RT	MAHNOLE WITH SANITARY CONFLICT MANHOLE RIM EL=56.19 S 24"RCP INV EL=49.39 N 24"RCP INV EL=49.29 E-W 12"DIP SANITARY CASING TOP EL=50.93
ES-162	204+73.5	77.9 RT	CURB INLET TOP EL=55.97 GRATE EL=55.20 N 24"RCP INV EL=49.66 E 18" RCP INV EL=49.74
ES-163	205+52.6	79.1 RT	CURB INLET TOP EL=55.64 GRATE EL=54.84 W 18"RCP INV EL=49.94
ES-164	144+68.6	443.2 LT	HEADWALL TOP EL=9.99 S 54"RCP INV EL=4.24
ES-165	144+78.8	426.9 LT	MANHOLE RIM EL=11.15 N 54"RCP INV= S 54"RCP INV= BOLTED SHUT UNABLE TO OPEN
ES-166	144+78.7	392.1 LT	HEADWALL WITH CONC SKIMMER TOP EL=10.45 N 54"RCP INV EL=4.24 SKIMMER EL=6.04

REVISIONS	BY	DATE

SURVEY BOOK No.: M&C 117,120,123		
SURVEY DIVISION	BY	DATE
SURVEYED	DM	1/09
TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	.	.
DRAWN	.	.
CHECKED	.	.

TOPOGRAPHIC SURVEY of
SUNSET POINT ROAD
from EDGEWATER DRIVE
to KEENE ROAD

EXISTING STRUCTURES
DRAINAGE

McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
Internet Site: http://www.mckimcreed.com

EARL W. RAMER, P.S.M.
Florida Professional Surveyor and Mapper
License No. 3612

DATE

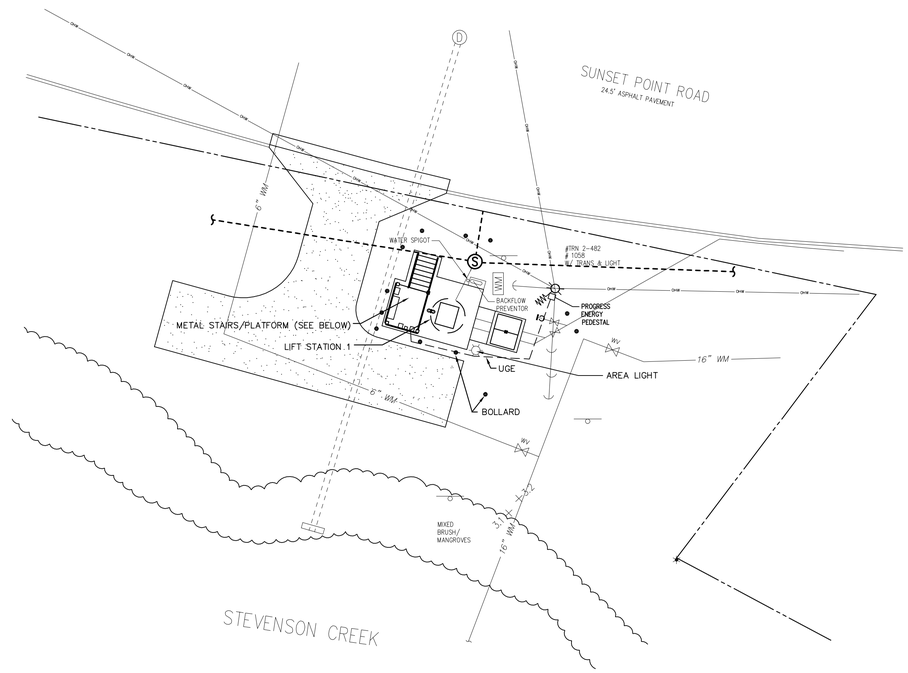
DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 04 of 42 | SH04.dwg

EXISTING STRUCTURES: SANITARY SEWER

NUMBER	STATION	OFFSET	DESCRIPTION
ESS-1	100+49.1	270.5 LT	MANHOLE EL=7.51 N 8"VCP INV EL=3.12 E 8"VCP INV EL=3.51
ESS-2	100+46.2	279.6 LT	MANHOLE EL=8.12 W 8"VCP INV EL=0.21 S 8"VCP INV EL=2.20 E 6"VCP INV EL=0.46 N 6"VCP INV EL=0.55
ESS-3	N/A	N/A	MANHOLE EL=6.85 S 8"VCP INV EL=(−)0.57 N 8"VCP INV EL=(−)0.49 E 8"VCP INV EL=(−)0.15
ESS-4	N/A	N/A	MANHOLE EL=6.29 E 8"VCP INV EL=(−)1.14 N 8"VCP INV EL=(−)1.11
ESS-5	101+50.0	18.7 RT	MANHOLE EL=4.88 E 8"VCP INV EL=(−)1.56 W 8"VCP INV EL=(−)1.49 SW 6"PVC INV EL=1.16
ESS-6	105+71.6	16.6 RT	MANHOLE EL=3.70 E 8"VCP INV EL=(−)2.66 W 8"VCP INV EL=(−)2.62 N 6"VCP INV EL=(−)0.04
ESS-7	107+86.8	21.9 RT	MANHOLE EL=4.98 W 8"VCP INV EL=(−)3.10 E 8"VCP INV EL=(−)1.04 N 6"VCP INV EL=1.07
ESS-8	111+02.6	22.4 RT	MANHOLE EL=7.45 W 8"VCP INV EL=3.53 S 8"VCP INV EL=3.65 E 8"VCP INV EL=3.90 N 6"VCP INV EL=4.35 NE 6"VCP INV EL=4.85
ESS-9	111+60.3	146.4 RT	MANHOLE EL=8.83 N 8"VCP INV EL=3.90 S 8"VCP INV EL=4.03
ESS-10	112+77.0	271.7 RT	MANHOLE EL=10.55 N 8"VCP INV EL=4.26 S 8"VCP INV EL=4.36
ESS-11	114+27.9	124.1 LT	MANHOLE EL=22.03 S 8"PVC INV EL=16.86 N 8"PVC INV EL=16.86 E 8"PVC INV EL=17.07
ESS-12	114+30.4	57.5 LT	MANHOLE EL=22.32 N 8"PVC INV EL=17.29
ESS-13	117+03.6	407.6 RT	MANHOLE EL=16.73 W 6"PVC INV EL=12.54 N 8"PVC INV EL=13.52
ESS-14	116+97.8	176.8 RT	MANHOLE EL=22.79 S 8"PVC INV EL=18.19 N 8"PVC INV EL=18.30
ESS-15	116+94.6	83.3 RT	MANHOLE EL=24.24 N 8"PVC INV EL=20.86 S 8"PVC INV EL=20.87 W 6"PVC INV EL=21.40
ESS-16	116.92.6	10.8 RT	MANHOLE EL=23.83 S 8"PVC INV EL=21.18 E 8"PVC INV EL=21.23 N 6"PVC INV EL=21.29
ESS-17	118+68.3	8.7 RT	MANHOLE EL=29.04 W 8"PVC INV EL=23.97 S 6"PVC INV EL=24.39 N 6"PVC INV EL=24.25
ESS-18	120+23.3	385.9 RT	MANHOLE EL=24.21 S 8"PVC INV EL=19.71 N 8"PVC INV EL=19.77
ESS-19	120+17.8	30.6 RT	MANHOLE EL=30.42 S 8"PVC INV EL=22.34 N 8"PVC INV EL=22.36
ESS-20	120+16.2	144.1 LT	MANHOLE EL=30.09 N 8"PVC INV EL=22.78 S 8"PVC INV EL=22.85 E 6"PVC INV EL=26.26 W 6"PVC INV EL=22.86
ESS-21	120+13.4	767.9 RT	MANHOLE EL=27.10 S 8"PVC INV EL=24.08 N 6"PVC INV EL=24.15
ESS-22	124+96.3	823.8 LT	MANHOLE EL=24.73 S 8"VCP INV EL=19.37
ESS-23	125+01.4	543.6 LT	MANHOLE EL=25.76 S 8"VCP INV EL=20.08 N 8"VCP INV EL=20.08 E 8"VCP INV EL=20.14
ESS-24	125+06.2	276.1 LT	MANHOLE EL=24.74 N 8"VCP INV EL=20.68 S 8"VCP INV EL=20.73 E 8"VCP INV EL=20.75
ESS-25	125+09.4	96.3 LT	MANHOLE EL=24.25 N 8"VCP INV EL=21.24
ESS-26	122+63.8	145.4 LT	MANHOLE EL=27.54 N 8"VCP INV EL=23.49 S 8"VCP INV EL=23.50 W 8"VCP INV EL=23.63
ESS-27	122+66.0	23.2 RT	MANHOLE EL=28.82 E 8"VCP INV EL=23.03 N 8"VCP INV EL=23.11 W 8"VCP INV EL=25.26
ESS-28	123+49.0	24.2 RT	MANHOLE EL=26.99 W 8"VCP INV EL=22.80 S 8"VCP INV EL=22.81 E 8"VCP INV EL=23.42 N 6"PVC INV EL=23.39
ESS-29	123+53.8	322.2 RT	MANHOLE EL=24.53 S 8"VCP INV EL=20.67 N 8"VCP INV EL=20.74
ESS-30	137+51.2	255.1 RT	MANHOLE EL=17.31 E 8"PVC INV EL=8.29 W 8"PVC INV EL=8.33 S 8"PVC INV EL=8.50 N 6"PVC INV EL=6.40
ESS-31	138+59.3	243.8 RT	MANHOLE EL=16.90 N 8"PVC INV EL=7.73 W 8"PVC INV EL=7.81
ESS-32	138+55.0	59.3 RT	MANHOLE EL=16.05 E 8"PVC INV EL=6.92 S 8"PVC INV EL=7.06
ESS-33	138+86.2	58.5 RT	MANHOLE EL=17.29 NE 8"PVC INV EL=6.21 W 8"PVC INV EL=6.27
ESS-34	138+96.4	43.0 RT	MANHOLE EL=17.35 SW 8"PVC INV EL=5.99 E 8"PVC INV EL=6.01
ESS-35	141+76.2	43.4 RT	MANHOLE EL=15.00 E 8"PVC INV EL=4.10 W 8"PVC INV EL=4.61 S 8"PVC INV EL=5.05 S 8"PVC INV EL=9.34
ESS-36	144+56.1	43.3 RT	MANHOLE EL=11.31 S 20"DIP INV EL=(−)1.02 E 20"DIP INV EL=(−)0.99 W 8"PVC INV EL=3.34
ESS-37	145+43.5	41.9 RT	MANHOLE EL=10.29 W 20"DIP INV EL=(−)0.72 N 20"DIP INV EL=(−)0.69 E 12"DIP INV EL=(−)0.08
ESS-38	145+43.6	46.5 LT	MANHOLE EL=10.95 S 20"DIP INV EL=(−)0.36 N 12"DIP INV EL=(−)0.28 E 18"DIP INV EL=(−)0.06
ESS-39	145+38.4	369.4 LT	MANHOLE EL=12.11 S 12"DIP INV EL=0.49 N 12"DIP INV EL=0.49
ESS-40	148+52.3	49.0 LT	MANHOLE EL=10.17 W 18"DIP INV EL=0.52 E 18"DIP INV EL=0.52
ESS-41	151+88.0	50.5 LT	MANHOLE EL=14.83 W 18"DIP INV EL=1.20 N 18"DIP INV EL=1.34
ESS-42	151+81.0	370.0 LT	MANHOLE EL=15.75 N 18"DIP INV EL=1.88 S 18"DIP INV EL=1.89
ESS-43	151+55.5	424.0 LT	MANHOLE EL=15.94 N 8"VCP INV EL=8.35 SW 6"VCP INV EL=9.11
ESS-44	151+75.8	668.6 LT	MANHOLE EL=14.92 S 18"DIP INV EL=1.04 N 18"DIP INV EL=1.05
ESS-45	151+48.6	748.4 LT	MANHOLE EL=15.29 S 8"VCP INV EL=6.61 N 8"VCP INV EL=6.67
ESS-46	153+21.8	171.8 LT	MANHOLE EL=17.75 W 8"PVC INV EL=13.75 S 8"PVC INV EL=13.80 E 8"PVC INV EL=13.87
ESS-47	153+24.0	45.2 RT	MANHOLE EL=17.49 N 8"PVC INV EL=14.99 E 8"PVC INV EL=15.06 S 6"PVC INV EL=15.23 SW 6"PVC INV EL=15.23
ESS-48	153+60.4	45.2 RT	MANHOLE EL=17.75 S 8"VCP INV EL=15.09 W 8"PVC INV EL=15.12 E 8"VCP INV EL=15.17 SW 6"VCP INV EL=15.20
ESS-49	153+61.6	175.6 RT	MANHOLE EL=18.93 N 8"VCP INV EL=15.37
ESS-50	165+47.3	344.4 LT	MANHOLE EL=30.46 W 8"VCP INV EL=22.66 E 8"VCP INV EL=28.93 E 8"VCP INV EL=23.09
ESS-51	165+26.7	341.3 LT	MANHOLE EL=26.70 W 10"VCP INV EL=22.45 S 8"VCP INV EL=22.46 E 8"VCP INV EL=22.53
ESS-52	165+39.4	31.4 LT	MANHOLE EL=32.40 N 8"VCP INV EL=27.56 E 8"VCP INV EL=27.76
ESS-53	166+81.1	31.1 LT	MANHOLE EL=33.00 N 8"VCP INV EL=28.31 W 8"VCP INV EL=28.37
ESS-54	166+81.0	46.2 LT	MANHOLE EL=31.72 E 8"VCP INV EL=28.26 S 8"VCP INV EL=28.28
ESS-55	168+26.1	46.0 LT	MANHOLE EL=31.93 E 8"VCP INV EL=29.11 W 8"VCP INV EL=29.14
ESS-56	171+89.5	41.4 LT	MANHOLE EL=39.83 E 8"VCP INV EL=33.73 W 8"VCP INV EL=33.73 N 4"DIP INV EL=36.41 S 4"DIP INV EL=36.09
ESS-57	172+37.6	40.0 LT	MANHOLE EL=40.13 W 8"VCP INV EL=33.67 S 8"VCP INV EL=33.73
ESS-58	172+36.3	31.1 RT	MANHOLE EL=39.80 N 8"VCP INV EL=33.80 E 8"VCP INV EL=33.86 SE 6"VCP INV EL=36.16
ESS-59	173+57.3	31.5 RT	MANHOLE EL=40.75 W 8"VCP INV EL=34.97 S 8"VCP INV EL=35.77
ESS-60	173+60.4	357.1 RT	MANHOLE EL=40.99 N 8"VCP INV EL=36.68
ESS-61	176+88.7	433.1 RT	MANHOLE EL=46.37 N 8"VCP INV EL=39.82
ESS-62	176+85.1	33.2 RT	MANHOLE EL=45.88 W 8"VCP INV EL=37.67 E 8"VCP INV EL=37.89 S 8"VCP INV EL=38.16
ESS-63	179+84.5	30.5 RT	MANHOLE EL=50.99 W 8"VCP INV EL=45.37 S 8"VCP INV EL=45.41 E 8"VCP INV EL=45.46
ESS-64	179+88.7	421.3 RT	MANHOLE EL=51.86 S 8"VCP INV EL=46.90 N 8"VCP INV EL=46.92
ESS-65	182+54.5	421.7 RT	MANHOLE EL=55.89 S 8"VCP INV EL=50.95 N 8"VCP INV EL=50.96
ESS-66	182+49.6	29.6 RT	MANHOLE EL=54.71 W 8"VCP INV EL=49.33 S 8"VCP INV EL=49.34 E 8"VCP INV EL=49.38
ESS-67	185+15.7	32.0 RT	MANHOLE EL=57.86 E 8"VCP INV EL=52.91 W 8"VCP INV EL=52.92 S 8"VCP INV EL=52.92
ESS-68	185+20.0	422.3 RT	MANHOLE EL=59.42 S 8"VCP INV EL=54.62 N 8"VCP INV EL=54.63
ESS-69	187+87.6	421.6 RT	MANHOLE EL=60.68 N 8"VCP INV EL=55.56 S 8"VCP INV EL=55.57
ESS-70	187+83.1	33.0 RT	MANHOLE EL=59.23 S 8"VCP INV EL=53.95 E 8"VCP INV EL=53.97 W 8"VCP INV EL=54.01
ESS-71	188+38.3	34.2 RT	MANHOLE EL=61.04 E 8"VCP INV EL=54.13 W 8"VCP INV EL=54.19
ESS-72	190+47.7	35.0 RT	MANHOLE EL=60.09 W 8"VCP INV EL=55.07 S 8"VCP INV EL=55.03
ESS-73	190+52.1	424.2 RT	MANHOLE EL=62.11 N 8"VCP INV EL=56.57 S 8"VCP INV EL=56.59
ESS-74	192+92.7	165.0 RT	MANHOLE EL=60.20 E 8"VCP INV EL=58.22 S 8"VCP INV EL=58.22 W 6"VCP INV EL=58.22 NW 6"VCP INV EL=58.24
ESS-75	196+48.0	165.1 RT	MANHOLE EL=61.91 E 8"VCP INV EL=56.79 W 8"VCP INV EL=56.79 SW 6"VCP INV EL=58.22 S 6"VCP INV EL=58.32 N 6"VCP INV EL=58.36
ESS-76	198+07.6	661.5 LT	MANHOLE EL=59.78 S 8"VCP INV EL=54.42 W 8"VCP INV EL=54.48 N 8"VCP INV EL=55.13 E 6"VCP INV EL=54.77
ESS-77	198+10.9	194.8 LT	MANHOLE EL=58.40 N 8"VCP INV EL=52.96 E 8"VCP INV EL=52.98 SW 6"VCP INV EL=53.07
ESS-78	200+71.1	195.1 LT	MANHOLE EL=59.04 N 8"VCP INV EL=52.12 E 8"VCP INV EL=52.16 W 8"VCP INV EL=52.18
ESS-79	203+01.7	193.8 LT	MANHOLE EL=58.00 S 8"VCP INV EL=51.25 N 8"VCP INV EL=51.31 W 8"VCP INV EL=51.34 E 8"VCP INV EL=51.34 SE 4"VCP INV EL=54.74
ESS-80	203+14.2	27.5 RT	MANHOLE EL=58.79 N 8"VCP INV EL=51.80 E 8"VCP INV EL=51.76
ESS-81	203+68.0	27.3 RT	MANHOLE EL=58.29 E 8"VCP INV EL=51.65 W 8"VCP INV EL=51.90 S 8"VCP INV EL=53.19 N 6"VCP INV EL=53.53
ESS-82	203+69.1	165.6 RT	MANHOLE EL=59.69 FULL OF 3" MUCK UNABLE TO FIND INVERT N 8"VCP BOTTOM OF STRUCTURE EL=53.27
ESS-83	168+96.7	57.7 RT	MANHOLE EL=34.74 S 8"PVC INV EL=30.04 E 8"PVC INV EL=30.04
ESS-84	170+12.5	55.8 RT	MANHOLE EL=36.21 W 8"PVC INV EL=29.41 SE 8"PVC INV EL=29.41
ESS-85	170+45.6	75.6 RT	MANHOLE EL=35.86 NW 8"PVC INV EL=29.16 E 8"PVC INV EL=29.16
ESS-86	170+90.8	75.1 RT	MANHOLE EL=36.76 W 8"PVC INV EL=28.86 SE 8"PVC INV EL=28.86
ESS-87	206+69.8	38.8 RT	MANHOLE EL=54.96 W 8"VCP INV EL=49.51 E 10"VCP INV EL=49.50
ESS-88	209+69.4	38.8 RT	MANHOLE EL=53.65 W 10"VCP INV EL=46.78 E 10"VCP INV EL=46.77
ESS-89	212+68.3	38.7 RT	MANHOLE EL=54.84 W 10"VCP INV EL=45.97 E 10"VCP INV EL=45.94

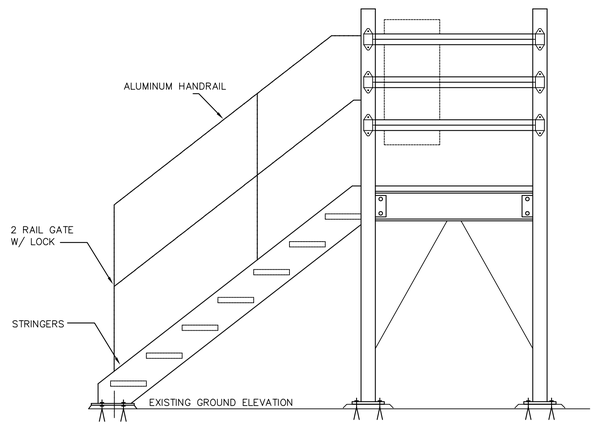
PUMP STATION DETAIL (SEE SHEET 9)

NOT TO SCALE



STAIRS/PLATFORM DETAIL (FROM ABOVE)

NOT TO SCALE



REVISIONS	BY	DATE

SURVEY BOOK No.:M&C 117,120,123		
SURVEY DIVISION	BY	DATE
SURVEYED	DM	1/09
TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	-	-
DRAWN	-	-
CHECKED	-	-

TOPOGRAPHIC SURVEY of
SUNSET POINT ROAD
from EDGEWATER DRIVE
to KEENE ROAD

EXISTING STRUCTURES
SANITARY SEWER

McKIM&CREED
1365 Hamlet Avenue
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Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
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EARL W. RAMER, P.S.M.
Florida Professional Surveyor and Mapper
License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 05 of 42 | SH05.dwg

WETLAND POINTS

POINT NUMBER, NORTHING, EASTING, DESCRIPTION

WETLAND SW1 (SHEETS 14, 35 & 36)

24153, 1329946.5074, 403466.6978, JL SW1-1
24154, 1329952.8600, 403451.2307, JL SW1-2
24155, 1329930.5054, 403436.8429, JL SW1-3
24156, 1329911.8887, 403440.7870, JL SW1-4
24151, 1330008.8787, 403498.3227, JL SW1-5
24152, 1329983.5651, 403481.5364, JL SW1-6
43331, 1329916.1811, 403065.9141, JL SW1-7
43332, 1329953.1865, 403088.7833, JL SW1-8

WETLAND W1 (SHEET 15)

43330, 1329911.5881, 404022.9654, JL W1-1
43329, 1329922.1586, 404024.2655, JL W1-2
24133, 1329929.4344, 404009.8209, JL W1-3
24134, 1329933.7850, 403920.7816, JL W1-4
24135, 1329940.6922, 403906.6670, JL W1-5
24136, 1329970.0360, 403898.5769, JL W1-6
24137, 1330017.5183, 403898.2891, JL W1-7
43333, 1330032.4098, 403613.6261, JL W1-8
24148, 1330004.9189, 403619.4048, JL W1-9
24147, 1329977.3663, 403640.0800, JL W1-10
24144, 1329965.4526, 403677.4674, JL W1-11
24143, 1329996.2533, 403699.8771, JL W1-12
24142, 1330024.8375, 403714.5980, JL W1-13
24141, 1330040.1638, 403754.1200, JL W1-14
43334, 1330032.0621, 403799.2783, JL W1-15
24140, 1330001.4390, 403816.7489, JL W1-16
24139, 1329943.8961, 403862.8553, JL W1-17
24138, 1329921.0310, 403889.4611, JL W1-18

WETLAND W2 (SHEET 15 & 16)

43335, 1329865.0907, 404020.1192, JL W2-1
24129, 1329835.7413, 404022.1193, JL W2-2
24122, 1329826.0956, 404534.3438, JL W2-3
24123, 1329846.4297, 404536.5513, JL W2-4
24128, 1329856.2347, 404036.9963, JL W2-5
24127, 1329866.2617, 404031.9226, JL W2-6

WETLAND W3 (SHEETS 15, 16 & 32)

24130, 1329708.1682, 404168.5924, JL W3-1
24131, 1329790.2543, 404159.7992, JL W3-2
24132, 1329812.2601, 404198.7347, JL W3-3
24124, 1329811.5941, 404342.3316, JL W3-4
24121, 1329783.3647, 404503.8524, JL W3-5
24120, 1329729.0219, 404501.7771, JL W3-6

SOIL BORINGS

POINT NUMBER, NORTHING, EASTING, ELEVATION, DESCRIPTION

1008, 1330037.489, 399524.355, 5.1, GP BOR RA-1
1009, 1329982.285, 399664.009, 4.2, GP BOR RA-2
1010, 1330013.189, 399776.648, 5.0, GP BOR RA-3
1089, 1329955.673, 399989.202, 3.3, GP BOR RA-4
1011, 1329962.299, 400195.991, 4.0, GP BOR RA-5
1012, 1329916.069, 400348.025, 4.8, GP BOR RA-6
1013, 1329950.357, 400557.070, 9.6, GP BOR RA-7
1014, 1329912.078, 400774.002, 17.0, GP BOR RA-8
1015, 1329947.509, 400967.223, 22.2, GP BOR RA-9
1092, 1329908.528, 401113.893, 25.0, GP BOR RA-10
1021, 1329943.647, 401357.396, 30.4, GP BOR RA-11
1020, 1329905.162, 401554.314, 30.4, GP BOR RA-12
1019, 1329939.220, 401769.006, 26.9, GP BOR RA-13
1018, 1329898.243, 402019.301, 23.0, GP BOR RA-14
1017, 1329933.818, 402167.336, 22.2, GP BOR RA-15
1023, 1329894.360, 402299.896, 20.2, GP BOR RA-16
1024, 1329929.886, 402319.799, 20.9, GP BOR RA-17
1025, 1329891.666, 402449.800, 18.3, GP BOR RA-18
1026, 1329925.949, 402567.761, 18.4, GP BOR RA-19
1027, 1329888.514, 402689.876, 17.3, GP BOR RA-20
1028, 1329925.321, 402737.396, 17.7, GP BOR RA-21
1088, 1329890.336, 402832.288, 17.5, GP BOR RA-22
1029, 1329922.053, 402923.359, 17.0, GP BOR RA-23
1075, 1329881.158, 402997.062, 16.1, GP BOR RA-24
1030, 1329919.472, 403143.433, 16.1, GP BOR RA-25
1076, 1329849.502, 403220.051, 17.2, GP BOR RA-26
1032, 1329916.036, 403398.748, 14.5, GP BOR RA-27
1087, 1329878.566, 403431.560, 15.3, GP BOR RA-28
1033, 1329914.640, 403512.381, 14.0, GP BOR RA-29
1083, 1329869.382, 403601.351, 14.7, GP BOR RA-30
1034, 1329912.506, 403691.113, 12.7, GP BOR RA-31
1084, 1329857.938, 403887.887, 11.2, GP BOR RA-32
1035, 1329908.237, 403970.155, 9.7, GP BOR RA-33
1086, 1329867.037, 404130.260, 10.8, GP BOR RA-34
1036, 1329906.139, 404162.735, 10.6, GP BOR RA-35
1085, 1329855.713, 404344.133, 11.3, GP BOR RA-36
1037, 1329908.855, 404349.559, 11.2, GP BOR RA-37
1078, 1329856.038, 404495.495, 13.5, GP BOR RA-38
1155, 1329918.846, 404523.907, 14.0, GP BOR RA-39
1079, 1329856.436, 404677.908, 16.6, GP BOR RA-40
1040, 1329904.919, 404748.530, 17.9, GP BOR RA-41
1082, 1329850.583, 404809.541, 17.9, GP BOR RA-42
1041, 1329898.969, 404912.419, 19.0, GP BOR RA-43
1081, 1329847.006, 404993.038, 19.1, GP BOR RA-44
1156, 1329894.011, 405124.238, 20.4, GP BOR RA-45
1095, 1329855.864, 405266.962, 22.6, GP BOR RA-46
1042, 1329892.831, 405327.699, 23.7, GP BOR RA-47
1096, 1329855.622, 405461.694, 26.8, GP BOR RA-48
1043, 1329891.264, 405517.836, 27.2, GP BOR RA-49
1044, 1329901.691, 405717.511, 30.3, GP BOR RA-50

POINT NUMBER, NORTHING, EASTING, ELEVATION, DESCRIPTION

1103, 1329844.670, 405771.764, 31.6, GP BOR RA-51
1045, 1329903.633, 406022.288, 32.9, GP BOR RA-52
1046, 1329901.994, 406120.907, 32.6, GP BOR RA-53
1047, 1329848.600, 406117.008, 33.0, GP BOR RA-54
1049, 1329901.461, 406219.304, 32.5, GP BOR RA-55
1048, 1329847.424, 406183.313, 32.9, GP BOR RA-56
1053, 1329901.350, 406316.076, 34.0, GP BOR RA-57
1054, 1329887.424, 406425.121, 36.0, GP BOR RA-58
1157, 1329849.305, 406404.008, 35.4, GP BOR RA-59
1058, 1329882.376, 406507.054, 37.4, GP BOR RA-60
1059, 1329847.532, 406455.658, 36.2, GP BOR RA-61
1162, 1329879.932, 406584.648, 38.2, GP BOR RA-62
1161, 1329844.677, 406662.890, 39.7, GP BOR RA-63
1061, 1329880.785, 406663.379, 39.7, GP BOR RA-64
1163, 1329879.132, 406817.798, 41.8, GP BOR RA-65
1160, 1329838.008, 406824.542, 42.0, GP BOR RA-66
1158, 1329879.250, 406893.686, 43.2, GP BOR RA-67
1100, 1329841.562, 406978.435, 44.5, GP BOR RA-68
1159, 1329876.726, 407003.716, 44.8, GP BOR RA-69
1101, 1329841.769, 407047.204, 45.7, GP BOR RA-70
1102, 1329842.577, 407118.641, 46.7, GP BOR RA-71
1154, 1329875.462, 407192.308, 47.8, GP BOR RA-72
1104, 1329841.330, 407231.026, 48.4, GP BOR RA-73
1150, 1329876.088, 407293.271, 49.3, GP BOR RA-74
1105, 1329836.817, 407322.897, 49.8, GP BOR RA-75
1149, 1329875.401, 407396.635, 50.8, GP BOR RA-76
1151, 1329834.072, 407410.857, 51.6, GP BOR RA-77
1148, 1329873.677, 407491.147, 52.4, GP BOR RA-78
1147, 1329871.308, 407619.880, 54.3, GP BOR RA-79
1106, 1329832.334, 407600.924, 54.5, GP BOR RA-80
1146, 1329869.923, 407702.985, 55.3, GP BOR RA-81
1107, 1329826.605, 407687.841, 56.2, GP BOR RA-82
1145, 1329871.575, 407794.319, 56.8, GP BOR RA-83
1144, 1329867.495, 407878.717, 56.8, GP BOR RA-84
1108, 1329825.360, 407866.269, 58.5, GP BOR RA-85
1109, 1329826.055, 407993.899, 59.6, GP BOR RA-86
1143, 1329867.157, 408102.092, 58.6, GP BOR RA-87
1110, 1329824.373, 408075.114, 60.4, GP BOR RA-88
1142, 1329867.706, 408184.544, 59.1, GP BOR RA-89
1166, 1329821.478, 408132.477, 60.9, GP BOR RA-90
1167, 1329870.589, 408289.878, 59.9, GP BOR RA-91
1152, 1329868.975, 408370.845, 59.8, GP BOR RA-92
1111, 1329823.719, 408368.200, 60.4, GP BOR RA-93
1153, 1329868.083, 408480.051, 59.9, GP BOR RA-94
1115, 1329820.745, 408480.907, 59.8, GP BOR RA-95
1140, 1329865.567, 408542.192, 59.4, GP BOR RA-96
1116, 1329824.880, 408592.117, 59.5, GP BOR RA-97
1135, 1329863.731, 408679.399, 59.1, GP BOR RA-98
1136, 1329861.971, 408763.963, 59.1, GP BOR RA-99
1118, 1329822.699, 408794.473, 59.5, GP BOR RA-100

POINT NUMBER, NORTHING, EASTING, ELEVATION, DESCRIPTION

1137, 1329862.016, 408872.699, 59.5, GP BOR RA-101
1119, 1329820.667, 408863.602, 59.5, GP BOR RA-102
1138, 1329863.719, 408954.407, 59.9, GP BOR RA-103
1120, 1329825.121, 408943.694, 60.0, GP BOR RA-104
1139, 1329863.252, 409039.147, 60.6, GP BOR RA-105
1134, 1329826.193, 409030.129, 60.1, GP BOR RA-106
1127, 1329875.694, 409133.619, 60.3, GP BOR RA-107
1128, 1329868.744, 409238.478, 60.6, GP BOR RA-108
1133, 1329823.821, 409262.365, 60.4, GP BOR RA-109
1129, 1329873.422, 409339.664, 60.6, GP BOR RA-110
1070, 1329815.534, 409338.305, 60.3, GP BOR RA-111
1130, 1329875.804, 409460.810, 60.2, GP BOR RA-112
1132, 1329815.908, 409333.831, 60.2, GP BOR RA-113
1131, 1329808.097, 409375.911, 60.3, GP BOR RA-114
1069, 1329875.891, 409662.982, 58.5, GP BOR RA-115

1093, 1329961.954, 401871.227, 25.5, GP BOR B-1
1094, 1329878.942, 401961.564, 24.1, GP BOR B-2
1073, 1329854.686, 403125.796, 17.0, GP BOR B-3
1074, 1329917.434, 403189.346, 15.7, GP BOR B-4
1072, 1329864.314, 403293.166, 17.0, GP BOR B-5
1077, 1329858.698, 404521.978, 13.9, GP BOR B-6
1080, 1329909.075, 404630.974, 15.8, GP BOR B-7
1099, 1329924.689, 405868.529, 32.2, GP BOR B-8
1097, 1329903.337, 406000.671, 33.2, GP BOR B-9
1098, 1329848.311, 406000.364, 33.3, GP BOR B-10

52333, 1329918.826,409961.632, 55.5, GP BOR STAKE PSI-1
52349, 1329425.930,404533.504, 16.1, GP BOR HOLE PA-1
52348, 1329491.943,404335.300, 14.1, GP BOR HOLE PA-2
52350, 1329611.640,404456.385, 11.9, GP BOR HOLE PA-3
52345, 1329758.689,404530.685, 14.5, GP BOR HOLE PA-4
52346, 1329776.343,404398.592, 9.8, GP BOR HOLE PA-5
52347, 1329680.623,404241.668, 9.9, GP BOR HOLE PA-6
52343, 1329949.777,403155.412, 14.5, GP BOR HOLE PA-7
52339, 1329881.374,402853.753, 17.7, GP BOR HOLE PA-8
52340, 1329874.805,402640.245, 15.8, GP BOR HOLE PA-9
52353, 1329959.992,403788.960, 9.2, GP BOR HOLE PA-10
52355, 1329990.524,403616.178, 8.6, GP BOR HOLE PA-11
52356, 1330040.309,403613.681, 8.9, GP BOR HOLE PA-12
52336, 1330462.987,403755.994, 10.4, GP BOR HOLE PA-13

REVISIONS	BY	DATE

SURVEY BOOK No.: M&C 117,120,123		
SURVEY DIVISION	BY	DATE
SURVEYED	DM	1/09
TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	.	.
DRAWN	.	.
CHECKED	.	.

TOPOGRAPHIC SURVEY of
SUNSET POINT ROAD
from EDGEWATER DRIVE
to KEENE ROAD

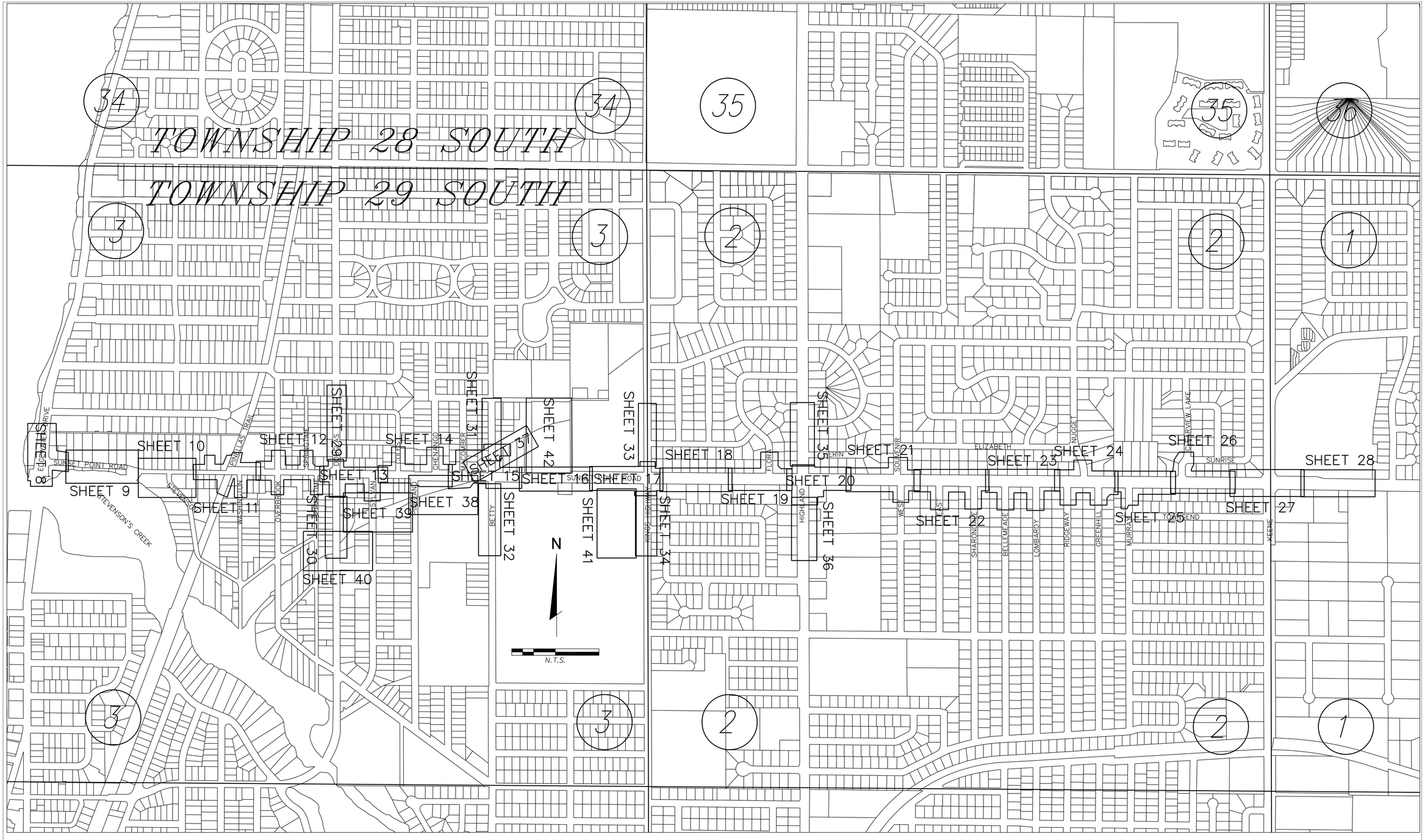
WETLAND POINTS AND
SOIL BORING POINTS

McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
Internet Site: http://www.mckimcreed.com

EARL W. RAMER, P.S.M.
Florida Professional Surveyor and Mapper
License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SPN 1029
SHEET: 06 of 42 | SH06.dwg



REVISIONS	BY	DATE

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TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	.	.
DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
KEY SHEET

McKIM&CREED
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Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
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EARL W. RAMER, P.S.M
Professional Surveyor and Mapper
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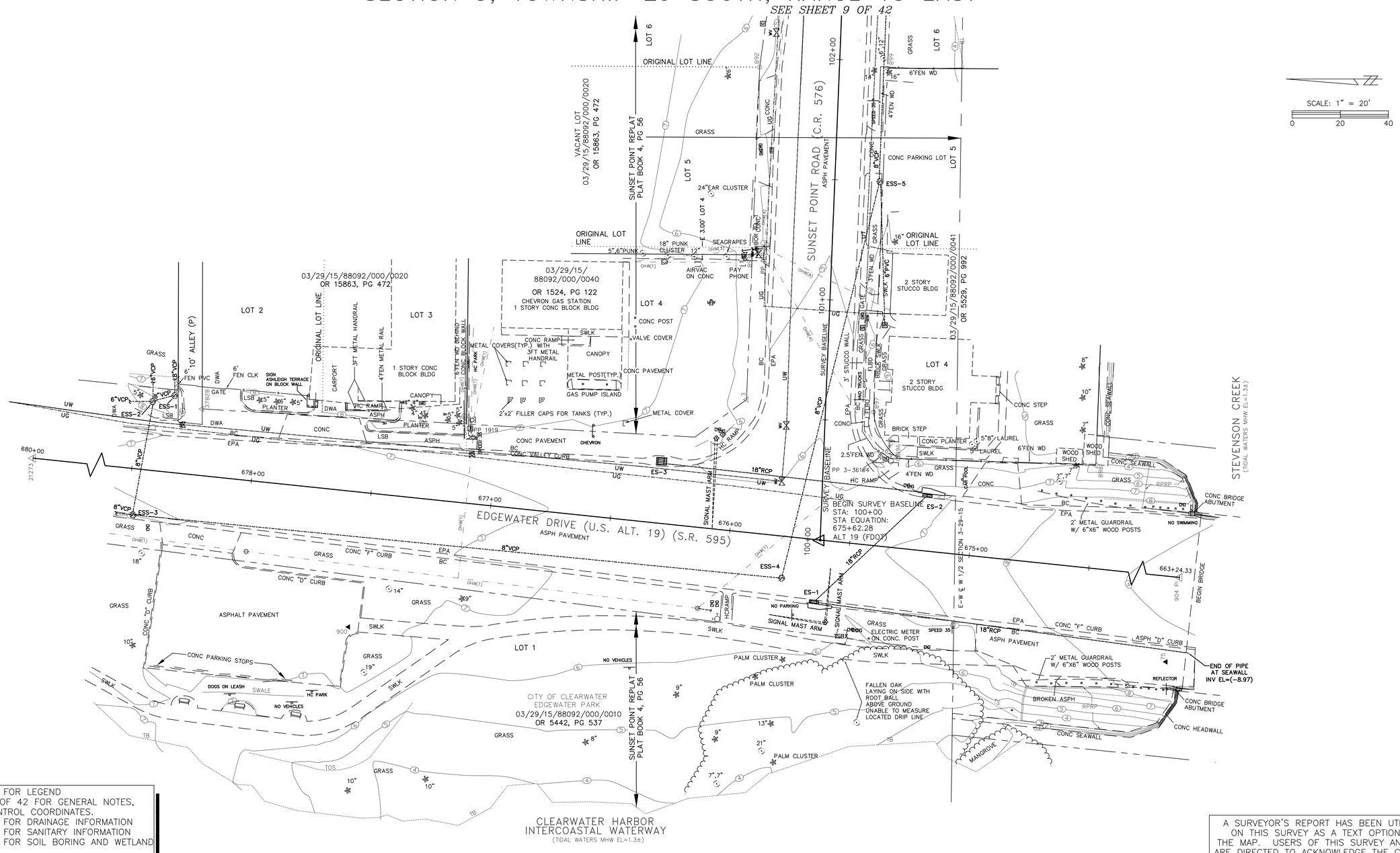
DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 7 of 42 keysht07.dwg

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
SEE SHEET 6 OF 42 FOR SOIL BORING AND WETLAND INFORMATION
SEE SHEET 7 OF 42 FOR KEY SHEET

A SURVEYOR'S REPORT HAS BEEN UTILIZED ON THIS SURVEY AS A TEXT OPTION TO THE MAP. USERS OF THIS SURVEY AND MAP ARE DIRECTED TO ACKNOWLEDGE THE CONTENT OF REPORT ITEMS AS INDICATED ON SHEET 2.

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SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 100+00 TO STA 102+00

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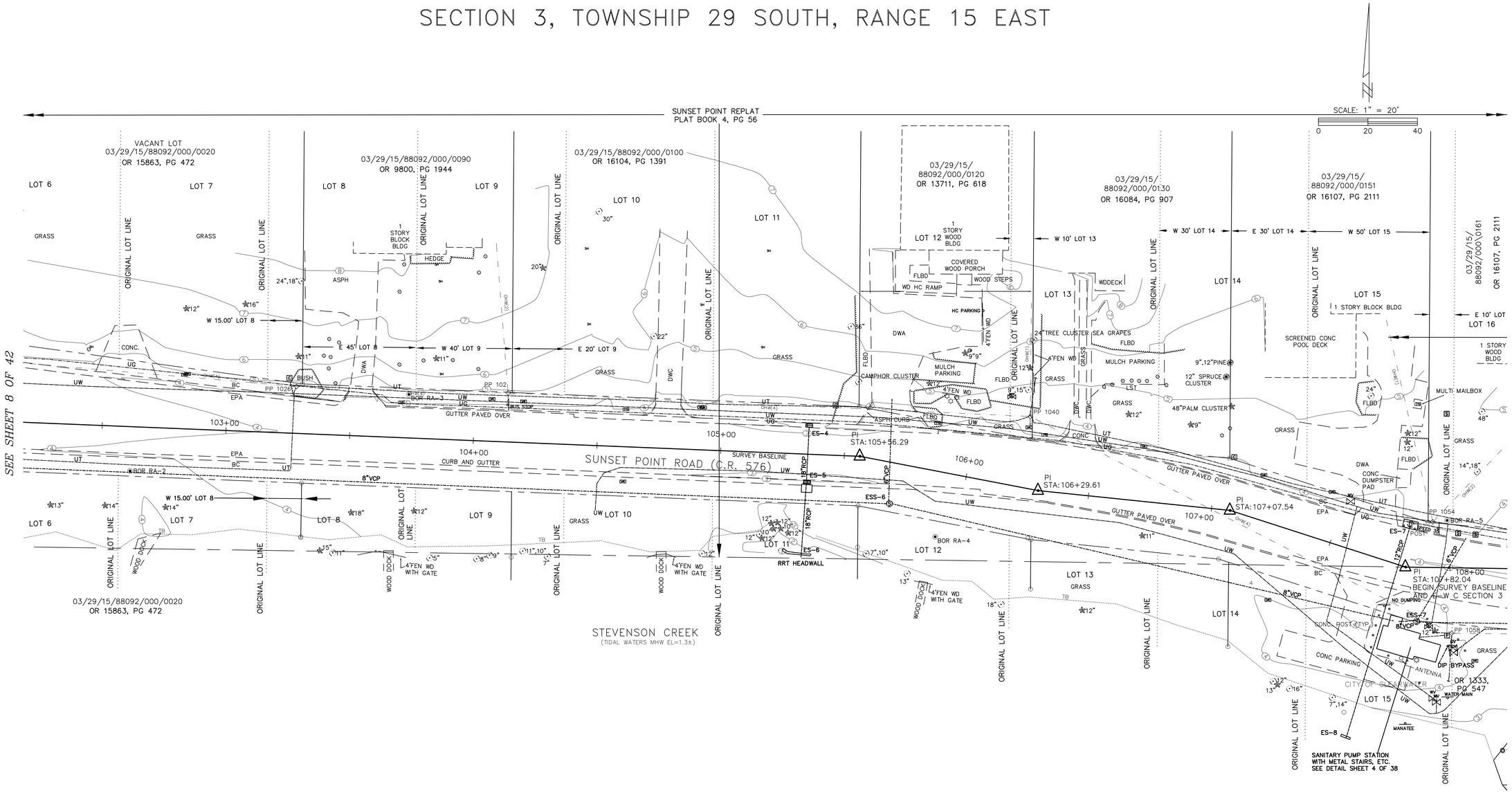
EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 8 of 42 | F1029.dwg

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
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CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	.	.
DRAWN	.	.
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SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 102+00 TO STA 108+00

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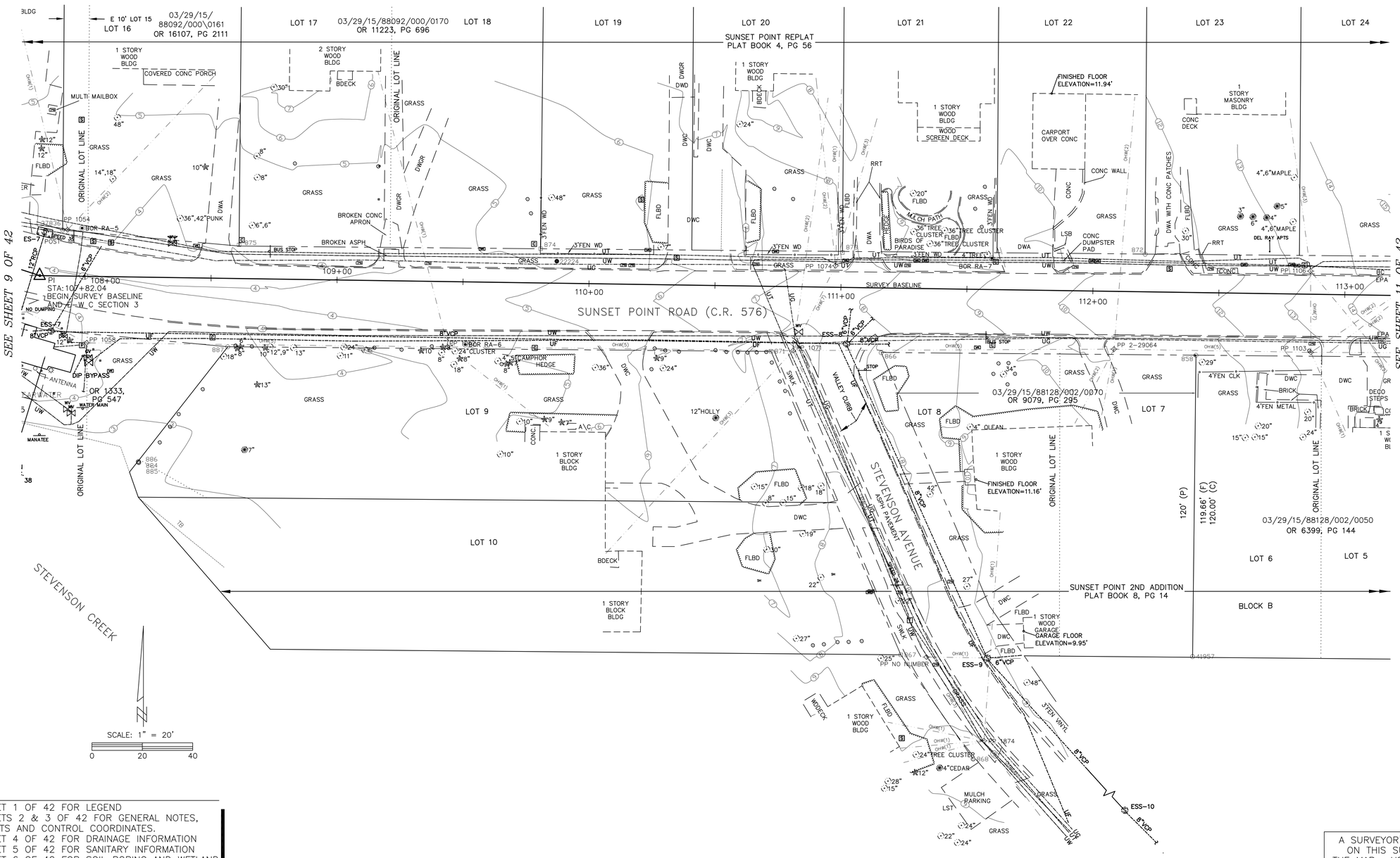
DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 9 of 42 | F1029.dwg

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
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DESIGN DIVISION		
DESIGNED	.	.
DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY DETAIL SHEET STA 108+00 TO STA 113+00

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License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 10 of 42 | F1029.dwg

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SCALE: 1" = 20'
0 20 40

SUNSET POINT ROAD (C.R. 576)
SURVEY BASELINE
PI STA: 116+08.54
113+00 114+00 115+00 116+00 117+00 118+00

SUNSET POINT REPLAT PLAT BOOK 4, PG 56
SUNSET POINT TOWNHOMES PHASE I CONDO PLAT BOOK 131, PG 50
SUNSET POINT TOWNHOMES PHASE IV CONDO PLAT BOOK 131, PG 82
SUNSET POINT TOWNHOMES PHASE V CONDO PLAT BOOK 140, PG 1
LION'S POINT CLEARWATER CONDOMINIUM (UNRECORDED)
03/29/15/ 51790/001/0010 OR 14543, PG 1611
PROPERTY LINE PER OR 14543, PG 1611
ORIGINAL LOT LINE
SUNSET POINT 2ND ADDITION PLAT BOOK 8, PG 14 BLOCK C
SUNSET POINT 2ND ADDITION PLAT BOOK 8, PG 14 BLOCK B
SUNSET RIDGE PLAT BOOK 11, PG 91
03/29/15/88128/002/0050 OR 6399, PG 144
03/29/15/88128/003/0030 OR 4673, PG 1019
03/29/15/ 88164/000/0010 OR 14477, PG 17

PINELLAS TRAIL
WASHINGTON AVENUE
PROPERTY LINE SPEED 20
SPEED 25
STA 1115

LOT 24 LOT 5 LOT 4 LOT 3 LOT 2 LOT 1 LOT 8 LOT 6 LOT 26 LOT 29 LOT 1

SEE SHEET 10 OF 42
SEE SHEET 12 OF 42

SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
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SEE SHEET 7 OF 42 FOR KEY SHEET

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REVISIONS	BY	DATE

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TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	.	.
DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY DETAIL SHEET STA 113+00 TO STA 118+50

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License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 11 of 42 F1029.dwg

SECTION 3
TOWNSHIP 29 SOUTH
RANGE 15 EAST

SCALE: 1" = 20'
0 20 40

SUNSET POINT 2ND ADDITION
PLAT BOOK 8, PG 14
BLOCK G

SUNSET POINT REPLAT
PLAT BOOK 4, PG 56

LION'S POINT CLEARWATER CONDOMINIUM
(UNRECORDED)

SUNSET POINT 1ST ADDITION
PLAT BOOK 5, PG 95
BLOCK E

SUNSET POINT 2ND ADDITION
PLAT BOOK 8, PG 14
BLOCK C

SUNSET POINT 1ST ADDITION
PLAT BOOK 5, PG 95
LOT 1 BLOCK D

OVERBROOK AVENUE

SPRINGTIME AVENUE

SUNSET POINT ROAD (C.R.576)

SURVEY BASELINE

119+00 120+00 121+00 122+00 123+00 124+00

LOT 63 LOT 62 LOT 43 LOT 42 ASPHALT PARKING LOT

LOT 1 LOT 2 LOT 3 LOT 4 LOT 5 LOT 6 LOT 7 LOT 8 LOT 9 LOT 10 LOT 11 LOT 12 LOT 13 LOT 14 LOT 16 LOT 17 LOT 18 LOT 19 LOT 29 LOT 27 LOT 33

03/29/15/
88128/007/0610
OR 9719, PG 1088

03/29/15/
88128/007/0430
OR 9719, PG 1091

03/29/15/
88128/007/0030
OR 13397, PG 1930
& OR 13494, PG 687

03/29/15/
88128/007/0070
OR 13038, PG 1124

03/29/15/
88128/007/0090
OR 6984, PG 1551

03/29/15/
88128/007/0110
OR 13277, PG 453

03/29/15/
88128/007/0130
OR 14526, PG 1654

03/29/15/
88128/007/0150
OR 11287, PG 2254

03/29/15/
88128/003/0030
OR 4673, PG 1019

03/29/15/
88128/003/0010
OR 6589, PG 45

03/29/15/
88128/003/0270
OR 10741, PG 2213

03/29/15/
88110/005/0011
OR 10265, PG 1089

03/29/15/
88110/005/0040
OR 10265, PG 1089

03/29/15/
88110/005/0050
OR 10663, PG 1008

03/29/15/
88110/005/0051
OR 5633, PG 268

03/29/15/
88110/005/0010
OR 10021, PG 503

03/29/15/
88110/005/0060
OR 16120, PG 2667

03/29/15/88110/005/0070
DECK OR 13349, PG 1018

03/29/15/88110/005/0081
OR 6448, PG 2391

LOT 7 03/29/15/
88110/005/0071
OR 14441, PG 778

SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
SEE SHEET 6 OF 42 FOR SOIL BORING AND WETLAND INFORMATION
SEE SHEET 7 OF 42 FOR KEY SHEET

A SURVEYOR'S REPORT HAS BEEN UTILIZED ON THIS SURVEY AS A TEXT OPTION TO THE MAP. USERS OF THIS SURVEY AND MAP ARE DIRECTED TO ACKNOWLEDGE THE CONTENT OF REPORT ITEMS AS INDICATED ON SHEET 2.

SEE SHEET 11 OF 42

SEE SHEET 13 OF 42

REVISIONS	BY	DATE

SURVEY BOOK No.: M&C 117,120,123		
SURVEY DIVISION	BY	DATE
SURVEYED	DM	1/09
TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	.	.
DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 118+50 TO STA 124+00

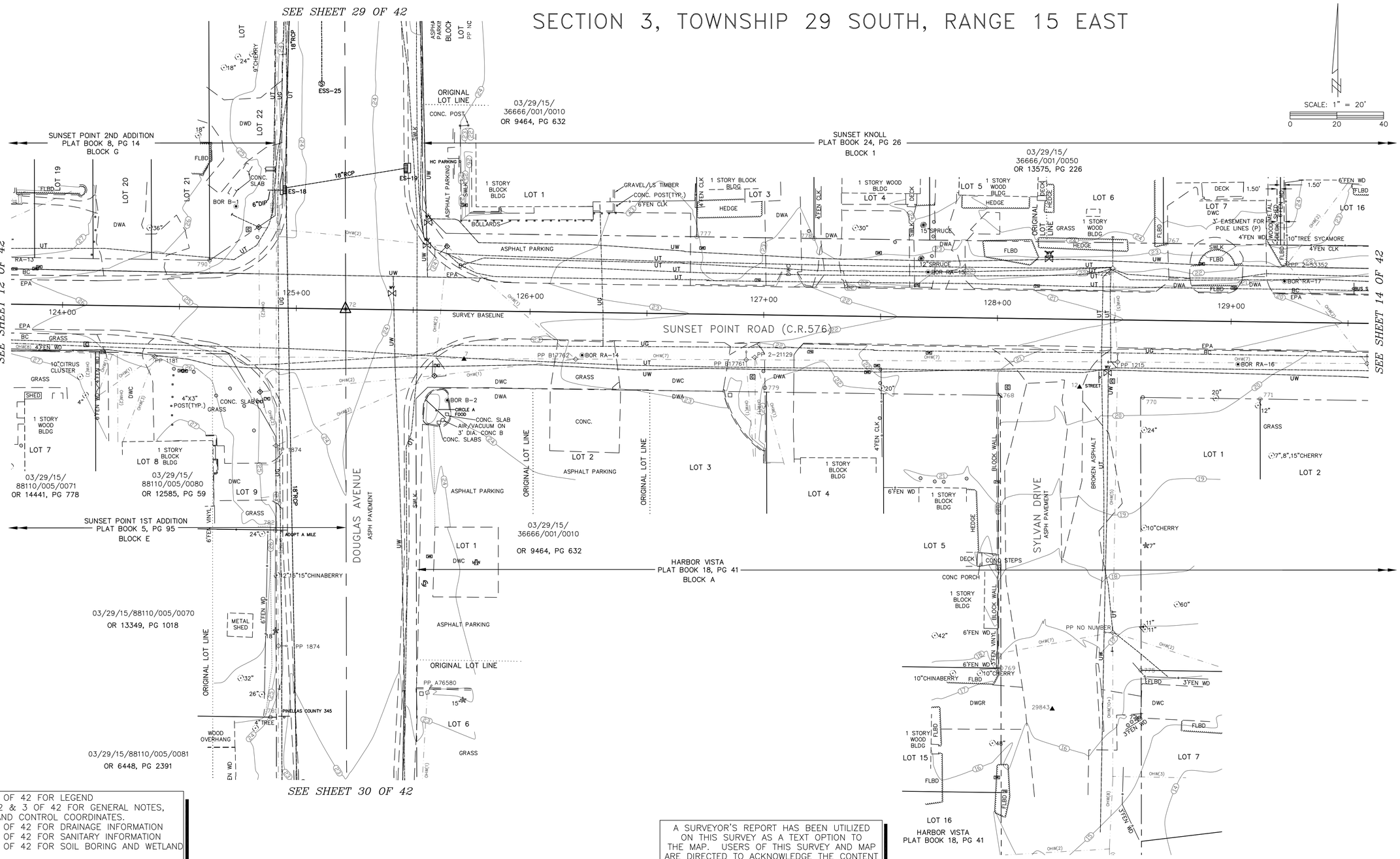
McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
Internet Site: http://www.mckimcreed.com

EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 12 of 42 F1029.dwg

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



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DESIGN DIVISION		
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SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 124+00 TO STA 129+50

McKIM&CREED
1365 Hamlet Avenue
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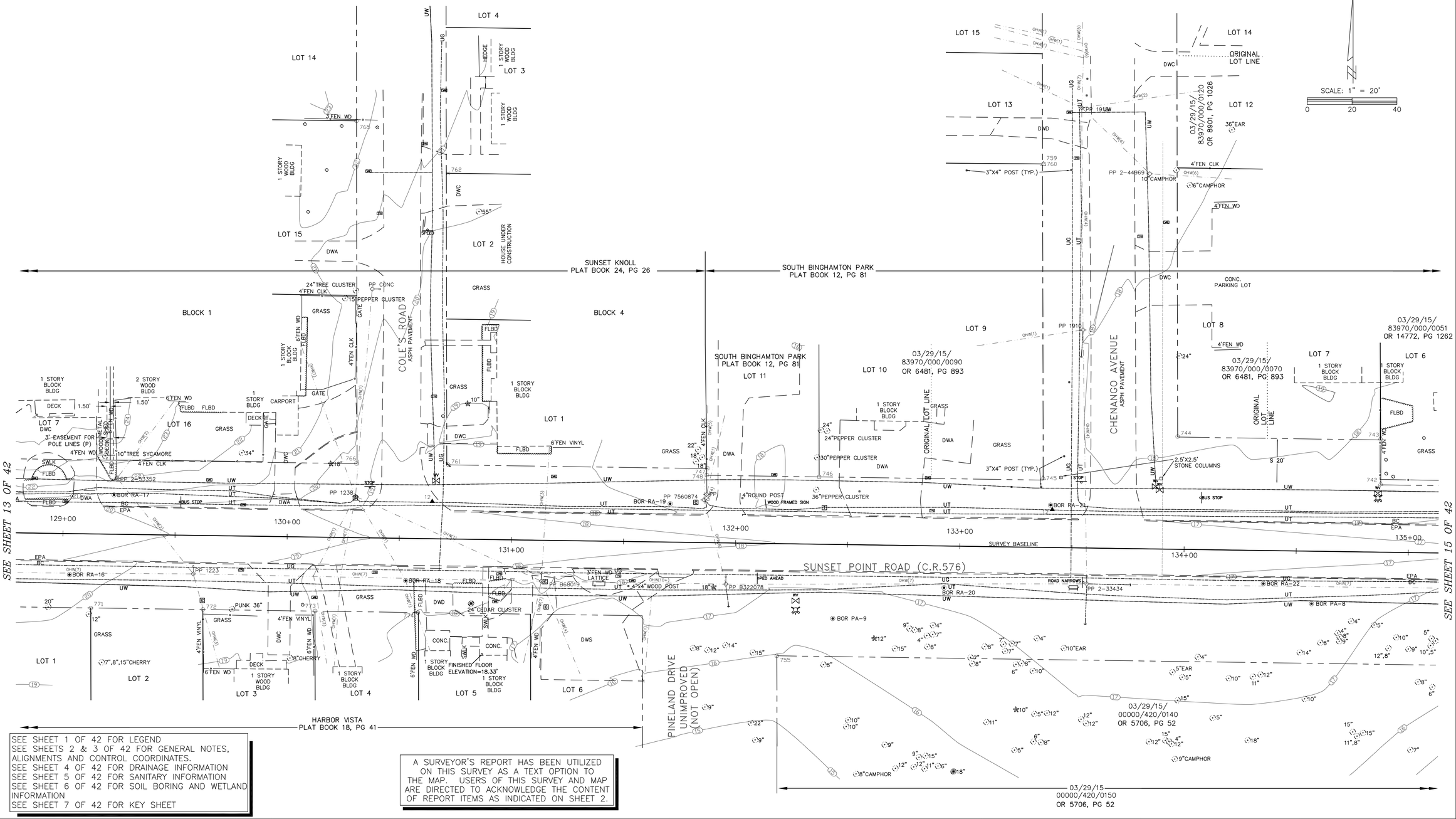
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 13 of 42 F1029.dwg

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



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DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY DETAIL SHEET STA 129+00 TO STA 135+00

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EARL W. RAMER, P.S.M
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License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 14 of 42 | F1029.dwg

SEE SHEET 31 OF 42

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SEE SHEET 37 OF 42

SCALE: 1" = 20'
0 20 40

SOUTH BINGHAMTON PARK
PLAT BOOK 12, PG 81

LOT 49

LOT 10
TALL GRASS AND SHRUBS

12"TREE CLUSTER
LOT 31
10"SPRUCE
03/29/15/
83970/000/0050
OR 15295, PG 2456
15"CITRUS
12"

03/29/15/
83970/000/0300
OR 11061, PG 462

LOT 30

03/29/15/
83970/000/0480
OR 15260, PG 1193
LOT 48

GARAGE ELEVATION=12.24'

ORIGINAL LOT LINE

03/29/15/
83970/000/0040
OR 14772, PG 1262

WD SHED

DE OR 3264, PG 683

18"CAMPHOR

SOUTH BINGHAMTON PARK
PLAT BOOK 12, PG 81

LOT 5

LOT 4

LOT 3

LOT 1

03/29/15/
LOT 2 83970/000/0010
OR 8973, PG 1528

LOT 6

1 STORY BLOCK BLDG

03/29/15/
83970/000/0051
OR 14772, PG 1262

SHED

FLBD

GRASS

MACOMBER AVENUE
ASPH PAVEMENT

11"TREE DEAD

12"CAMPHOR

1 STORY WOOD BLDG

ORIGINAL LOT LINE

UTILITY LINES RUN THROUGH CONDUIT ABOVE CREEK

13'X 7.5' ARCHED CMP CULVERT ES-36

DRAINAGE EASEMENT OR 3264, PG 685

SPRING BRANCH (TIDAL WATERS MHW EL=1.33')

FINISHED FLOOR ELEVATION=15.29'

BOR PA-7

BETTY LANE
ASPH PAVEMENT

LOT 8

LOT 7
FINISHED FLOOR ELEVATION=14.41'

UNKNOWN MANHOLE
RIM EL=15.08
FULL OF MUCK
BOTTOM OF STRUCTURE
EL=9.43

2 STORY WOOD BLDG

1 STORY BLOCK BLDG

CONC PAVERS

12" STUMP

DIRT AND BROKEN ASPHALT

GRAVEL

ASPHALT PAVEMENT TO BUILDING

03/29/15/
49986/000/0090
OR 8930, PG 1976

03/29/15/
49986/000/0091
7142, PG 1425

LANGE'S REPLAT OF BROWN'S SUBDIVISION
PLAT BOOK 24, PG 74

SEE SHEET 1 OF 42 FOR LEGEND
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SEE SHEET 6 OF 42 FOR SOIL BORING AND WETLAND INFORMATION
SEE SHEET 7 OF 42 FOR KEY SHEET

SEE SHEET 14 OF 42

SUNSET POINT ROAD (C.R.576)

SURVEY BASELINE

135+00 136+00 137+00 138+00 139+00 140+00 141+00

ES-27 ES-28 24"CMP ES-29 12"X18"ECMP

ES-138 15"RCP

ES-30 15"RCP

ES-31 18"RCP

ES-32 8"PVC

ES-33 8"PVC

ES-34 8"PVC

ES-35 12"CMP

ES-37 13'X 7.5' ARCHED CMP CULVERT

ES-38 6"FEN WD

ES-39 12"CMP

ES-40 15"RCP

ES-41 15"RCP

ES-140 BRIDGE CULVERT

JL SW1-1 JL SW1-2 JL SW1-3 JL SW1-4 JL SW1-5 JL SW1-6

WETLAND LINE

BOR RA-24 BOR RA-25 BOR RA-26 BOR RA-27 BOR RA-28 BOR B-3 BOR B-4 BOR B-5

METAL HANDRAIL

METAL PEDESTRIAN BRIDGE

SANITARY LIFT STATION

HABITAT FOR HUMANITY OF PINELLAS COUNTY, INC.
03/29/15/
00000/420/0140
OR 16167, PG 2644

03/29/15/
00000/420/0150
OR 5706, PG 52

SCHOOL BOARD OF PINELLAS COUNTY
03/29/15/00000/410/0100
OR 4191, PG 286

SIGN
HUNSINGER SCHOOL

ADOPT A MILE

UTILITY LINES RUN THROUGH CONDUIT ABOVE CREEK

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SEE SHEET 38 OF 42

SEE SHEET 32 OF 42

SEE SHEET 16 OF 42

REVISIONS	BY	DATE

SURVEY BOOK No.:M&C 117,120,123

SURVEY DIVISION	BY	DATE
SURVEYED	DM	1/09
TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	.	.
DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 135+00 TO STA 141+00

McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
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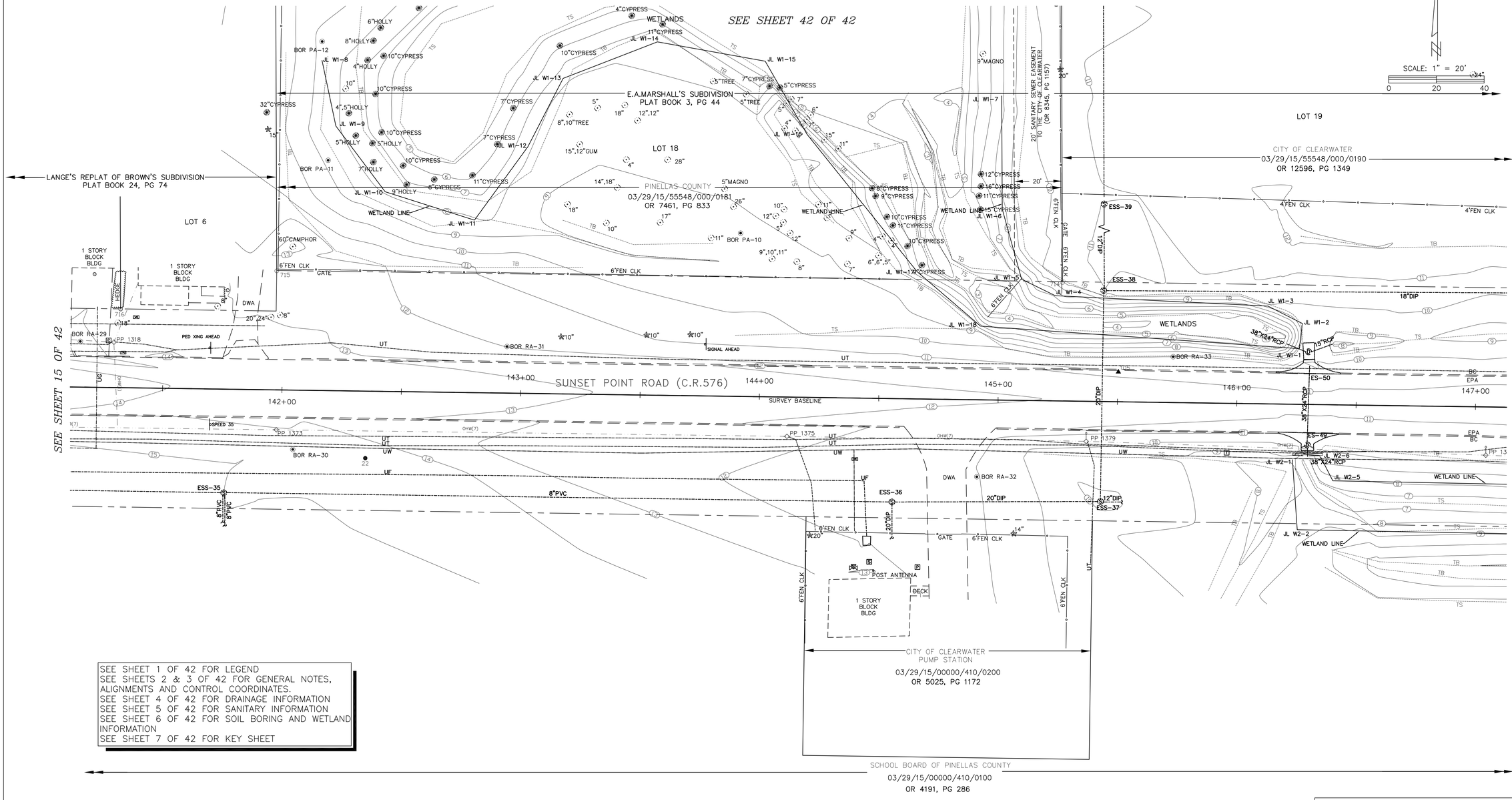
EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 15 of 42 F1029.dwg

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



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DESIGNED	.	.
DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 141+00 TO STA 147+00

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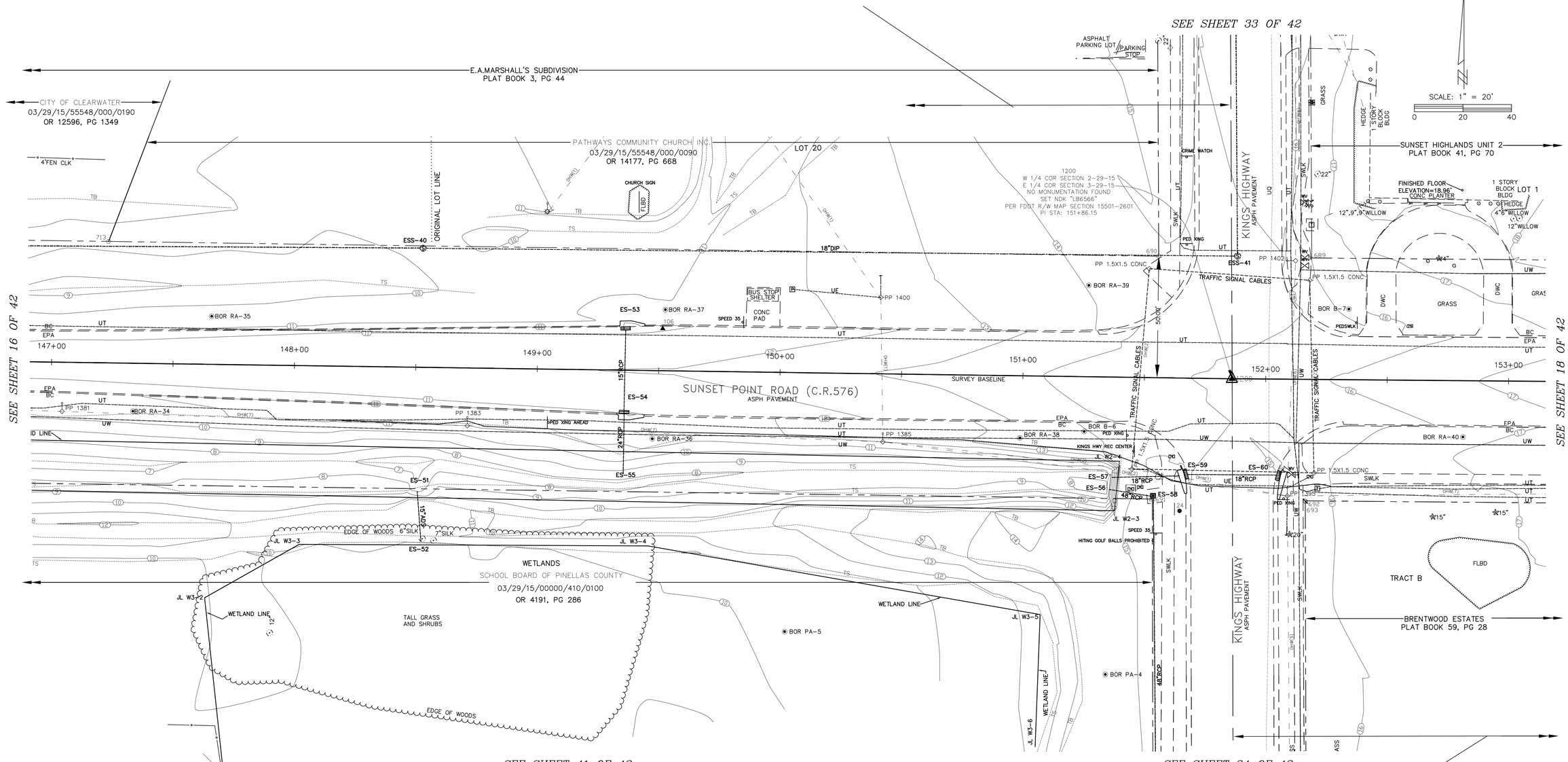
DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 16 of 42 | F1029.dwg

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SEE SHEET 1 OF 42 FOR LEGEND
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DRAWN	.	.
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SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 147+00 TO STA 153+00

McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
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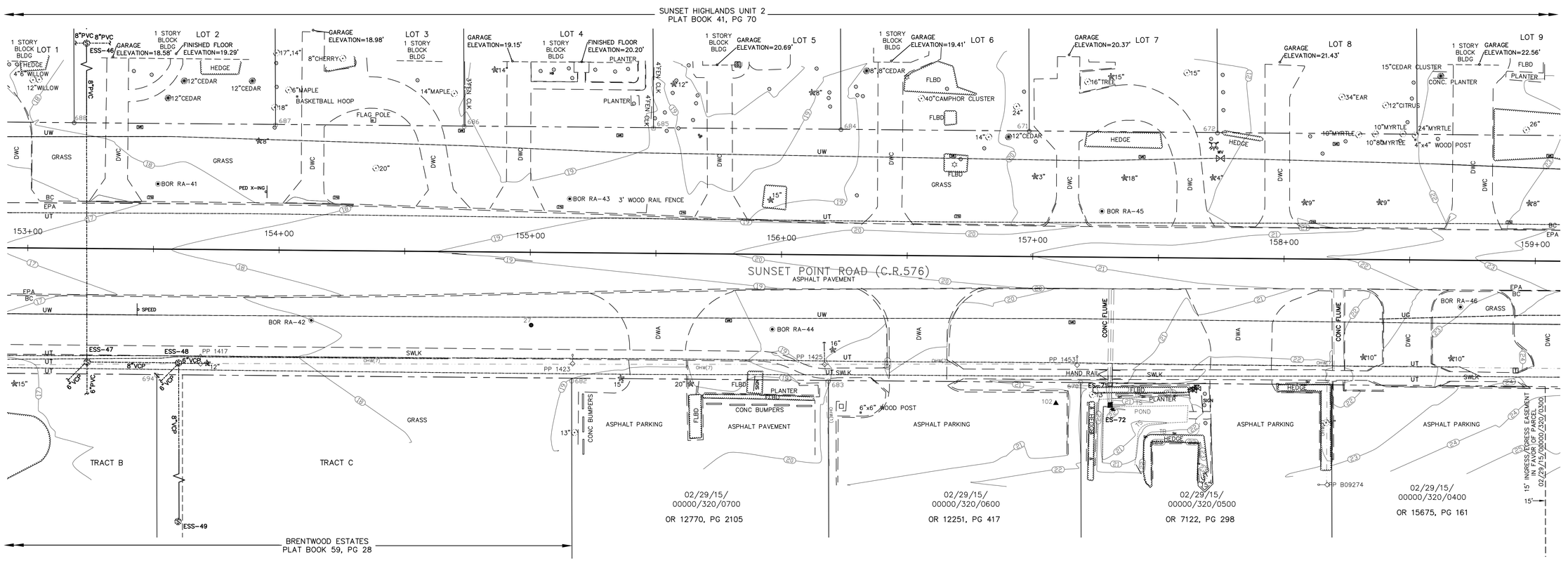
EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 17 of 42 | F1029.dwg

SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SCALE: 1" = 20'
0 20 40



SEE SHEET 1 OF 42 FOR LEGEND
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SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 153+00 TO STA 159+00

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SHEET: 18 of 42 F1029.dwg

SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

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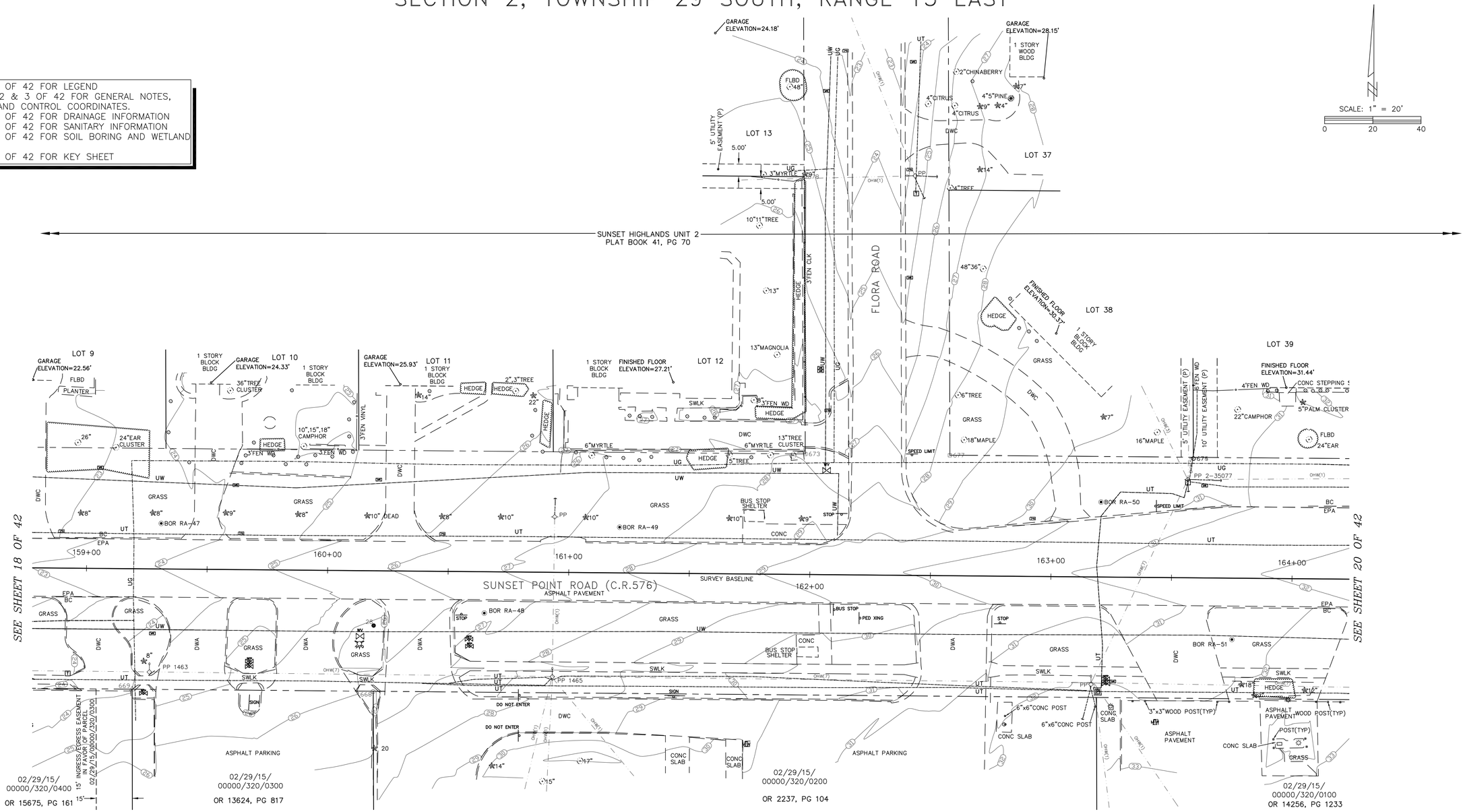

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SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 159+00 TO STA 164+00

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SHEET: 19 of 42 | F1029.dwg

SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SEE SHEET 35 OF 42

SEE SHEET 19 OF 42

SEE SHEET 21 OF 42

SEE SHEET 36 OF 42

SCALE: 1" = 20'
0 20 40

SUNSET HIGHLANDS UNIT 2
PLAT BOOK 41, PG 70

SUNSET HIGHLANDS UNIT 1
PLAT BOOK 41, PG 68

LOT 36 | LOT 35 | LOT 34 | LOT 33 | LOT 32

SUNSET POINT ROAD (C.R.576)

SURVEY BASELINE

STA: 165+18.83

164+00 | 165+00 | 166+00 | 167+00 | 168+00 | 169+00

HIGHLAND AVENUE
ASPH PAVEMENT

LOT 1 | LOT 2 | LOT 2

SUNSET SQUARE
PLAT BOOK 90, PG 4

1 STORY BLOCK BLDG
1 STORY WOOD BLDG
WD SHED
DRIVE THRU PHARM.
ASPHALT PARKING
ASPHALT PAVEMENT
CONC SLAB
CONC STEPPING STONES
FINISHED FLOOR ELEVATION=31.44'
GRASS
MULCH/MISC PLANTS
MULCH/SHRUBS
CONC BLOCK WALL
CONC SANDBAG
CONC BUMPERS(TYP.)
CONC WALL
CONC BULKHEAD
3' PROPOSED SIDEWALK EASEMENT
3.5'x3.0'BOX CULVERT
ASPHALT FLUME
SPEED LIMIT
SIGN
SIGNAL MAST ARM
FOR SALE
DEAD END
GATE
HEDGE
SWLK
DWC
DWA
UT
UW
UC
UG
EPA
BC
OHW(1)
OHW(2)
OHW(5)
OHW(6)
FLBD
TB
TS
PED XING
METAL POST(TYP)
WOOD POST(TYP)
POST(TYP)
SLAB
CONC
4'FEN WD
4'FEN CLK
6'FEN VINYL
5'PALM CLUSTER
5"5"4"4"PALM CLUSTER
"CAMPHOR
10"CITRUS
9"CITRUS
18"EAR
24"EAR
6"6"TREE
6"MAGNO
15"MAPLE
26"MAPLE
12"MYRTLE
4"TREE
13" 12"
9"
8"
6"
4"
3"
2"

BOR B-8 | BOR B-9 | BOR B-10 | BOR RA-52 | BOR RA-53 | BOR RA-54 | BOR RA-55 | BOR RA-56

ES-81 | ES-82 | ES-83 | ES-84 | ES-85 | ES-86 | ES-96 | ES-97 | ES-98 | ES-99 | ES-100 | ES-101 | ES-102 | ES-103 | ES-104 | ES-105 | ES-106 | ES-107 | ES-108 | ES-109 | ES-110

ESS-52 | ESS-53 | ESS-54 | ESS-55

PP 2-28019 | PP 15CB | PP C612 | PP C6487324 | PP 7723541 | PP 8108324

15"RCP | 18"RCP | 24"RCP | 30"RCP | 36"RCP | 42"RCP | 8"VCP | 8"PVC | 10" | 8"DIP | 24"CMP

02/29/15/
00000/320/0100
OR 14256, PG 1233

SEE SHEET 1 OF 42 FOR LEGEND
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SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
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DRAWN	.	.
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SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 164+00 TO STA 169+00

McKIM&CREED
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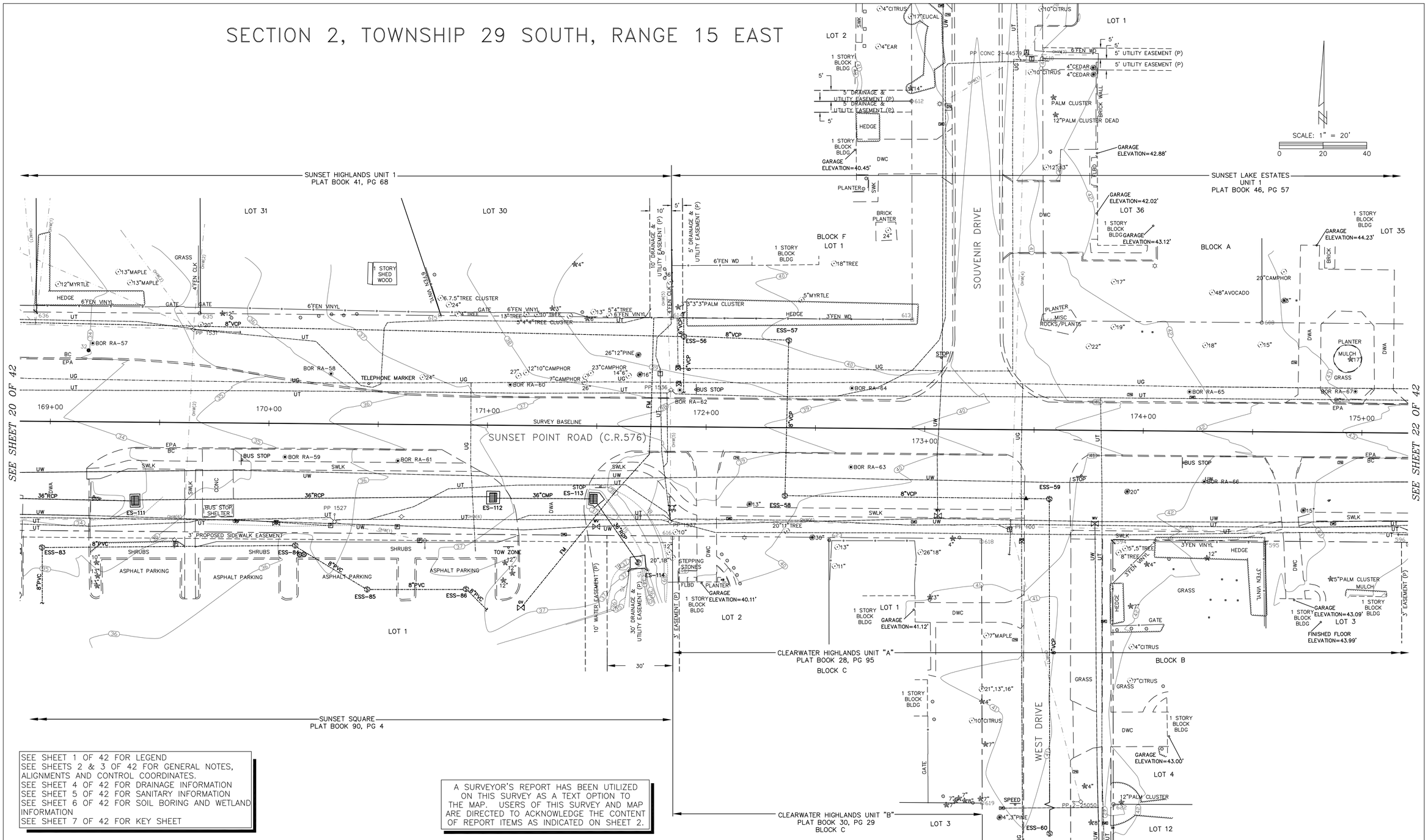
License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 20 of 42 | F1029.dwg

SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST



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SEE SHEET 7 OF 42 FOR KEY SHEET

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REVISIONS	BY	DATE

SURVEY BOOK No.: M&C 117,120,123		
SURVEY DIVISION	BY	DATE
SURVEYED	DM	1/09
TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	.	.
DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 169+00 TO STA 175+00

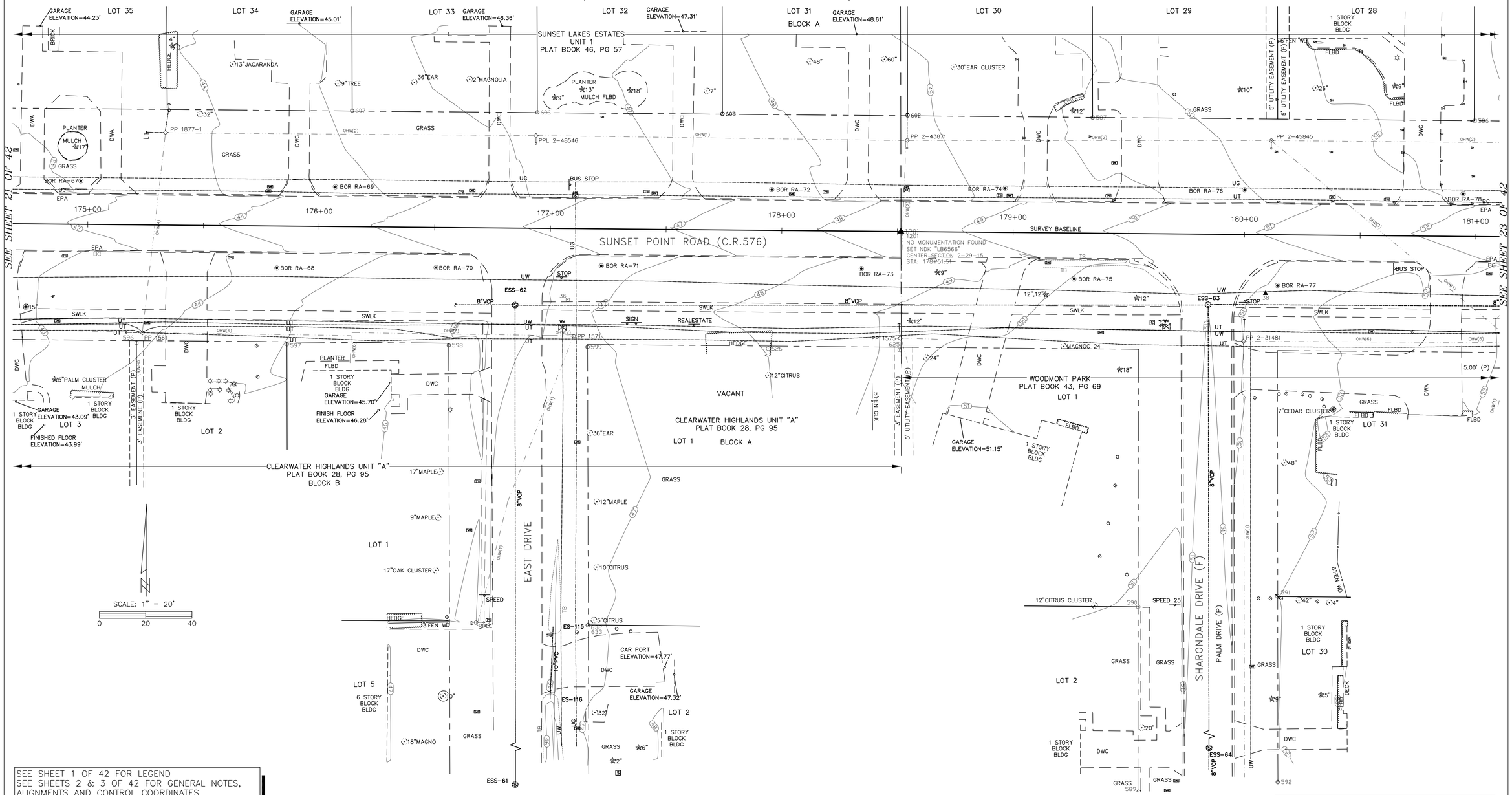
McKIM&CREED
1365 Harnlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
Internet Site: http://www.mckimcreed.com

EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 21 of 42 | F1029.dwg

SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
SEE SHEET 6 OF 42 FOR SOIL BORING AND WETLAND INFORMATION
SEE SHEET 7 OF 42 FOR KEY SHEET

A SURVEYOR'S REPORT HAS BEEN UTILIZED ON THIS SURVEY AS A TEXT OPTION TO THE MAP. USERS OF THIS SURVEY AND MAP ARE DIRECTED TO ACKNOWLEDGE THE CONTENT OF REPORT ITEMS AS INDICATED ON SHEET 2.

REVISIONS	BY	DATE

SURVEY BOOK No.: M&C 117,120,123		
SURVEY DIVISION	BY	DATE
SURVEYED	DM	1/09
TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	.	.
DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 175+00 TO STA 181+00

McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
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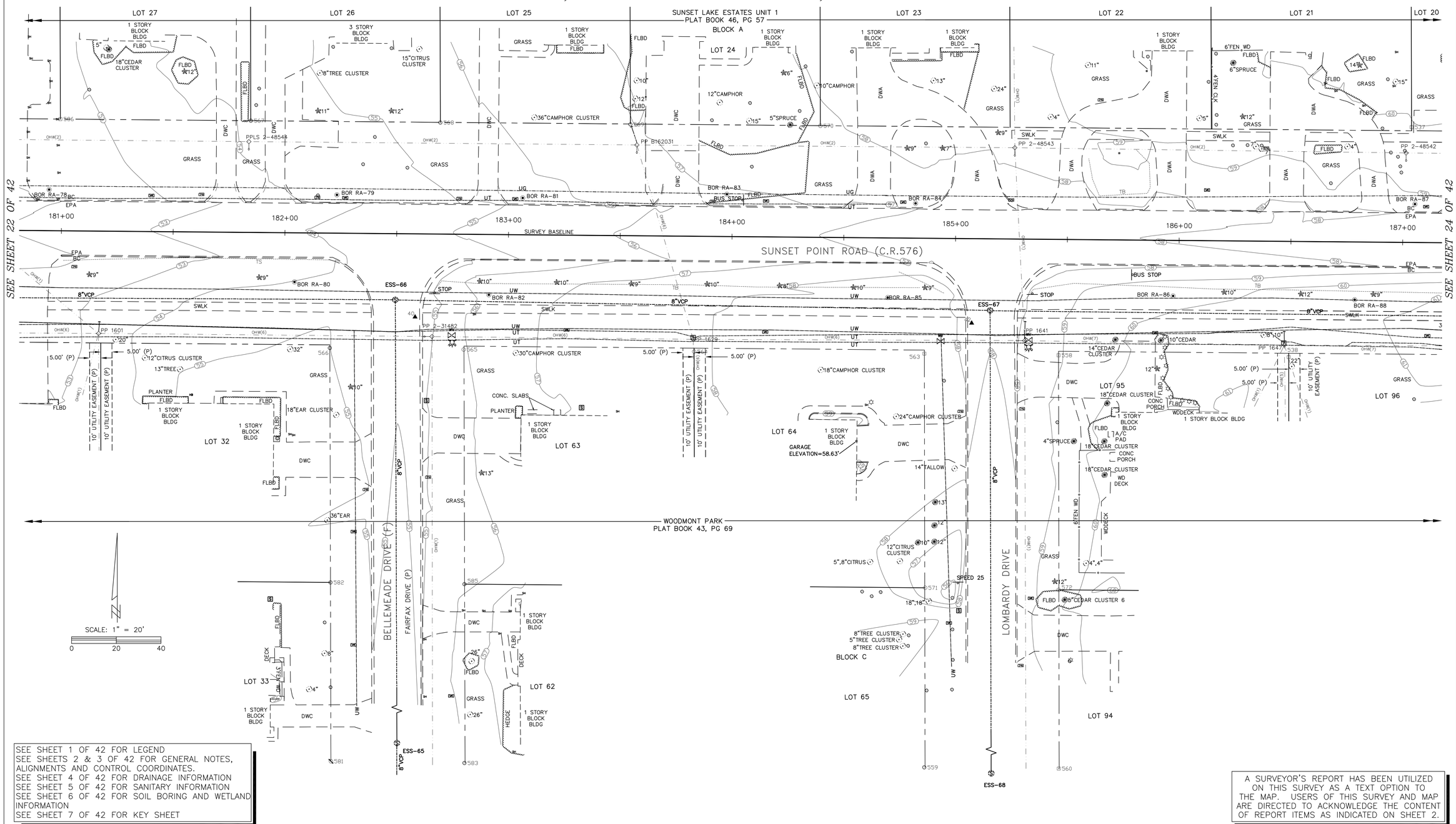
EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 22 of 42 | F1029.dwg

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
SEE SHEET 6 OF 42 FOR SOIL BORING AND WETLAND INFORMATION
SEE SHEET 7 OF 42 FOR KEY SHEET

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TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	.	.
DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD
FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 181+00 TO STA 187+00

McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
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EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 23 of 42 | F1029.dwg

SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SUNSET LAKE ESTATES
UNIT 1
PLAT BOOK 46, PG 57

CLEARVIEW LAKE ESTATES
PLAT BOOK 66, PG 37

WOODMONT PARK
PLAT BOOK 43, PG 69

BLACKSHIRE ESTATES
PLAT BOOK 54, PG 31

SUNSET POINT ROAD (C.R.576)

NUGGET DRIVE

RIDGEWAY DRIVE

GREENHILL DRIVE (F)

MELROSE DRIVE (P)

SURVEY BASELINE

SCALE: 1" = 20'
0 20 40

SEE SHEET 23 OF 42

SEE SHEET 25 OF 42

SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
SEE SHEET 6 OF 42 FOR SOIL BORING AND WETLAND INFORMATION
SEE SHEET 7 OF 42 FOR KEY SHEET

A SURVEYOR'S REPORT HAS BEEN UTILIZED ON THIS SURVEY AS A TEXT OPTION TO THE MAP. USERS OF THIS SURVEY AND MAP ARE DIRECTED TO ACKNOWLEDGE THE CONTENT OF REPORT ITEMS AS INDICATED ON SHEET 2.

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SURVEY BOOK No.: M&C 117,120,123

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TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
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DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 187+00 TO STA 192+00

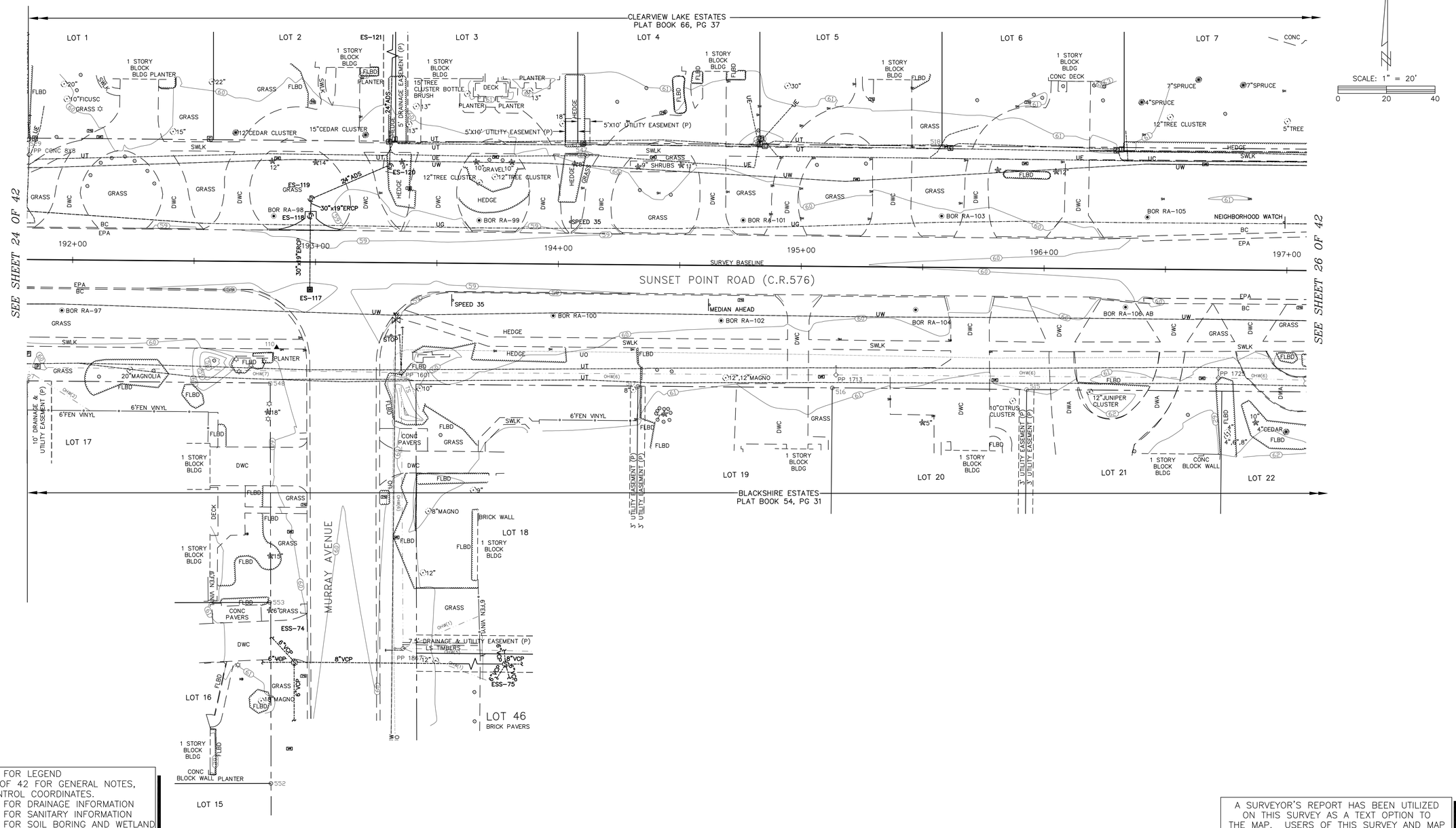
McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
Internet Site: http://www.mckimcreed.com

EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 24 of 42 | F1029.dwg

SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
SEE SHEET 6 OF 42 FOR SOIL BORING AND WETLAND INFORMATION
SEE SHEET 7 OF 42 FOR KEY SHEET

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REVISIONS	BY	DATE

SURVEY BOOK No.:M&C 117,120,123		
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TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
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DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 192+00 TO STA 197+00

McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
Internet Site: http://www.mckimcreed.com

EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

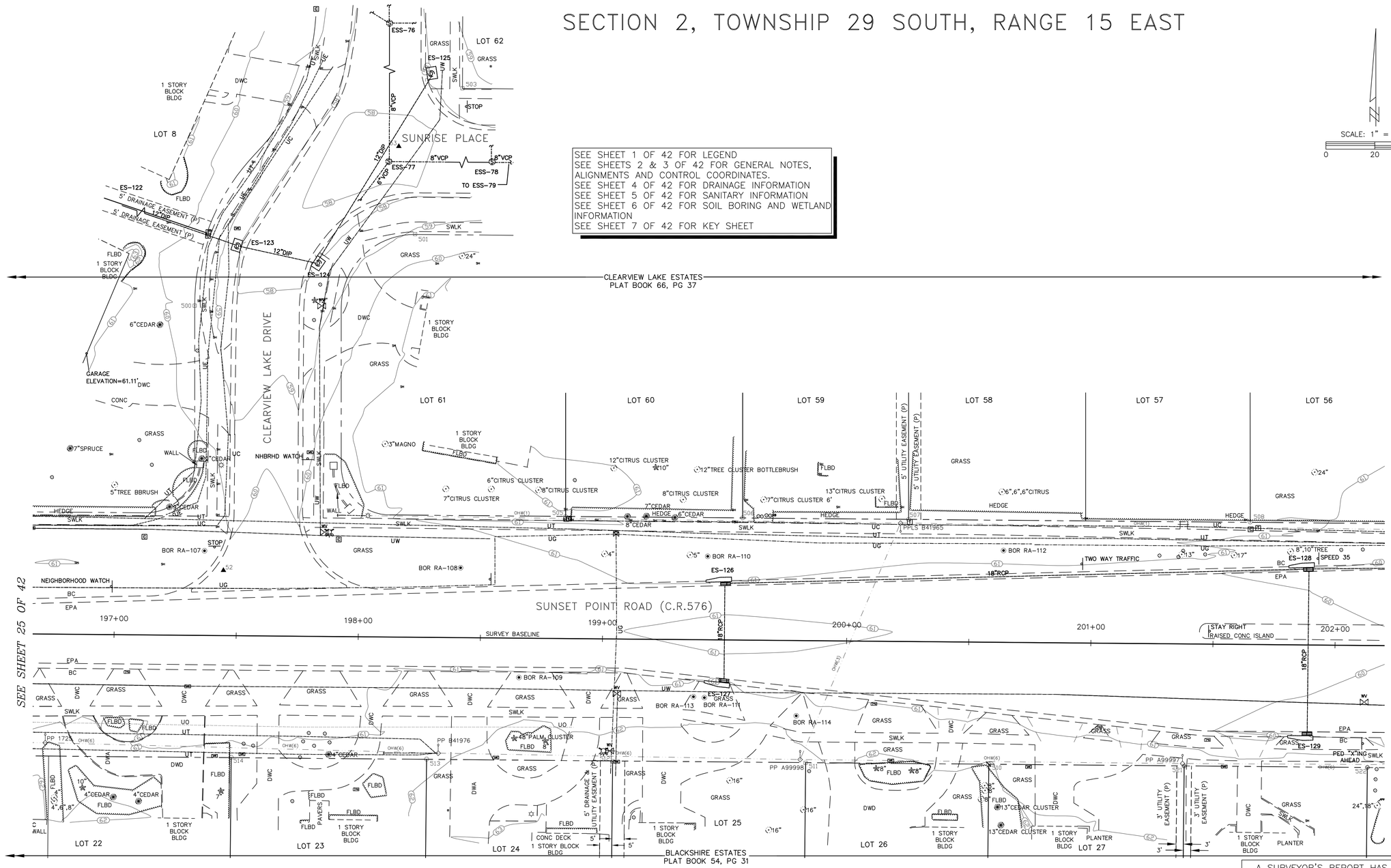
DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 25 of 42 F1029.dwg

SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SCALE: 1" = 20'
0 20 40

SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
SEE SHEET 6 OF 42 FOR SOIL BORING AND WETLAND INFORMATION
SEE SHEET 7 OF 42 FOR KEY SHEET



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REVISIONS	BY	DATE

SURVEY BOOK No.:M&C 117,120,123

SURVEY DIVISION	BY	DATE
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TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
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DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
STA 197+00 TO STA 202+00

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Clearwater, Florida, 33756
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Certificate of Authorization No. LB6566
Internet Site: http://www.mckimcreed.com

EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

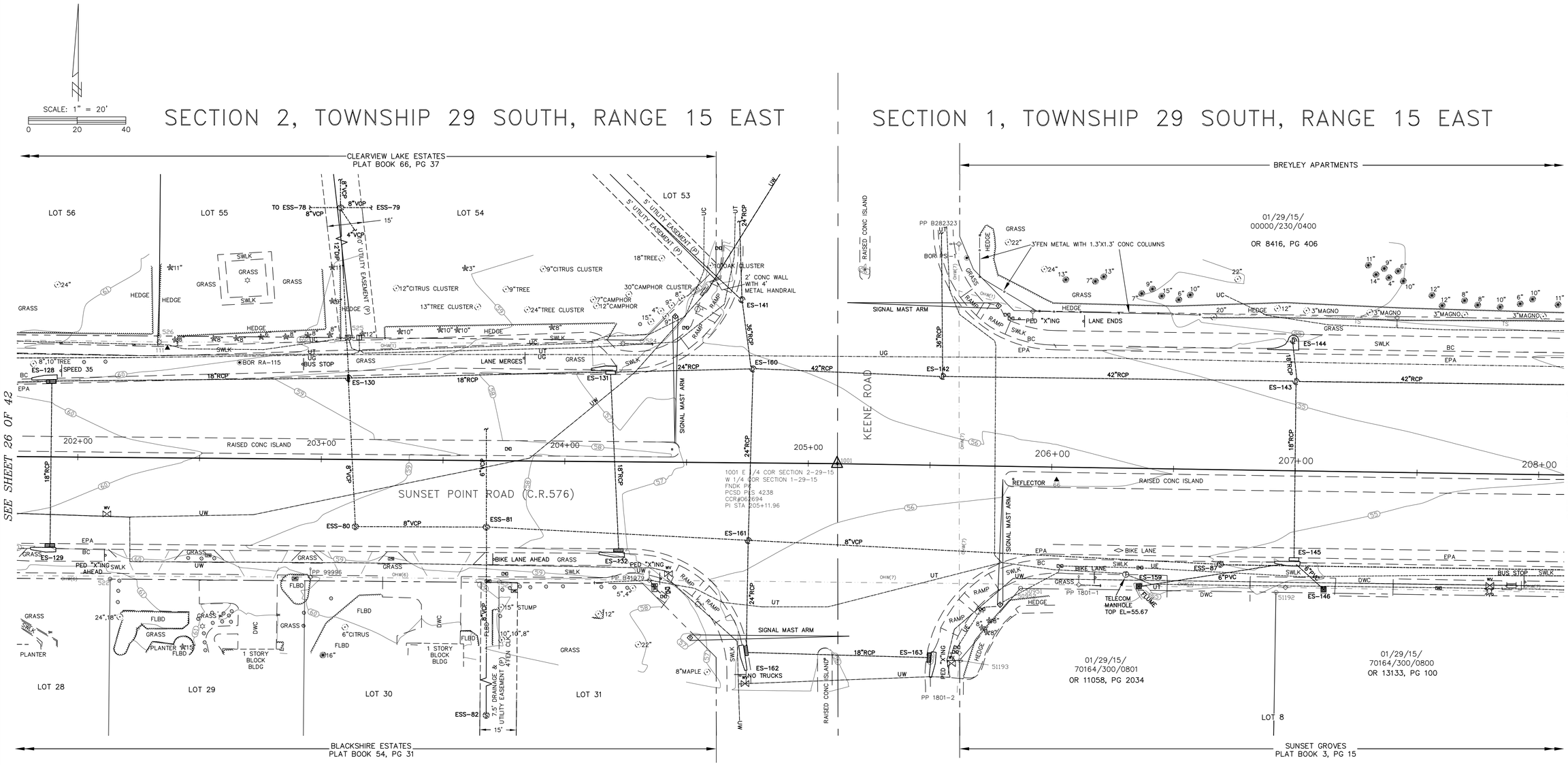
DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 26 of 42 F1029.dwg

SCALE: 1" = 20'
0 20 40

SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SECTION 1, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
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SEE SHEET 7 OF 42 FOR KEY SHEET

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SURVEY BOOK No.:M&C 117,120,123		
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TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	.	.
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CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY DETAIL SHEET STA 202+00 TO STA 206+00

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Clearwater, Florida, 33756
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Certificate of Authorization No. LB6566
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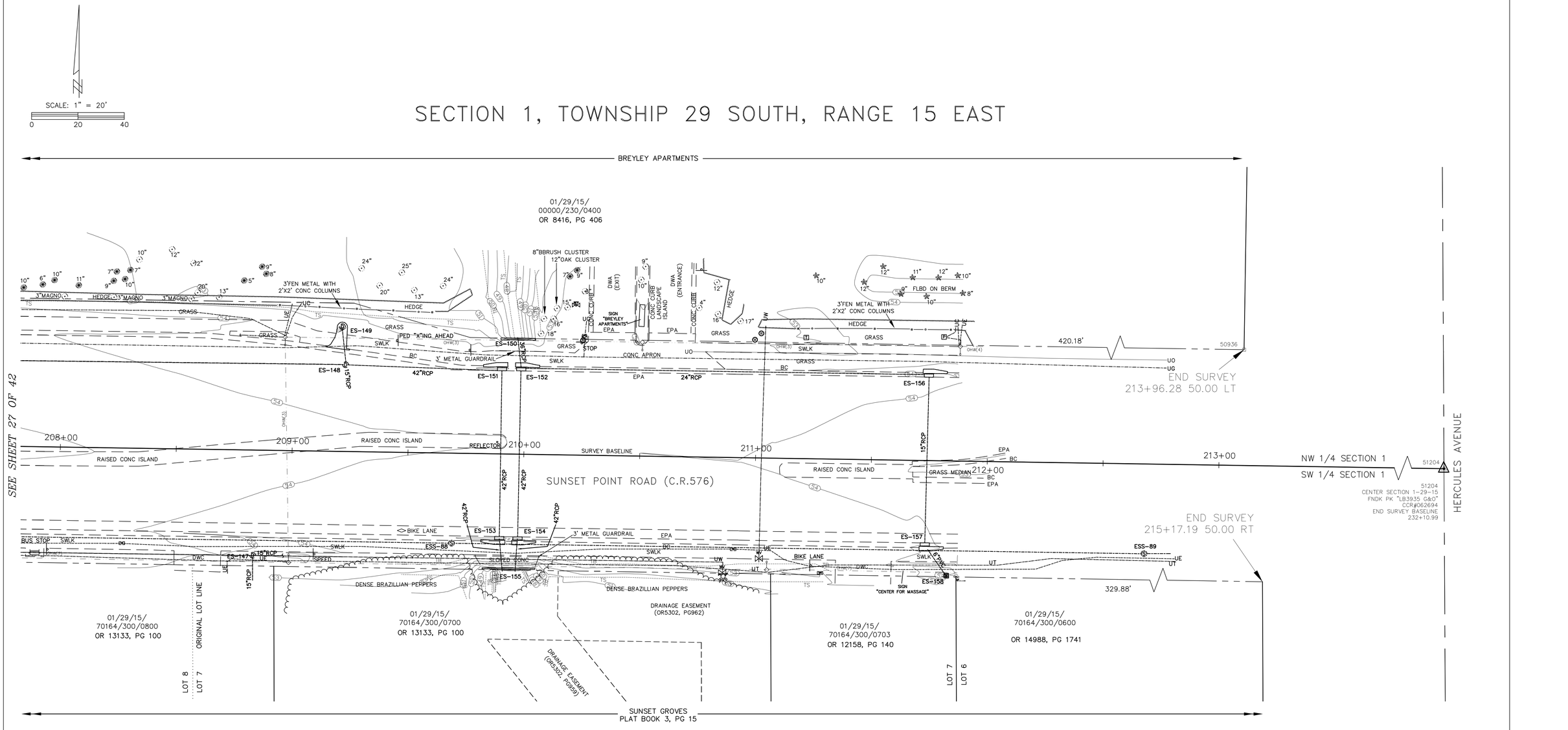
EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 27 of 42 F1029.dwg

SCALE: 1" = 20'
0 20 40

SECTION 1, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
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SEE SHEET 7 OF 42 FOR KEY SHEET

A SURVEYOR'S REPORT HAS BEEN UTILIZED ON THIS SURVEY AS A TEXT OPTION TO THE MAP. USERS OF THIS SURVEY AND MAP ARE DIRECTED TO ACKNOWLEDGE THE CONTENT OF REPORT ITEMS AS INDICATED ON SHEET 2.

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SURVEY BOOK No.:M&C 117,120,123		
SURVEY DIVISION	BY	DATE
SURVEYED	DM	1/09
TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
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CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY DETAIL SHEET STA 208+00 TO STA 213+00

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Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
Internet Site: http://www.mckimcreed.com

EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

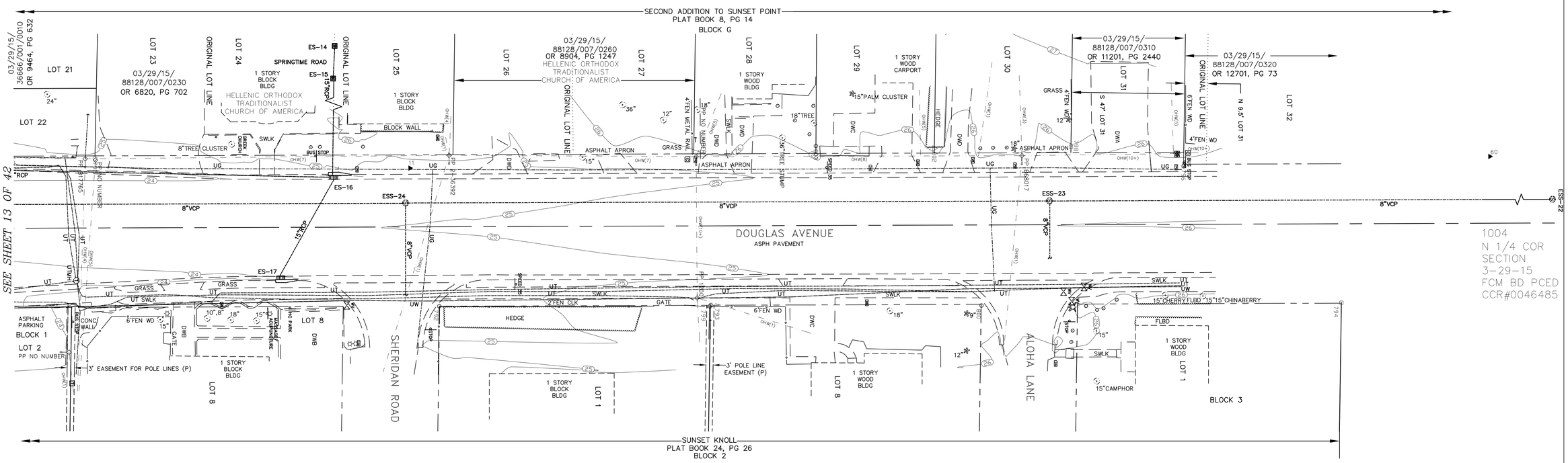
DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 28 of 42 F1029.dwg

SCALE: 1" = 20'

0 20 40

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
SEE SHEET 6 OF 42 FOR SOIL BORING AND WETLAND INFORMATION
SEE SHEET 7 OF 42 FOR KEY SHEET

A SURVEYOR'S REPORT HAS BEEN UTILIZED ON THIS SURVEY AS A TEXT OPTION TO THE MAP. USERS OF THIS SURVEY AND MAP ARE DIRECTED TO ACKNOWLEDGE THE CONTENT OF REPORT ITEMS AS INDICATED ON SHEET 2.

REVISIONS	BY	DATE

SURVEY BOOK No.:M&C 117,120,123

SURVEY DIVISION	BY	DATE
SURVEYED	DM	1/09
TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
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DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
DOUGLAS AVENUE NORTH

McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
Internet Site: http://www.mckimcreed.com

EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

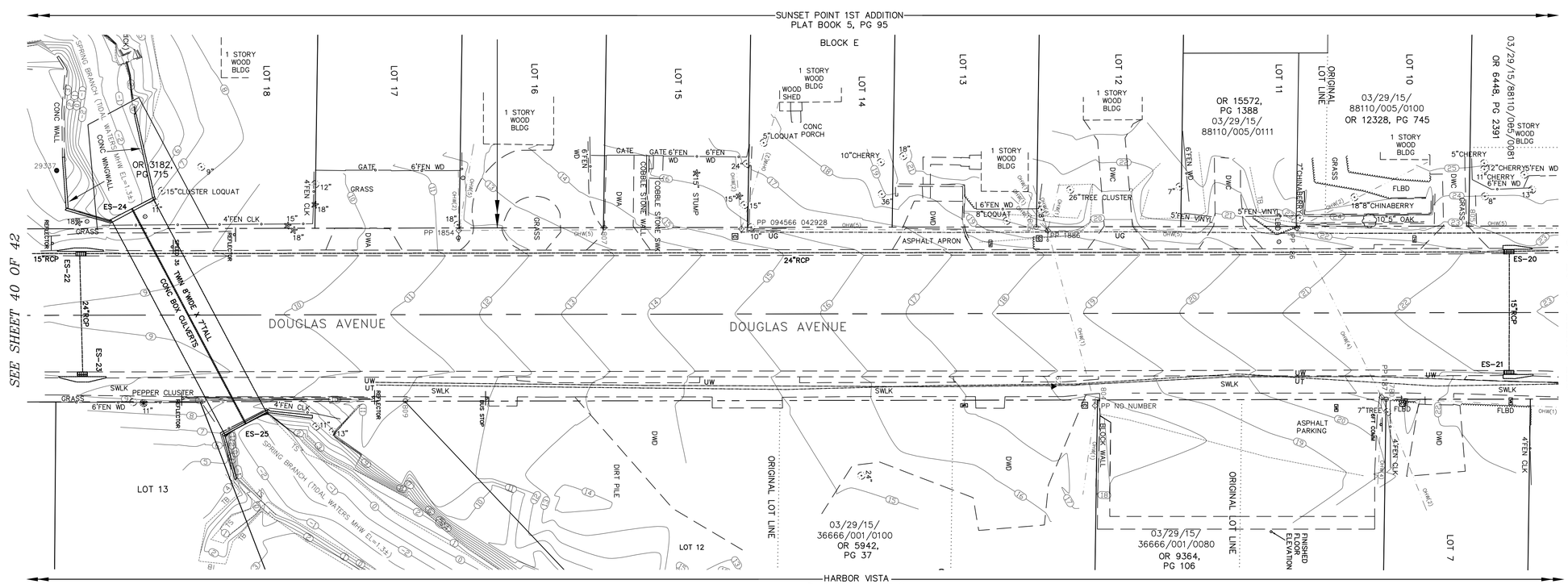
DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 29 of 42 F1029.dwg

SCALE: 1" = 20'

0 20 40

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SEE SHEET 39 OF 42

SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
SEE SHEET 6 OF 42 FOR SOIL BORING AND WETLAND INFORMATION
SEE SHEET 7 OF 42 FOR KEY SHEET

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TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	.	.
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CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
DOUGLAS AVENUE SOUTH

McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
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EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

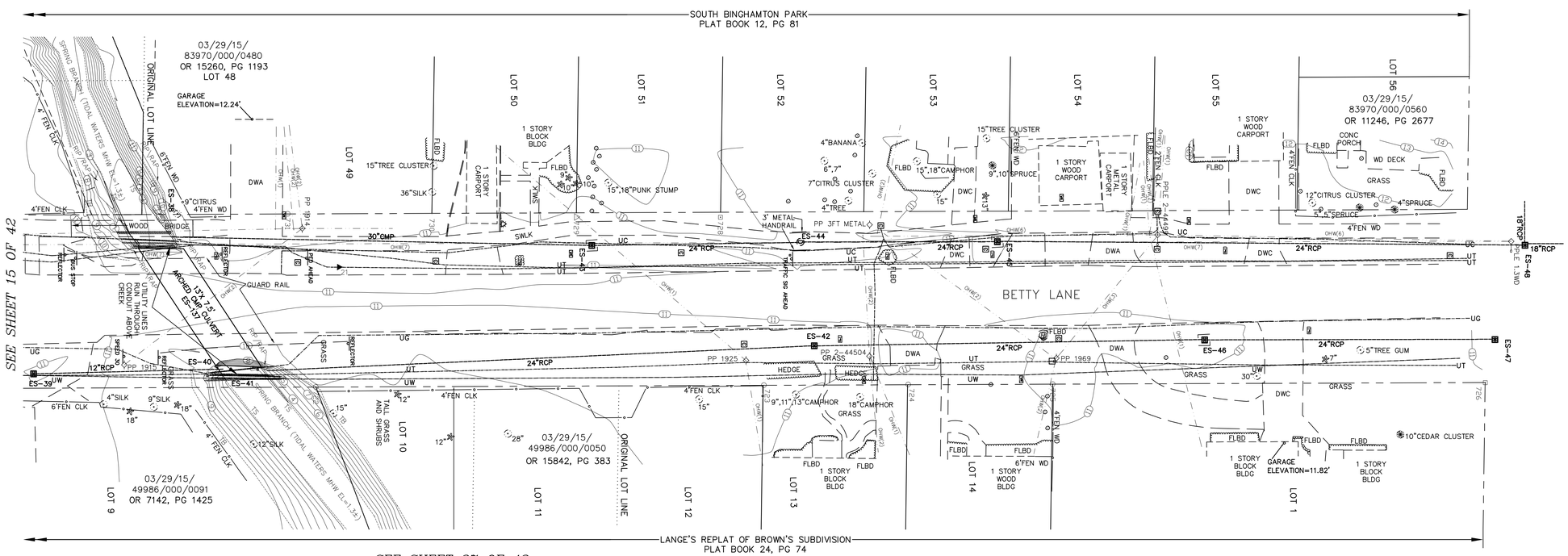
DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 30 of 42 | F1029.dwg

SCALE: 1" = 20'

0 20 40

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SEE SHEET 15 OF 42

SEE SHEET 37 OF 42

SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
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SEE SHEET 7 OF 42 FOR KEY SHEET

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CHECKED	EWR	1/09
DESIGN DIVISION		
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CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY DETAIL SHEET BETTY LANE NORTH

McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
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EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

DATE

DATE: 01/06/2009

PROJECT I.D. 920476

SURVEY FILE NO.: SFN 1029

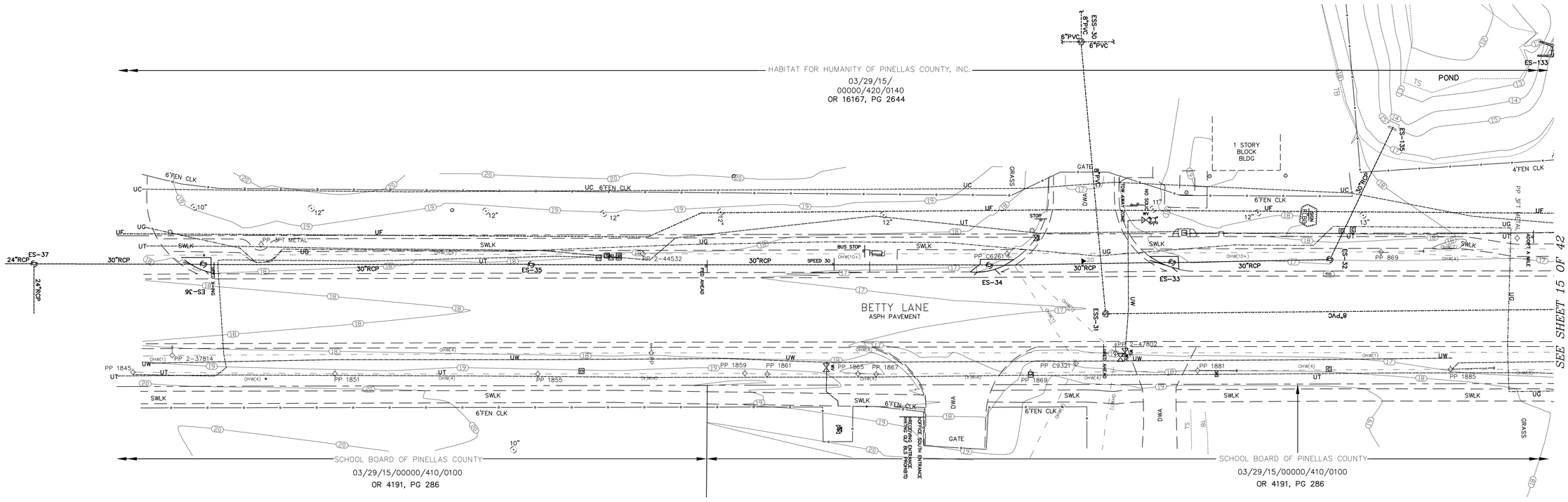
SHEET: 31 of 42 | *F1029.dwg*

SCALE: 1" = 20'

0 20 40

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SEE SHEET 38 OF 42



SEE SHEET 15 OF 42

SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
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DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY DETAIL SHEET BETTY LANE SOUTH

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1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
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EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

DATE

DATE: 01/06/2009

PROJECT I.D. 920476

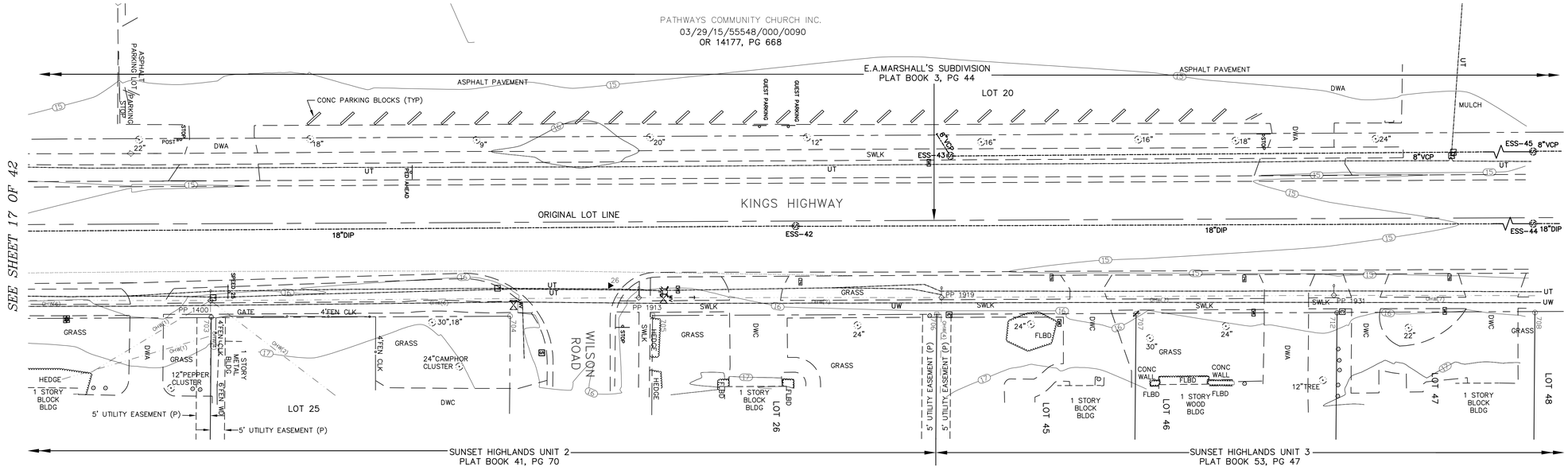
SURVEY FILE NO.: SFN 1029

SHEET: 32 of 42 | *F1029.dwg*

SCALE: 1" = 20'

0 20 40

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
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DESIGN DIVISION		
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DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD
FROM EDGEWATER DRIVE
TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
KINGS HIGHWAY NORTH

McKIM&CREED
1365 Hamlet Avenue
Clearwater, Florida, 33756
Phone: (727)442-7196, Fax: (727)461-3827
Certificate of Authorization No. LB6566
Internet Site: http://www.mckimcreed.com

EARL W. RAMER, P.S.M
Florida Professional Surveyor and Mapper
License No. 3612

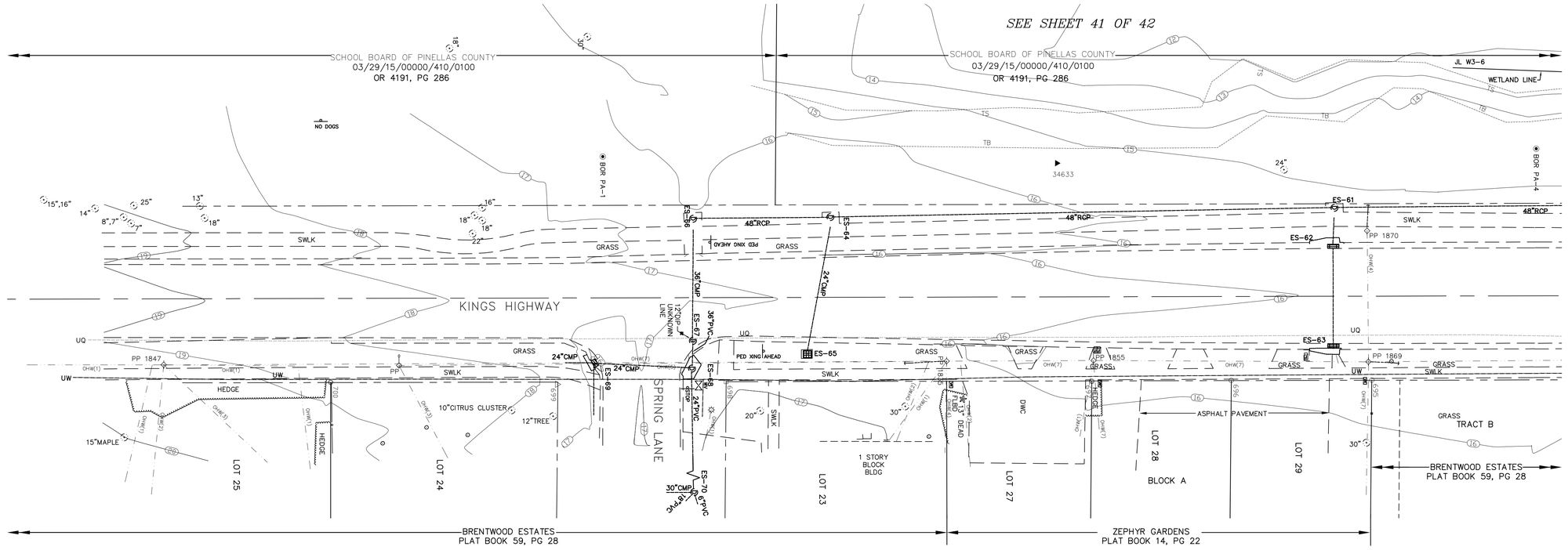
DATE

DATE: 01/06/2009
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 33 of 42 F1029.dwg

SCALE: 1" = 20'

0 20 40

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SEE SHEET 1 OF 42 FOR LEGEND
SEE SHEETS 2 & 3 OF 42 FOR GENERAL NOTES, ALIGNMENTS AND CONTROL COORDINATES.
SEE SHEET 4 OF 42 FOR DRAINAGE INFORMATION
SEE SHEET 5 OF 42 FOR SANITARY INFORMATION
SEE SHEET 6 OF 42 FOR SOIL BORING AND WETLAND INFORMATION
SEE SHEET 7 OF 42 FOR KEY SHEET

A SURVEYOR'S REPORT HAS BEEN UTILIZED ON THIS SURVEY AS A TEXT OPTION TO THE MAP. USERS OF THIS SURVEY AND MAP ARE DIRECTED TO ACKNOWLEDGE THE CONTENT OF REPORT ITEMS AS INDICATED ON SHEET 2.

REVISIONS	BY	DATE

SURVEY BOOK No.:M&C 117,120,123		
SURVEY DIVISION	BY	DATE
SURVEYED	DM	1/09
TECHNICIAN	JMA	1/09
CHECKED	EWR	1/09
DESIGN DIVISION		
DESIGNED	.	.
DRAWN	.	.
CHECKED	.	.

SUNSET POINT ROAD
FROM EDGEWATER DRIVE
TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
KINGS HIGHWAY SOUTH

McKIM&CREED
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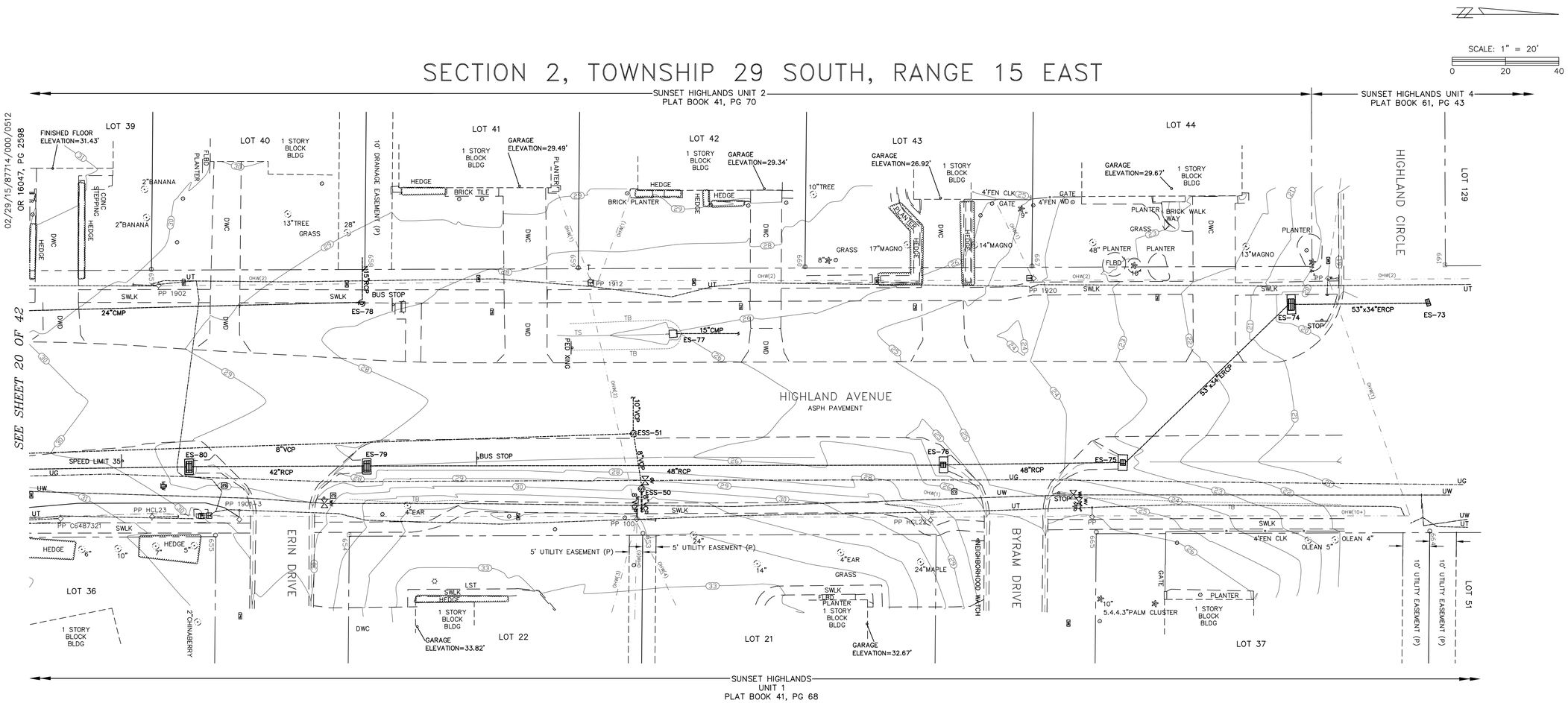
SHEET: 34 of 42 F1029.dwg

SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SCALE: 1" = 20'
0 20 40



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SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY DETAIL SHEET HIGHLAND AVENUE NORTH

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License No. 3612

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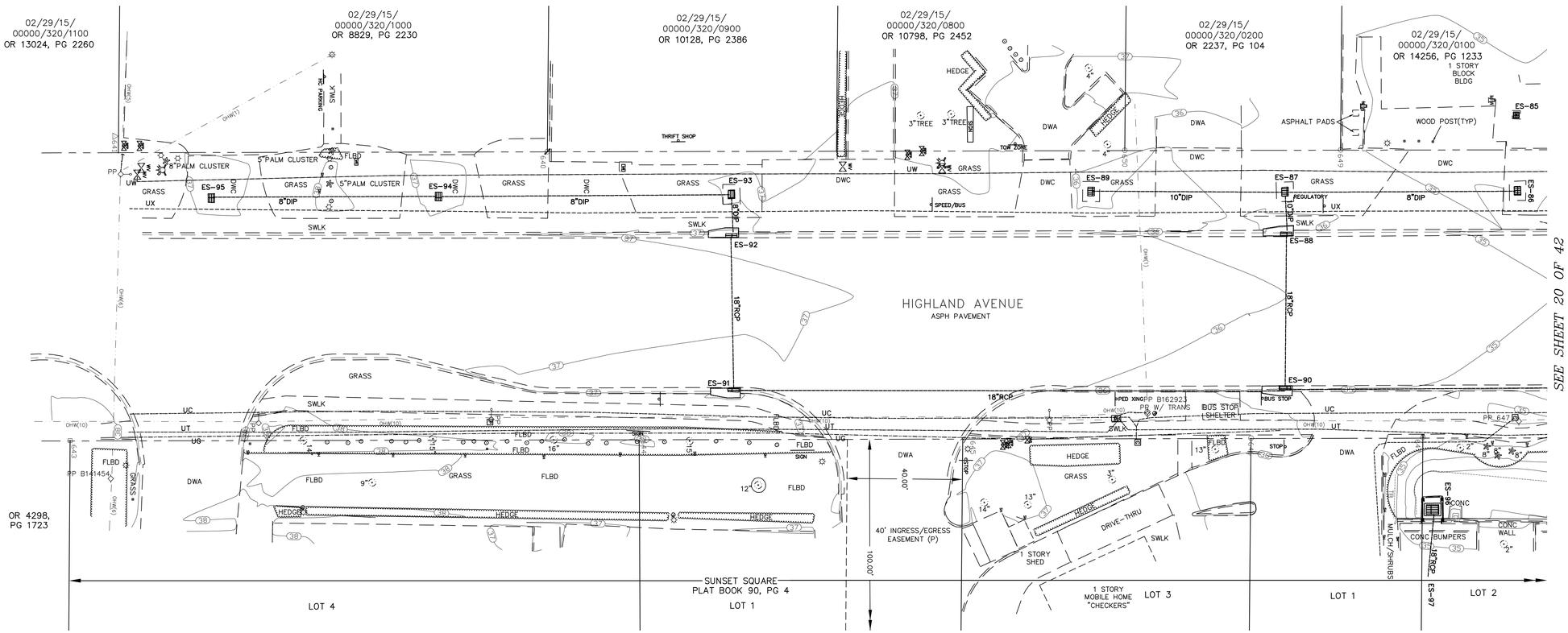
PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 35 of 42 F1029.dwg

SCALE: 1" = 20'

0 20 40

SECTION 2, TOWNSHIP 29 SOUTH, RANGE 15 EAST



SEE SHEET 20 OF 42

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SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
HIGHLAND AVENUE SOUTH

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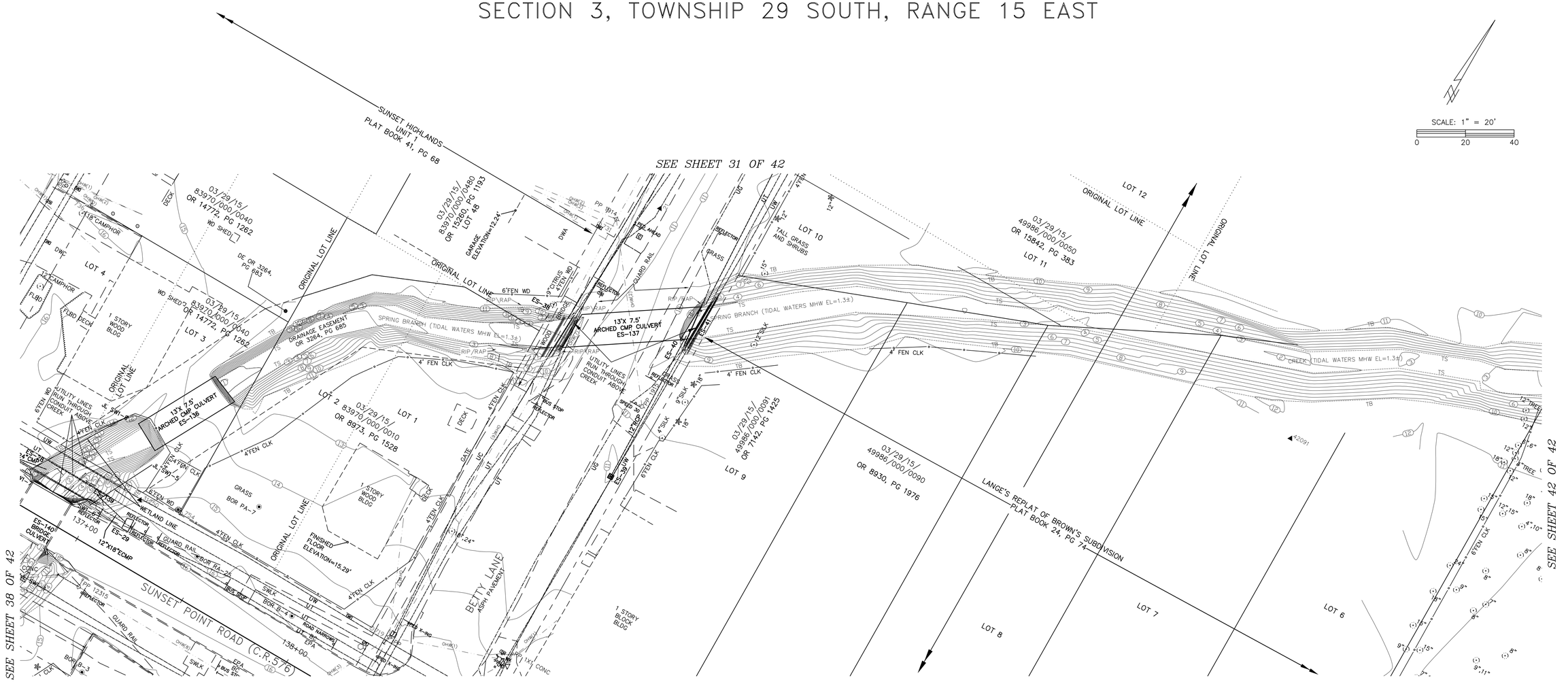
SHEET: 36 of 42 F1029.dwg

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



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SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY
DETAIL SHEET
CREEK

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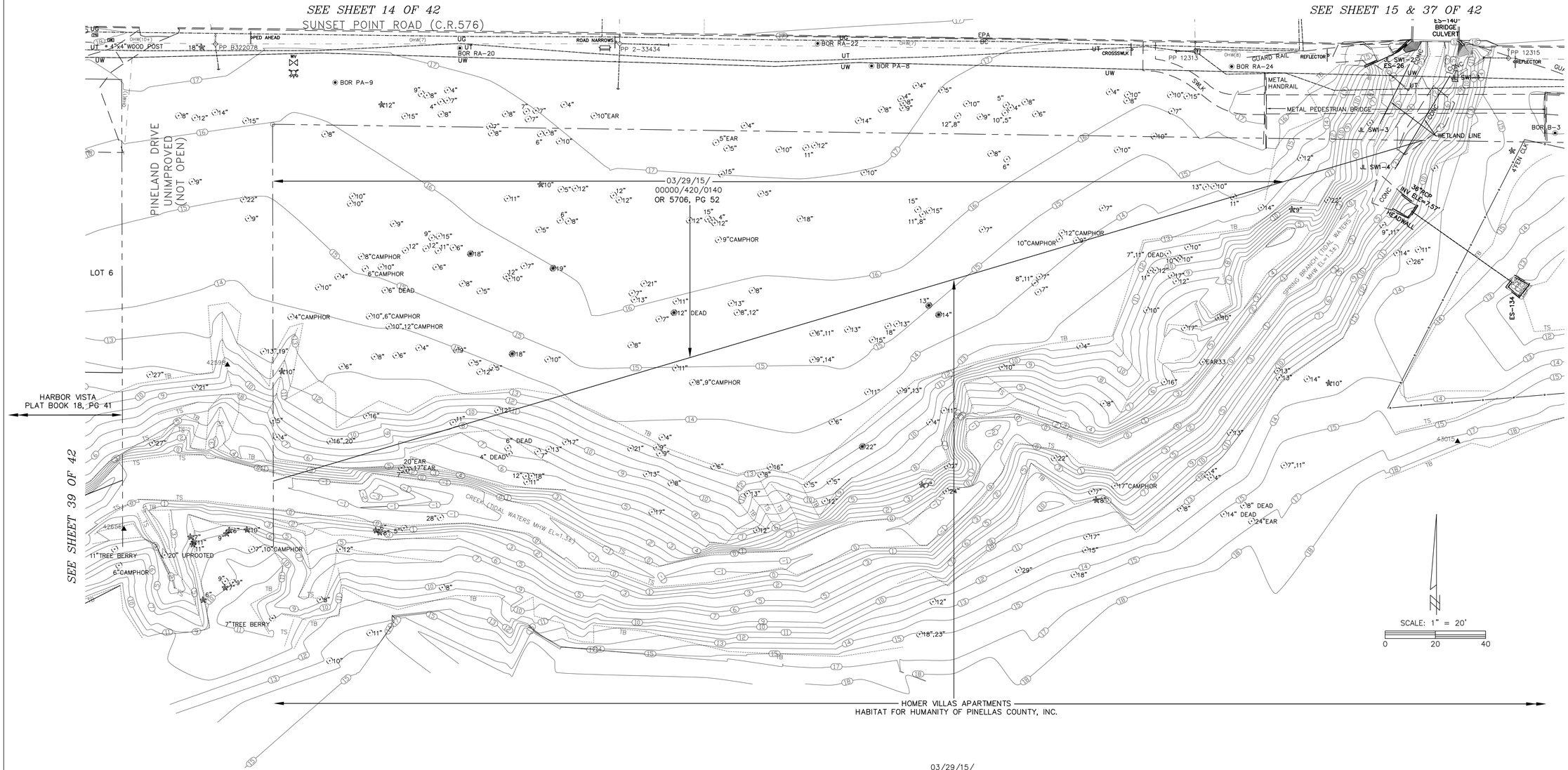
SHEET: 37 of 42 | F1029.dwg

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST



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SURVEY FILE NO.: SFN 1029
SHEET: 38 of 42 | F1029.dwg

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SEE SHEET 13 OF 42

SEE SHEET 38 OF 42

SEE SHEET 30 OF 42

SEE SHEET 40 OF 42

LOT 6

ORIGINAL LOT LINE

1 STORY WOOD BLDG

FLBD

LOT 15

DWGR

DWC

29843

48"

OHW(10+)

OHW(3)

OHW(6)

OHW(2)

STEEN RD

LOT 7

FINISHED FLOOR ELEVATION=15.04'

HARBOR VISTA
PLAT BOOK 18, PG 41

LOT 7

FINISHED FLOOR ELEVATION=21.05'

LOT 16

LOT 17

LOT 8

PARK

4265e

11" TREE BERRY

6" CAMPHOR

LOT 8

FINISHED FLOOR ELEVATION=18.50

SCALE: 1" = 20'

0 20 40

LOT 18

IRIGINAL LOT LINE

03/29/15/
36666/001/0080
OR 9364,
PG 106

LOT 9

BLOCK A

PARK

LOT 19

LOT 10

FINISHED FLOOR ELEVATION=14.86'

LOT 9

LOT 20

ORIGINAL LOT LINE

03/29/15/
36665/001/0100
OR 5942,
PG 37

LOT 11

CREEK (TIDAL WATERS MHW EL=1.33')

SYLVAN DRIVE
ROAD UNPAVED

LOT 10

OR 5516, PG1687

CHILDRENS PLAYGROUND (P)

LOT 21

PINELAND DRIVE
UNIMPROVED

IAL LOT LINE

LOT 18

LOT 22

SEE SHEET 1 OF 42 FOR LEGEND
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SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY

DETAIL SHEET

CREEK

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PROJECT I.D. 920476

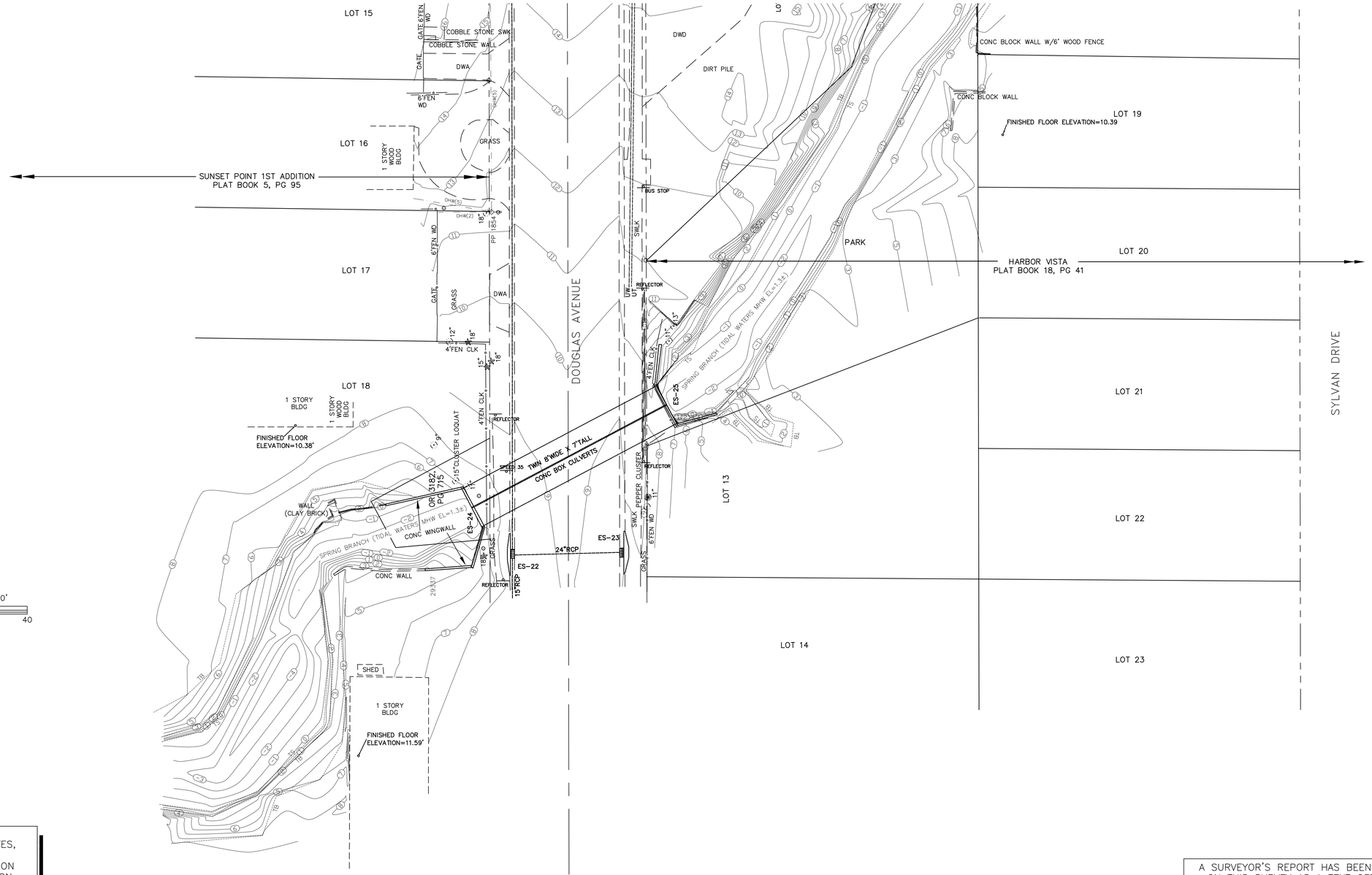
SURVEY FILE NO.: SFN 1029

SHEET: 39 of 42 | *F1029.dwg*

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SEE SHEET 30 OF 42

SEE SHEET 39 OF 42



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SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY DETAIL SHEET CREEK

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PROJECT I.D. 920476
SURVEY FILE NO.: SFN 1029
SHEET: 40 of 42 | *F1029.dwg*

SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SEE SHEET 17 OF 41

SEE SHEET 34 OF 42

SEE SHEET 1 OF 42 FOR LEGEND
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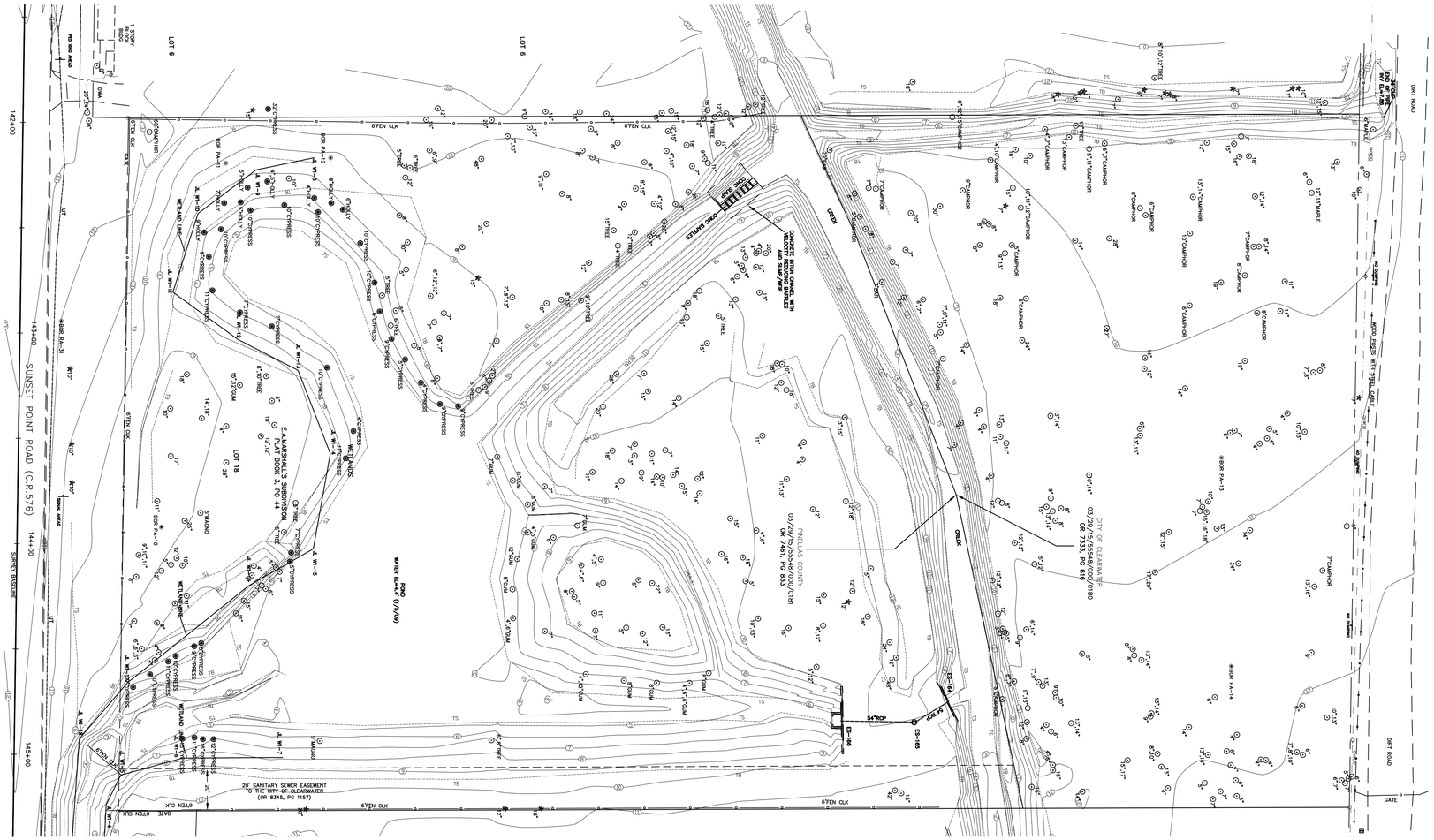
SECTION 3, TOWNSHIP 29 SOUTH, RANGE 15 EAST

SEE SHEET 37 OF 42



SEE SHEET 16 OF 42

SCALE: 1" = 30'

0 30 60

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SUNSET POINT ROAD FROM EDGEWATER DRIVE TO KEENE ROAD

TOPOGRAPHIC SURVEY DETAIL SHEET POND

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SHEET: 42 of 42 | *F1029.dwg*

Historical Bridge Inspection Reports

BRIDGE INSPECTION REPORT ADDENDUM

Prepared for:
Pinellas County

Bridge No: BR0003 **Inspection Date: 9/15/2009**

Sunset Point Rd. (CR 596) over Spring Branch **0.7 mi. E/O US 19 Alt.**

Latitude: 27°59'24" **Longitude: 82°47'03"**

DEFICIENCY PHOTOS

Photo 1: Ele. 241: Graffiti and joint leakage.
Recommendation: Cover graffiti. Seal joint at west side of culvert. 8MH

Photo 2: Ele. 241: Collapsed floor.
Recommendation: Remove concrete and debris from under the structure and channel. Update Load Rating 20MH

DEFICIENCY PHOTOS

Photo 3: Ele. 331: Rail delamination.
Recommendation: Replace the right and left rails. 64MH

Photo 4: Ele. 331: Rail fracture.
Recommendation: Replace the right and left rails. 64MH

DEFICIENCY PHOTOS

Photo 5: Ele. 331: Guardrail transition damage.
Recommendation: Replace damaged guardrail and missing hardware. 16MH

Photo 6: Ele. 331: Northeast end terminal missing lock nut.
Recommendation: Replace damaged guardrail and missing hardware. 16MH

DEFICIENCY PHOTOS

Photo 7: Ele. 331: Northwest guardrail transition bent / missing bolts.
Recommendation: Replace damaged guardrail and missing hardware. 16MH

Photo 8: Ele. 331: Northwest delineator facing wrong direction.
Recommendation: Properly install delineators at the 4 corners. 4MH

DEFICIENCY PHOTOS

Photo 9: Insp. Notes: Hole at northwest corner.
Recommendation: Fill hole adjacent to the drain at the NW corner of the structure. 8MH

SCOUR EVALUATION

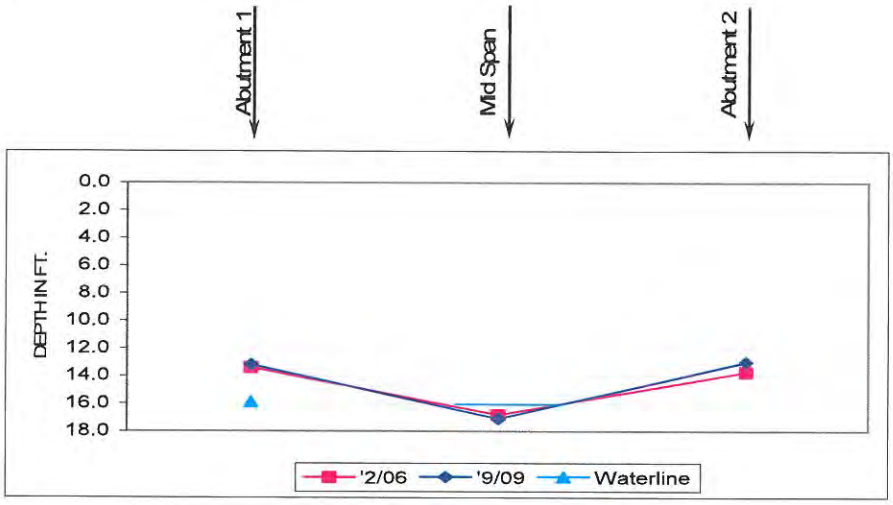
The following are groundline measurements referenced to the top of the concrete bridgerail. These measurements have been provided to compare and monitor scour or buildup. Refer to the profiles on the following pages.
All measurements are taken in feet.

Water Depth = 1.2 ft.

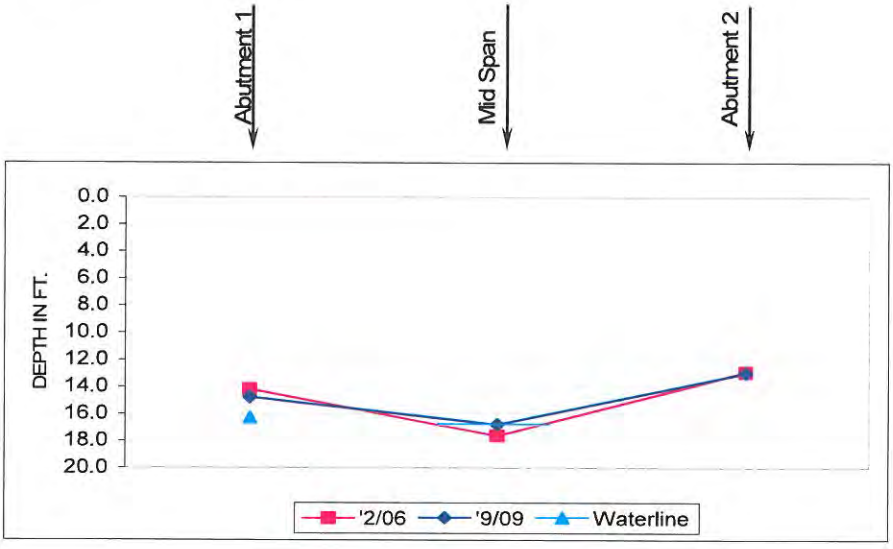
	Left Side		Right Side	
	2/06	9/09	2/06	9/09
Abutment 1	13.4	13.2	14.2	14.8
Mid Span	16.8	17.1	17.6	16.8
Abutment 2	13.7	13.0	12.9	13.0
Waterline at Mid Span	16.3	15.9	17.1	16.3

SCOUR EVALUATION

Left Side:



Right Side:



INVENTORY PHOTOS

West approach looking East

East approach looking West

Pinellas County	**BRIDGE INSPECTION REPORT ADDENDUM** **Prepared for:** **Pinellas County**	AYRES ASSOCIATES
Bridge No: BR0003		**Inspection Date: 9/15/2009**

INVENTORY PHOTOS

South elevation

North elevation

INVENTORY PHOTOS

South channel

North channel

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
INSPECTION REPORT

Bridge ID: BR0003
DISTRICT: 07 Tampa **Inspection Date: 9/15/2009**

BY:	Ayres Associates	STRUCTURE NAME:	CR 596 / Spring Branch
OWNER:	County Hwy Agency	YEAR BUILT:	NA
MAINTAINED BY:	County Hwy Agency	SECTION NO.:	00 000 000
STRUCTURE TYPE:	Concrete Culvert	MP.:	0
LOCATION:	0.7 mi. E/O US 19 Alt.	ROUTE:	00000
SERVICE TYPE ON:	Highway	FACILITY CARRIED:	Sunset Point Road (CR 596)
SERV TYPE UND:	Waterway	FEATURE INTERSECTED:	Spring Branch

☐ THIS BRIDGE CONTAINS FRACTURE CRITICAL COMPONENTS

☐ THIS BRIDGE IS SCOUR CRITICAL

☐ THIS REPORT IDENTIFIES DEFICIENCIES WHICH REQUIRE PROMPT CORRECTIVE ACTION

☐ FUNCTIONALLY OBSOLETE ☐ STRUCTURALLY DEFICIENT

TYPE OF INSPECTION: Regular NBI
DATE FIELD INSPECTION WAS PERFORMED: ABOVE WATER: 9/15/2009 UNDERWATER:

SUFFICIENCY RATING: 85.0

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
INSPECTION REPORT

Bridge ID: BR0003
DISTRICT: 07 Tampa

Inspection Date: 9/15/2009

BY:	Ayres Associates	STRUCTURE NAME:	CR 596 / Spring Branch
OWNER:	County Hwy Agency	YEAR BUILT:	NA
MAINTAINED BY:	County Hwy Agency	SECTION NO.:	00 000 000
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LOCATION:	0.7 mi. E/O US 19 Alt.	ROUTE:	00000
SERVICE TYPE ON:	Highway	FACILITY CARRIED:	Sunset Point Road (CR 596)
SERV TYPE UND:	Waterway	FEATURE INTERSECTED:	Spring Branch

☐ THIS BRIDGE CONTAINS FRACTURE CRITICAL COMPONENTS

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☐ THIS REPORT IDENTIFIES DEFICIENCIES WHICH REQUIRE PROMPT CORRECTIVE ACTION

☐ FUNCTIONALLY OBSOLETE ☐ STRUCTURALLY DEFICIENT

TYPE OF INSPECTION: Regular NBI
DATE FIELD INSPECTION WAS PERFORMED: ABOVE WATER: 9/15/2009 UNDERWATER:

SMART FLAGS:
None

OVERALL NBI RATINGS:

DECK:	N N/A (NBI)
SUPERSTRUCTURE:	N N/A (NBI)
SUBSTRUCTURE:	N N/A (NBI)
CHANNEL:	6 Bank Slumping
CULVERT:	6 Satisfactory
SUFFICIENCY RATING:	85.0

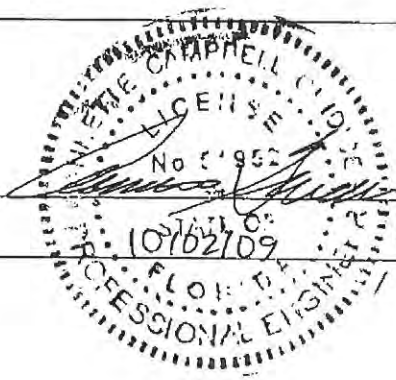
FIELD PERSONNEL / TITLE / NUMBER	INITIALS
Aker, Roger L. – Bridge Inspector (CBI #00401) (lead)	RLA
Guidice, Annette – Professional Engineer	

REVIEWING BRIDGE INSPECTION SUPERVISOR:
Laney, Steve – Professional Engineer (PE # 46449) SML

CONFIRMING REGISTERED PROFESSIONAL ENGINEER:
Guidice, Annette – Professional Engineer (PE # 51952)
Ayres & Associates
8875 Hidden River Pkwy
Tampa, FL 33637

SIGNATURE:

DATE: 10/02/09



ELEMENT/ENV:	**241/4**	**Conc Culvert**	**21 lf.**	**ELEM CATEGORY:**	Super
CONDITION STATE (4)					QUANTITY
2		Deterioration, minor chloride contamination, minor abrasion, minor cracking and/or leaching may have begun. There may be deterioration and separation of joints.			20 lf.
3		There may be moderate to major deterioration, abrasion, extensive cracking and/or leaching and large areas of spalls. Minor to moderate distortion, settlement, or misalignment may have occurred. There may be considerable deterioration and separation of joints.			1 lf.

ELEMENT INSPECTION NOTES:
Note: The footings are also evaluated under this element.

CS2:
The culvert underside has heavy graffiti. Refer to Photo 1 in the Addendum. Repair.
The construction joint along the north and south faces of the structure is cracked up to 1/16 in. wide - NEW
The construction joint along the centerline of the structure is open up to 1/8 in. wide and has minor water seepage along the lower 2 ft. Refer to Photo 1 in the Addendum. Repair.
It appears that at one time the channel bottom was above the floor slab. Due to unknown events, possibly scour, the floor slab has collapsed and displaced. Refer to Photo 2 in the Addendum. Repair.
The footings are exposed up to 2 1/2 ft. high.
No Load Rating information available – NEW. Repair.

CS3:
The underside has a 6 in. x 3 in. x 1/4 in. spall, with exposed and corroded rebar having minor section loss, 3 ft. from the north end. Repair not necessary.

EPCA:
The construction joint at the centerline has not been sealed.
The graffiti has not been covered.
The broken pieces of concrete have not been removed from the channel.

ELEMENT/ENV:	331/4	R/Conc Rail	40 lf.	ELEM CATEGORY:	Railing
CONDITION STATE (4)					QUANTITY
3		Some delaminations and/or spalls may be present and some reinforcing may be exposed. Corrosion of rebar may be present but loss of section is incidental and does not significantly affect the strength and/or serviceability of either the element or the bridge.			10 lf.
4		Deterioration is advanced. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant review to ascertain the impact on the strength and/or serviceability of either the element or the bridge.			30 lf.

ELEMENT INSPECTION NOTES:
Note: Narrow bridge signs are installed at both approaches.

CS3:
The left rail has multiple cracks and spalls.
The roadway at the southeast corner is cracked and has settled slightly, possibly due to previous fill loss - NEW.

CS4
The right and left rails have multiple cracks and, spalls, delaminations and fractures due to traffic impact – INCREASE. Refer to Photos 3 and 4 in the Addendum. Repair.

The following are incidental to the element:
The guardrails are missing reflectors.
The southeast guardrail panel at the bridge transition has heavy damage and one missing bolt. Refer to Photo 5 in the Addendum. Repair.
The northeast end terminal lower cable assembly has a missing lock nut. Refer to Photo 6 in the Addendum. Repair.
The northeast guardrail at the bridge transition has heavy damage and missing 2 bolts – NEW. Repair
The northwest guardrail at the bridge transition has one bent bolt, one missing bolt and one missing nut. Refer to Photo 7 in the Addendum. Repair.
The 4 delineators are misplaced. The delineator at the northwest corner is facing westbound traffic – NEW. Refer to Photo 8 in the Addendum. Repair.

EPCA:
The shoulder and the post at the southeast corner have been repaired / replaced.
The voids in the southwest mowing strip have been repaired.
The guardrail panels and hardware have not been replaced.

ELEMENT/ENV:	394/4	Conc Slope Protection	374 sf.	ELEM CATEGORY:	Substruct
CONDITION STATE (4) 1		The element shows little or no deterioration. There may be discoloration, efflorescence, and/or superficial cracking but without affect on strength and/or serviceability. Random open joints may exist.			QUANTITY 374 sf.

ELEMENT INSPECTION NOTES:
CS1:
The southeast concrete approach shoulder has a 3 in. x 5 in. x 8 in. hole adjacent to the guardrail post – NEW.

ELEMENT/ENV:	475/4	R/Conc Wall	39 lf.	ELEM CATEGORY:	Substruct
CONDITION STATE (4) 1		The element shows little or no deterioration. There may be discoloration, efflorescence, and/or superficial cracking but without affect on strength and/or serviceability. Random open joints may exist.			QUANTITY 39 lf.

ELEMENT/ENV:	290/4	Channel	1 ea.	ELEM CATEGORY:	Channel
CONDITION STATE (4) 2		Bank protection is in need of minor repairs, bank may be beginning to slump, minor stream bed movement may be evident or debris may be present.			QUANTITY 1

ELEMENT INSPECTION NOTES:
CS2:
There is concrete debris beneath the structure and throughout the south channel. See Element 241 for additional comments. Refer to Photo 2 in the Addendum. Repair.

Inspector Recommendations

ELEMENT 241/4 Conc Culvert

WORK ORDER RECOMMENDATION:
Update Load Rating. 4MH

ELEMENT 241/4 Conc Culvert

WORK ORDER RECOMMENDATION:
Seal joint at west side of the culvert. 4MH

ELEMENT 241/4 Conc Culvert

WORK ORDER RECOMMENDATION:
Remove concrete and debris from under structure and channel. 16MH

ELEMENT 241/4 Conc Culvert

WORK ORDER RECOMMENDATION:
Cover graffiti. 4MH

ELEMENT 331/4 R/Conc Rail

WORK ORDER RECOMMENDATION:
Properly install delineators at the 4 corners. 4MH

ELEMENT 331/4 R/Conc Rail

WORK ORDER RECOMMENDATION:
Replace the right and left rails. 64MH

ELEMENT 331/4 R/Conc Rail

WORK ORDER RECOMMENDATION:
Replace damaged guardrail and install missing hardware. 16MH

ELEMENT NA Inspection Notes

WORK ORDER RECOMMENDATION:
Fill the hole adjacent to the drain at the northwest corner of the structure. 8MH

Structure Notes:

BRIDGE OWNER: PINELLAS COUNTY

The structure is inventoried from west to east.

Inspection Notes:

The following is incidental to the structure:
The area adjacent to the drain at the northwest corner of the structure has a 3 ft. x 3 ½ ft. x 4 ft. hole – NEW. Refer to Photo 9 in the Addendum. Repair.

4 Description

Structure Unit Identification

Bridge/Unit Key: BR0003 UNIT 0
Structure Name: Sunset Point Road (CR 596) / Spring Branch
Description: Span 1
Type: Main Span

Roadway Identification

NBI Structure No (8)	BR0003
Position/Prefix (5)	Route On Structure
Kind Hwy (Rte Prefix)	County Hwy
Design Level of Service	Mainline
Route Number/Suffix	00596/ N/A (NBI)
Feature Intersect	Spring Branch
Critical Facility	Not Defense-critical
Facility Carried (7)	Sunset Point Road
Mile Point (11)	0
Latitude (16)	27d59'24" Long (17) 082d47'03"

Roadway Traffic and Accidents

Lanes (28)	2	Medians 0	Speed 35
ADT Class	Class 2		
Recent ADT (29)	500	Year (30)	2006
Future ADT (114)	625	Year (115)	2026
Truck % ADT (109)	1		
Detour Length (19)	1 mi		
Detour Speed	35 mph		
Accident Count	-1	Rate -1	

Roadway Classification

Nat. Hyw Syst (104)	Not on NHS		
National base Net (12)	Not on Base Network		
LRS Inventory Rte (13a)	0000000000	Sub Rte (13b) 00	
Functional Class (26)	Urban Local		
On Federal Aid System	No		
Defense Hwy (100)	Not a STRAHNET hwy		
Direction of Traffic (102)	2-way traffic		
Critical Travel Route	☐		

Roadway Clearances

Vertical (10)	99.99 ft	Appr. Road (32)	24.0 ft
Horiz. (47)	20.5 ft	Roadway (51)	0.0 ft
Truck Network (110)	Not Part of Natl. Network		
Toll Facility (20)	On free road		
Fed. Lands Hwy (105)	N/A (NBI)		
School Bus Route	☐		
Transit Route	☐		

Structure Identification

Admin Area	Pinellas County
District (2)	D7 Tampa
County (12)	(15) Pinellas
Place Code (4)	Clearwater
Location (9)	0.7 mile E/O US 19 Alt.
Border Br St/Reg (98)	N/A Not Applicable (P) Share 0 %
Border Structure No (99)	
FIPS State/Region (1)	Florida
NBIS Bridge Len (112)	Does Not Meet NBI Length
Parallel Structure (101)	No II Bridge Exists
Temp. Structure(103)	N/A
Maint. Resp. (21)	County Hwy Agency
Owner (22)	County Hwy Agency
Historic Signif. (37)	Not eligible for NRHP

Geometrics

Spans in Main Unit (42)	1
Approach Spans (46)	0
Length of Max Span (48)	19.0 ft.
Structure Length (49)	19.0 ft.
Deck Area	0 sq ft
Structure Flared (35)	0 No Flare

Age and Service

Year Built (27)	0
Year Reconstructed (106)	0
Type of Service On (42a)	Highway
Under (42b)	Waterway
Fracture Critical Details	N/A

Structure Type and Material

Curb/Sidewalk (50)	Left 0 ft Right 0 ft
Bridge Median (33)	0 No median
Main Span Material (43A)	Reinforced Concrete
Appr Span Material (44A)	None
Main Span Design (43B)	Culvert
Appr Span Design (44B)	None

Deck Type and Material

Deck Width (52)	0 ft.
Skew (34)	0 deg
Deck Type (107)	Not Applicable
Surface (108)	Not Applicable
Membrane	Not Applicable
Deck Protection	Not Applicable

Appraisal

Structure Appraisal

Open/Posted/Closed (41)	A Open, no restriction
Deck Geometry (68)	Not Calculated
Underclearances (69)	Not Applicable
Approach Alignment (72)	No speed red no curve
Bridge Railings (36a)	Substandard
Transitions (36b)	Substandard
Approach Guardrail (36c)	Substandard
Approach Guardrail ends (36d)	Substandard
Scour Critical (113)	Calc's not made

Navigation Data

Navigation Control (38)	Permit Not Required
Nav Vertical Clr (39)	0 ft
Nav Horizontal Clr (40)	0 ft
Min Vet Lift Clr (116)	0 ft
Pier Protection (111)	Not required

NBI Condition Rating

Sufficiency Rating	No Calculated
Structural Eval (67)	Not Calculated
Deficiency	Not Calculated

Minimum Vertical Clearance

Over Structure (53)	99.99
Under (reference) (54a)	Feature Not Hwy or RR
Under (54b)	0 ft.

Minimum Lateral Underclearance

Reference (55a)	Feature Not Hwy or RR
Right Side (55b)	0 ft.
Left Side (56)	0 ft.

Load Rating

Design Load (31)	Unknown		Operating Type (63)	Unknown	
Rating Date	Unknown	Initials	Operating Rating (64)	Unknown	Alternate -1
Posting (70)	Unknown		Inventory Type (65)	Unknown	
			Inventory Rating (66)	Unknown	Alternate -1
					Alt Meth -1

6 Schedule

Current Inspection

Inspection Date:	9/15/2009
Inspector:	KN738RA-P - Roger Aker
Bridge Group:	N/A
Primary Type:	Regular NBI
Review Required:	☒

Next Inspection Date

	Scheduled
NBI:	9/15/2011
Element:	9/15/2011
Fracture Critical:	
Underwater:	
Other/Special:	

Inspection Types Performed NBI☒ Element☒ Fracture Critical☐ Underwater☐ Other Special☐

Inspection Intervals	Required (92)	Frequency (92)	Last Date (93)
Fracture Critical	☐	mos	
Underwater	☐	mos	
Other Special	☐	mos	
NBI		24 mos (91)	9/15/2009

Inspection Resources	
Crew Hours	4
Flagger Hours	0
Helper Hours	0
Snooper Hours	0
Special Crew Hours	0
Special Equip Hours	0

5 Custom

General Bridge Information

Parallel Bridge Seq	
Channel Depth	1.2 ft.
Radio Frequency	-1
Phone Number	(000) 000-0001
Exception Date	
Exception Type	Unknown
Bridge Rail 1	Reinforced Concrete
Bridge Rail 2	Not Applicable - No Rail
Electrical Devices	No Electrical Service
Culvert Type	Not Applicable
Maintenance Yard	Pinellas Yard
FIHS ON/OFF	No routes on FIHS

Bridge Load Rating Information

HS20 Govr. Span Length		Single Unit Truck 2 Axles	
L-Rating Origination		Single Unit Truck 3 Axles	
Load Rating Date		Single Unit Truck 4 Axles	
Method Calculation		Combination Unit Truck 3 Axles	
Load Dist. Factor		Combination Unit Truck 4 Axles	
Impact Factor		Combination Unit Truck 5 Axles	
Design Method		Truck Trailer 5 Axles	
Design Measure	English	Posting Weight	
Recommend SU Posting		Actual SU Posting	
Recommend C Posting		Actual C Posting	
Recommend ST5 Posting		Actual ST5 Posting	

Bridge Scour and Storm Information

Pile Driving Record	Unknown	Scour Recommended I	Unknown
Foundation Type	Unknown	Scour Recommended II	Unknown
Mode of Flow	Tidal	Scour Recommended III	Unknown
Rating Scour Eval	Unknown	Scour Elevation	-1 ft.
Highest Scour Eval	Unknown	Action Elevation	-1 ft.
		Storm Frequency	-1

1 Condition

NBI Rating

Channel (61)	6 Bank Slumping	Culvert (62)	6 Satisfactory
Deck (58)	N N/A (NBI)	Waterway (71)	7 Above Minimum
Superstructure (59)	N N/A (NBI)	Unrepaired Spalls	-1 sq. ft.
Substructure (60)	N N/A (NBI)	Review Required	☒

AYRES ASSOCIATES

OWNER: PINELLAS COUNTY
LOCATION: BRIDGE NO. BR0003 (Sunset Point over Spring Branch)

CALC. BY: SML DATE: 9/28/2009
CHK BY: ACG DATE: 10/2/2009

Note: Based on FHWA's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges
This Sufficiency Rating is being calculated without Load Rating data

Disclaimer: No warranty is implied in the use of this form and the user assumes all risks.

SUFFICIENCY RATING = $S_1 + S_2 + S_3 - S_4$

Sufficiency Rating shall not be less than 0% nor greater than 100%

1. STRUCTURAL ADEQUACY AND SAFETY (55% MAXIMUM)

a. Only the lowest code of Item 59, 60, or 62 applies.

If #59 (Superstructure Rating) or #60 (Substructure Rating) is	<=2	then	Reduction = 55%
	=3		40%
	=4		25%
	=5		10%

ITEM 59(G2.00) = N Reduction (A) = NA
ITEM 60(G3.00) = N

If #59 and #60 = N #62 (Culvert Rating) is	<=2	then	Reduction = 55%
	=3		40%
	=4		25%
	=5		10%

ITEM 62(G7.00) = 6 Reduction (A) = 0

b. Reduction for Load Capacity.

Not required for Nonvehicular bridges

B = 0

S1 = 55 -(A + B) S1 shall not be less than 0% nor greater than 55%

S1=	**55**

AYRES ASSOCIATES

OWNER: PINELLAS COUNTY
LOCATION: BRIDGE NO. BR0003 (Sunset Point over Spring Branch)

CALC. BY: SML DATE: 9/28/2009
CHK BY: ACG DATE: 10/2/2009

Note: Based on FHWA's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges
This Sufficiency Rating is being calculated without Load Rating data

Disclaimer: No warranty is implied in the use of this form and the user assumes all risks.

2. SERVICEABILITY AND FUNCTIONAL OBSOLESCENCE (30% MAXIMUM)

a. Rating Reductions (13% maximum).

If # 58 (Deck Condition) is	<=3	then	A=	5%
	=4			3%
	=5			1%
If # 69 (Underclearances) is	<=3	then	D=	4%
(Refer to Tables 3A-3B, SIA Gde)	=4			2%
(Use Functional Class as Local)	=5			1%
If # 71 (Waterway Adequacy) is	<=3	then	E=	4%
	=4			2%
	=5			1%

J = (A + D + E)

J shall not be less than 0% nor greater than 13%

ITEM 58(G1.00) =	N	A = 0	
ITEM 69(I4) =	N	D = 0	(Refer to SIA Tables 3A - 3B)
ITEM 71(I5) =	7	E = 0	
		J = 0	

b. Width of Roadway Insufficiency (15% maximum).

Not required for Nonvehicular bridges

G + H = 0

c. Vertical Clearance Insufficiency (2% maximum).

#53 (VC over Deck) >= 16	then	I = 0%
# 53 < 16		I = 2%

AYRES ASSOCIATES

OWNER: PINELLAS COUNTY
LOCATION: BRIDGE NO. BR0003 (Sunset Point over Spring Branch)

CALC. BY: SML DATE: 9/28/2009
CHK BY: ACG DATE: 10/2/2009

Note: Based on FHWA's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges
This Sufficiency Rating is being calculated without Load Rating data

Disclaimer: No warranty is implied in the use of this form and the user assumes all risks.

INPUT DATA

ITEM 53(D12) = 9999 (9999 Indicates No Restrictions)

OUTPUT DATA

I = 0 %

S2 = 30 -(J + (G + H) + I)

S2 shall not be less than 0% nor greater than 30%

S2 =	**30**

3. Essentiality for Public Use (15% MAXIMUM)

Not required for Nonvehicular bridges

S3 =	**0**

4. Special Reductions (Use only when S1 + S2 + S3 >= 50)

Not required for Nonvehicular bridges

S4 =	**0**

Sufficiency Rating

Sufficiency Rating =	**85.0**

BRIDGE INSPECTION REPORT

Prepared for:
Pinellas County

Bridge No: BR0003 **Inspection Date: 02/24/06**

Sunset Point Rd. (CR 596) over Spring Branch **0.7 mi. E/O US 19 Alt.**

Latitude: 27°59'25" **Longitude: 82°47'03"**

781
Br. Insp Rpt.
2/24/06
2/24/06

BRIDGE INSPECTION REPORT

CONTENTS OF REPORT

A.	Condensed Inspection Report	F.	Field Preparation
B.	Comprehensive Report of Deficiencies	*G.	Fracture Critical Inspection
C.	Evaluation of Previous Corrective Action	H.	Groundline Measurements & Profiles
D.	Required Maintenance Repair & Rehabilitation	*I.	Load Rating Analysis Summary Sheet
*E.	Not Used for Consultant Inspection	Attachments	Drawings and Photographs

* This section is not included in this report.

PREPARED FOR: PINELLAS COUNTY

BY: AYRES ASSOCIATES

REPORT IDENTIFICATION

Bridge No. BR0003 Bridge Name: Sunset Point Road (CR 596) over Spring Branch

Location: 0.7 mi. E/O US 19 Alt.

NO	YES	
☒	☐	This bridge contains fracture critical components.
☒	☐	This bridge is scour critical. Road Name Sunset Point Road (CR 596)
☒	☐	This report identifies deficiencies which require prompt corrective action.

Type of Inspection ☒ Routine Interim Special Initial Inspection

Field Inspection Date: 02/24/06 Underwater: N/A

Name of Inspector/Diver	Initials	Eng. Reg. Number	Cert. Bridge Insp. #	Nicet Insp. Number
Earl Love Jr. (Sr. Inspector)			00298	
Randall Whaley				

Reviewing Bridge Inspector Supervisor

Name Andrew Fickett **Initials** _____

CBI # 00285

Confirming Registered Professional Engineer

Name Steven M. Laney **PE #** 46449

Signature _____ **C.A. #** 4356

4/7/06

A. CONDENSED INSPECTION REPORT
CULVERT

Bridge No. BR0003 **Inspection Date:** 02/24/2006

APPROACH ROADWAY MAJOR FEATURE			CHANNEL MAJOR FEATURE		
BMIS NO.	ELEMENT TITLE	NCR **	BMIS NO.	ELEMENT TITLE	NCR **
G4.00	Approach Roadway Overall Rating	7	G5.00	Channel and Channel Protection Overall Rating	7
G4.02	Retaining Walls/ Approach Slopes/ Embankments/ Shoulders	6*	G5.03	Embankments/ Slopes	7
G4.03	Roadway – Bridge Transition	7	G5.04	Degradation/ Aggradation	6*
G4.04	Guardrails	6*	G5.05	Alignment	7
G4.05	Roadway Alignment	8	G5.06	Flow	7
NON-STRUCTURAL FEATURES			**CULVERT**		
BMIS NO.	ELEMENT TITLE	NCR **	BMIS NO.	ELEMENT TITLE	NCR **
G6.01	Lighting System	N	G7.00	Culvert Overall Rating	7
G6.02	Signs	N	G7.01	Deck Slab (Top)	7
G6.03	Striping (Roadway Reflective)	3	G7.02	Deck Slab (Underside)	6*
G6.04	Reflectors	3*	G7.03	Side Walls	N
G6.05	Utility Attachments	N	G7.04	Head Walls	N
G6.08	Traffic Control and Monitoring Systems	N	G7.05	Wing Walls	7
G6.09	Deck Cleanness	4	G7.06	Floor Slabs	6*
G6.12	Fences and Glare Screens	N	G7.07	Handrails/Bridgerails/Sidewalks	7*

* Deficiencies exist in this element that warrant written and/or sketched descriptions that are provided in Section B of this report.
** NCR is an acronym for Numerical Condition Rating, the definitions of which can be found on the next page.

NUMERICAL CONDITION RATING DEFINITIONS FOR CULVERT

CODE	DESCRIPTION
N	NOT APPLICABLE - Use if structure is not a culvert.
9	EXCELLENT CONDITION - No deficiencies.
8	VERY GOOD CONDITION - No noticeable or noteworthy deficiencies which affect the condition of the culvert. Insignificant scrape marks caused by drift.
7	GOOD CONDITION - Shrinkage cracks, light scaling, and insignificant spalling which does not expose reinforcing steel. Insignificant damage caused by drift with no misalignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls or pipes. Metal culverts have a smooth symmetrical curvature with superficial corrosion and no pitting.
6	SATISFACTORY - Deterioration or initial disintegration, minor chloride contamination, cracking with some leaching, or spalls on concrete or masonry walls and slabs. Local minor scouring at curtain walls, wingwalls, or pipes. Metal culverts have a smooth curvature, non-symmetrical shape, significant corrosion or moderate pitting.
5	FAIR CONDITION - Moderate to major deterioration or disintegration, extensive cracking and leaching, or spalls on concrete or masonry walls and slabs. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection in one section, significant corrosion or deep pitting.
4	POOR CONDITION - Large spalls, heavy scaling, wide cracks, considerable efflorescence, or opened construction joint permitting loss of backfill. Considerable settlement or misalignment. Considerable scouring or erosion at curtain walls, wingwalls or pipes. Metal culverts have significant distortion and deflection throughout, extensive corrosion or deep pitting.
3	SERIOUS CONDITION - Any condition described in Code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Holes may exist in walls or slabs. Integral wingwalls nearly severed from culvert. Severe scour or erosion at curtain walls, wingwalls or pipes. Metal culverts have extreme distortion and deflection in one section, extensive corrosion, or deep pitting with scattered perforations.
2	CRITICAL CONDITION - Integral wingwalls collapsed, severe settlement of roadway due to loss of fill. Section of culvert may have failed and can no longer support embankment. Complete undermining at curtain walls and pipes. Corrective action required to maintain traffic. Metal culverts have extreme distortion and deflection throughout with extensive perforations due to corrosion.
1	"IMMINENT" FAILURE CONDITION - Bridge closed. Corrective action may put the structure back into light service.
0	FAILED CONDITION - Bridge closed. Replacement necessary.

NUMERICAL CONDITION RATING DEFINITIONS FOR APPROACH ROADWAY

CODE	DESCRIPTION
9	EXCELLENT CONDITION
8	VERY GOOD CONDITION - No defects.
7	GOOD CONDITION - Minor defects such as cracking or approach roadway, small spalls in approach roadway, minor settlements (less than 1") or minor collision damage to guardrails.
6	SATISFACTORY - More significant defects such as large spalls, severe settlements (1" to 2") or major collision damage to guardrails. Moderate amounts of slope embankment erosion.
5	FAIR CONDITION - Defects requiring minor rehabilitation such as approach slabs pushing against abutment, settlements (over 2") causing significant impact on the bridge, or large amounts of approach embankment erosion.
4	POOR CONDITION - Defects requiring major rehabilitation such as buckling approach slabs, undermining of approach shoulders due to erosion, or approach slabs causing movement of abutment.
3	SERIOUS CONDITION - Defects requiring immediate repair of rehabilitation such as severe undermining or washout of approach shoulders and loss of an approach guardrail section.
2	CRITICAL CONDITION - Defects requiring urgent repair or rehabilitation, warrants closing bridge to all traffic.
1	"IMMINENT" FAILURE CONDITION - Structure is closed to traffic study should determine the feasibility for repair.
0	FAILED CONDITION - Structure is closed and condition is beyond repair.

BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

B. COMPREHENSIVE REPORT OF DEFICIENCIES

Bridge inventoried west to east.

FIXED SPAN ELEMENTS

ELEMENT
NUMBERS

G4.02 Retaining Walls/ Approach Slopes/ Embankments/ Shoulders - Rated 6

The asphalt mowing strip below the guardrail along the southwest approach shoulder has voids up to 12 in. x 6 in. x 4 in. deep around Posts 3 and 4 from the bridge. REPAIR

The southeast asphalt approach shoulder has a 4 in. diameter x 12 in. deep void below the southeast guardrail to bridgerail transition. Refer to Photo 1. REPAIR
The approach shoulder and the backfill material behind the wingwall has collapsed and undermined in an area 12 ft. x 6 ft. x 3 ft. deep. Refer to Photo 2. REPAIR

G4.04 Guardrails - Rated 6

The southeast guardrail panel at the bridgerail connection has one sheared bolt. Refer to Photo 3. REPAIR.
Post 1 from the southeast corner has heavy decay at the groundline. Refer to Photo 4. REPAIR
The southeast end terminal has minor impact damage. Refer to Photo 5.

The northwest guardrail has one bent bolt, one missing bolt at the bridgerail connection and one missing nut. There is also one missing panel attachment bolt at the northwest guardrail and between Posts 2 and 3 from the bridge. Refer to Photo 6. REPAIR

The northeast end terminal lower cable assembly has a missing lock nut. REPAIR

G5.04 Degradation/Aggradation - Rated 6

There is concrete debris beneath the structure and throughout the south channel.

G6.04 Reflectors - Rated 3

There are four missing or broken guardrail mounted reflectors.

B. COMPREHENSIVE REPORT OF DEFICIENCIES

FIXED SPAN ELEMENTS

ELEMENT
NUMBERS

G7.02 Deck Slab (Underside) - Rated 6

NOTE: This element represents the underside of the reinforced concrete arch culvert.

The underside has a 6 in. x 3 in. x 1/4 in. spall, with exposed and corroded rebar having minor section loss, 3 ft. from the north end. Refer to Photo 7. REPAIR

The construction joint along the centerline of the structure is cracked up to 1/16 in. wide and has minor water seepage along the lower 2 ft. Refer to Photo 8. The construction joint along the north and south faces of the structure is also cracked up to 1/16 in. wide.

The culvert underside has heavy graffiti. Refer to Photo 9. REPAIR.

G7.06 Floor Slabs - Rated 6

NOTE: The footings were also evaluated under this element.

It appears that at one time the channel bottom was above the floor slab, but due to unknown events or possibly scour, the floor slab is collapsed and displaced. Refer to Photo 10. REPAIR

The footings are exposed up to 2-1/2 ft. high.

G7.07 Handrails/Bridgerails/Sidewalks - Rated 7

The right bridgerail has spalls up to 2 ft. x 9 in. x 2-1/2 in., with no exposed steel, above and behind the southwest guardrail connection.

Both bridgerails have numerous edge spalls up to 10 in. x 5 in. x 2 in., with no exposed steel.

C. EVALUATION OF PREVIOUS CORRECTIVE ACTION

FIXED SPAN ELEMENTS

ELEMENT NUMBERS

None

D. RECOMMENDED CORRECTIVE ACTION

Traffic Restriction: The structure is not posted; however, a load rating analysis has not been performed.

FIXED SPAN ELEMENTS

ELEMENT
NUMBERS

G4.02 Retaining Walls/ Approach Slopes/ Embankments/ Shoulders

Repair voids asphalt mowing strip along the southwest approach shoulder around Posts 3 and 4. (2SF) 6mh

Repair void, backfill and stabilize area below southeast guardrail to bridgerail transition and behind southeast wingwall. (36SF) 10mh

G4.04 Guardrails

Replace SE and NW guardrail panels and attachment hardware. 6mh

Replace Post 1 at the southeast corner. 4mh

Install lock nut at northeast end terminal lower cable assembly. 1mh

G7.02 Deck Slab (Underside)

Repair spall in deck underside. 4mh

Seal construction joint along centerline of deck underside. 10mh

Remove or paint over graffiti from deck underside. 10mh

G7.06 Floor Slabs

Remove broken sections of floor slab from beneath structure. 16mh

G5.04 Degradation/Aggredation

No corrective action is required.

G6.04 Reflectors

No corrective action is required.

G7.07 Handrails/Bridgerails/Sidewalks

No corrective action is required.

BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

P H O T O G R A P H S

Photo 1

DEFICIENCY: Void in SE approach shoulder.
REPAIR RECOMMENDATION: Repair void in asphalt.

BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

P H O T O G R A P H S

Photo 2

DEFICIENCY: Undermining behind SE wingwall.
REPAIR RECOMMENDATION: Repair void, backfill and stabilize area below southeast guardrail to bridgerail transition and behind southeast wingwall. (36SF) 10mh

BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

P H O T O G R A P H S

Photo 3

DEFICIENCY: Damage to SE guardrail panel attached to the bridgerail.
REPAIR RECOMMENDATION: Replace SE and NW guardrail panels and attachment hardware. 6mh

BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

P H O T O G R A P H S

Photo 4

DEFICIENCY: Decay at Post 1 of the SE corner.
REPAIR RECOMMENDATION: Replace Post 1 at the southeast corner.
4mh

BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

P H O T O G R A P H S

Photo 5

DEFICIENCY: Damage to SE end terminal.
REPAIR RECOMMENDATION: None.

BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

P H O T O G R A P H S

Photo 6

DEFICIENCY: Missing hardware at NW guardrail to bridgerail connection.
REPAIR RECOMMENDATION: Replace SE and NW guardrail panels and attachment hardware. 6mh

BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

P H O T O G R A P H S

Photo 7

DEFICIENCY: Spall in culvert underside.
REPAIR RECOMMENDATION: Repair spall in culvert underside. 4mh

BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

P H O T O G R A P H S

Photo 8

DEFICIENCY: Crack with seepage west side of culvert.
REPAIR RECOMMENDATION: Seal construction joint along centerline of culvert. 10mh

BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

P H O T O G R A P H S

Photo 9

DEFICIENCY: Graffiti on culvert underside.
REPAIR RECOMMENDATION: Remove or paint over graffiti on culvert underside. 10mh

BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

P H O T O G R A P H S

Photo 10

DEFICIENCY: Condition of floor slab.
REPAIR RECOMMENDATION: Remove broken sections of floor slab from beneath structure. 16mh

BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

F. FIELD PREPARATION

1. Tools and Equipment
   Normal Bridge Inspection Tools

2. Services
   N/A

3. Scheduling
   Daytime Hours

4. Site Conditions
   Traffic: Estimated A.D.T. 500 Estimated % of Truck Traffic 1.
   Vegetation Conditions: Shoulders and Slopes - Light
   Site Accessibility: Typical
   Embankment Conditions: Typical

5. Traffic Control Requirements:
   N/A

6. Underwater Inspection Requirements:
   N/A

7. Special Access Requirements:
   N/A

8. Manhours (Top Side)
   Travel to and from site 2 hour x 2 people = 4 hours.
   Inspection hours 2 hours x 2 people = 4 hours.

9. Plans Available: Unknown

4 Description

Structure Unit Identification

Bridge/Unit Key: BR0003 UNIT 0
Structure Name: Sunset Point Road (CR 596) over Spring Branch
Description: Span 1
Type: Main Span

Roadway Identification

NBI Structure No (8)	BR0003
Position/Prefix (5)	Route On Structure
Kind Hwy (Rte Prefix)	County Hwy
Design Level of Service	Mainline
Route Number/Suffix	00596/ N/A (NBI)
Feature Intersect	Spring Branch
Critical Facility	Not Defense-critical
Facility Carried (7)	Sunset Point Road
Mile Point (11)	0
Latitude (16)	27d59'25" Long (17) 082d47'03"

Roadway Traffic and Accidents

Lanes (4)	2	Medians 0	Speed 35
ADT Class	Class 2		
Recent ADT (29)	500	Year (30)	2006
Future ADT (114)	625	Year (115)	2026
Truck % ADT (109)	1		
Detour Length (19)	1 mi		
Detour Speed	35 mph		
Accident Count	-1	Rate	-1

Roadway Classification

Nat. Hyw Syst (104)	Not on NHS		
National base Net (12)	Not on Base Network		
LRS Inventory Rte (13a)	0000000000	Sub Rte (13b)	00
Functional Class (26)	Urban Local		
On Federal Aid System	No		
Defense Hwy (100)	Not a STRAHNET hwy		
Direction of Traffic (102)	2-way traffic		
Critical Travel Route	☐		

Roadway Clearances

Vertical (10)	99.99 ft	Appr. Road (32)	24.0 ft
Horiz. (47)	20.5 ft	Roadway (51)	0.0 ft
Truck Network (110)	Not Part of Natl. Network		
Toll Facility (20)	On free road		
Fed. Lands Hwy (105)	N/A (NBI)		
School Bus Route	☐		
Transit Route	☐		

760
IN0151A - 2/24/06
2/24/06

4/7/06

Structure Identification

Admin Area	Pinellas County
District (2)	D7 Tampa
County (12)	(15) Pinellas
Place Code (4)	Clearwater
Location (9)	0.7 mile E/O US 19 Alt.
Border Br St/Reg (98)	N/A Not Applicable (P) Share 0 %
Border Structure No (99)	
FIPS State/Region (1)	Florida
NBIS Bridge Len (112)	Meets NBI Length
Parallel Structure (101)	No II Bridge Exists
Temp. Structure(103)	N/A
Maint. Resp. (21)	County Hwy Agency
Owner (22)	County Hwy Agency
Historic Signif. (37)	Not eligible for NRHP

Geometrics

Spans in Main Unit (42)	1
Approach Spans (46)	0
Length of Max Span (48)	19.0 ft.
Structure Length (49)	19.0 ft.
Deck Area	0 sq ft
Structure Flared (35)	0 No Flare

Age and Service

Year Built (27)	0
Year Reconstructed (106)	0
Type of Service On (42a)	Highway
Under (42b)	Waterway
Fracture Critical Details	N/A

Structure Type and Material

Curb/Sidewalk (50)	Left 0 ft Right 0 ft
Bridge Median (33)	0 No median
Main Span Material (43A)	Reinforced Concrete
Appr Span Material (44A)	None
Main Span Design (43B)	Culvert
Appr Span Design (44B)	None

Deck Type and Material

Deck Width (52)	0 ft.
Skew (34)	0 deg
Deck Type (107)	Not Applicable
Surface (108)	Not Applicable
Membrane	Not Applicable
Deck Protection	Not Applicable

3 Appraisal

Structure Appraisal

Open/Posted/Closed (41)	A Open, no restriction
Deck Geometry (68)	Not Calculated
Underclearances (69)	Not Applicable
Approach Alignment (72)	No speed red no curve
Bridge Railings (36a)	Substandard
Transitions (36b)	Substandard
Approach Guardrail (36c)	Meets Standards
Approach Guardrail ends (36d)	Meets Standards
Scour Critical (113)	Calc's not made

Navigation Data

Navigation Control (38)	Permit Not Required
Nav Vertical Clr (39)	0 ft
Nav Horizontal Clr (40)	0 ft
Min Vet Lift Clr (116)	0 ft
Pier Protection (111)	Not required

NBI Condition Rating

Sufficiency Rating	No Calculated
Structural Eval (67)	Not Calculated
Deficiency	Not Calculated

Minimum Vertical Clearance

Over Structure (53)	99.99
Under (reference) (54a)	Feature Not Hwy or RR
Under (54b)	0 ft.

Minimum Lateral Underclearance

Reference (55a)	Feature Not Hwy or RR
Right Side (55b)	0 ft.
Left Side (56)	0 ft.

Load Rating

Design Load (31)	Unknown		Operating Type (63)	Unknown	
Rating Date	Unknown	Initials	Operating Rating (64)	Unknown	Alternate -1
Posting (70)	Unknown		Inventory Type (65)	Unknown	
			Inventory Rating (66)	Unknown	Alternate -1
					Alt Meth -1

6 Schedule

Current Inspection

Inspection Date:	2/24/06
Inspector:	KNAAAEL-P - Earl Love
Bridge Group:	N/A
Primary Type:	Regular NBI
Review Required:	☒

Next Inspection Date — Scheduled

NBI:	2/24/2008
Element:	2/24/2008
Fracture Critical:	
Underwater:	
Other/Special:	

Inspection Types Performed NBI☒ Element☒ Fracture Critical☐ Underwater☐ Other Special☐

Inspection Intervals	Required (92)	Frequency (92)	Last Date (93)
Fracture Critical	☐	mos	
Underwater	☐	mos	
Other Special	☐	mos	
NBI		24 mos (91)	2/24/06

Inspection Resources	
Crew Hours	4
Flagger Hours	0
Helper Hours	0
Snooper Hours	0
Special Crew Hours	0
Special Equip Hours	0

5 Custom

General Bridge Information

Parallel Bridge Seq	
Channel Depth	0.5 ft.
Radio Frequency	-1
Phone Number	(000) 000-0001
Exception Date	
Exception Type	Unknown

Bridge Rail 1	Reinforced Concrete
Bridge Rail 2	Not Applicable - No Rail
Electrical Devices	No Electrical Service
Culvert Type	Not Applicable
Maintenance Yard	Pinellas Yard
FIHS ON/OFF	No routes on FIHS

Bridge Load Rating Information

HS20 Govr. Span Length	
L-Rating Origination	
Load Rating Date	
Method Calculation	
Load Dist. Factor	
Impact Factor	
Design Method	
Design Measure	English
Recommend SU Posting	
Recommend C Posting	
Recommend ST5 Posting	

Single Unit Truck 2 Axles	
Single Unit Truck 3 Axles	
Single Unit Truck 4 Axles	
Combination Unit Truck 3 Axles	
Combination Unit Truck 4 Axles	
Combination Unit Truck 5 Axles	
Truck Trailer 5 Axles	
Posting Weight	
Actual SU Posting	
Actual C Posting	
Actual ST5 Posting	

Bridge Scour and Storm Information

Pile Driving Record	Unknown
Foundation Type	Unknown
Mode of Flow	Tidal
Rating Scour Eval	Unknown
Highest Scour Eval	Unknown

Scour Recommended I	Unknown
Scour Recommended II	Unknown
Scour Recommended III	Unknown
Scour Elevation	-1 ft.
Action Elevation	-1 ft.
Storm Frequency	-1

1 Condition

NBI Rating

Channel (61)	7 – Minor Damage
Deck (58)	N/A
Superstructure (59)	N/A
Substructure (60)	N/A

Culvert (67)	7 – Minor Deterioration
Waterway (71)	7 – Above Minimum
Unrepaired Spalls	-1 sq. ft.
Review Required	☒

TOPIC A

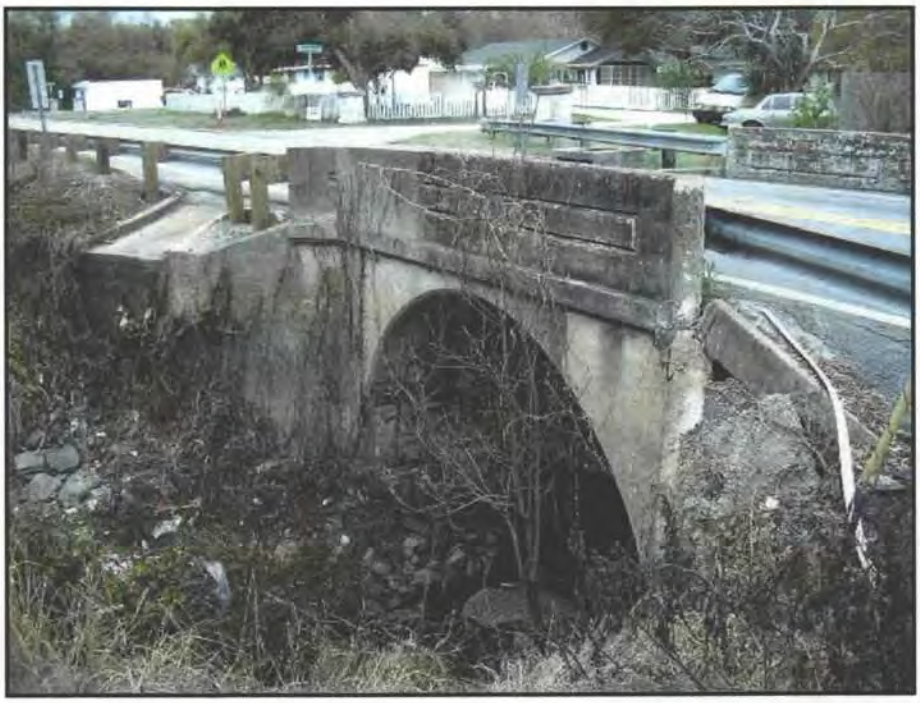
PHOTOGRAPHIC INVENTORY

Inventory Photos

West Approach Looking East

East Approach Looking West

Inventory Photos



South Elevation

North Elevation

Inventory Photos

Typical Superstructure and Substructure

Bridge Number

PINELLAS COUNTY HIGHWAY DEPARTMENT
PROJECT REQUEST

Project Number: 30315 Fiscal Year 05,06

INFORMATION TO BE PROVIDED BY SUPERVISOR REQUESTING PROJECT NUMBER
****

DESCRIPTION OF WORK Sunset Point Rd over Creek
East of Alt. US. 19 (BR0003

STREET NAME Sunset Point

WORK LOCATION

DISTRICT _____ JOB BILLABLE? ___ / ✓
Yes / No

Indicate one of the following:
___ Unincorporated Exclusively
✓ Countywide
___ Municipal

When doing work for other departments, provide the following:

Department And Division Name Specialty Bridge

Dept Contact Person R. Little Phone # 409-3456

Account Number for other department 0281 / 5530000 / 5612000
Fund / Account / Center
4 digits 7 digits 7 digits

If Capital Improvement Project, provide PID# _____

For repair of damage to County Property, provide
Highway Department Accident Report #_____

(Attach copy of Accident Report)

SPECIAL INSTRUCTIONS _____

R. Little
Supervisor's Signature

11/8/05
Date

179
Corr.
11/8/05

Historical Channel Profile Measurements

BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

H. SCOUR EVALUATION

The following are groundline measurements referenced to the top of the concrete bridgerail. These measurements have been provided to compare and monitor scour or buildup. Refer to the profiles on the following page.

	Left Side		Right Side	
		2/06		2/06
Abutment 1		13.4		14.2
C/L Channel		16.8		17.6
Abutment 2		13.7		12.9
Waterline at C/L		16.3		17.1

Water Depth = 0.5 ft.

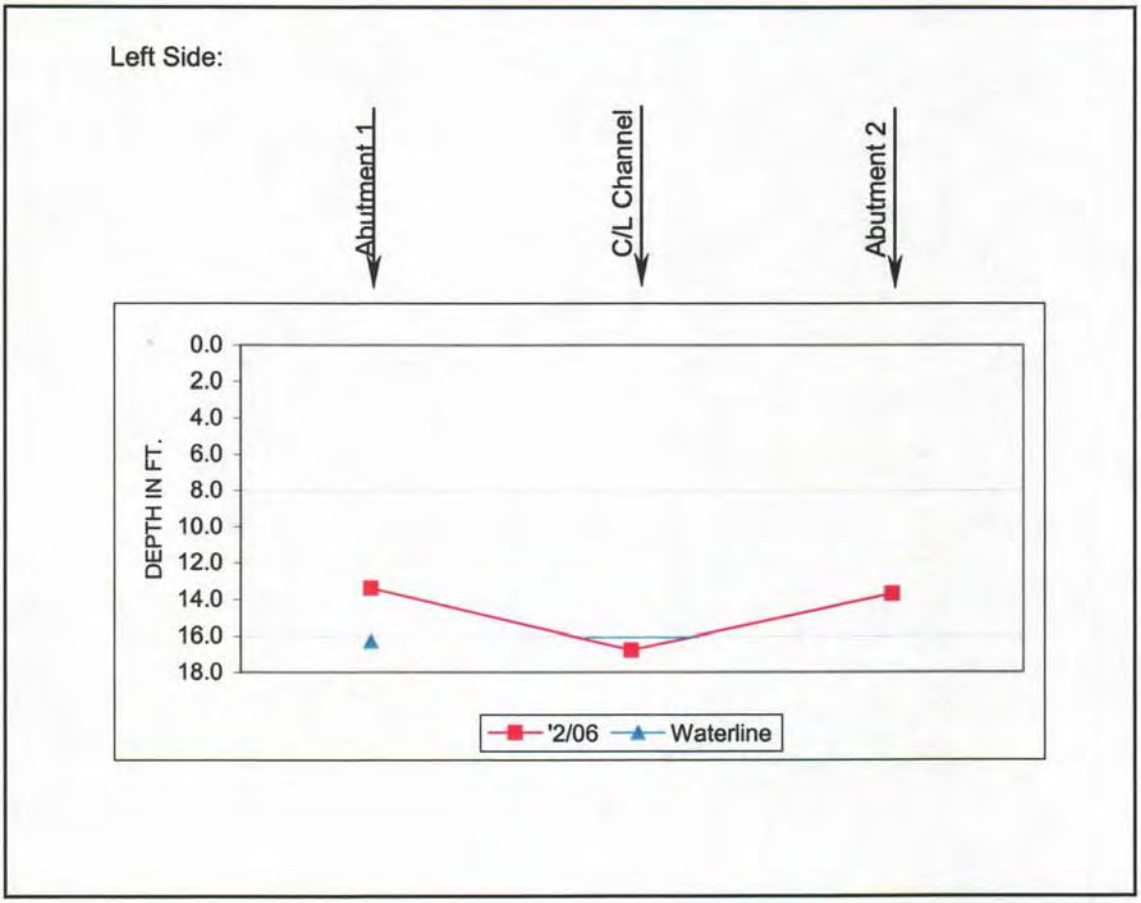
All measurements were taken in feet.
- = Aggradation (filling in) since previous measurement.
+ = Degradation (deepening) since previous measurement.
-- = No measurement taken.

783 Spec. Rpts. 2/24/06-2/24/06

BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

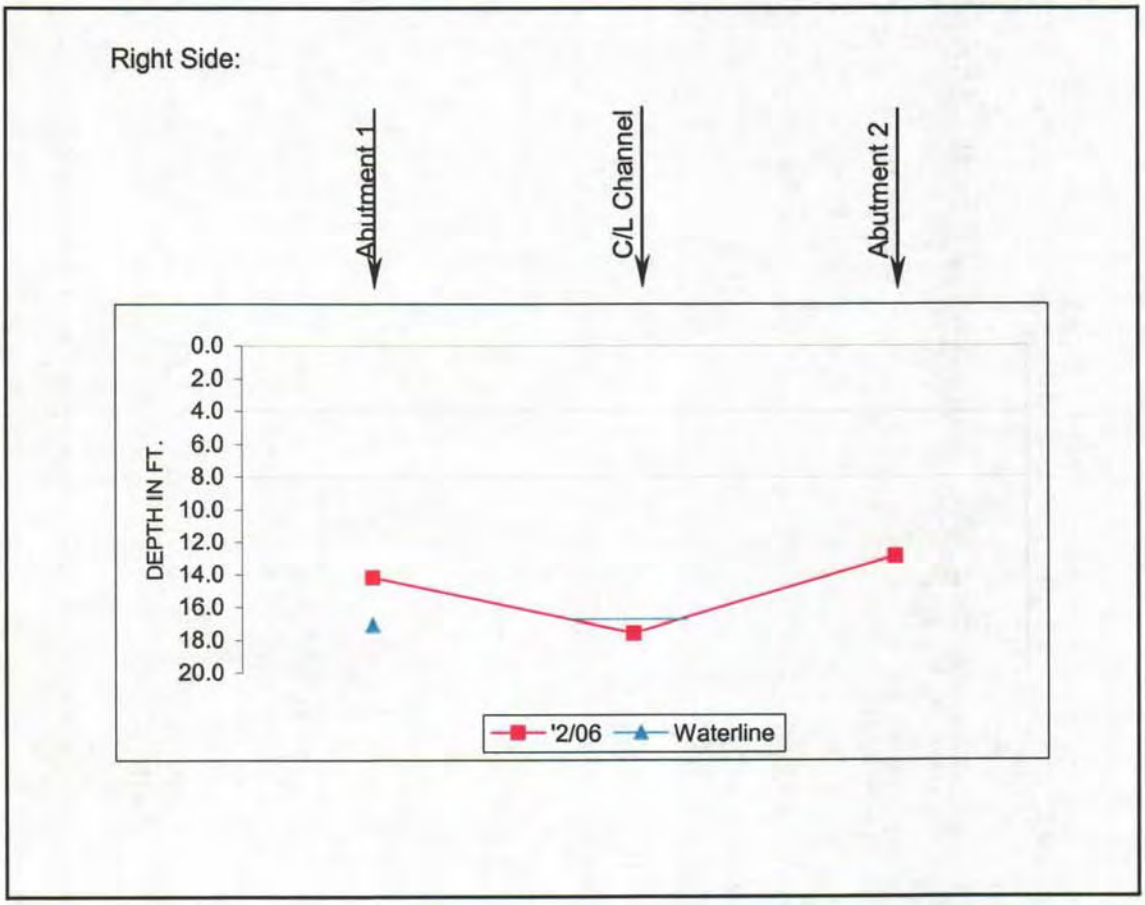
H.SCOUR EVALUATION



BRIDGE INSPECTION REPORT

Bridge No. BR0003
Inspection Date: 2/24/06

H. SCOUR EVALUATION



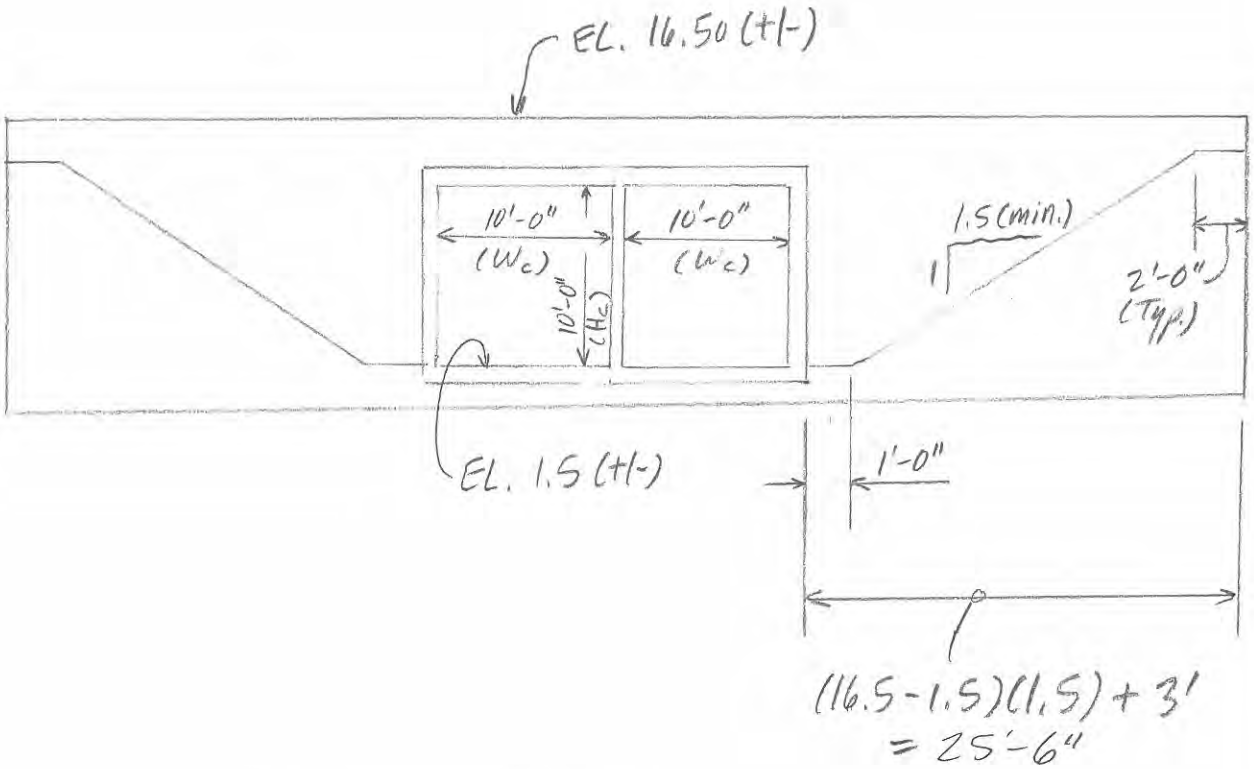
Appendix E

Preliminary Design Calculations

LOCHNER

SHEET _____ OF _____

Job: Sunset Pt. Road Box Culvert
Description: 2-celled Box Culvert Layout
Project No.: 7444
Computed By: DMH Date: 9/23/2013
Checked By: _____ Date: _____



Elevation

72.125°
25'-6"
25'-6"
112°30'0"
72°7'28.7169"
112°30'0"
1'-0"
10'-0"
10'-0"
112°30'0"
67°30'0"
25'-6"
25'-6"

PLAN

Reference:C:\FDOT Structures\Programs\LRFDBoxCulvertV3.2\ReadData.xmcd(R)

CurrentDataFile = "\Data Files\SunsetPtRd.dat"

Box Culvert Program:

Estimate of Quantities

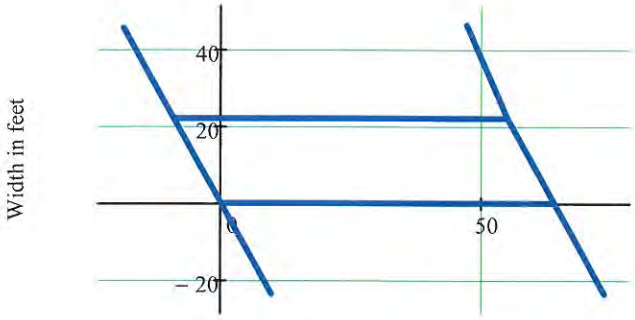
© 2002 Florida Department of Transportation

Project = "Sunset Pt. Rd. - Phase II Report"

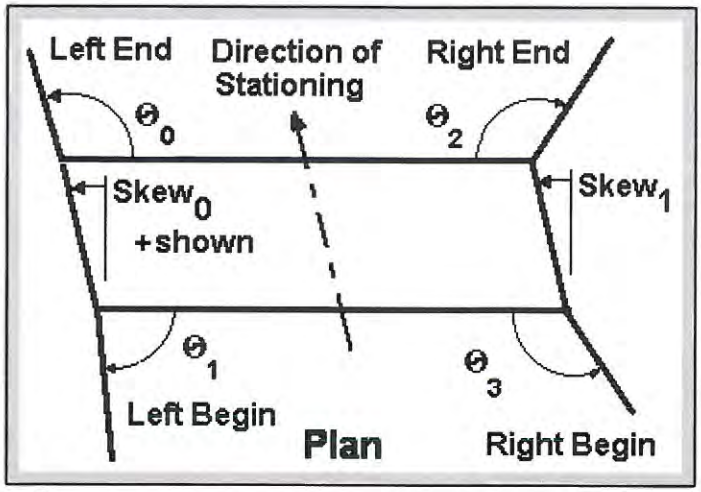
DesignedBy = "DMH"

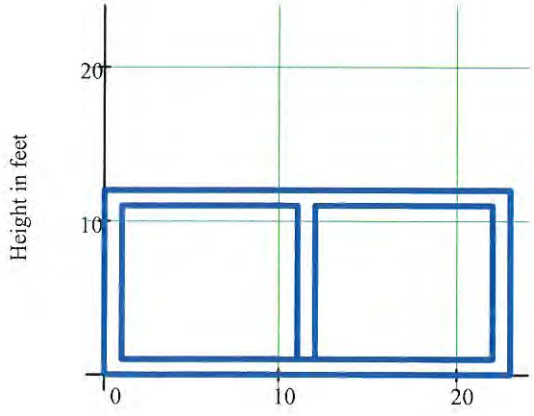
CheckedBy = "---"

Comment = "2-celled 10 x 10"

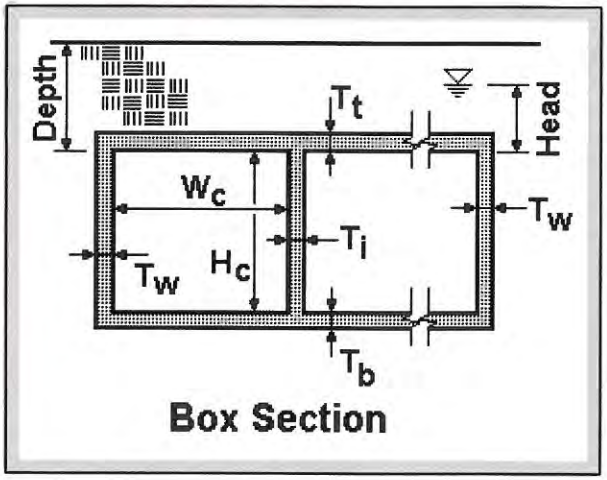


Plan - Box Culvert





Cross Section - Box Culvert



Box Dimensions

HydraulicOpening := $W_c \cdot H_c \cdot NoOfCells$ HydraulicOpening = 200 ft^2 SoilHeight = 4 ft

NoOfCells = 2 W_c = 10 ft H_c = 10 ft L_c = 64.17 ft θ^T = (112.5 67.5 72.13 112.5) deg Head = 0 ft

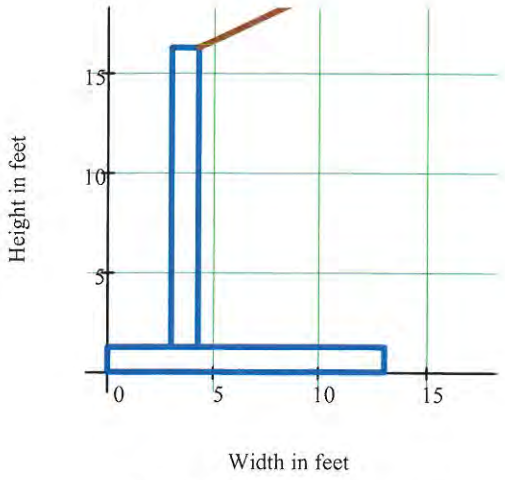
T_t = 12 in T_b = 12 in T_w = 12 in T_i = 12 in Cover = 2 in Depth = 5 ft

Cutoff wall and Headwall Dimensions

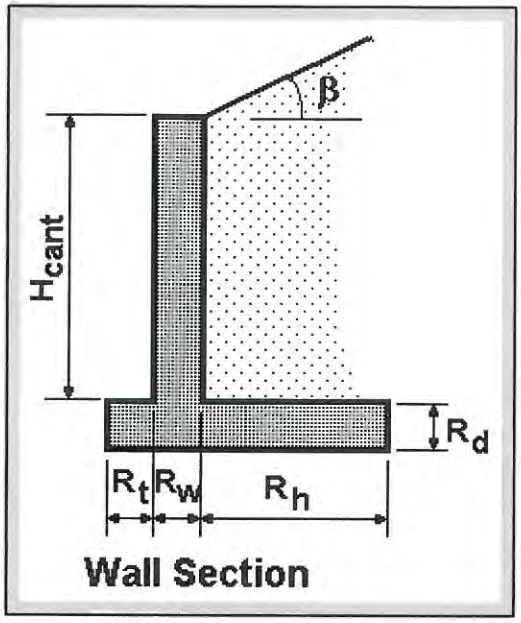
$Skew_{left}$ = 22.5 deg B_{lhw} = 14 in H_{lhw} = 24 in B_{lcw} = 12 in H_{lcw} = 24 in

$Skew_{right} = 22.5 \cdot deg$ $B_{rhw} = 14 \cdot in$ $H_{rhw} = 24 \cdot in$ $B_{rcw} = 12 \cdot in$ $H_{rcw} = 24 \cdot in$

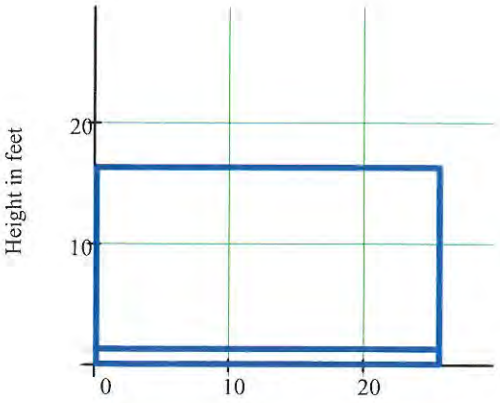
Wingwall Dimensions CurrentDataFile = "\Data Files\SunsetPtRd.dat"



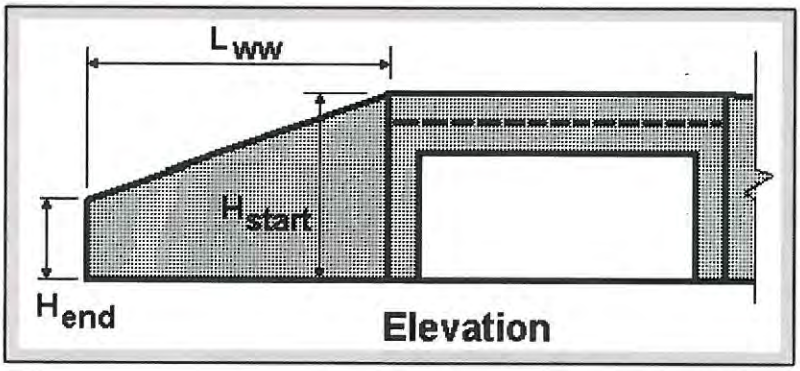
Cross Section - First Wingwall



$$R_t = \begin{pmatrix} 36 \\ 36 \\ 36 \\ 36 \end{pmatrix} \cdot in \quad R_w = \begin{pmatrix} 15 \\ 15 \\ 15 \\ 15 \end{pmatrix} \cdot in \quad R_h = \begin{pmatrix} 105 \\ 105 \\ 105 \\ 105 \end{pmatrix} \cdot in \quad R_d = \begin{pmatrix} 15 \\ 15 \\ 15 \\ 15 \end{pmatrix} \cdot in \quad \beta = \begin{pmatrix} 26.57 \\ 26.57 \\ 26.48 \\ 26.57 \end{pmatrix} \cdot deg$$



Elevation - First Wingwall



$$H_{end} = \begin{pmatrix} 15 \\ 15 \\ 15 \\ 15 \end{pmatrix} ft \quad H_{start} = \begin{pmatrix} 15 \\ 15 \\ 15 \\ 15 \end{pmatrix} ft \quad L_{ww} = \begin{pmatrix} 25.5 \\ 25.5 \\ 25.5 \\ 25.5 \end{pmatrix} ft \quad \theta = \begin{pmatrix} 112.5 \\ 67.5 \\ 72.13 \\ 112.5 \end{pmatrix} \cdot deg$$

Summary of Concrete Quantities

$Vol_{cw.left} = 0.92 \cdot yd^3$ $Vol_{cw.right} = 0.92 \cdot yd^3$

$Vol_{bot.slab} = 57.22 \cdot yd^3$ $Vol_{walls} = 71.3 \cdot yd^3$ $Vol_{top.slab} = 54.66 \cdot yd^3$

$Vol_{hw.left} = 1.08 \cdot yd^3$ $Vol_{hw.right} = 1.08 \cdot yd^3$

$$Vol_{wall} = \begin{pmatrix} 17.71 \\ 17.71 \\ 17.71 \\ 17.71 \end{pmatrix} \cdot yd^3 \quad Vol_{ww.cowall} = \begin{pmatrix} 0.7083 \\ 0.7083 \\ 0.7083 \\ 0.7083 \end{pmatrix} \cdot yd^3 \quad Vol_{footing} = \begin{pmatrix} 15.35 \\ 14.61 \\ 14.78 \\ 15.35 \end{pmatrix} \cdot yd^3 \quad TotalVol_{wingwall} = \begin{pmatrix} 33.76 \\ 33.03 \\ 33.19 \\ 33.76 \end{pmatrix} \cdot yd^3$$

$Vol_{box} = 187.44 \cdot yd^3$ $\sum Vol_{wall} = 70.83 \cdot yd^3$ $\sum TotalVol_{footing} = 62.92 \cdot yd^3$ $TotalVolume = 321.19 \cdot yd^3$

Summary of Soil and Miscellaneous Values

$E = 3841 \cdot ksi$ $f_c = 5.5 \cdot ksi$ $Extension = 0$

Extension type
0 - new box (no extension)
1 - left extension
2 - right extension

$Env = 2$

Environmental Class
1 - slightly aggressive
2 - moderately aggressive
3 - extremely aggressive

$F_y = 60 \cdot ksi$ $n_{mod} = 9$

$ConsiderLLSurcharge_{ww} = 1$ *0 - No, 1 - Yes* $ConsiderLL_{hw} = 1$ *0 - No, 1 - Yes* $BarrierDL_{hw} = 0 \cdot \frac{kip}{ft}$

Concrete Volume

$\gamma_{soil} = 110 \cdot \frac{lbf}{ft^3}$ $k_s = 100000 \cdot \frac{lbf}{ft^3}$ $\phi = 30 \cdot deg$ $q_{nom} = 5000 \cdot \frac{lbf}{ft^2}$

Summary of Reinforcement Check Values

$Check_{box} = "OK"$ $Check_{cw} = "OK"$ $Check_{hw} = "OK"$ $Check_{ww} = "OK"$ $TotalCheck = "OK"$

$$BarSize_{slabs} = \begin{pmatrix} 6 \\ 6 \\ 6 \\ 6 \end{pmatrix} \quad S_{slabs} = \begin{pmatrix} 6 \\ 6 \\ 6 \\ 6 \end{pmatrix} \cdot in$$

top slab, top mat
top slab, bot mat
bot slab, top mat
bot slab, bot mat

$$BarSize_{long} = \begin{pmatrix} 4 \\ 4 \\ 4 \\ 4 \\ 4 \\ 4 \end{pmatrix} \quad S_{long} = \begin{pmatrix} 12 \\ 12 \\ 12 \\ 12 \\ 12 \\ 12 \end{pmatrix} \cdot in$$

top slab, top mat
top slab, bot mat
interior wall(s)
exterior walls
bot slab, both m.

$$BarSize_{walls} = \begin{pmatrix} 4 \\ 4 \end{pmatrix} \quad S_{walls} = \begin{pmatrix} 14 \\ 14 \end{pmatrix} \cdot in$$

interior wall(s)
exterior walls

$$BarSize_{corners} = \begin{pmatrix} 5 \\ 6 \end{pmatrix} \quad S_{corners} = \begin{pmatrix} 9 \\ 9 \end{pmatrix} \cdot in$$

top corner
bot corner

$$BarSize_{cw} = \begin{pmatrix} 6 \\ 6 \\ 6 \\ 6 \end{pmatrix} \quad Num_{cw} = \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix}$$

top bar, left cw
bot bar, left cw
top bar, right cw
bot bar, right cw

$$StirSize_{cw} = \begin{pmatrix} 4 \\ 4 \end{pmatrix} \quad S_{stirrup.cw} = \begin{pmatrix} 12 \\ 12 \end{pmatrix} \cdot in$$

$$BarSize_{hw} = \begin{pmatrix} 6 \\ 6 \\ 6 \\ 6 \end{pmatrix} \quad Num_{hw} = \begin{pmatrix} 3 \\ 3 \\ 3 \\ 3 \end{pmatrix}$$

top bar, left hw
bot bar, left hw
top bar, right hw
bot bar, right hw

$$StirSize_{hw} = \begin{pmatrix} 4 \\ 4 \end{pmatrix} \quad S_{stirrup.hw} = \begin{pmatrix} 12 \\ 12 \end{pmatrix} \cdot in$$

Reinforcement List - Main Box *click table below to reveal scroll bar...*

$Reinf_{box} =$

	0	1	2
0	"Bar Location"	"Size"	"Desig"
1	"top face, top slab"	6	101
2	" ....varies"	6	201
3	" ....varies"	-1	0
4	" ....varies"	6	301
5	" ....varies"	-1	0
6	"bot face, top slab"	6	102
7	" ....varies"	6	202
8	" ....varies"	-1	0
9	" ....varies"	6	302
10	" ....varies"	-1	0
11	"top face, bot slab"	6	103
12	" ....varies"	6	203
13	" ....varies"	-1	0
14	" ....varies"	6	303
15	" ....varies"	-1	...

Reinforcement Lists - Left Begin and Left End Wingwalls

$Rw_0 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"I
"wall vert, soil side"	7	401	14.75	62	1	0	0	14.75	0	0	0	0	0	0	0	(
"wall horiz, front side"	4	402	25.17	16	1	0	0	25.17	0	0	0	0	0	0	0	(
"wall horiz, soil side"	4	404	25.17	16	1	0	0	25.17	0	0	0	0	0	0	0	(
"wall vert, front side"	4	406	14.75	27	1	0	0	14.75	0	0	0	0	0	0	0	(
"wall vert, soil side"	7	407	9.25	62	10	0	0	3.92	5.33	0	0	0	0	0	0	(
"top footing heel"	6	409	12.67	62	1	0	0	12.67	0	0	0	0	0	0	0	(
"bot footing toe"	4	410	12.67	32	1	0	0	12.67	0	0	0	0	0	0	0	(
"temp footing"	4	411	25.17	28	1	0	0	25.17	0	0	0	0	0	0	0	(
"wall to box ties"	5	412	2	23	1	0	0	2	0	0	0	0	0	0	0	(

$Rw_1 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"I
"wall vert, soil side"	7	501	14.75	62	1	0	0	14.75	0	0	0	0	0	0	0	(
"wall horiz, front side"	4	502	25.17	16	1	0	0	25.17	0	0	0	0	0	0	0	(
"wall horiz, soil side"	4	504	25.17	16	1	0	0	25.17	0	0	0	0	0	0	0	(
"wall vert, front side"	4	506	14.75	27	1	0	0	14.75	0	0	0	0	0	0	0	(
"wall vert, soil side"	7	507	9.25	62	10	0	0	3.92	5.33	0	0	0	0	0	0	(
"top footing heel"	6	509	12.67	62	1	0	0	12.67	0	0	0	0	0	0	0	(
"bot footing toe"	4	510	12.67	32	1	0	0	12.67	0	0	0	0	0	0	0	(
"temp footing"	4	511	25.17	28	1	0	0	25.17	0	0	0	0	0	0	0	(
"wall to box ties"	5	512	2	23	1	0	0	2	0	0	0	0	0	0	0	(

Reinforcement Lists - Right Begin and Right End Wingwalls

$Rw_2 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"I
"wall vert, soil side"	7	601	14.75	62	1	0	0	14.75	0	0	0	0	0	0	0	(
"wall horiz, front side"	4	602	25.17	16	1	0	0	25.17	0	0	0	0	0	0	0	(
"wall horiz, soil side"	4	604	25.17	16	1	0	0	25.17	0	0	0	0	0	0	0	(
"wall vert, front side"	4	606	14.75	27	1	0	0	14.75	0	0	0	0	0	0	0	(
"wall vert, soil side"	7	607	9.25	62	10	0	0	3.92	5.33	0	0	0	0	0	0	(
"top footing heel"	6	609	12.67	62	1	0	0	12.67	0	0	0	0	0	0	0	(
"bot footing toe"	4	610	12.67	32	1	0	0	12.67	0	0	0	0	0	0	0	(
"temp footing"	4	611	25.17	28	1	0	0	25.17	0	0	0	0	0	0	0	(
"wall to box ties"	5	612	2	23	1	0	0	2	0	0	0	0	0	0	0	(

$Rw_3 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"N
"wall vert, soil side"	7	701	14.75	62	1	0	0	14.75	0	0	0	0	0	0	0	(
"wall horiz, front side"	4	702	25.17	16	1	0	0	25.17	0	0	0	0	0	0	0	(
"wall horiz, soil side"	4	704	25.17	16	1	0	0	25.17	0	0	0	0	0	0	0	(
"wall vert, front side"	4	706	14.75	27	1	0	0	14.75	0	0	0	0	0	0	0	(
"wall vert, soil side"	7	707	9.25	62	10	0	0	3.92	5.33	0	0	0	0	0	0	(
"top footing heel"	6	709	12.67	62	1	0	0	12.67	0	0	0	0	0	0	0	(
"bot footing toe"	4	710	12.67	32	1	0	0	12.67	0	0	0	0	0	0	0	(
"temp footing"	4	711	25.17	28	1	0	0	25.17	0	0	0	0	0	0	0	(
"wall to box ties"	5	712	2	23	1	0	0	2	0	0	0	0	0	0	0	(

Reinforcement Lists - Headwalls and Cutoff Walls

$Rh_1 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"N"
"top"	6	801	24.56	3	1	0	0	24.56	0	0	0	0	0	0	0	0
"bottom"	6	802	24.56	3	1	0	0	24.56	0	0	0	0	0	0	0	0
"stirrups"	4	803	5.11	25	27	0	0	1.6	0.5	0.33	0.42	1.19	0.67	0.67	0	0

$Rh_2 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"N"
"top"	6	804	24.56	3	1	0	0	24.56	0	0	0	0	0	0	0	0
"bottom"	6	805	24.56	3	1	0	0	24.56	0	0	0	0	0	0	0	0
"stirrups"	4	806	5.11	25	27	0	0	1.6	0.5	0.33	0.42	1.19	0.67	0.67	0	0

$Rc_1 =$

"Bar Location"	"Size"	"Desig"	"Len"	"Num"	"Type"	"A"	"G"	"B"	"C"	"D"	"E"	"F"	"H"	"J"	"K"	"N"
"top"	6	807	24.56	2	1	0	0	24.56	0	0	0	0	0	0	0	0
"bottom"	6	808	24.56	2	1	0	0	24.56	0	0	0	0	0	0	0	0
"stirrups"	4	809	4.88	25	7	0	0	1.6	0.67	0.5	0.5	0	0	0	0	0

$$Rc_2 = \begin{pmatrix} \text{"Bar Location"} & \text{"Size"} & \text{"Desig"} & \text{"Len"} & \text{"Num"} & \text{"Type"} & \text{"A"} & \text{"G"} & \text{"B"} & \text{"C"} & \text{"D"} & \text{"E"} & \text{"F"} & \text{"H"} & \text{"J"} & \text{"K"} & \text{"N"} \\ \text{"top"} & 6 & 810 & 24.56 & 2 & 1 & 0 & 0 & 24.56 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \text{"bottom"} & 6 & 811 & 24.56 & 2 & 1 & 0 & 0 & 24.56 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \text{"stirrups"} & 4 & 812 & 4.88 & 25 & 7 & 0 & 0 & 1.6 & 0.67 & 0.5 & 0.5 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

No variables are modified in this file CurrentDataFile = "\Data Files\SunsetPtRd.dat"

REINFORCING STEEL QUANTITIES

DATE RAN: TUE SEP 24 10:46:38 2013

NAME OF UNIT	QUANTITY/UNIT	NO. UNITS	TOTAL-QUANTITY	COST/LB	TOTAL-COST
MAIN BOX	31748 LBS	X 1 =	31748 LBS AT	0.000 = $	0.00
LEFT END WINGWALL	5815 LBS	X 1 =	5815 LBS AT	0.000 = $	0.00
LEFT BEGIN WINGWALL	5815 LBS	X 1 =	5815 LBS AT	0.000 = $	0.00
RIGHT END WINGWALL	5815 LBS	X 1 =	5815 LBS AT	0.000 = $	0.00
RIGHT BEGIN WINGWALL	5815 LBS	X 1 =	5815 LBS AT	0.000 = $	0.00
LEFT HEADWALL	307 LBS	X 1 =	307 LBS AT	0.000 = $	0.00
RIGHT HEADWALL	307 LBS	X 1 =	307 LBS AT	0.000 = $	0.00
LEFT CUTOFF WALL	229 LBS	X 1 =	229 LBS AT	0.000 = $	0.00
RIGHT CUTOFF WALL	229 LBS	X 1 =	229 LBS AT	0.000 = $	0.00
	GRAND TOTAL =		56080 LBS		$ 0.00

Reinforcing Steel Weight

LOCATION MAIN BOX NO. REQUIRED = 1

								LBS/MARK
6	101	22- 8	110	1	22- 8			3745.54
6	201	VARY	18	1	21- 7 1/2			
		11- 5	0	1	1- 0 3/4			306.72
6	301	VARY	18	1	21- 7 1/2			
		11- 5	0	1	1- 0 3/4			306.72
6	102	22- 8	110	1	22- 8			3745.54
6	202	VARY	18	1	21- 7 1/2			
		11- 5	0	1	1- 0 3/4			306.72
6	302	VARY	18	1	21- 7 1/2			
		11- 5	0	1	1- 0 3/4			306.72
6	103	22- 8	116	1	22- 8			3949.84
6	203	VARY	18	1	21- 7 1/2			
		11- 5	0	1	1- 0 3/4			306.72
6	303	VARY	18	1	21- 7 1/2			
		11- 5	0	1	1- 0 3/4			306.72
6	104	22- 8	116	1	22- 8			3949.84
6	204	VARY	18	1	21- 7 1/2			
		11- 5	0	1	1- 0 3/4			306.72
6	304	VARY	18	1	21- 7 1/2			
		11- 5	0	1	1- 0 3/4			306.72
5	105	9- 3	172	10	2- 1 1/2	7- 1 1/4		1657.62
6	106	9- 8	172	10	2- 6 1/2	7- 1 1/4		2495.60
4	107	12- 1	220	10	5- 4	6- 8 1/4		1767.93
4	108	11- 8	110	1	11- 8			856.78
4	109	68- 2	24	2	1- 3 1/2	66-10		1092.42 1
4	110	65- 2	24	2	1- 3 1/2	63-10		1044.32 1
4	111	64- 6	24	2	1- 3 1/2	63- 2 1/4		1033.90 1
4	112	68- 2	24	2	1- 3 1/2	66-10		1092.42 1
4	113	65- 2	22	2	1- 3 1/2	63-10		957.30 1
4	114	65- 2	22	2	1- 3 1/2	63-10		957.30 1
4	115	64- 6	22	2	1- 3 1/2	63- 2 1/4		947.75 1

LOCATION LEFT END WINGWALL NO. REQUIRED = 1

								LBS/MARK
7	401	14- 9	62	1	14- 9			1869.24
4	402	25- 2	16	1	25- 2			269.02
4	404	25- 2	16	1	25- 2			269.02
4	406	14- 9	27	1	14- 9			266.03
7	407	9- 3	62	10	3-11	5- 4		1172.23
6	409	12- 8	62	1	12- 8			1179.88
4	410	12- 8	32	1	12- 8			270.83
4	411	25- 2	28	1	25- 2			470.78
5	412	2- 0	23	1	2- 0			47.98

LOCATION LEFT BEGIN WINGWALL NO. REQUIRED = 1

								LBS/MARK
7	501	14- 9	62	1	14- 9			1869.24
4	502	25- 2	16	1	25- 2			269.02
4	504	25- 2	16	1	25- 2			269.02
4	506	14- 9	27	1	14- 9			266.03

7	507	9- 3	62	10	3-11	5- 4						1172.23
6	509	12- 8	62	1	12- 8							1179.88
4	510	12- 8	32	1	12- 8							270.83
4	511	25- 2	28	1	25- 2							470.78
5	512	2- 0	23	1	2- 0							47.98

LOCATION RIGHT END WINGWALL NO. REQUIRED = 1

												LBS/MARK
7	601	14- 9	62	1	14- 9							1869.24
4	602	25- 2	16	1	25- 2							269.02
4	604	25- 2	16	1	25- 2							269.02
4	606	14- 9	27	1	14- 9							266.03
7	607	9- 3	62	10	3-11	5- 4						1172.23
6	609	12- 8	62	1	12- 8							1179.88
4	610	12- 8	32	1	12- 8							270.83
4	611	25- 2	28	1	25- 2							470.78
5	612	2- 0	23	1	2- 0							47.98

LOCATION RIGHT BEGIN WINGWALL NO. REQUIRED = 1

												LBS/MARK
7	701	14- 9	62	1	14- 9							1869.24
4	702	25- 2	16	1	25- 2							269.02
4	704	25- 2	16	1	25- 2							269.02
4	706	14- 9	27	1	14- 9							266.03
7	707	9- 3	62	10	3-11	5- 4						1172.23
6	709	12- 8	62	1	12- 8							1179.88
4	710	12- 8	32	1	12- 8							270.83
4	711	25- 2	28	1	25- 2							470.78
5	712	2- 0	23	1	2- 0							47.98

LOCATION LEFT HEADWALL NO. REQUIRED = 1

												LBS/MARK
6	801	24- 7	3	1	24- 6 3/4							110.67
6	802	24- 7	3	1	24- 6 3/4							110.67
4	803	5- 2	25	27	1- 7 1/4	0- 6	0- 4	0- 5	1- 2 1/4	0- 8	0- 8	85.32
10	0	0- 0	0	0								

LOCATION RIGHT HEADWALL NO. REQUIRED = 1

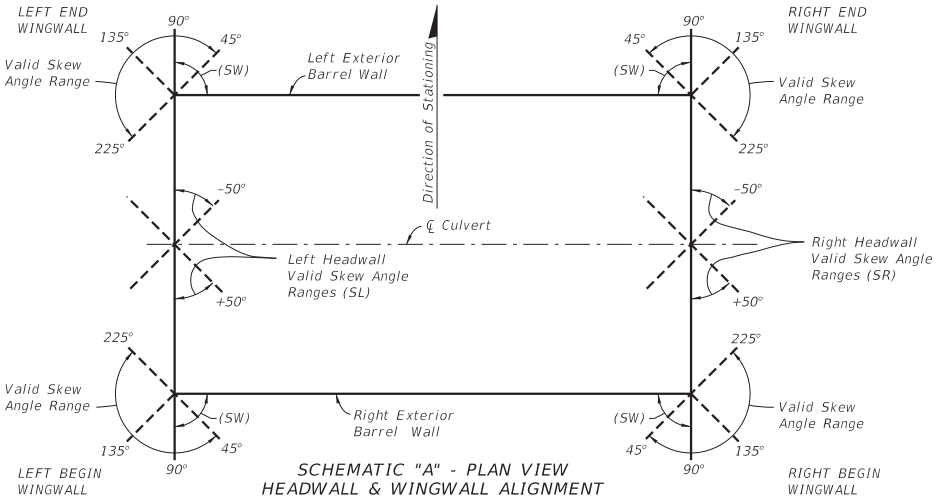
												LBS/MARK
6	804	24- 7	3	1	24- 6 3/4							110.67
6	805	24- 7	3	1	24- 6 3/4							110.67
4	806	5- 2	25	27	1- 7 1/4	0- 6	0- 4	0- 5	1- 2 1/4	0- 8	0- 8	85.32
10	0	0- 0	0	0								

LOCATION LEFT CUTOFF WALL NO. REQUIRED = 1

										LBS/MARK
6	807	24- 7	2	1	24- 6 3/4					73.78
6	808	24- 7	2	1	24- 6 3/4					73.78
4	809	4-11	25	7	1- 7 1/4	0- 8	0- 6	0- 6		81.45
10	0	0- 0	0	0						

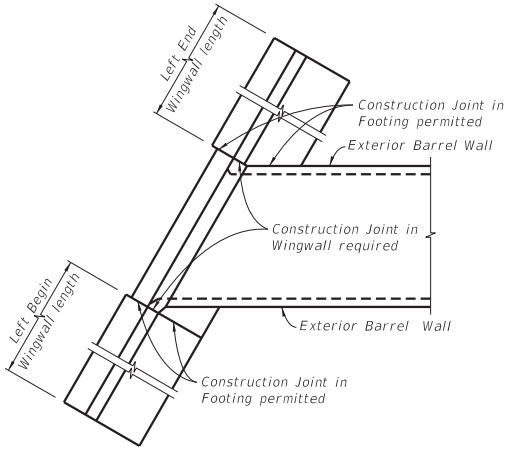
LOCATION RIGHT CUTOFF WALL NO. REQUIRED = 1

										LBS/MARK
6	810	24- 7	2	1	24- 6 3/4					73.78
6	811	24- 7	2	1	24- 6 3/4					73.78
4	812	4-11	25	7	1- 7 1/4	0- 8	0- 6	0- 6		81.45
10	0	0- 0	0	0						



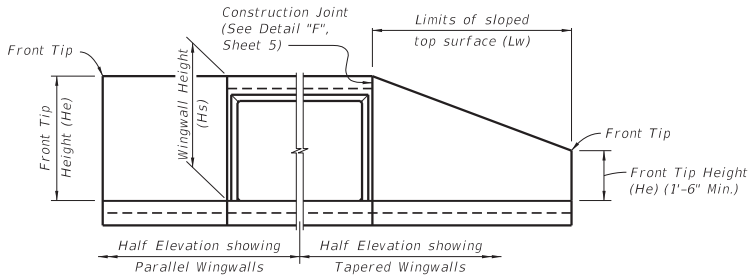
SCHEMATIC "A" - PLAN VIEW
HEADWALL & WINGWALL ALIGNMENT

NOTE: All headwall and culvert skew angles are measured in degrees from a line perpendicular to the centerline of culvert (counter-clockwise positive), see Schematic "B".



PART PLAN SHOWING PARALLEL WINGWALLS
AND LOCATION OF CONSTRUCTION JOINTS

NOTE:
Construction Joints in wingwalls and footings are located as follows: For non-skewed wingwalls they are located adjacent to the exterior face of the exterior barrel wall; when the ℄ of wingwall and ℄ of exterior barrel wall results in an acute angle see Left End Wingwall above, and when the angle is obtuse see Left Begin Wingwall above and Detail C (Sheet 5).



END ELEVATION
OF CULVERT

GENERAL NOTES:

LIVE LOAD: HL-93.

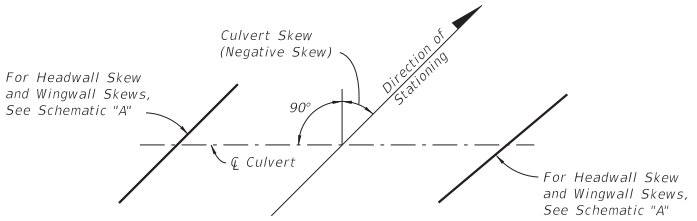
CONSTRUCTION LOADING: It is the construction Contractor's responsibility to provide for supporting construction loads that exceed AASHTO HL-93, and any construction load applied prior to 2 feet of compacted fill placed above the top slab.

SURFACE FINISH: All concrete surfaces shall receive a general surface finish.

SKEWED CONSTRUCTION JOINTS: Construction joints in barrels of culverts with skewed wingwalls may be placed parallel to the headwalls and the reinforcing steel, and the slabs may be cut provided that the cut reinforcing steel extends beyond the construction joint enough for splices to be made in accordance with Table 1 on this sheet. The cost of construction joints and additional reinforcing shall be at the expense of the Contractor.

CULVERT EXTENSIONS: For cut backs and ties into existing concrete box culverts see Sheet 6 of 7.

REINFORCING STEEL: See the "Box Culvert Data Tables" in the Contract Plans for grade and bar spacing. See the Reinforcing Bar List in the Contract Plans for bar sizes and bar bending details.



SCHEMATIC "B" - PLAN VIEW
CULVERT ALIGNMENT

NOTE: For Culvert Skew see Contract Plans.

TABLE 1 - MINIMUM BAR SPLICE LENGTHS FOR LONGITUDINAL REINFORCING

BAR SIZE	SPLICE (CLASS B) CLASS II (3400 psi)	SPLICE (CLASS B) CLASS IV (5500 psi)	BAR SIZE	SPLICE (CLASS B) CLASS II (3400 psi)	SPLICE (CLASS B) CLASS IV (5500 psi)
#3	1'-0"	1'-0"	#8	3'-6"	2'-9"
#4	1'-4"	1'-4"	#9	4'-5"	3'-6"
#5	1'-8"	1'-8"	#10	6'-7"	4'-5"
#6	1'-11"	1'-11"	#11	7'-10"	6'-5"
#7	2'-8"	2'-3"			

TABLE 1 NOTE: Splice lengths are based on an AASHTO Class B tension lap splice for the Specification Section 346 concrete class shown.

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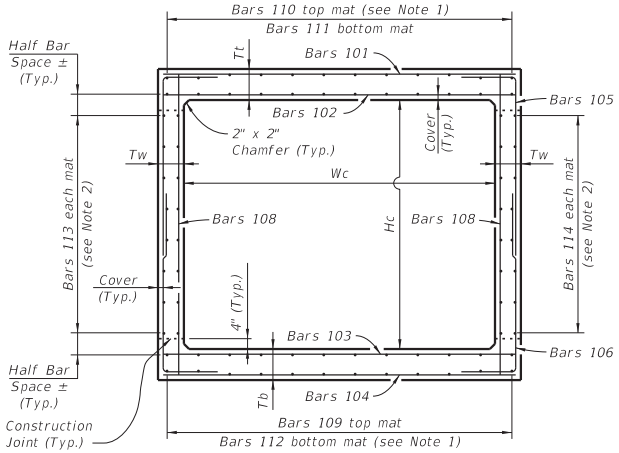
LAST REVISION	REVISION	DESCRIPTION:		INDEX NO.	SHEET NO.
07/01/13			FDOT 2014 DESIGN STANDARDS	289	1 of 8

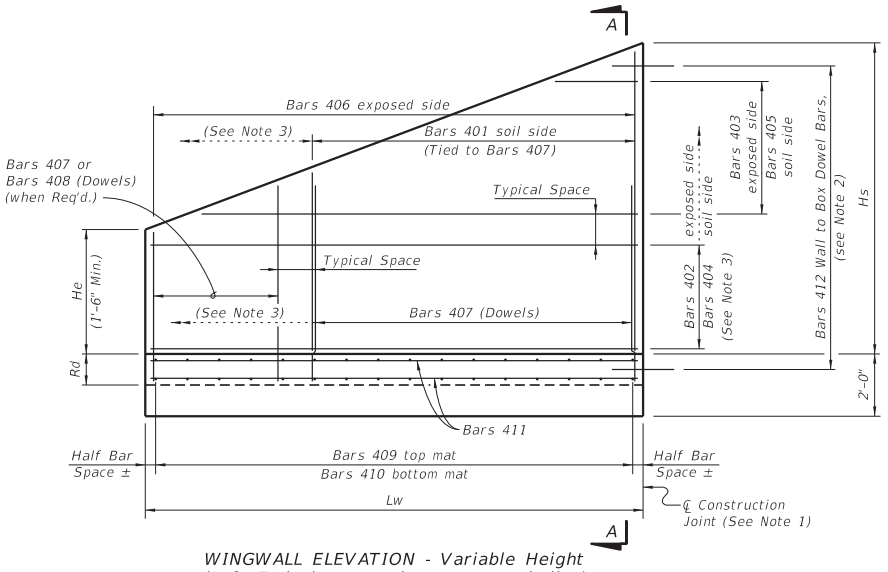
CONCRETE BOX CULVERT DETAILS (LRFD)



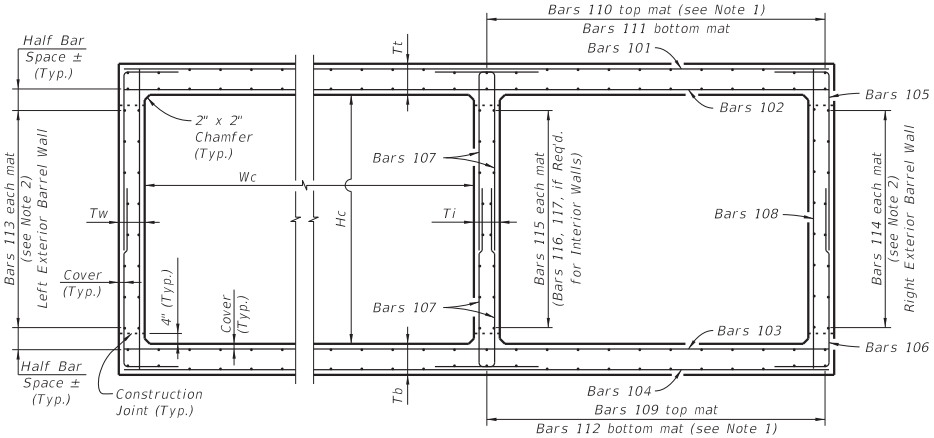
TYPICAL SECTION THRU SINGLE BARREL CULVERT

CULVERT BARREL NOTES:

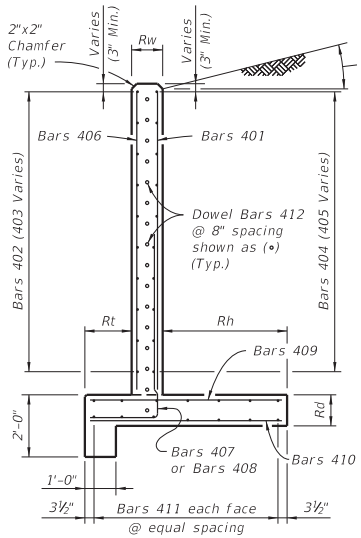
1. Space Bars 110 and 112 with a bar in each corner, and at the ℄ of interior walls (for multiple barrel culverts only), and the remaining bars placed at equal spacing shown in the Contract Plans. Adjust last bar spacing when required.
2. Place Bars 113 and 114 at spacing shown in the Contract Plans evenly between Bars 109 and 111.
3. Locate the first transverse bar from the ends of the culvert at one half the bar spacing, but provide the minimum reinforcement cover and not greater than 4" clear.



WINGWALL ELEVATION - Variable Height
(Left End shown - other corners similar)



TYPICAL SECTION THRU MULTIPLE BARREL CULVERT



WINGWALL SECTION A-A

WINGWALL NOTES:

1. Align construction joint perpendicular to wingwall.
2. In the vicinity of the construction joint, field bend reinforcement as necessary to maintain minimum reinforcement cover.
3. For constant height wingwalls, variable length Bars 403, 405 & 408 are not required, and as such the limits of Bars 401 & 407 extend the full length of the wingwall, and the limits of Bars 402 & 404 extend to the full height of the wingwall.

LAST REVISION	REVISION	DESCRIPTION:		INDEX NO.	SHEET NO.
07/01/13			FDOT 2014 DESIGN STANDARDS	289	2 of 8

CONCRETE BOX CULVERT DETAILS (LRFD)

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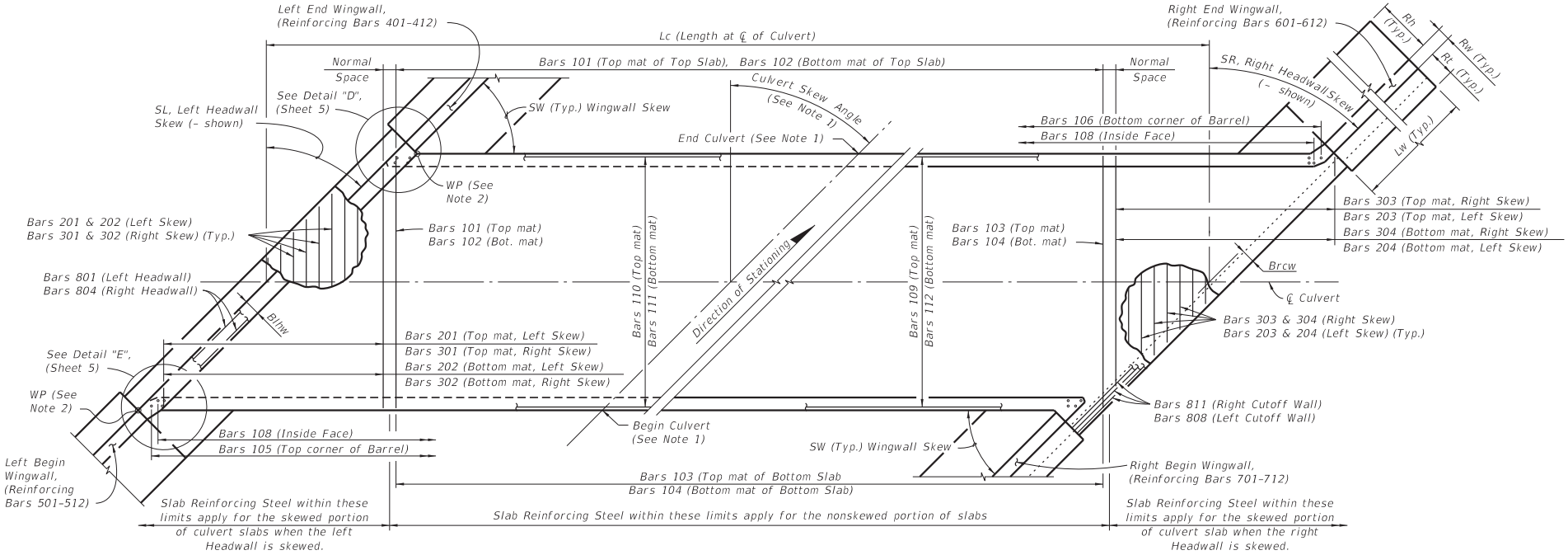
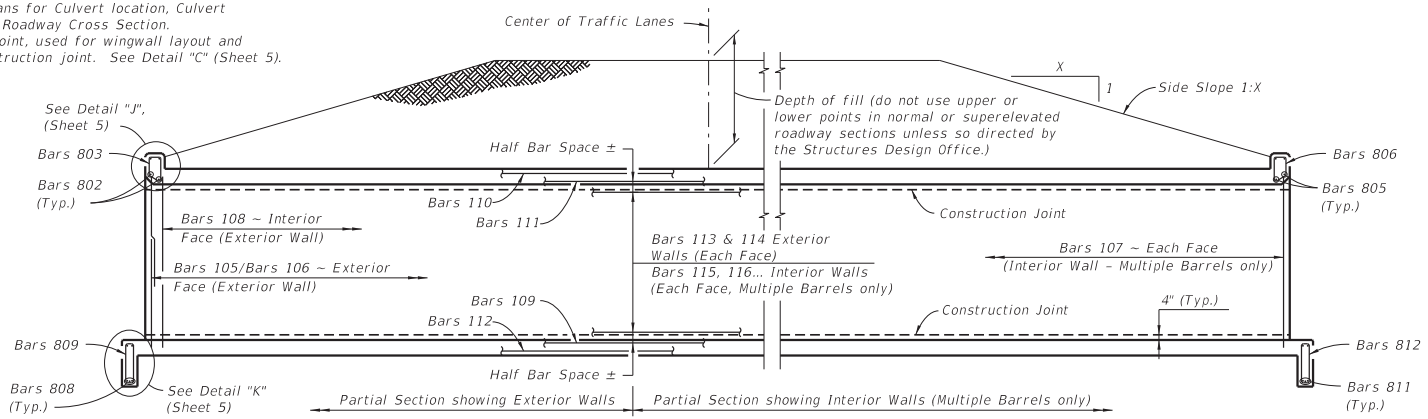


PARTIAL PLAN TOP SLAB
(Left Side, Left Skew)

SINGLE BARREL BOX CULVERT
(Skewed Culvert With Parallel Wingwalls Shown)

PARTIAL PLAN BOTTOM SLAB
(Right Side, Right Skew)

NOTES:
1. See Contract Plans for Culvert location, Culvert Skew Angle and Roadway Cross Section.
2. WP = Working Point, used for wingwall layout and location of construction joint. See Detail "C" (Sheet 5).



LONGITUDINAL SECTION THRU CULVERT
(Transverse Top & Bottom Slab Reinforcing Not Shown For Clarity)

LAST REVISION	REVISION	DESCRIPTION:		INDEX NO.	SHEET NO.
01/01/07			FDOT 2014 DESIGN STANDARDS	289	3 of 8

CONCRETE BOX CULVERT DETAILS (LRFD)

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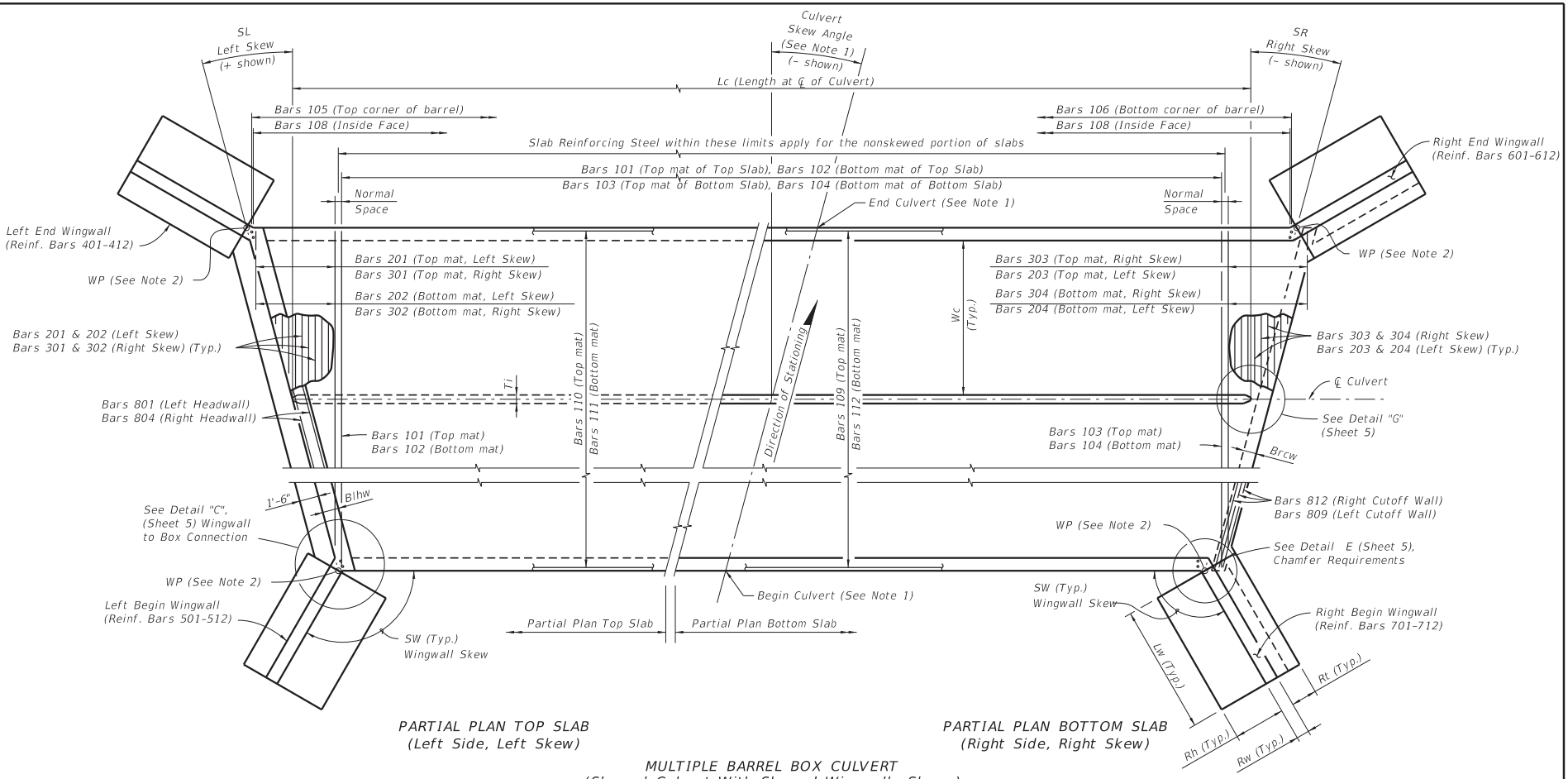

PARTIAL PLAN TOP SLAB
(Left Side, Left Skew)

PARTIAL PLAN BOTTOM SLAB
(Right Side, Right Skew)

MULTIPLE BARREL BOX CULVERT
(Skewed Culvert With Skewed Wingwalls Shown)

NOTES:
1. See Contract Plans for Culvert Location, Culvert Skew Angle and Roadway Cross Section.
2. WP = Working Point, used for wingwall layout and location of construction joint. See Detail C (Sheet 5).

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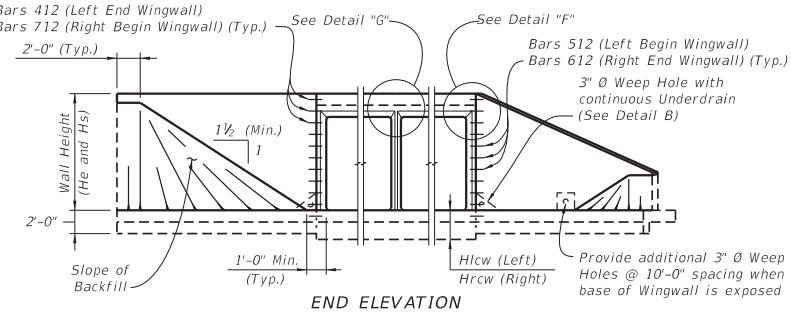
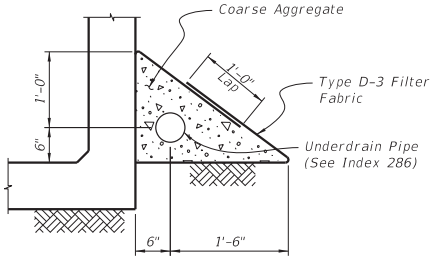
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/07			FDOT 2014 DESIGN STANDARDS	CONCRETE BOX CULVERT DETAILS (LRFD)	289	4 of 8



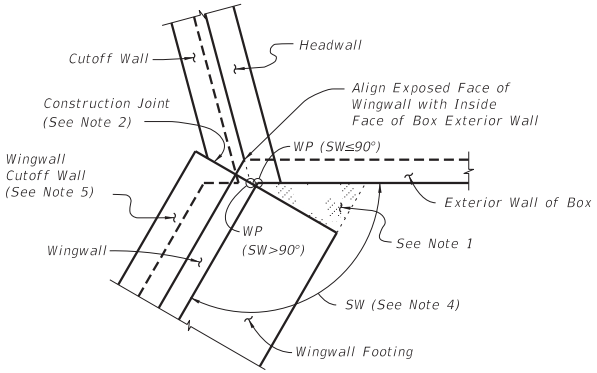
END ELEVATION
(Showing Constant Height And Variable Height Wingwalls)



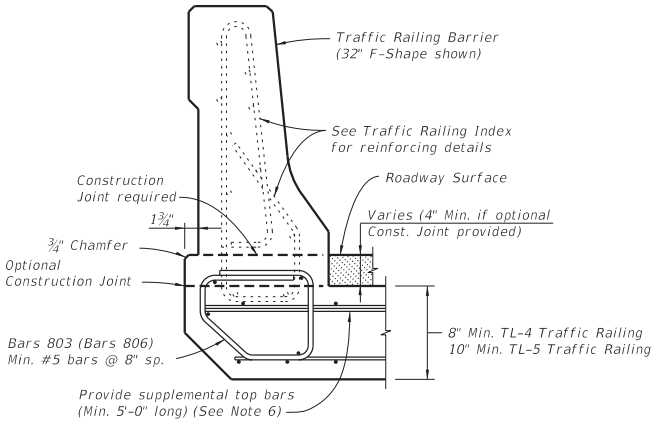
DETAIL "B"
UNDERDRAIN DETAIL
(Similar to Type II ~ Index 286)

NOTES:

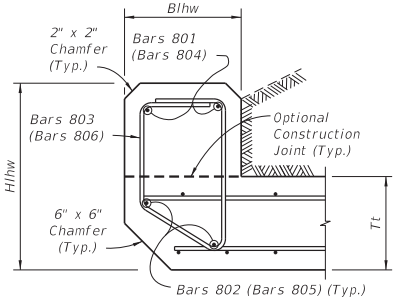
1. For small angles, the Contractor may elect to fill the area between the box and the wingwall footing with unreinforced concrete. For wingwall skew angles less then 90 degrees, field bend wingwall reinforcement as necessary while maintaining cover. No additional payment will be made for this work.
2. Location of Construction Joint determined by WP at theoretical intersection of:
   – Soil side face of Headwall and outside face of Box Exterior Wall, for SW≤90°;
   – Outside face of Wingwall and outside face of Box Exterior Wall, for SW>90°.
3. Provide 6" chamfer when angle 'A' is greater than 45°. Maintain minimum wall thickness. Field adjust reinforcing to maintain cover.
4. Wingwall Skew Angles (SW) are measured from the adjacent box exterior wall to the wingwall.
5. Turn or extend Wingwall Cutoff Wall as necessary to meet Box Cutoff Wall.
6. Provide additional reinforcement in the top of the top slab below traffic railings to ensure a minimum area of 0.80 sq. in./ft. transverse reinforcing.



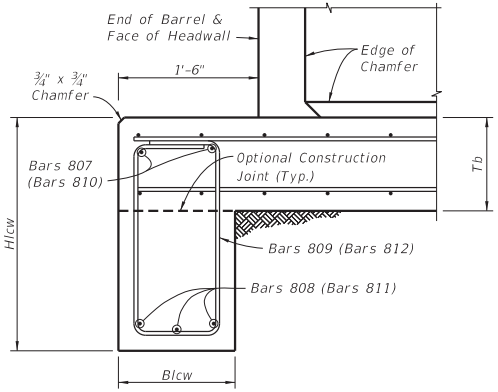
DETAIL "C" - PLAN VIEW
WINGWALL TO BOX CONNECTION
(Left Begin Corner Shown, Other Corners Similar)



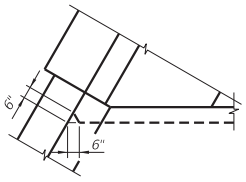
DETAIL "I"
TRAFFIC RAILING ATTACHMENT TO HEADWALL



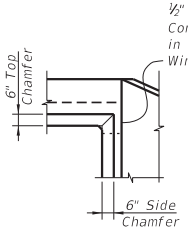
DETAIL "J"
LEFT HEADWALL SECTION
(Right Headwall similar)



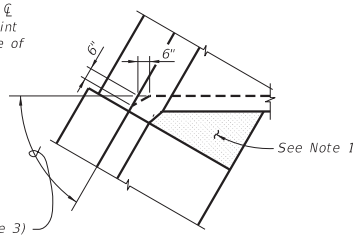
DETAIL "K"
LEFT CUTOFF WALL SECTION
(Right Cutoff Wall similar)



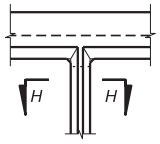
DETAIL "D"



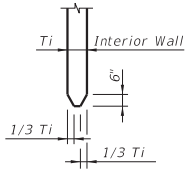
DETAIL "F"



DETAIL "E"



DETAIL "G"



SECTION H-H

CROSS REFERENCE:
See Sheet 3 for locations of Details "D", "E", "J" & "K".
See Sheet 4 for locations of Detail "C".

LAST REVISION	REVISION	DESCRIPTION:			
01/01/10			FDOT 2014 DESIGN STANDARDS	CONCRETE BOX CULVERT DETAILS (LRFD)	INDEX NO. 289 / SHEET NO. 5 of 8

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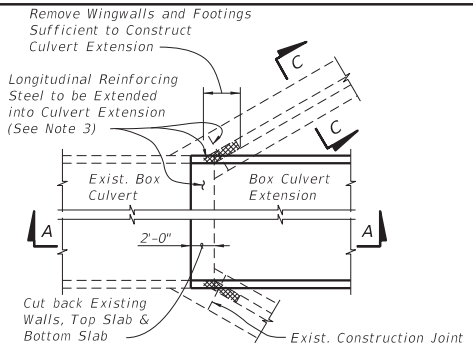
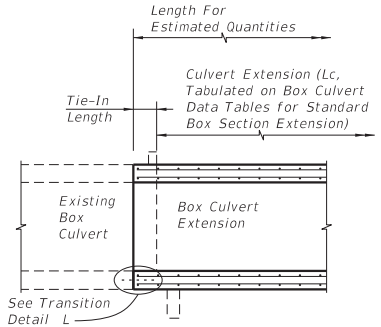
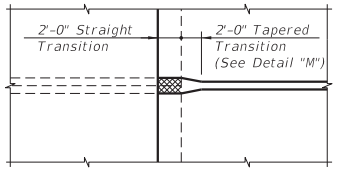


OUTSIDE WALLS OF BOXES

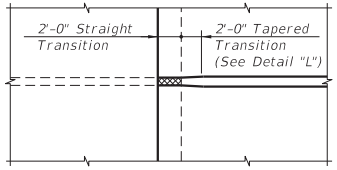


SECTION A-A

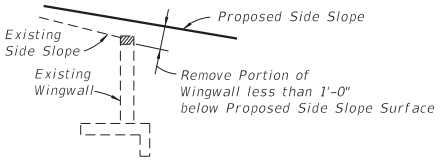
FLARED WINGWALL



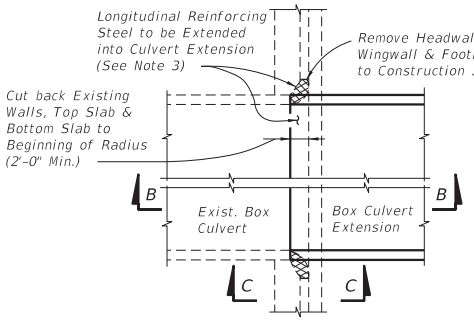
INTERIOR DOUBLE WALLS OF BOXES



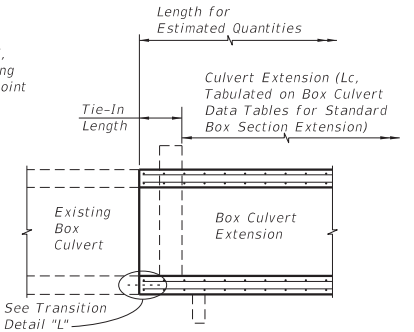
INTERIOR SINGLE WALLS OF BOXES



SECTION C-C



OUTSIDE WALLS OF BOXES



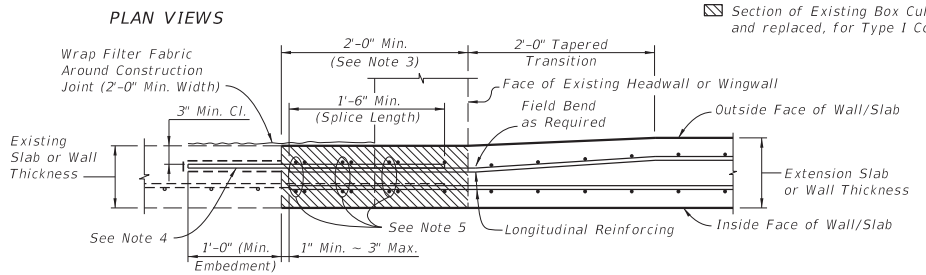
SECTION B-B

STRAIGHT WINGWALL

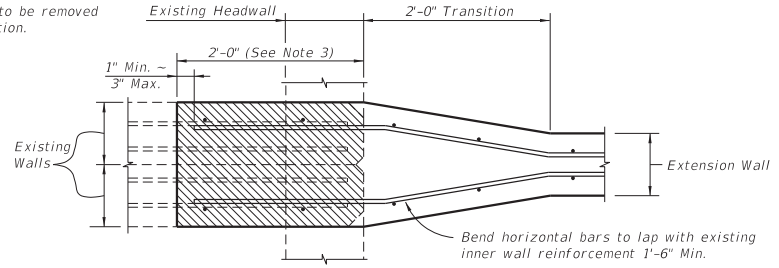
NOTES:

1. The Box Culvert Data Tables and Reinforcing Bar List do not include the additional quantities needed for dowel connections or transitions from double walls of existing concrete box culverts; the cost for additional reinforcement and the thickened concrete wall in the transitional area shall be included in the costs for concrete and steel in the culvert extension.
2. Cost for removal and disposal of material from existing headwalls, wingwalls and box, and cost of cleaning, straightening and extending or doweling longitudinal reinforcing steel shall be included in the cost for concrete and steel of the culvert extension.
3. Remove existing concrete while avoiding damage to existing reinforcement. Clean and straighten existing reinforcement, lap and tie onto extension reinforcement.
4. Dowel in #4 Bars @ 1'-0" max. spacing into wall/slab when there is a single mat of existing reinforcing steel, otherwise splice 1'-6" as shown for inside reinforcement. Use an Adhesive Bonding Material System in accordance with Specifications Section 416 & 937.
5. Provide additional transverse bars for top and bottom slab, parallel and full width of any skewed joint connection when shown in the Plans.
6. See Box Culvert Data Table notes in Plans for Connection Types allowed.

PLAN VIEWS



DETAIL "L" - TRANSITION FOR EXTERIOR WALL/SLAB EXTENSION
(Interior Single Walls Similar)



DETAIL "M" - TRANSITION FOR INTERIOR DOUBLE WALLS OF BOX CULVERTS

TYPE I CONNECTION DETAILS FOR CONCRETE BOX CULVERT EXTENSIONS (CUT BACK EXISTING CONCRETE)

LAST REVISION	REVISION	DESCRIPTION:				
01/01/12			FDOT 2014 DESIGN STANDARDS	CONCRETE BOX CULVERT DETAILS (LRFD)	INDEX NO. 289	SHEET NO. 6 of 8

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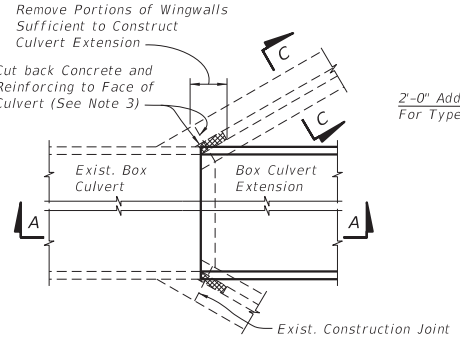
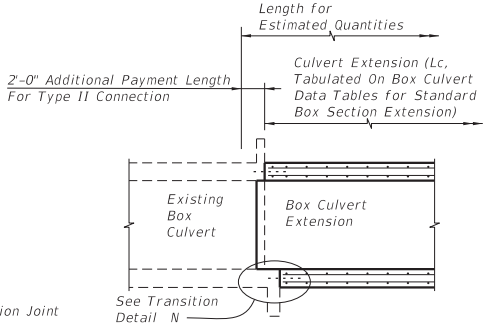
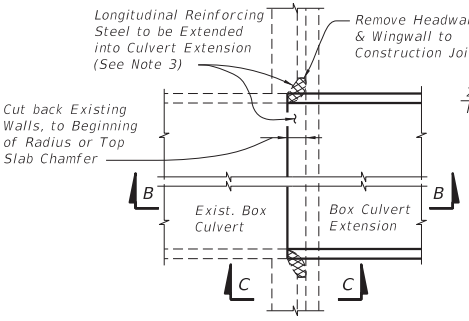


OUTSIDE WALLS OF BOXES

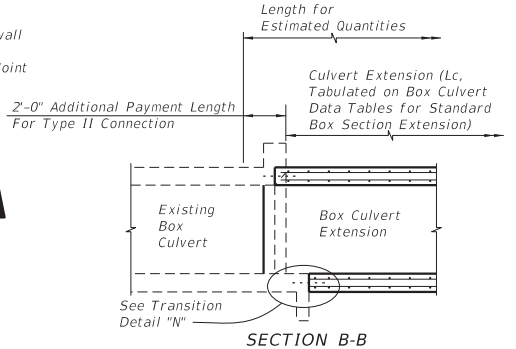


SECTION A-A

FLARED WINGWALL

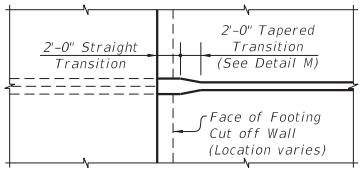


OUTSIDE WALLS OF BOXES

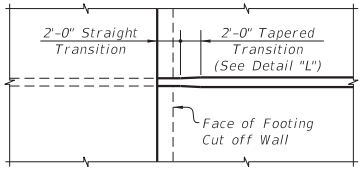


SECTION B-B

STRAIGHT WINGWALL

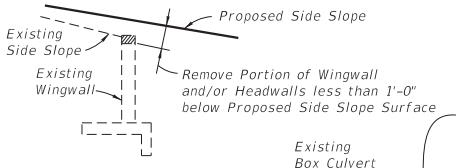


INTERIOR DOUBLE WALLS OF BOXES

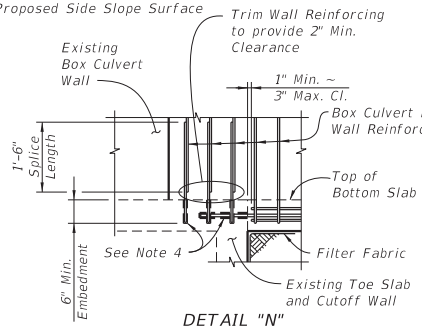


INTERIOR SINGLE WALLS OF BOXES

PLAN VIEWS



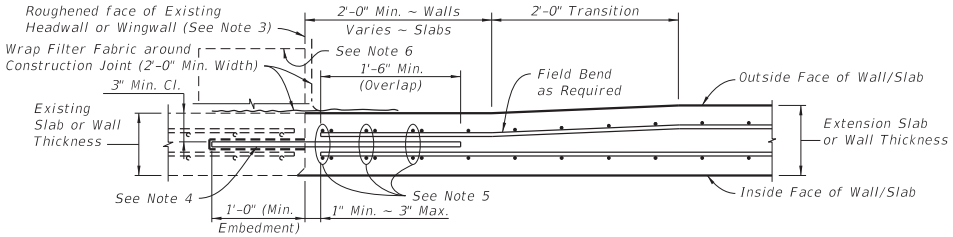
SECTION C-C



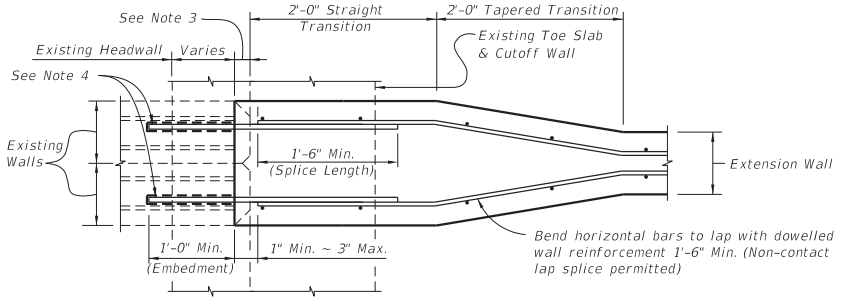
DETAIL "N"

NOTES:

1. The Box Culvert Data Tables and Reinforcing Bar List do not include the additional quantities needed for dowel connections or transitions from double walls of existing concrete box culverts; the cost for additional reinforcement and the thickened concrete wall in the transitional area shall be included in the costs for concrete and steel in the culvert extension.
2. Cost for roughening and cleaning existing headwalls, wingwalls and box, and cost of doweling longitudinal reinforcing steel shall be included in the cost for concrete and steel of the culvert extension.
3. Remove existing concrete and reinforcing back to edge of any chamfers exceeding 1". Roughen and clean existing or exposed surface and coat with a Type A epoxy bonding compound in accordance with the manufacturer's recommendations.
4. Dowel in #5 Bars @ 1'-0" max. spacing horizontally into center of wall/slab. Provide vertical dowels in footing to match size, alignment and spacing of outside vertical wall reinforcing. Use an Adhesive Bonding Material System in accordance with Specifications Section 416 & 937.
5. Provide additional transverse bars for top and bottom slab, parallel and full width of any skewed joint connection when shown in the Plans.
6. Remove top of existing headwall when necessary to provide 1'-0" clearance below finished grade. Saw cut full width and seal with Type F-2 epoxy compound to protect exposed reinforcing.
7. See Box Culvert Data Table notes in Plans for Connection Types allowed.



DETAIL "L" - TRANSITION FOR EXTERIOR WALL/SLAB EXTENSION
(Interior Single Walls Similar)



DETAIL "M" - TRANSITION FOR INTERIOR DOUBLE WALLS OF BOX CULVERTS

TYPE II CONNECTION DETAILS FOR CONCRETE BOX CULVERT EXTENSIONS
(ADHESIVE DOWEL TO EXISTING CONCRETE)

LAST REVISION	REVISION	DESCRIPTION:				
01/01/12			FDOT 2014 DESIGN STANDARDS	CONCRETE BOX CULVERT DETAILS (LRFD)	INDEX NO. 289	SHEET NO. 7 of 8

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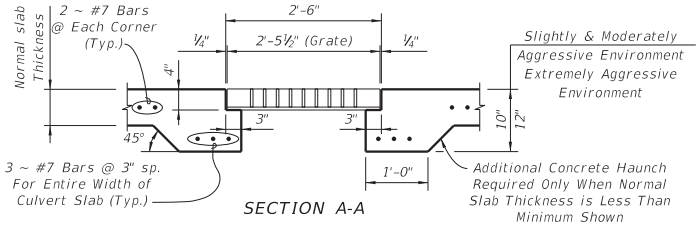
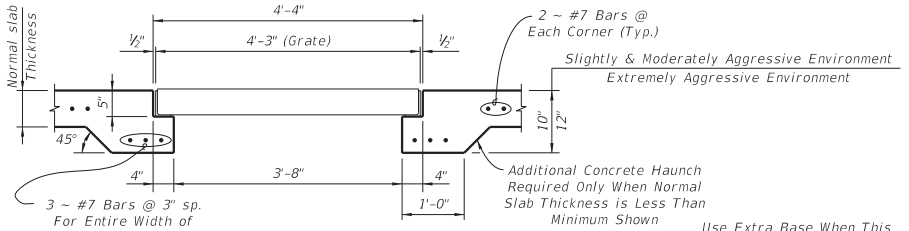
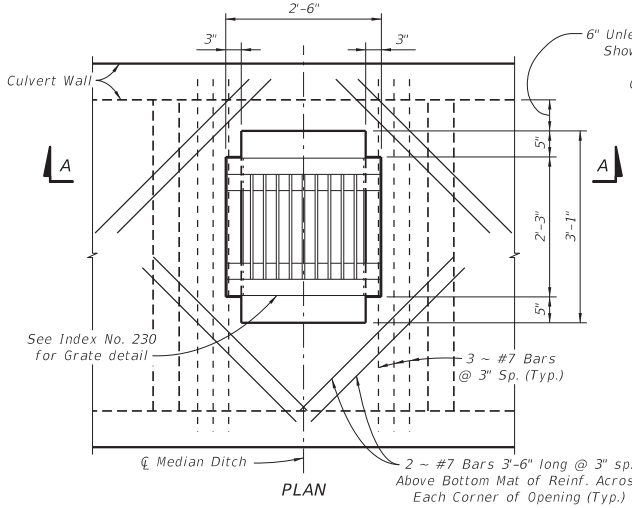


SECTION A-A

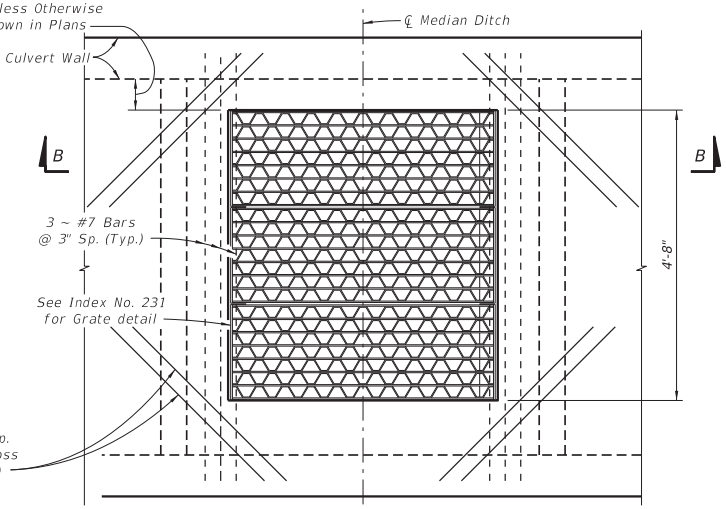


SECTION B-B



PLAN

INLET TYPE A GRATE

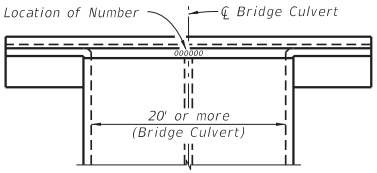


PLAN

INLET TYPE B GRATE

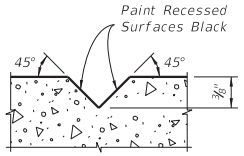
NOTES:
1. Cost of Steel Grating to be included in cost of Box Culvert.
2. All reinforcing shall be 2" clear for Slightly and Moderately Aggressive Environments, and 3" clear for Extremely Aggressive Environments.

INLET IN TOP OF BOX CULVERT



The number is to be placed in the center of the top surface of all bridge culvert headwalls. For Bridge Number see Plan-Profile sheet(s).

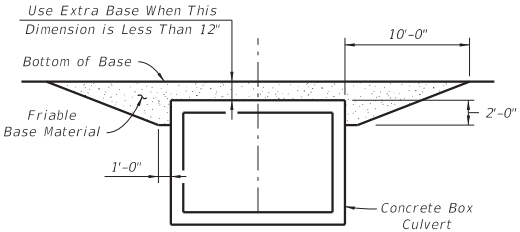
TOP VIEW OF HEADWALL



SECTION THRU RECESSED V-GROOVE TO FORM INSCRIBED FIGURES

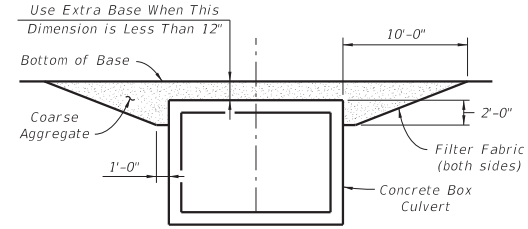
Black Plastic Figures 3" in height as approved by the Engineer may be used in lieu of numbers formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed figures.

BRIDGE CULVERT NUMBER LOCATION



The cost of furnishing and installing extra friable base material shall be included in the cost of the Box Culvert.

FRIABLE BASE



Place coarse aggregate in 6 inch lifts and compact sufficiently as to be firm and unyielding. Provide coarse aggregate gravel or stone meeting the requirements of Specification Section 901-2 or 901-3 respectively. Meet the gradation requirements of Specification Section 901-6, Grades 4, 467, 5, 56 or 57 unless restricted in the plans. Provide Type D-3 filter fabric (see Index No. 199). The cost of furnishing and installing the coarse aggregate and filter fabric shall be included in the cost of the Box Culvert.

ASPHALTIC CONCRETE BASE

NOTE: Extra base is required when cross box culverts are located on facilities subject to high speed traffic (>45 mph) or high traffic volumes (>1600 ADT) and the cover is within the range specified in the notation above.

EXTRA BASE FOR BOX CULVERTS CROSSING UNDER FLEXIBLE PAVEMENT

LAST REVISION	REVISION	DESCRIPTION:		INDEX NO.	SHEET NO.
01/01/12			FDOT 2014 DESIGN STANDARDS	289	8 of 8

CONCRETE BOX CULVERT DETAILS (LRFD)

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