FINAL
GEOTECHNICAL REPORT

PROJECT DEVELOPMENT AND ENVIRONMENT STUDY
US 19 (SR 55)
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

Work Program Item Segment No: 405822 1
Federal-Aid Program No: 1852 007 P

Prepared for:

Florida Department of Transportation
District Seven
11201 North McKinley Drive
Tampa, Florida 33612-6456

May 2004

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1.0 PROJECT INFORMATION

1.1 Introduction

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) Study for improvement alternatives along US 19 (SR 55) from south of US 98 (milepost 1.730) to CR 488 (milepost 20.742) in Citrus County, Florida. The project location map (Figure 2-1) illustrates the location and limits of the Study. This Figure is included in Appendix B.

1.2 Purpose

The purpose of the PD&E Study is to provide documented environmental and engineering analyses to assist the Department and Federal Highway Administration (FHWA) in reaching a decision on the type, location and conceptual design of the necessary improvements, in order to accommodate future traffic demand in a safe and efficient manner. The PD&E Study also satisfies the requirements of the National Environmental Policy Act (NEPA) and other Federal requirements in order to qualify the project for Federal-aid funding of future development phases of the project.

This Study documents the need for the improvements, and presents the procedures utilized to develop and evaluate various improvement alternatives. Information relating to the engineering and environmental characteristics essential for alternatives and analytical decisions was collected. Design criteria have been established and preliminary alternatives have been developed. The comparison of alternatives was based on a variety of parameters utilizing a matrix format. This process identified the alternative which would have the least impact, while providing the necessary improvements. **The design year for analysis is 2025.**

1.3 Project Description

The PD&E Study limits encompass the portion of US 19 from south of US 98 to North Dunnellon Road (CR 488) in western Citrus County (Sections 1, 12, 13, 24, and 25 of Township 20 South, Range 17 East; Sections 3, 10, 15, 22, 26, 27, 34, and 35 of Township 19 South, Range 17 East; Sections 5, 6, 8, 17, 20, 21, 22, 27, 28, and 34 of Township 18 South, Range 17 East; Sections 30 and 31 of Township 17 South, Range 17 East; and Section 25 of Township 17 South, Range 16 East). The total length of the Study is approximately 18.8 miles (mi). US 19 is primarily a north/south rural principal arterial which follows the West Coast of Florida. Within the project limits, US 19 is part of the National Highway System (NHS) and the Florida Intrastate Highway System (FIHS). The facility serves as a major evacuation route for residents in Citrus County.

For the purposes of evaluating improvement alternatives, the project was divided into six segments based on the existing and future land use, projected traffic volumes for the design year 2025, existing typical sections and available existing ROW. The project segments are as follows:

Segment 1: South of US 98 to West Green Acres Street; 4.86 mi
Segment 2: West Green Acres Street to West Jump Court; 2.07 mi
Segment 3: West Jump Court to West Fort Island Trail (CR 44); 4.65 mi
Segment 4: West Fort Island Trail (CR 44) to NE 1st Terrace; 0.86 mi
Segment 5: NE 1st Terrace to Turkey Oak Drive; 2.05 mi
Segment 6: Turkey Oak Drive to North Dunnellon Road (CR 488); 4.31 mi

1.4 Review of USGS Quadrangle Maps of Red Level, Crystal River, and Homosassa, Florida

Based on a review of the USGS Topographic Survey Maps for Red Level, Florida (NGVD dated 1990), Crystal River, Florida (NGVD dated 1988), and Homosassa, Florida (NGVD dated 1990), it appears that the project site elevations range from approximately 7 to 25 feet along US 19.

1.5 General Site Conditions

The proposed alignment generally traverses US 19, roadway corridor, and undeveloped land in the project area.

2.0 SCOPE OF SERVICES

2.1 Purpose and Scope of Services

The study was performed to obtain information on the existing subsurface conditions at the proposed project site to assist in the preparation of a Project Development and Environmental Report for the proposed improvements. The following services were provided:

1. Reviewed readily available published topographic and soils information. This information was obtained from the "Soil Survey of Citrus County, Florida" published by the United States Department of Agriculture (USDA) Soil Conservation Services (SCS).

2. Performed a Geotechnical field study for the proposed roadway improvements, which included fourteen (14) days of site reconnaissance. During this time period, approximately 200 auger borings were advanced to a depth of approximately five (5) feet below ground surface and eight

(8) power augur borings were advanced to a depth of approximately fifteen (15) feet below ground surface to confirm soil type and condition.

3. Performed a limited laboratory testing routine to establish the soil properties along the roadway alignment.

4. Prepared this Roadway Soil Survey Report for the project.

These Geotechnical Services were performed in general accordance with FDOT standards.

2.2 Review of USDA Soil Survey, Citrus County, Florida

Based on a review of the Citrus County Soil Survey (1988), it appears that there are 22 soil-mapping units noted within the project alignment. The general soil descriptions are presented in the sub-section below, as described in the Soil Survey.

2.2.1 Adamsville Fine Sand (2)

The Adamsville fine sand series consists of nearly level, poorly drained soils. A Seasonal High Groundwater Table (SHGWT) will be encountered at a depth ranging from 2.0 to 3.5 feet below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to November.

2.2.2 Basinger Fine Sand (5)

The Basinger fine sand series consists of nearly level, poorly drained soils. A SHGWT will be encountered at a depth ranging from 0 to 1.0 foot below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to February.

2.2.3 Basinger Fine Sand, Depressional (6)

The Basinger fine sand, depressional series consists of nearly level, poorly drained soils. A SHGWT will be encountered at a depth ranging from 2.0 feet above to 1.0 foot below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to February.

2.2.4 Myakka Fine Sand (7)

The Myakka fine sand series consists of nearly level, poorly drained soils. A SHGWT will be encountered at a depth ranging from 0 to 1.0 foot below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to November.

2.2.5 Tavares Fine Sand, 0 to 5 Percent Slopes (11)

The Tavares fine sand, 0 to 5 percent slopes series consists of nearly level to gently sloping and moderately well drained soils. A SHGWT will be encountered at a depth ranging from 3.5 to 6.0 feet below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to December.

2.2.6 Immokalee Fine Sand (12)

The Immokalee fine sand series consists of nearly level, poorly drained soils. A SHGWT will be encountered at a depth ranging from 0 to 1.0 foot below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to November.

2.2.7 Okeelanta Muck (13)

The Okeelanta muck series consists of nearly level, very poorly drained soils. A SHGWT will be encountered at a depth ranging from 1.0 foot above to existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to January.

2.2.8 Kendrick Fine Sand, 5 to 8 Percent Slopes (19)

The Kendrick fine sand series consists of well drained soils. A SHGWT will be encountered at a depth ranging from 6.0 feet below existing grades at the subject site (current ground surface) or deeper.

2.2.9 Pits (20)

The Pits series consists of irregularly-shaped, open Pits which the soil and other materials have been mined or excavated. No valid estimates can be made concerning the seasonal high water table.

2.2.10 Quartzipsamments, 0 to 5 Percent Slopes (22)

The Quartzipsamments, 0 to 5 percent slopes series consists of nearly level to gently sloping soils. No valid estimates can be made concerning the seasonal high water table.

1.2.11 Okeelanta-Lauderhill-Terra Ceia Muck (24)

The Okeelanta-Lauderhill-Terra Ceia muck series consists of nearly level, very poorly drained, well decomposed organic soils. A SHGWT will be encountered at a depth ranging from 1.0 foot above to 1.0 foot below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to January.

2.2.12 Redlevel Fine Sand (28)

The Redlevel fine sand series consists of nearly level, somewhat poorly drained soils. A SHGWT will be encountered at a depth ranging from 2.0 to 3.0 feet below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to November.

2.2.13 Sparr Fine Sand.o to 5 Percent Slopes (35)

The Sparr fine sand series consists of nearly level, somewhat poorly drained soils. A SHGWT will be encountered at a depth ranging from 1.5 to 3.5 feet below existing grades at the subject site (current ground surface) or at the predevelopment site grades from July to October.

2.2.14 EauGallie Fine Sand (36)

The EauGallie fine sand series consists of nearly level, poorly drained soils. A SHGWT will be encountered at a depth ranging from 0 to 1.0 foot below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to October.

2.2.15 Matlacha, Limestone Substratum-Urban Land (37)

The Matlacha, limestone substratum-Urban land series consists of nearly level, somewhat poorly drained Matlacha soil and areas of Urban land. A SHGWT will be encountered at a depth ranging from 2.0 to 3.0 feet below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to October.

2.2.16 EauGallie Fine Sand, Depressional (46)

The EauGallie fine sand, depressional series consists of nearly level, very poorly drained soils. A SHGWT table will be encountered at a depth ranging from 2.0 feet above to 1.0 foot below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to February.

2.2.17 Boca Fine Sand (53)

The Boca fine sand series consists of nearly level, poorly drained soils. A SHGWT will be encountered at a depth ranging from 0 to 1.0 foot below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to February.

2.2.18 Udorthents, 0 to 5 Percent Slopes (55)

The Udorthents series consists of nearly level to gently sloping manmade soils. No valid estimates can be made concerning the seasonal high water table.

2.2.19 Myakka, Limestone Substratum-EauGallie, Limestone Substratum Complex (58)

The Myakka, limestone substratum-EauGallie, limestone substratum complex series consists of nearly level, poorly drained soils. A SHGWT will be encountered at a depth ranging from 0 to 1.0 foot below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to October.

2.2.20 Boca Fine Sand, Depressional (59)

The Boca fine sand, depressional series consists of nearly level, poorly drained soils. A SHGWT will be encountered at a depth ranging from 2.0 feet above to 1.0 foot below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to February.

2.2.21 Broward Fine Sand (60)

The Broward fine sand series consists of nearly level, somewhat poorly drained soils. A SHGWT will be encountered at a depth ranging from 1.5 to 2.5 feet below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to November.

2.2.22 Citronella Fine Sand (64)

The Citronella fine sand series consists of nearly level, somewhat poorly drained soils. A SHGWT will be encountered at a depth ranging from 2.0 to 3.0 feet below existing grades at the subject site (current ground surface) or at the predevelopment site grades from June to September.

2.3 Auger Boring Process

To evaluate the subsurface conditions and groundwater table levels among the project area, auger borings were performed between approximate station numbers 100+00 and 1105+00. The auger borings were performed to depths of approximately five (5) feet below existing grade by advancing a bucket auger into the ground, typically in 6-inch increments. As each soil type was revealed, representative samples were placed in airtight jars and returned to our office for review by a Geotechnical engineer for confirmation of the field classification.

2.4 Regional Geology

As stated in the USDA Soil Survey for Citrus County, Florida, the subject corridor is located in the Gulf Coastal Lowlands. The Gulf Coastal Lowlands extend the entire length of Citrus County. The lowlands range in elevation from sea level to 100 feet above sea level. In the coastal lowlands are the coastal swamps and marine terraces of Pleistocene age (10,000 to 1.6 million years ago).

The westernmost region is the Coastal Swamps. This region is defined as an area that included all continuous freshwater swamps and saltwater marshes adjacent to the Gulf of Mexico. The region is a low energy, saltwater or freshwater environment with insufficient sand to build beaches. Sediment has in many places been conducive to the establishment of vegetation.

The marine terraces are gently sloping features with seaward-facing escarpments. These features formed when sedimentary materials were alternately deposited, and they eroded as sea level rose and fell. The Pamlico Terrace is at an elevation of about 25 feet and the Wicomico Terrace is at an elevation of about 100 feet. These are the main terrace features in Citrus County. Also associated with the coastal lowlands are ancient dune features. The lowlands are composed of sand and clayey sand of variable thickness underlain by Eocene and Oligocene limestone and dolomite.

3.0 RESULTS OF SUBSURFACE EXPLORATION

3.1 General Soil Condition

Typically, sandy soils were encountered within the full depth of the borings performed. Some highly organic materials were encountered at approximate stations 273+00, 427+00, 606+85, and 637+00; and some plastic soils were encountered at approximate stations 273+00, 435+58, 585+00, 19+30, 870+00, 890+00, and 1075+00. Shallow limestone was encountered between stations

845+00 and 1080+00. The limestone stratum is typically referred to as "cap-rock" and will adversely affect utility excavations and/or foundation locations. The limestone stratum was encountered at depths ranging from 2 to 5 feet deep and extended to depths greater than 15 feet below existing grade.

The soil types encountered during exploration have been assigned a stratum number. The stratum numbers and soil types associated with this project are listed below.

Stratum Number	Typical Soil Description	AASHTO Classification
1	Light Brown to Dark Brown to Gray Fine Sand (Fill)	A-3
2	Dark to Reddish Brown to Gray Fine Sand	A-3
3	Tan to Reddish Brown Slightly Silty Fine Sand	A-2-4
4	Light Tan to Orange Slightly Silty to Slightly Clayey Fine Sand	A-2-4, A-2-6
5	Muck	A-8
6	Weathered Limestone	N/A
7	Reddish to Blue/Green Clay	A-6, A-7-6

A Geotechnical engineer bases soil stratification on a visual review of the recovered samples, laboratory testing and interpretation of the field boring logs. The boring stratification lines represent the approximate boundaries between soil types of significantly different engineering properties; however, 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 boring profiles represent the conditions at the particular boring location and variations do occur among the borings. The results of the auger borings performed for this project are presented in Appendix C. Station markers were not present in the existing roadway. The borings were located in the field by using the site features as reference.

3.2 Photo Reconnaissance

A photo log was taken from various points along the proposed alignment. The photographs present a record of the areas explored and the condition of the sites at the time of the soil review.

Photo 1 & 2
West Cardinal Street and US 19 intersection. Photo 1 is Station 261+90, 120 RT. looking northwest across the intersection. Photo 2 is Station 261+90, 50 RT. looking north. The North Bound lanes are approximately 1½ to 2 feet higher in elevation.

Photo 3
Approximate Station 272+00, 120 RT. A culvert crosses under US 19. Head walls may need to be extended based on final roadway geometry.

Photo 4
Approximate Station 273+00, 30 LT facing north. The area was tested for the presence of soil considered detrimental to the roadway corridor. Muck and plastic materials were encountered.

Photo 5
Station 369+50, 20 LT. US 19 and West Green Acres Street intersection looking northeast across the intersection. The North Bound lanes are still 2 to 2½ feet higher in elevation.

Photos 6
Station 413+00, 20 LT is near the W Yulee Drive and US 19 intersection. Raised concrete median looking north on US 19.

Photo 7
Station 424+40, 60 RT. Curb and gutter looking south on US 19. Curb and gutter starts at West Yulee Drive (CR490) and extends north.

Photo 8 & 9
A culvert crossing under US 19. Photo 8 is Station 430+10, 80 LT.; a culvert on the South Bound of US 19 looking southeast. Photo 9 is Station 430+10, 50RT.; a culvert on the North Bound of US 19 looking west. The culverts are just north of Homosassa Springs Park. A headwall is located approximately 25 feet west of the South Bound lanes and 23½ feet east of the North Bound lanes. A 12-inch diameter potable water supply runs through the culvert under US 19 and an 8-inch diameter water supply was noted on the east side of the alignment.

Photo 10
Station 443+10, 30 RT. US 19 looking north. Curb and gutters have stopped north of Homosassa Springs. Curb and gutters stop at approximate Station 442+00.

Photo 11 & 12
Photo 11 is Station 271+00, 80 RT and Photo 12 is Station 467+00, 20 RT. These photos depict road oxidation on North Bound lanes. Stress cracks are more prevalent for the North Bound lanes.

Photo 13
Approximate Station 606+85. Photo 13 depicts the east side of US 19 looking north. The area was tested for the presence of soil considered detrimental to the roadway corridor. Muck was encountered within the limits of the relic cypress head.

Photo 14
Station 658+00, 20 LT. Looking east across North Bound US 19 at the Crystal River Airport main runways.

Photo 15
Station 704+10, 40 RT. Looking north on US 19 North Bound ROW.

Photo 16 & 17

Photo 16 depicts Station 714+00 (Fort Island Trail and US 19 Intersection) and Photo 17 depicts Station 38+80, 100 RT. In Photo 16 North Bound US 19 goes to three (3) lanes, while South Bound drops to two (2) lanes. In Photo 17 North Bound US 19 drops to two (2) lanes, while South Bound goes to three (3) lanes.

Photo 18 & 19

Station 858+50, standing in the median, facing north. Photo 18 depicts an extra North Bound right turn lane at Crystal River Mall. Photo 19 at Station 858+50 in the median facing north, depicts two (2) lanes on US 19 South Bound.

4.0 LABORATORY TESTING

4.1 General

Representative soil samples collected from the auger borings were classified and stratified in general accordance with the AASHTO Soil Classification System. Our classification was based on visual inspection, using the results from the laboratory testing as confirmation. Laboratory tests were assigned to aid in classification of the explored soils. These tests included organic content, grain-size analyses, Atterberg Limits and natural moisture content determination. Corrosion tests were assigned on selected soil samples to provide a basis for environmental classification. These test included pH, resistivity, sulfate and chloride contents. The following list summarizes the laboratory tests performed by type and number:

Organic Content	4
Grain Size Analysis	18
Minus 200	13
Atterberg Limits	15
Natural Moisture Content	14
Environmental Corrosion Tests	9

A detailed summary of the laboratory tests performed with the corresponding results is presented in Appendix D.

4.2 Soil Classification

The auger boring soil samples were classified using the Unified Soil Classification System in general accordance with the ASTM test designation D-2487. This test method classifies soils into specific categories based on the results of the laboratory testing program. The assignment of a group name and symbol is then used to aid in the evaluation of the significant engineering properties of a soil.

4.3 Organic Content

Moisture free samples are used for this test. Drying is accomplished by heating the samples in a warm (230^{o} F) oven. The dried soil samples are then heated in a muffle furnace at a temperature of 833^{o} F for six hours, thereby burning off all organic-type material, leaving only the soil minerals. The difference in weight prior to and after the burning is the weight of the organics. The weight of the organics divided by the weight of the dried soil before the burning process is the percentage of organics within the sample. Organic contents that exceed five (5) percent are considered detrimental by FDOT criteria. Tests were performed in general accordance with AASHTO T-267.

4.4 Grain-Size Analysis

The grain-size analyses were conducted in general accordance with the AASHTO test designation T-088 (ASTM test designation D-422). The grain-size analysis test measures the percentage by weight of a dry soil sample passing a series of U.S. standard sieves, including the percentage passing No. 200 Sieve. In this manner, the grain-size distribution of a soil is measured. The percentage by weight passing the No. 200 Sieve is the amount of silt and clay sized particles. The soil gradation, including the amount of silt and clay in a soil, affects its engineering properties, including permeability, consolidation rate, suitability as roadway subgrade, and suitability as general fill material.

4.5 Atterberg Limits

The liquid limit and the plastic limit tests ("Atterberg Limits") were conducted in general accordance with the AASHTO test designations T-080 and T-090, respectively (ASTM test designation D-4318). Atterberg plastic limit and liquid limit tests measure the moisture content at which fine-grained soil changes from a semi-solid to plastic state and from a plastic to a liquid state, respectively. The plasticity index is the difference between the liquid and plastic limits. The plasticity index is a rough indication of the tendency of a soil to absorb water on the particle surfaces. Some clays have a strong affinity for water, and tend to swell when wetted and shrink when dried. The larger the plastic index, the greater the shrink-swell tendency.

4.6 Moisture Content

The laboratory moisture content test consists of the determination of the percentage of moisture contents in selected samples in general accordance with AASHTO test designation T-265 (ASTM test designation D-2216). Briefly, natural moisture content is determined by weighing a sample of the selected material and then drying it in an oven. Care is taken to use a temperature of 230^{o} F and does not destroy any organics. The sample is removed from the oven and reweighed. The difference of the two weights is the amount of moisture removed from the sample. The weight of the moisture divided by the weight of the dry soil sample is the percentage by weight of the moisture in the sample.

4.7 Environmental Classification

Environmental corrosion tests were conducted in accordance with the FDOT test designations FM 5-550, FM 5-551, FM 5-552, FM 5-553. These test were performed on recovered soil samples obtained from auger borings drilled along the project alignment. Environmental corrosion tests measure parameters such as pH, resistivity, sulfate content and chloride content. Based on the laboratory test results and our on-site observations, the FDOT Structures Design Guidelines, Topic No. 625-020-150-a, Section 7.2, classifications of these soils ranged from slightly to extremely aggressive. The results obtained are presented in the Corrosion Test Results table in Appendix D.

5.0 GROUNDWATER CONDITIONS

5.1 Groundwater

The groundwater table was encountered in some of the borings performed. The groundwater table data is reflected on each soil profile in Appendix C.

Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences (i.e. existing swells, drainage ponds, underdrains and areas of covered soils like, paved parking lots and sidewalks).

5.2 Seasonal High Groundwater Estimates

Estimated seasonal high groundwater table levels are expected to range from ground surface to greater than six (6) feet below existing grades along the project. The seasonal high groundwater for each USDA soil type in presented in Appendix A. The majority of the roadway alignment is constructed with elevated embankments with the exception of the alignment through Homosassa Springs and Crystal River. The roadway in these areas appears to be constructed at or near minimum grade separation with respect to seasonal high groundwater levels. These estimates were based on soil stratigraphy, measured groundwater levels from the borings, the Citrus County, Florida USDA Soil Survey information and past experience with similar soil conditions.

6.0 ENGINEERING EVALUATIONS AND RECOMMENDATIONS

6.1 General

In general, the existing shallow subsurface soils encountered in the borings performed are suitable for supporting the proposed roadway widening after proper subgrade preparation. Typically, sandy soils were encountered within the full depth of the borings performed. Some highly organic materials were encountered at approximate stations 273+00, 427+00, 606+85, and 637+00; and some plastic soils were encountered at approximate stations 273+00, 435+58, 585+00, 19+30, 870+00, 890+00, and 1075+00. Shallow limestone was encountered between stations 845+00 and 1080+00. The limestone stratum is typically referred to as "cap-rock" and will adversely affect utility excavations and/or foundation locations.

The limestone stratum was encountered at depths ranging from 2 to 5 feet deep and extended to depths greater than 15 feet below existing grade. If buried organic soils, debris or unsuitable fills are encountered during construction, which are not shown on the boring profiles, they should be removed and replaced with clean, compacted, sandy soils. Similarly, plastic soils encountered within the pavement section should be removed and placed in areas not affecting pavement performance. The removal of top-soils, clayey soils, and other surficial organic soils should be accomplished in accordance with the Florida Department of Transportation (FDOT) Standard Indexes 500 and 505. Site preparation should consist of normal clearing and grubbing followed by compaction of subgrade soils. Backfill should consist of materials conforming to FDOT Standard Index 505 and compacted in accordance with Section 120-9 of the Standard Specification for Road and Bridge Construction, latest edition.

6.2 Embankment Construction

Embankments should be constructed using materials in accordance with FDOT Standard Index 505. This requires the use of soils with AASHTO Classification of A-1, A-3, or A-2-4 in the upper 4 feet below the bottom of base or asphaltic concrete pavement, while soils with AASHTO Classification A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, and A-7 (all with liquid limits less than 50) may be used in the lower portions of the embankment.

Site preparation should consist of stripping and grubbing of topsoil and surface vegetation followed by compaction of the fill and subgrade soils. Upon completion of stripping and clearing operations, the resulting subgrade surface should be compacted in accordance with the Standard Specification for Road and Bridge Construction (SSRBC). Placement of the embankment fill materials may then begin.

Clean sand materials (A-1, A-3, and A-2-4) can generally be placed in 12-inch loose lifts for the embankment. Other materials with more fines are likely to require drying and placement in thinner lifts. The embankment fill areas should be constructed in accordance with Section 120-8 of FDOT Standard Specifications for Road and Bridge Construction.

In general, the existing shallow subsurface soils appear to be capable of supporting the construction of the proposed roadway improvements and a typical pavement section after proper subgrade preparation. Subgrade preparation will include the removal of any surficial and buried organic soils within the proposed roadway pavement widths and shoulders in accordance with FDOT Index 505.

6.3 General Roadway Construction

The roadway soil will need to be prepared in general accordance to FDOT design guidelines. These recommendations should be used as a guideline for the project general specifications, which are prepared by the Design Engineer. Site preparation and filling should be in accordance with FDOT Standard Specifications for Road and Bridge Construction (SSRBC) and Standard Index 505.

7.0 REPORT LIMITATIONS

The Geotechnical engineering evaluation of the site and subsurface conditions with respect to the planned roadway improvements and our recommendations for site preparation and foundation construction are based upon the following: (1) site observations, (2) the field exploratory test data obtained during the geotechnical study, and (3) our understanding of the project information and anticipated final grades as presented in this report. The information provided is to support the PD&E Study and not intended for use in roadway construction plan preparation.

APPENDIX A

USDA Seasonal High Groundwater Table Estimates and Soil Survey Information

Seasonal High Groundwater Table Estimates
US 19 PD & E, South of US 98 to CR 488, Citrus County, FL
FPN: 405822 1 22 01
Tierra Project No. 6511-01-010

Citrus County USDA Soil Survey Information							
USDA Map Unit	**Soil Classification**			**Permeability (in/hr)**	**pH**	**Seasonal High Groundwater**	
	Depth (in)	**USCS**	**AASHTO**			**Depth (in)**	**Months of year**
2 Adamsville	0-7	SP-SM	A-3, A-2-4	6.0-20	4.5-7.8	2.0-3.5	June-Nov
	7-80	SP-SM, SP	A-3, A-2-4	6.0-20	4.5-7.8		
5 Basinger	0-8	SP	A-3	6.0-20	3.6-8.4	0-1.0	June-Feb
	8-24	SP, SP-SM	A-3, A-2-4	6.0-20	3.6-7.3		
	24-80	SP, SP-SM	A-3, A-2-4	6.0-20	3.6-7.3		
	36-60	SP, SP-SM	A-3, A-2-4	6.0-20	3.6-7.3		
6 Basinger	0-19	SP	A-3	6.0-20	3.6-7.3	+2-1.0	June-Feb
	19-31	SP, SP-SM	A-3, A-2-4	6.0-20	3.6-7.3		
	31-80	SP, SP-SM	A-3, A-2-4	6.0-20	3.6-7.3		
	42-80	SP, SP-SM	A-3, A-2-4	6.0-20	3.6-7.3		
7 Myakka	0-27	SP, SP-SM	A-3	6.0-20	3.6-6.5	0-1.0	June-Nov
	27-55	SM, SP-SM	A-3, A-2-4	0.6-6.0	3.6-6.5		
	55-80	SP, SP-SM	A-3	6.0-20	3.6-6.5		
11 Tavares	0-3	SP, SP-SM	A-3	>6.0	3.6-6.0	3.5-6.0	June-Dec
	3-80	SP, SP-SM	A-3	>6.0	3.6-6.0		
12 Immokalee	0-6	SP, SP-SM	A-3	6.0-20	3.6-6.0	0-1.0	June-Nov
	6-33	SP, SP-SM	A-3	6.0-20	3.6-6.0		
	33-52	SP-SM, SM	A-3, A-2-4	0.6-2.0	3.6-6.0		
	52-80	SP, SP-SM	A-3	6.0-20	3.6-6.0		

Seasonal High Groundwater Table Estimates
US 19 PD & E, South of US 98 to CR 488, Citrus County, FL
FPN: 405822 1 22 01
Tierra Project No. 6511-01-010

Citrus County USDA Soil Survey Information

USDA Map Unit	Soil Classification			Permeability (in/hr)	pH	Seasonal High Groundwater	
	Depth (in)	USCS	AASHTO			Depth (in)	Months of year
13 Okeelanta	0-38	PT	A-8	6.0-20	4.5-6.5	+1-0	June-Jan
	38-80	SP, SP-SM, SM	A-3, A-2-4	6.0-20	5.1-7.8		
19 Kendrick	0-26	SP, SP-SM	A-3, A-2-4	6.0-20	4.5-6.0	>6.0	
	26-30	SC, SM-SC	A-2-6, A-2-4, A-6, A-4	0.6-6.0	4.5-6.0		
	30-56	SC	A-2-6, A-6	0.06-2.0	4.5-6.0		
	56-80	SC, SM-SC	A-2-6, A-2-4	<0.0-2.0	4.5-6.0		
20 Pitts	No Data Available						
22 Quartzipsamments	No Data Available						
24 Okeelanta	0-32	PT	A-8	6.0-20	4.5-6.5	+1-0	June-Jan
	32-80	SP, SP-SM, SM	A-3, A-2-4	6.0-20	5.1-7.8		
24 Lauderhill	0-26	PT		6.0-20	5.6-7.8	+1-1.0	Jun-Feb
	26						
24 Terra Ceia	0-80	PT	A-8	6.0-20	4.5-8.4	+1-1.0	Jan-Dec
	65-80	SP, SP-SM	A-3, A-2-4	6.0-20	4.5-8.4		
28 Redlevel	0-7	SP-SM	A-3	6.0-20	4.5-8.4	2.0-3.0	June-Nov
	7-55	SP-SM	A-3	6.0-20	4.5-8.4		
	55						

Seasonal High Groundwater Table Estimates
US 19 PD & E, South of US 98 to CR 488, Citrus County, FL
FPN: 405822 1 22 01
Tierra Project No. 6511-01-010

Citrus County USDA Soil Survey Information							
USDA Map Unit	Soil Classification			Permeability (in/hr)	pH	Seasonal High Groundwater	
	Depth (in)	USCS	AASHTO			Depth (in)	Months of year
35 Sparr	0-8	SP-SM, SM	A-3, A-2-4	6.0-20	3.6-6.5	1.5-3.5	July-Oct
	8-61	SP-SM, SM	A-3, A-2-4	6.0-20	3.6-6.5		
	61-71	SM-SC, SC, SM	A-2-4	0.6-2.0	3.6-6.5		
	71-80	SC, SM-SC	A-2, A-4, A-6	0.06-0.6	3.6-6.5		
36 EauGallie	0-22	SP, SP-SM	A-3	6.0-20	4.5-6.0	0-1.0	June-Oct
	22-53	SP-SM, SM	A-3, A-2-4	0.6-6.0	4.5-6.5		
	53-80	SM, SM-SC, SC	A-2-4, A-2-6	0.06-2.0	4.5-7.8		
37 Matlacha-Urban land	0-42	SP-SM	A-3, A-2-4	2.0-6.0	5.6-8.4	2.0-3.0	June-Oct
	42-60	SP, SP-SM	A-3	6.0-20	5.6-7.3		
	60						
46 EauGallie	0-21	SP. SP-SM	A-3	6.0-20	4.5-6.0	+2-1.0	June-Feb
	21-32	SP-SM, SM	A-3, A-2-4	0.6-6.0	4.5-6.5		
	32-46	SP, SP-SM	A-3, A-2-4	6.0-20	4.5-7.8		
	46-80	SM, SM-SC, SC	A-2-4, A-2-6	0.06-2.0	4.5-7.8		
53 Boca	0-5	SP, SP-SM	A-3, A-2-4	6.0-20	5.1-8.4	0-1.0	June-Feb
	5-21	SP, SP-SM	A-3, A-2-4	6.0-20	5.1-8.4		
	21-38	SC	A-2-4, A-6, A-2-6	0.6-2.0	5.1-8.4		
	38						
55 Udorthents	No Data Available						

Seasonal High Groundwater Table Estimates
US 19 PD & E, South of US 98 to CR 488, Citrus County, FL
FPN: 405822 1 22 01
Tierra Project No. 6511-01-010

Citrus County USDA Soil Survey Information							
USDA Map Unit	Soil Classification			Permeability (in/hr)	pH	Seasonal High Groundwater	
	Depth (in)	USCS	AASHTO			Depth (in)	Months of year
Myakka 58	0-23	SP, SP-SM	A-3	6.0-20	5.1-7.8	0-1.0	June-Oct
	23-24	SM, SP-SM	A-3, A-2-4	0.6-6.0	5.1-7.8		
	34-62	SP, SP-SM	A-3	6.0-20	5.1-7.8		
	62						
EauGallie	0-25	SP, SP-SM	A-3	6.0-20	4.5-6.0	0-1.0	June-Oct
	25-33	SP-SM, SM	A-3, A-2-4	0.6-6.0	4.5-6.5		
	33-57	SP, SP-SM	A-3, A-2-4	6.0-20	5.1-7.8		
	57-63	SM. SM-SC, SC	A-2-4, A-2-6	0.2-6.0	5.1-7.8		
	63						
59 Boca	0-8	SP, SP-SM	A-3, A-2-4	6.0-20	5.1-7.8	+2-1.0	June-Feb
	8-21	SP, SP-SM	A-3, A-2-4	6.0-20	5.1-8.4		
	21-27	SM-SC, SC	A-2-4, A-6, A-2-4, A-4	0.6-2.0	5.1-8.4		
	27						
60 Broward	0-5	SP-SM	A-3, A-2-4	6.0-20	5.6-8.4	1.5-2.5	June-Nov
	5-35	SP, SP-SM	A-3, A-2-4	6.0-20	5.6-8.4		
	26						
64 Citronelle	0-2	SP-SM, SP	A-3	0.6-6.0	5.1-8.4	2.0-3.0	June-Sept
	2-9	SP-SM	A-3, A-2-4	0.6-6.0	5.1-8.4		
	9						

APPENDIX B

Project Location Map – Figure 2-1

Base Maps Sheets 00 through 37

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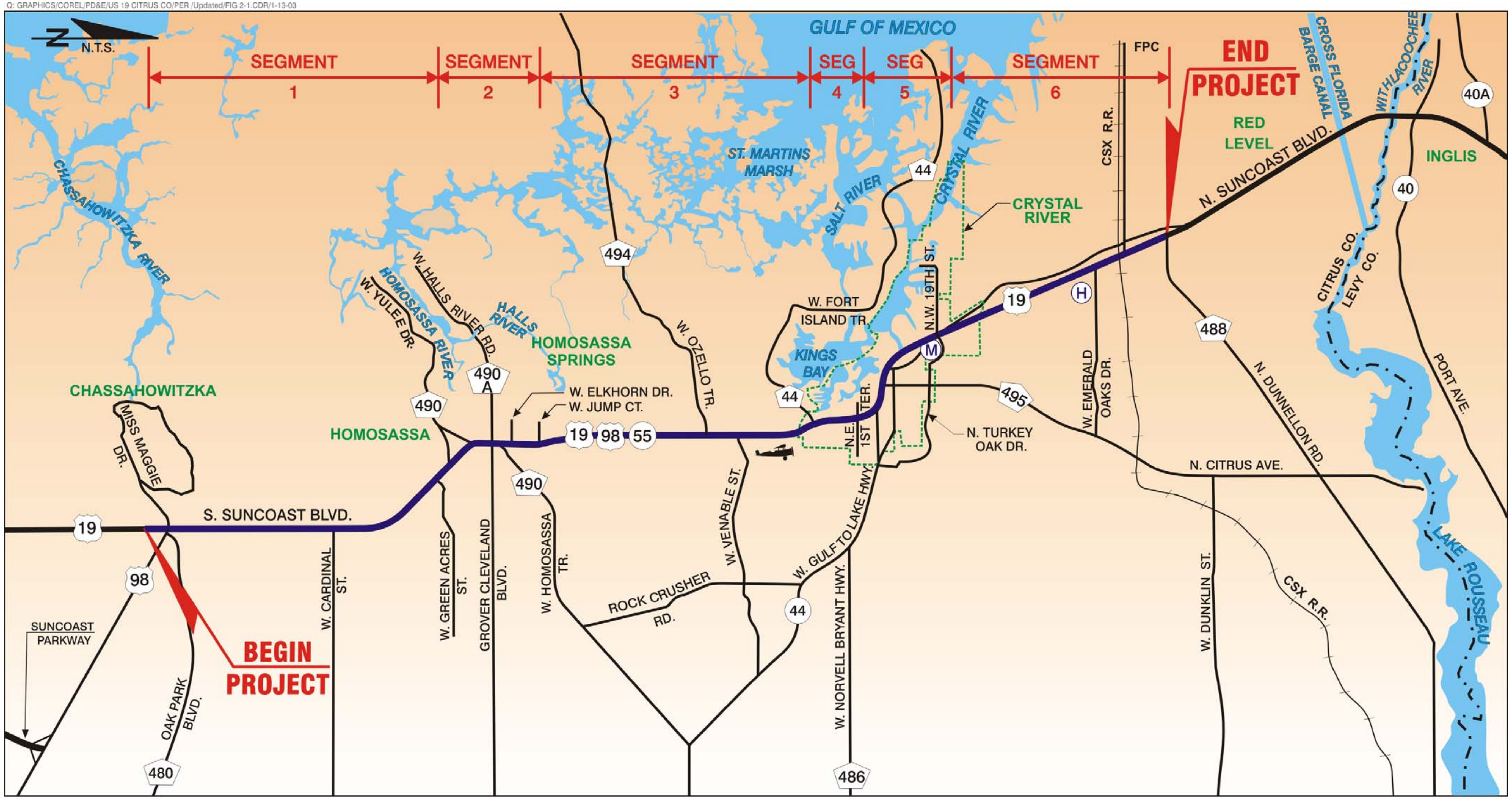


LEGEND

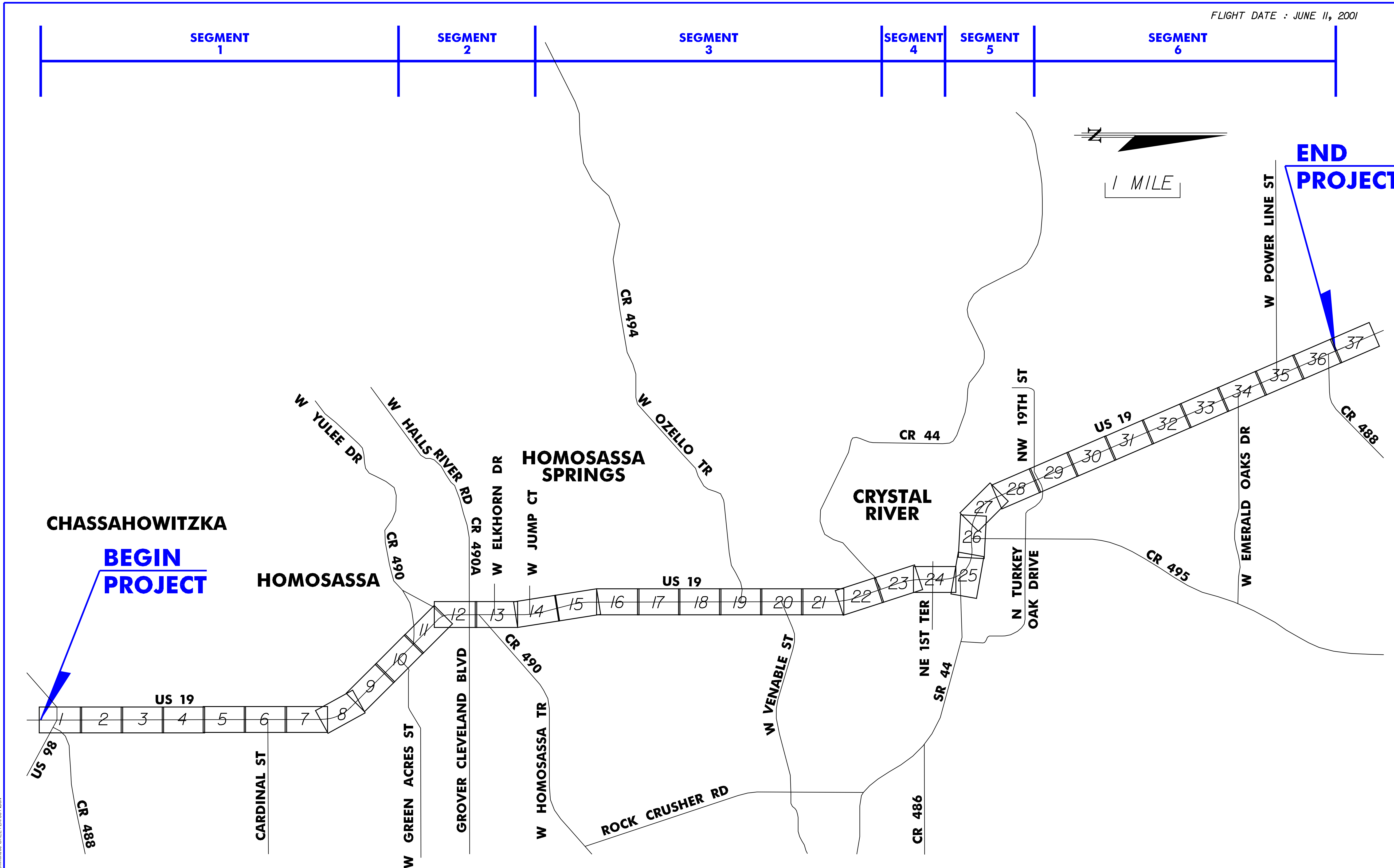
- US 19 Project Limits
- Crystal River Airport
- Crystal River City Limits
- (H) Seven Rivers Community Hospital
- (M) Crystal River Mall

US 19 (SR 55)
PD&E STUDY
From South of US 98 to CR 488
Citrus County, Florida

PROJECT LOCATION MAP

WPI SEG NO: 405822 1
FAP: 1852 007 P

FIGURE 2-1



1 PLAN SHEET LAYOUT

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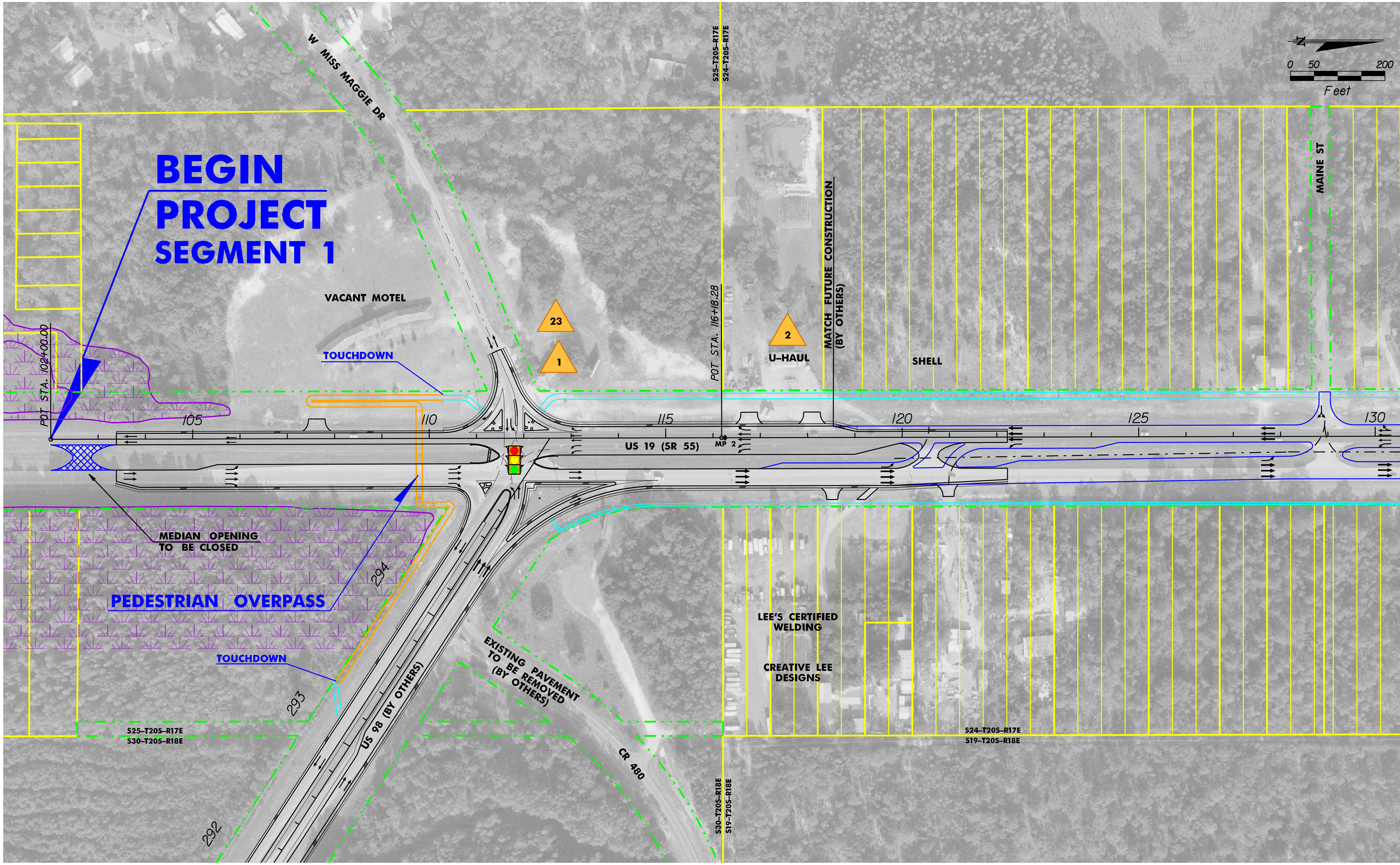
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
00

FLIGHT DATE : JUNE 11, 2001



SEGMENT 1 RECOMMENDED ALTERNATIVE

	EXISTING RIGHT OF WAY OR EASEMENT
	PROPERTY LINES
120 / MP 3	BASELINE SURVEY / MILEPOST
	CENTERLINE OF CONSTRUCTION
	PROPOSED PAVEMENT / CURB
X	POTENTIAL CONTAMINATION SITE
	PROPOSED RIGHT OF WAY
	BRIDGE STRUCTURE OR RETAINING WALL
	PROPOSED SIDEWALK OR MULTI-USE PATH
	WETLANDS WITHIN STUDY AREA
B R NP	BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION

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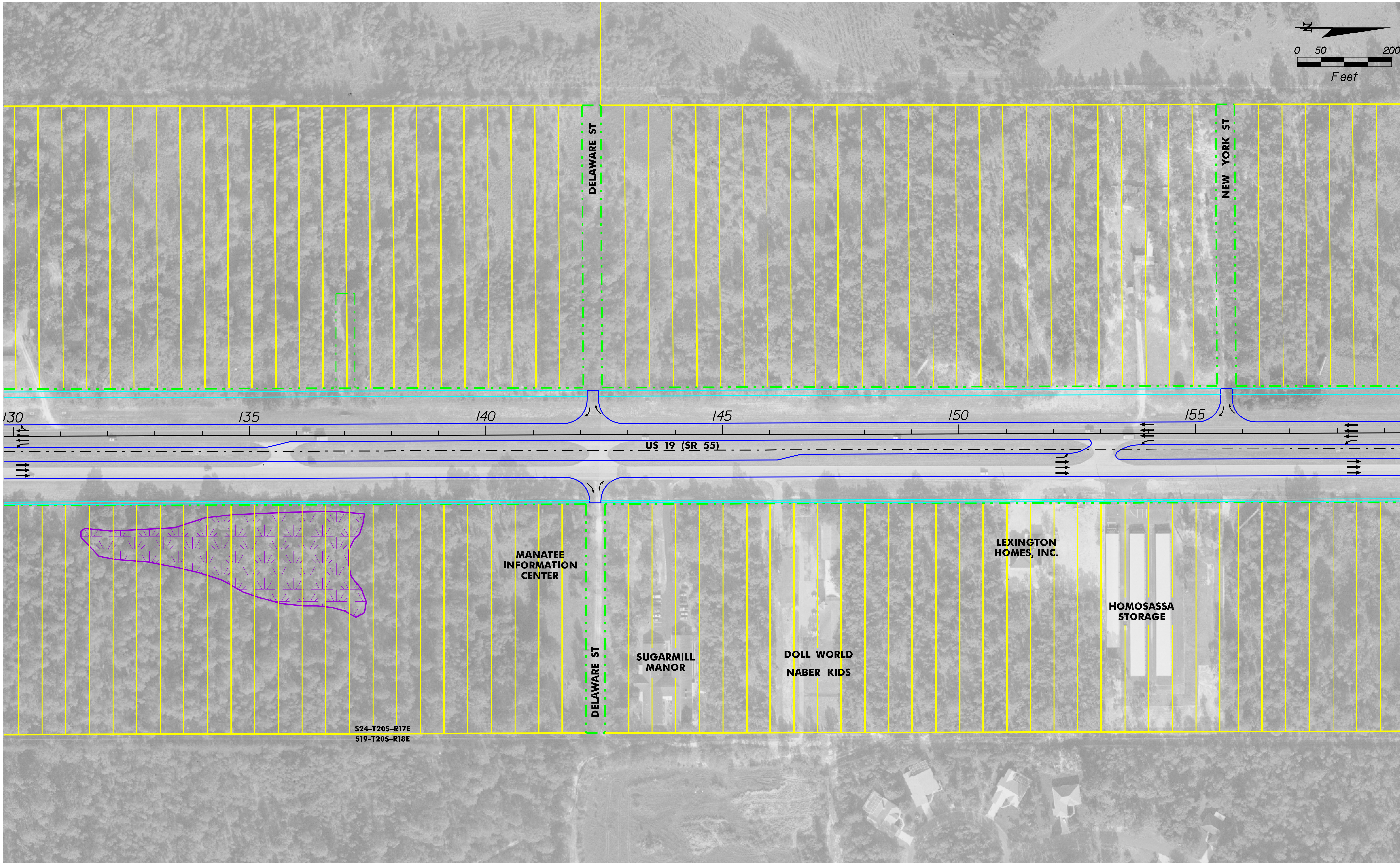

SEGMENT 1 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT
PROPERTY LINES
BASELINE SURVEY (120)
MILEPOST (MP 3)
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
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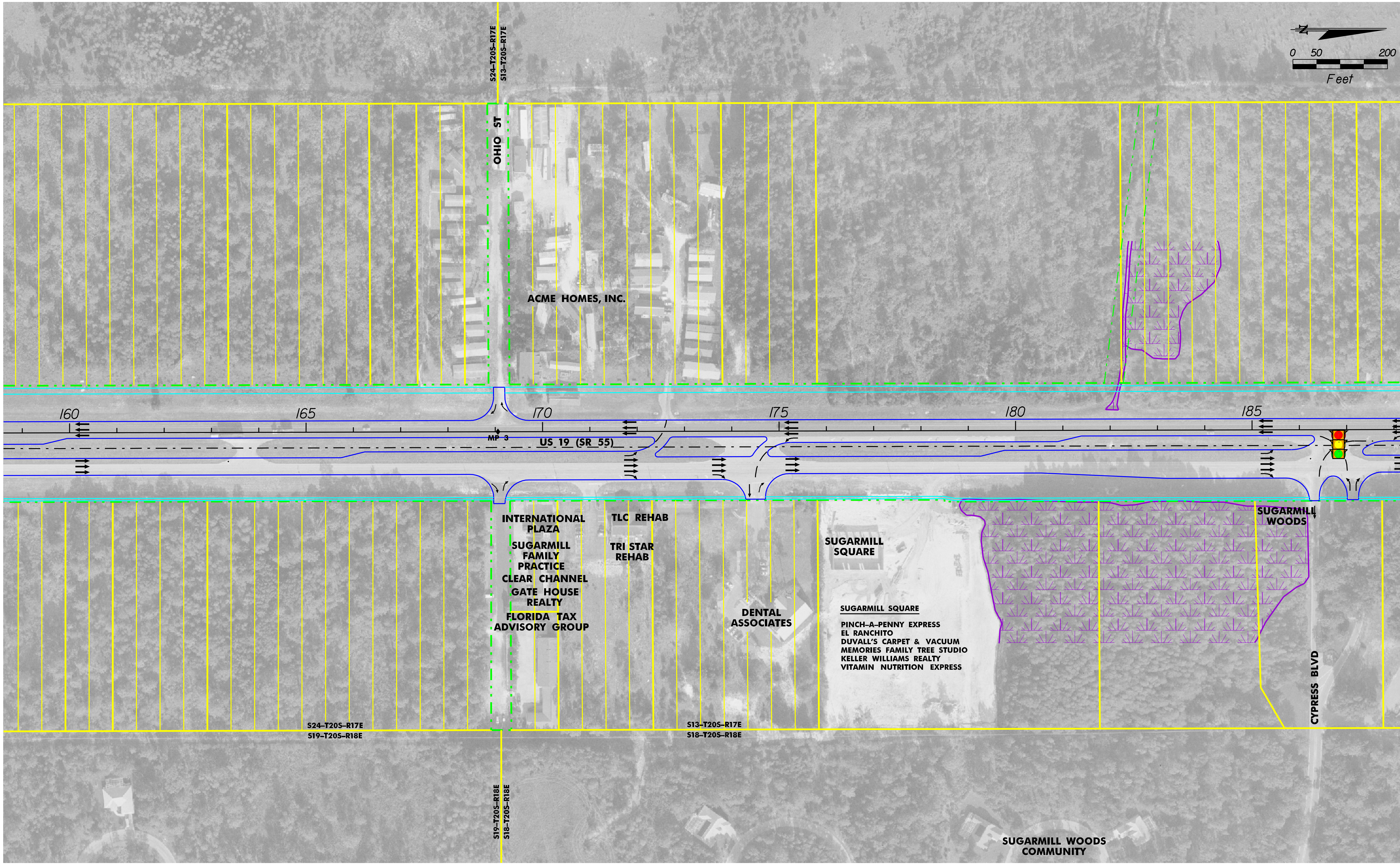

SEGMENT 1 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION	PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA	
PROPERTY LINES	PROPOSED PAVEMENT / CURB	BRIDGE STRUCTURE OR RETAINING WALL	B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION	
120 MP 3 BASELINE SURVEY MILEPOST	X POTENTIAL CONTAMINATION SITE	PROPOSED SIDEWALK OR MULTI-USE PATH		

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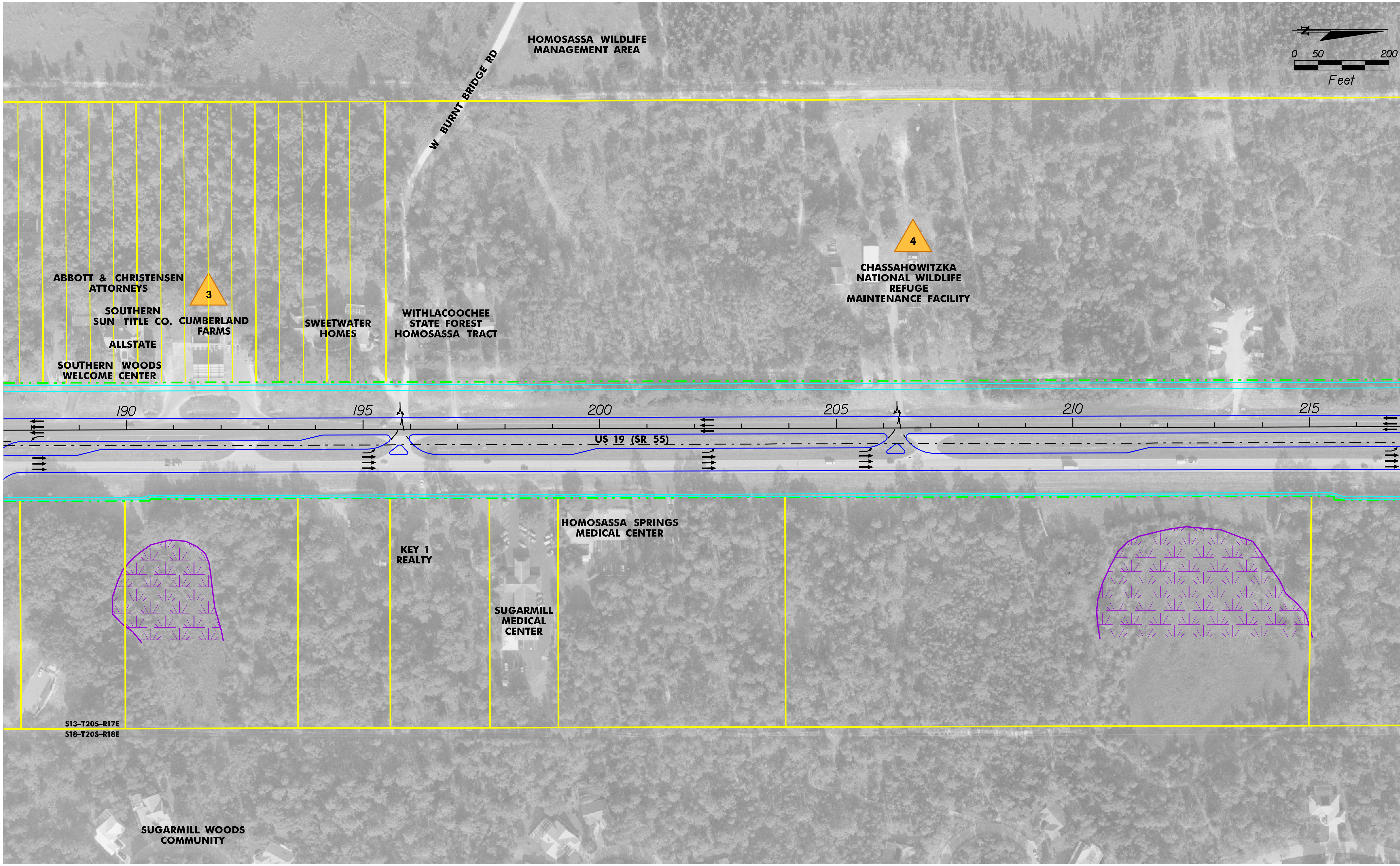

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PROPERTY LINES
120 MP 3 BASELINE SURVEY MILEPOST
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
X POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
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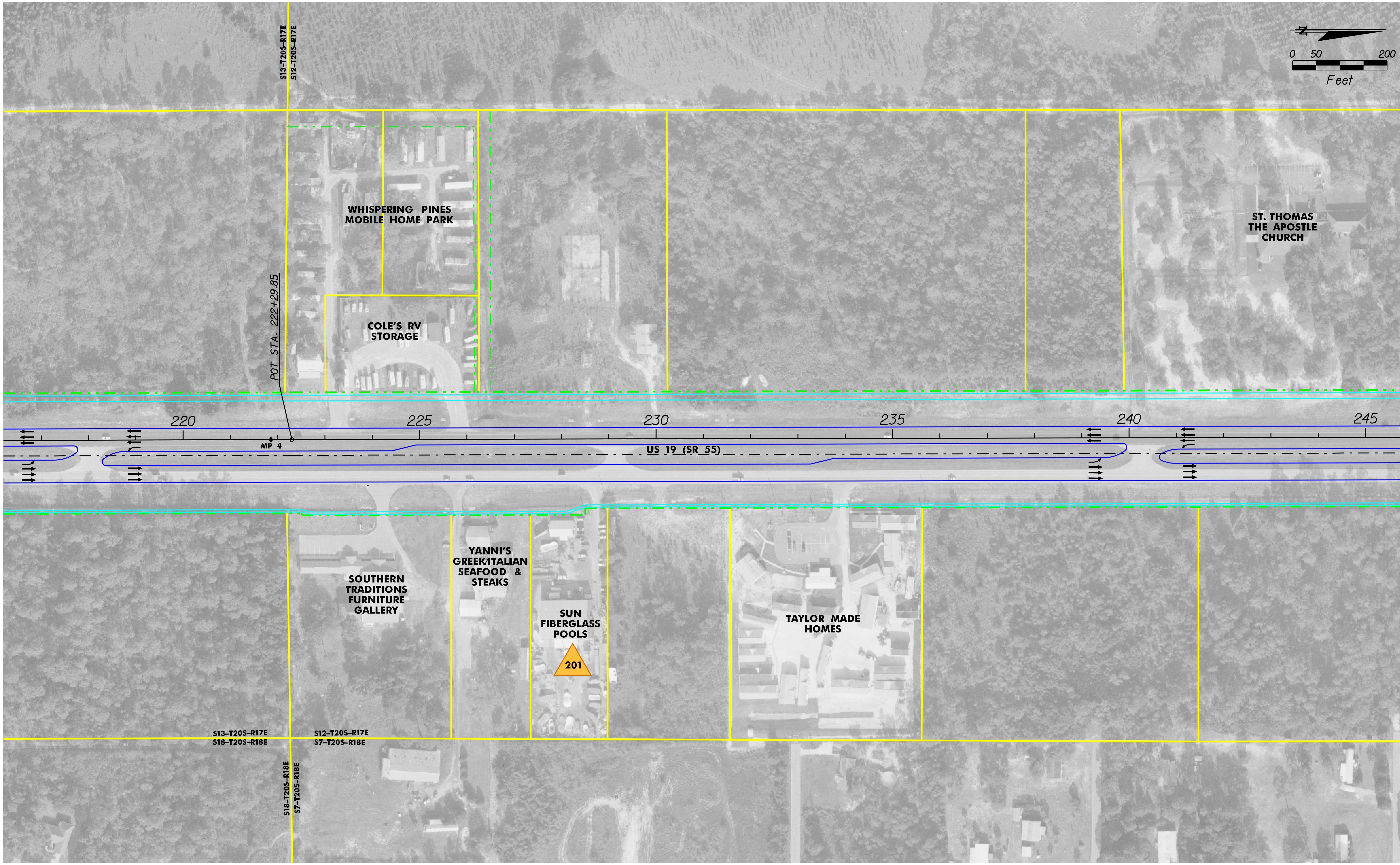

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PROPERTY LINES	PROPOSED PAVEMENT / CURB
120 MP 3 BASELINE SURVEY MILEPOST	POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
BRIDGE STRUCTURE OR RETAINING WALL	BUSINESS / NON-PROFIT ORGANIZATION / RESIDENTIAL RELOCATION
PROPOSED SIDEWALK OR MULTI-USE PATH	

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SHEET NO.
5

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SEGMENT 1 RECOMMENDED ALTERNATIVE

Legend	
EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION
PROPERTY LINES	PROPOSED PAVEMENT / CURB
120 MP 3 BASELINE SURVEY MILEPOST	POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
BRIDGE STRUCTURE OR RETAINING WALL	B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
PROPOSED SIDEWALK OR MULTI-USE PATH	

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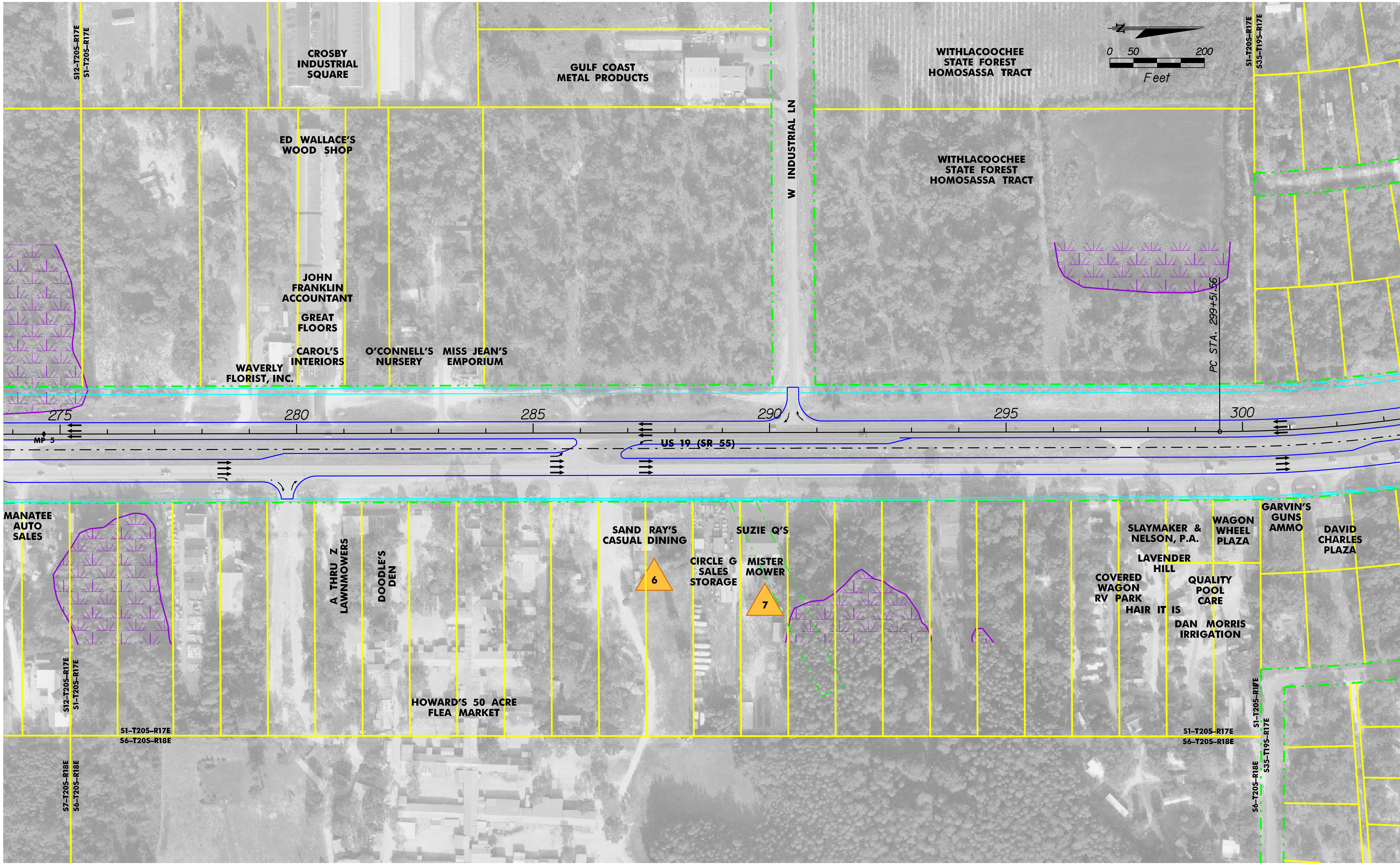

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EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION
PROPERTY LINES	PROPOSED PAVEMENT / CURB
120 MP 3 BASELINE SURVEY MILEPOST	POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
BRIDGE STRUCTURE OR RETAINING WALL	B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
PROPOSED SIDEWALK OR MULTI-USE PATH	

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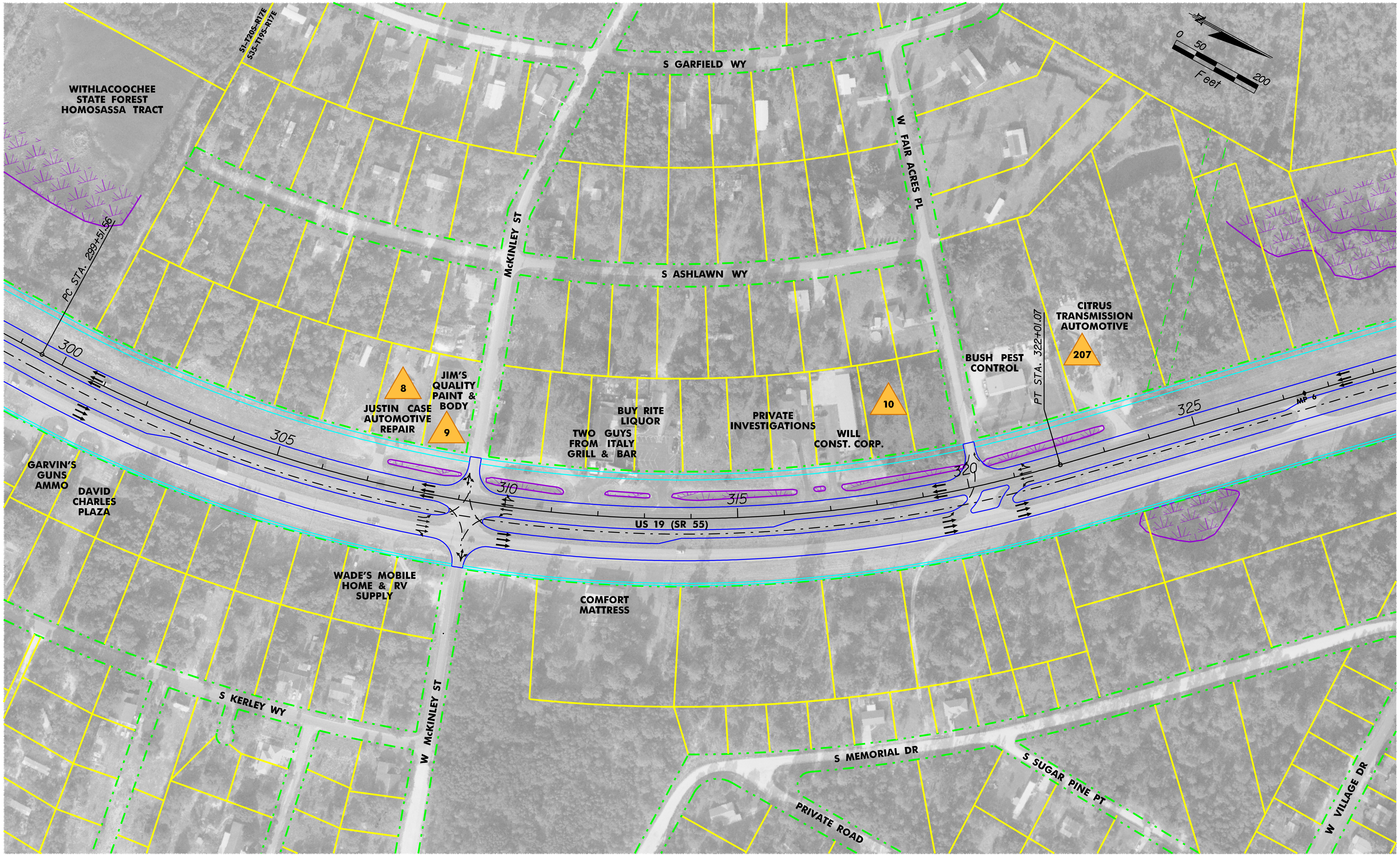

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EXISTING RIGHT OF WAY OR EASEMENT
PROPERTY LINES
BASELINE SURVEY (120) MILEPOST (MP 3)
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
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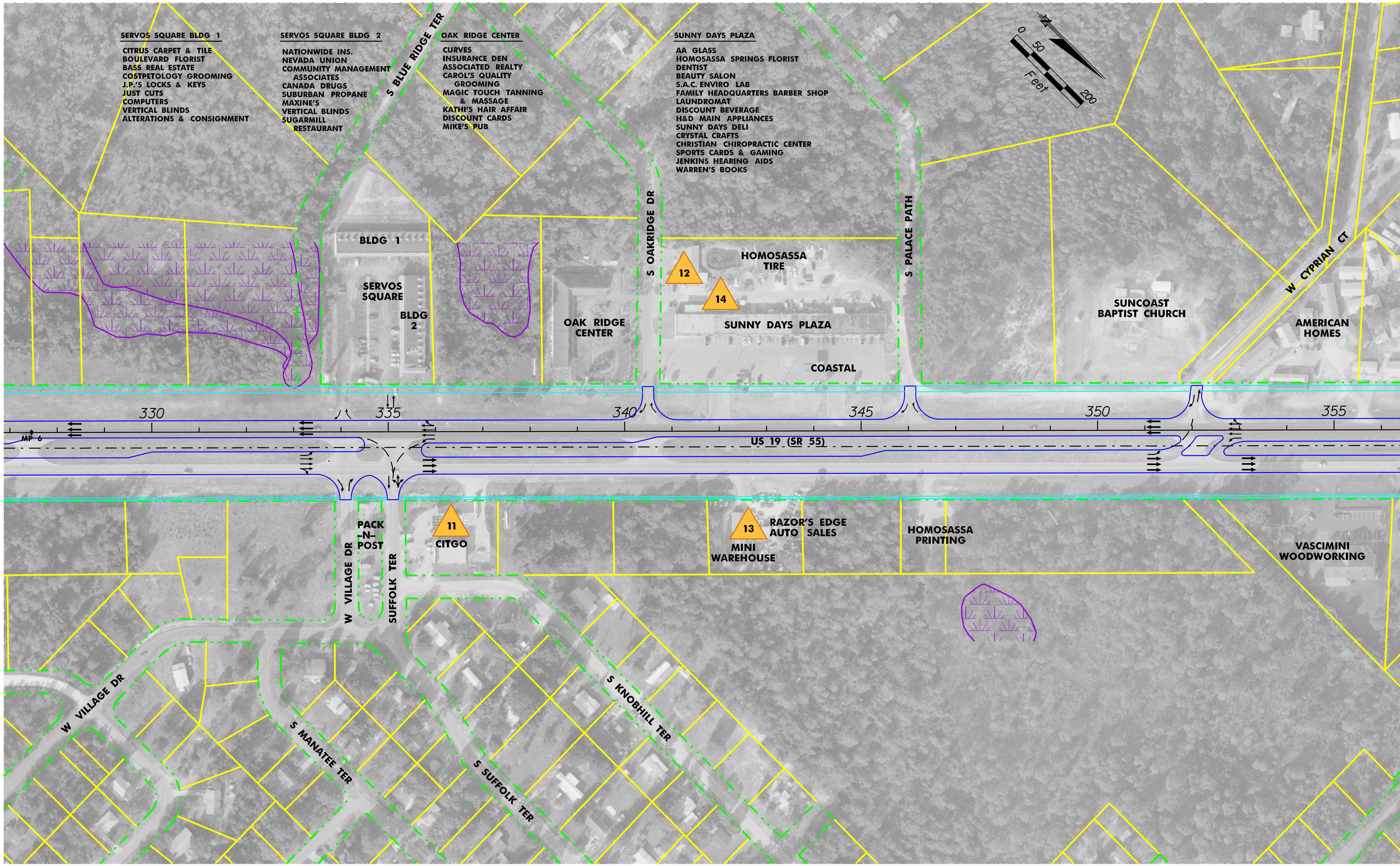

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Legend	
EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION
PROPERTY LINES	PROPOSED PAVEMENT / CURB
120 MP 3 BASELINE SURVEY MILEPOST	POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
BRIDGE STRUCTURE OR RETAINING WALL	B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
PROPOSED SIDEWALK OR MULTI-USE PATH	

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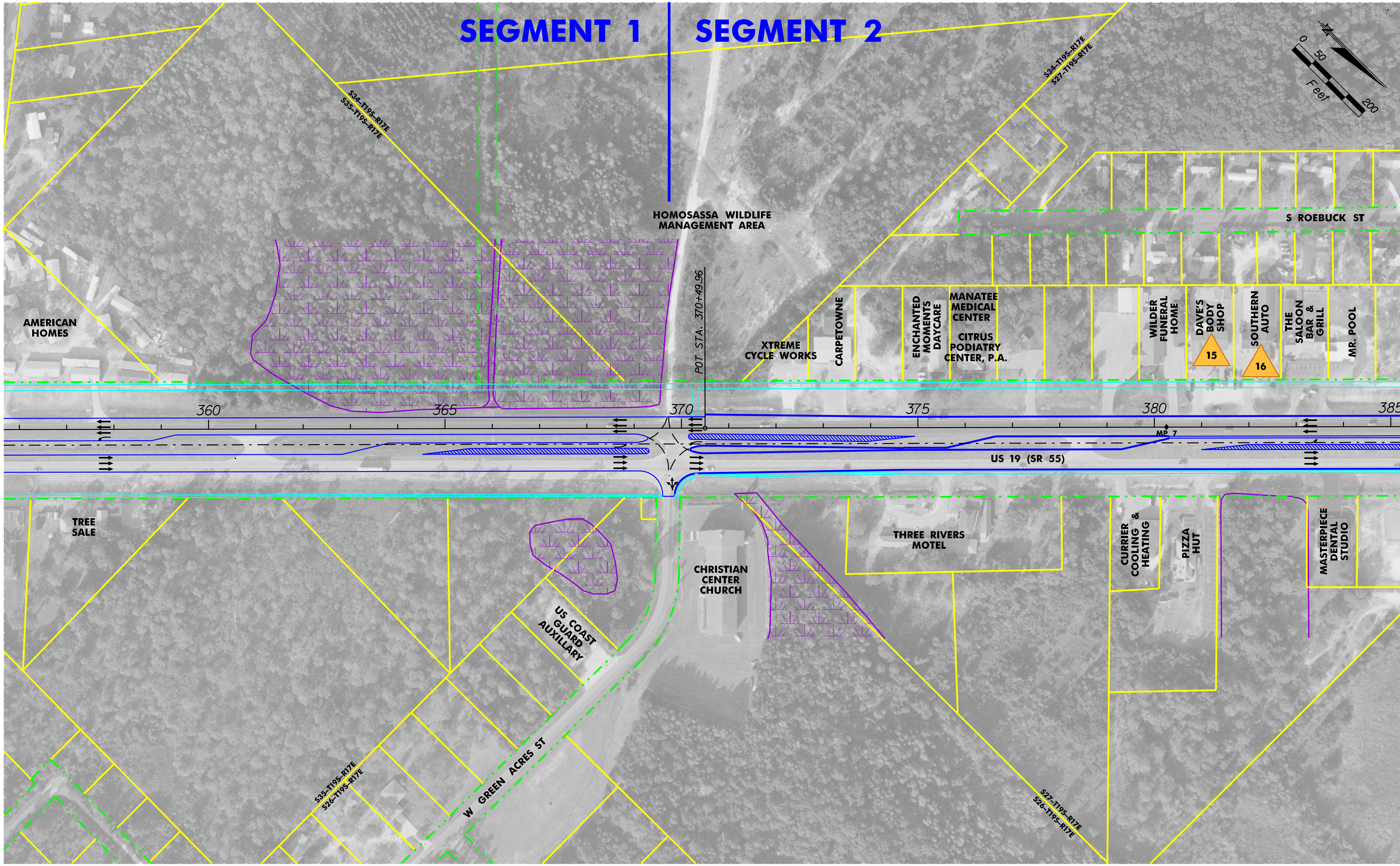
CITRUS COUNTY, FLORIDA

FLIGHT DATE : JUNE 11, 2001



SEGMENT 1 RECOMMENDED ALTERNATIVE

Legend	
EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION
PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
PROPERTY LINES	PROPOSED PAVEMENT / CURB
BRIDGE STRUCTURE OR RETAINING WALL	BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION (B, R, NP)
120 / MP 3 BASELINE SURVEY MILEPOST	POTENTIAL CONTAMINATION SITE
PROPOSED SIDEWALK OR MULTI-USE PATH	

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FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
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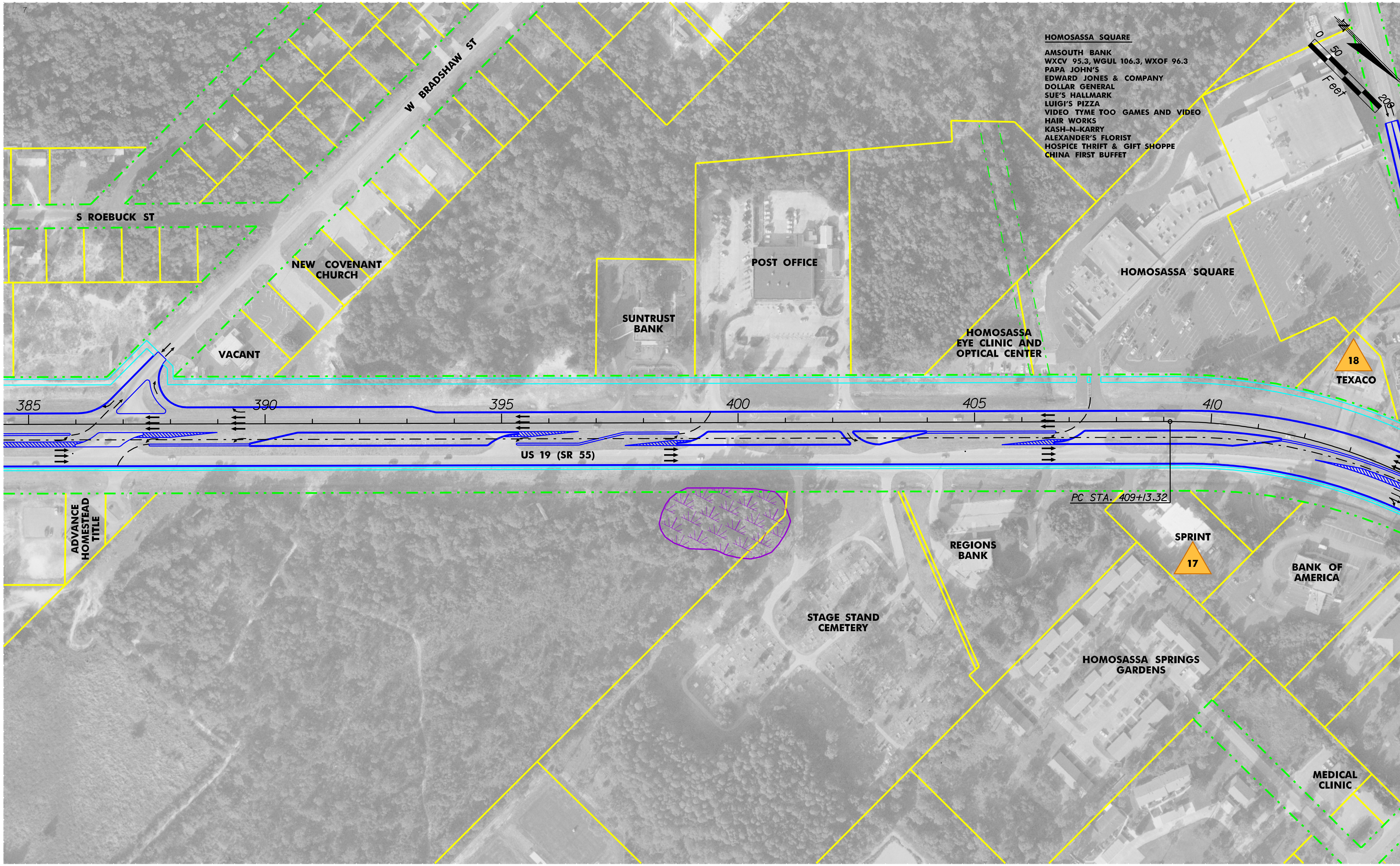
FLIGHT DATE : JUNE 11, 2001



SEGMENT 2 RECOMMENDED ALTERNATIVE

Legend			
EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION	PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
PROPERTY LINES	PROPOSED PAVEMENT / CURB	BRIDGE STRUCTURE OR RETAINING WALL	B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
120 MP 3 BASELINE SURVEY MILEPOST	X POTENTIAL CONTAMINATION SITE	PROPOSED SIDEWALK OR MULTI-USE PATH	

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FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

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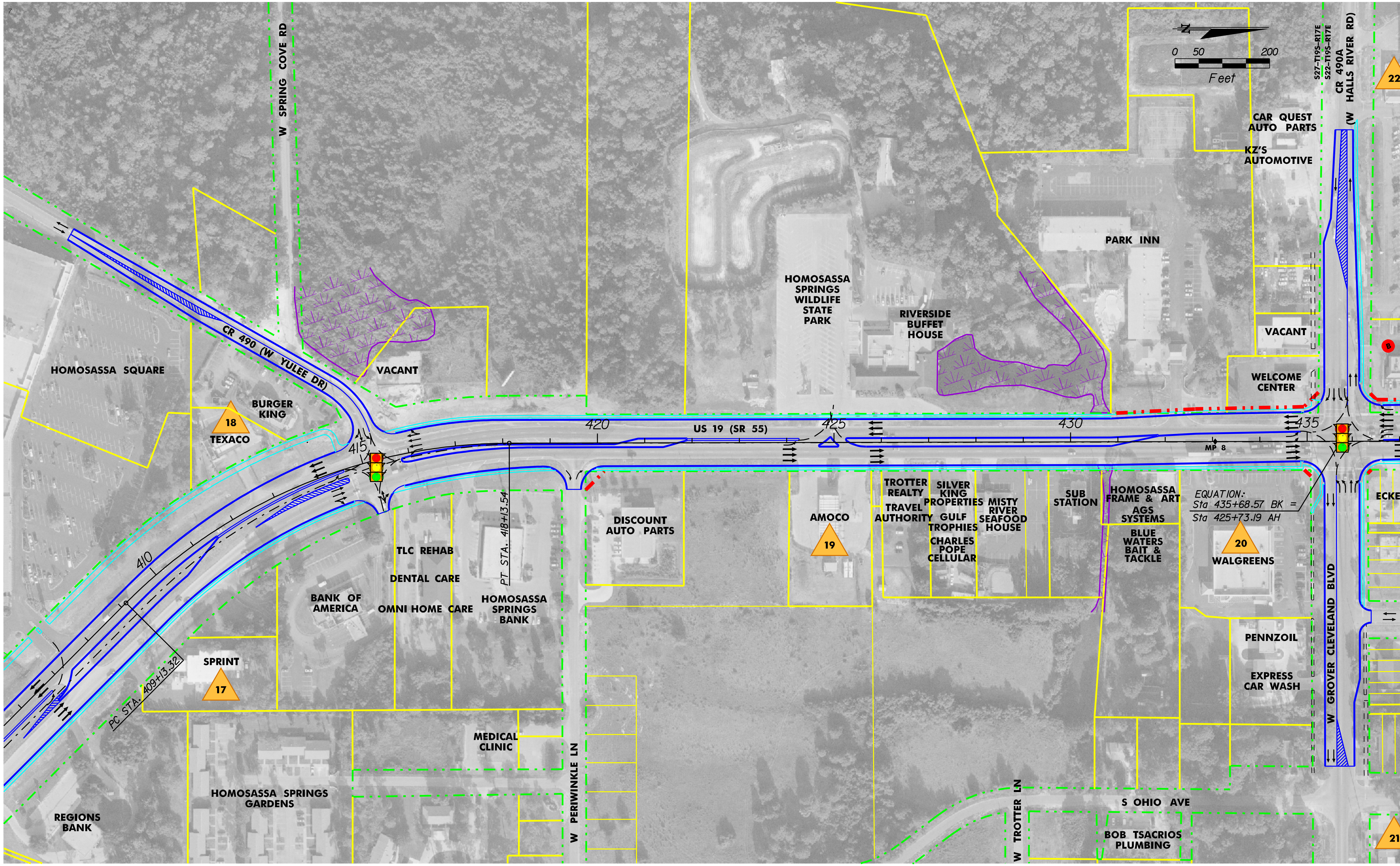

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- EXISTING RIGHT OF WAY OR EASEMENT
- PROPERTY LINES
- 120 MP 3 — BASELINE SURVEY MILEPOST
- CENTERLINE OF CONSTRUCTION
- PROPOSED PAVEMENT / CURB
- X — POTENTIAL CONTAMINATION SITE
- PROPOSED RIGHT OF WAY
- BRIDGE STRUCTURE OR RETAINING WALL
- PROPOSED SIDEWALK OR MULTI-USE PATH
- WETLANDS WITHIN STUDY AREA
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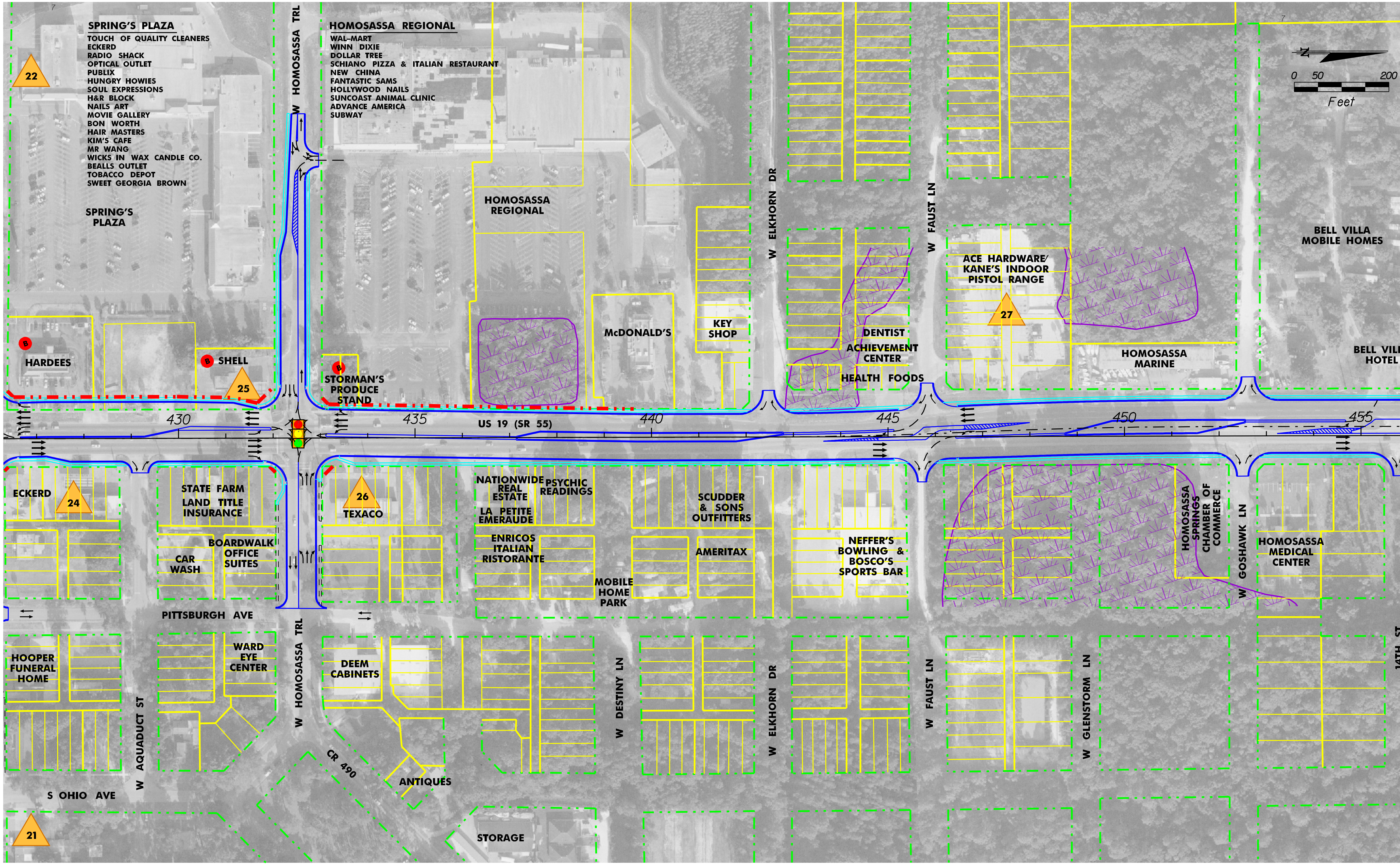

SEGMENT 2 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT
PROPERTY LINES
120 MP 3 BASELINE SURVEY MILEPOST
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
WETLANDS WITHIN STUDY AREA
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
13

19-MAR-2004 09:41
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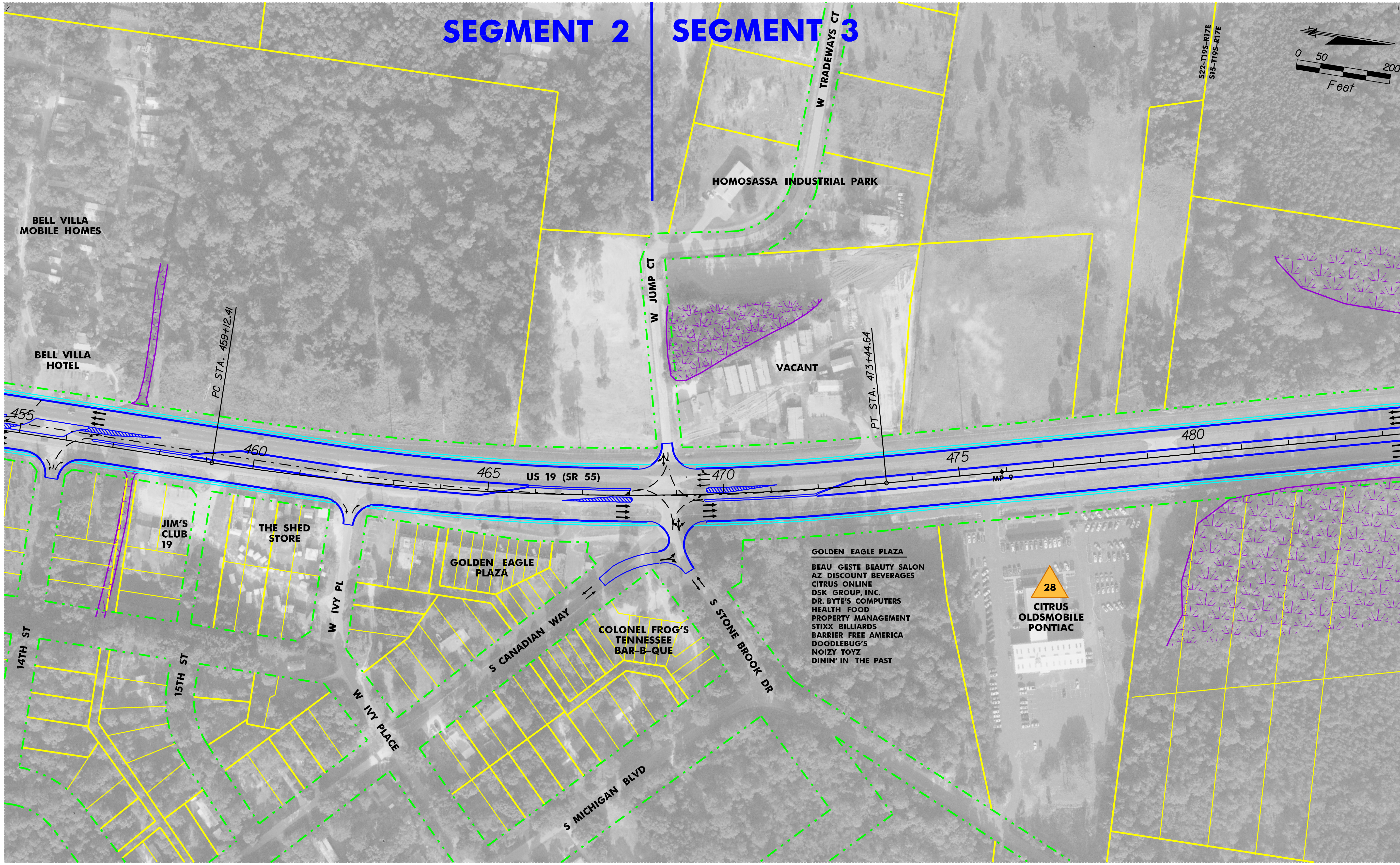
FLIGHT DATE : JUNE 11, 2001



SEGMENT 2 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT
PROPERTY LINES
120 MP 3 BASELINE SURVEY MILEPOST
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
WETLANDS WITHIN STUDY AREA
B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION

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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
14

19-MAR-2004 09:42
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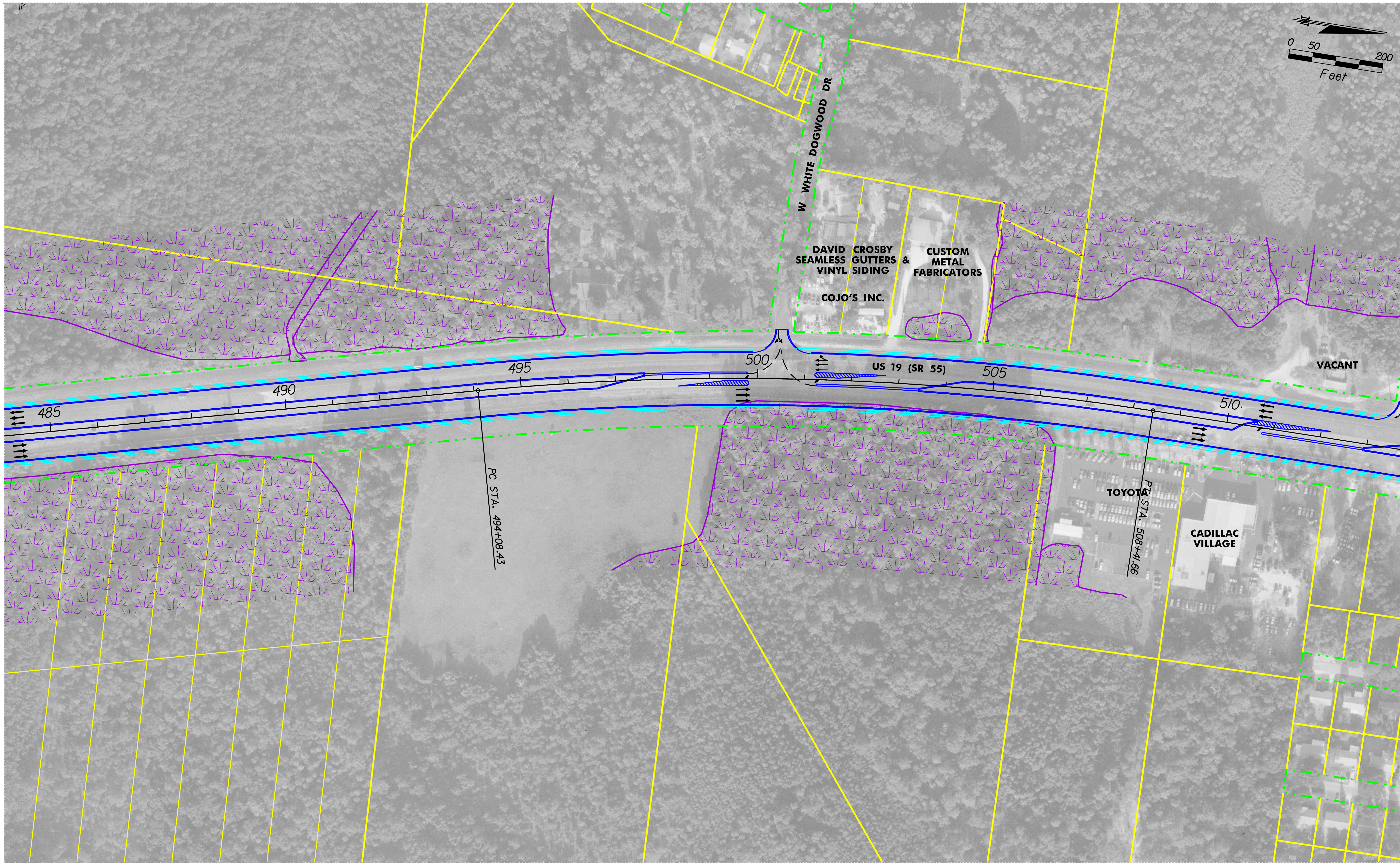
FLIGHT DATE : JUNE 11, 2001



SEGMENT 3 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION
PROPERTY LINES	PROPOSED PAVEMENT / CURB
120 MP 3 BASELINE SURVEY MILEPOST	POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
BRIDGE STRUCTURE OR RETAINING WALL	B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
PROPOSED SIDEWALK OR MULTI-USE PATH	

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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
15

19-MAR-2004 09:43
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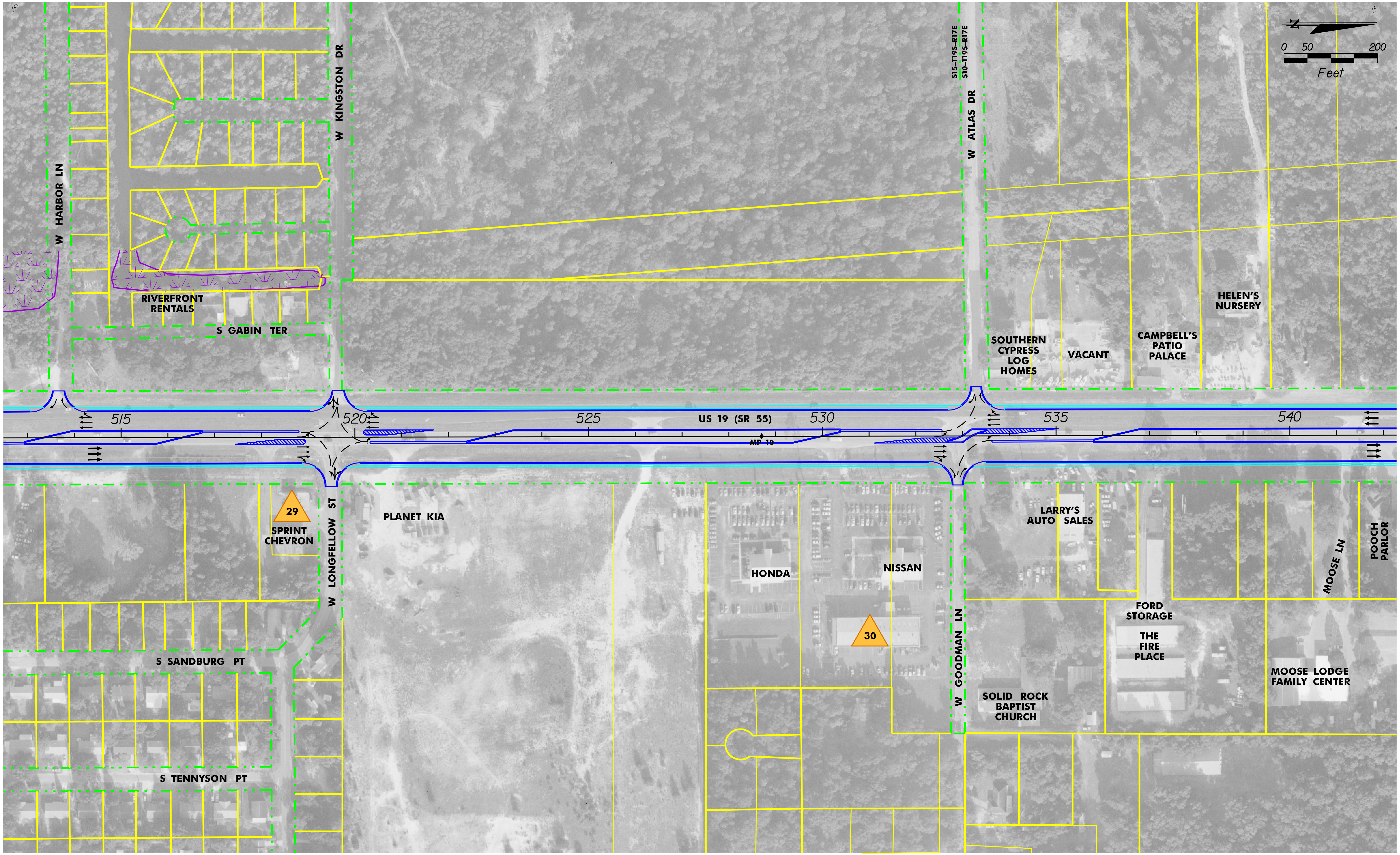
FLIGHT DATE : JUNE 11, 2001



SEGMENT 3 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT
PROPERTY LINES
120 MP 3 BASELINE SURVEY MILEPOST
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
WETLANDS WITHIN STUDY AREA
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

**US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA**

SHEET NO.
16

19-MAR-2004 09:43
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FLIGHT DATE : JUNE 11, 2001

SEGMENT 3 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT
PROPERTY LINES
120 MP 3 BASELINE SURVEY MILEPOST
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
WETLANDS WITHIN STUDY AREA
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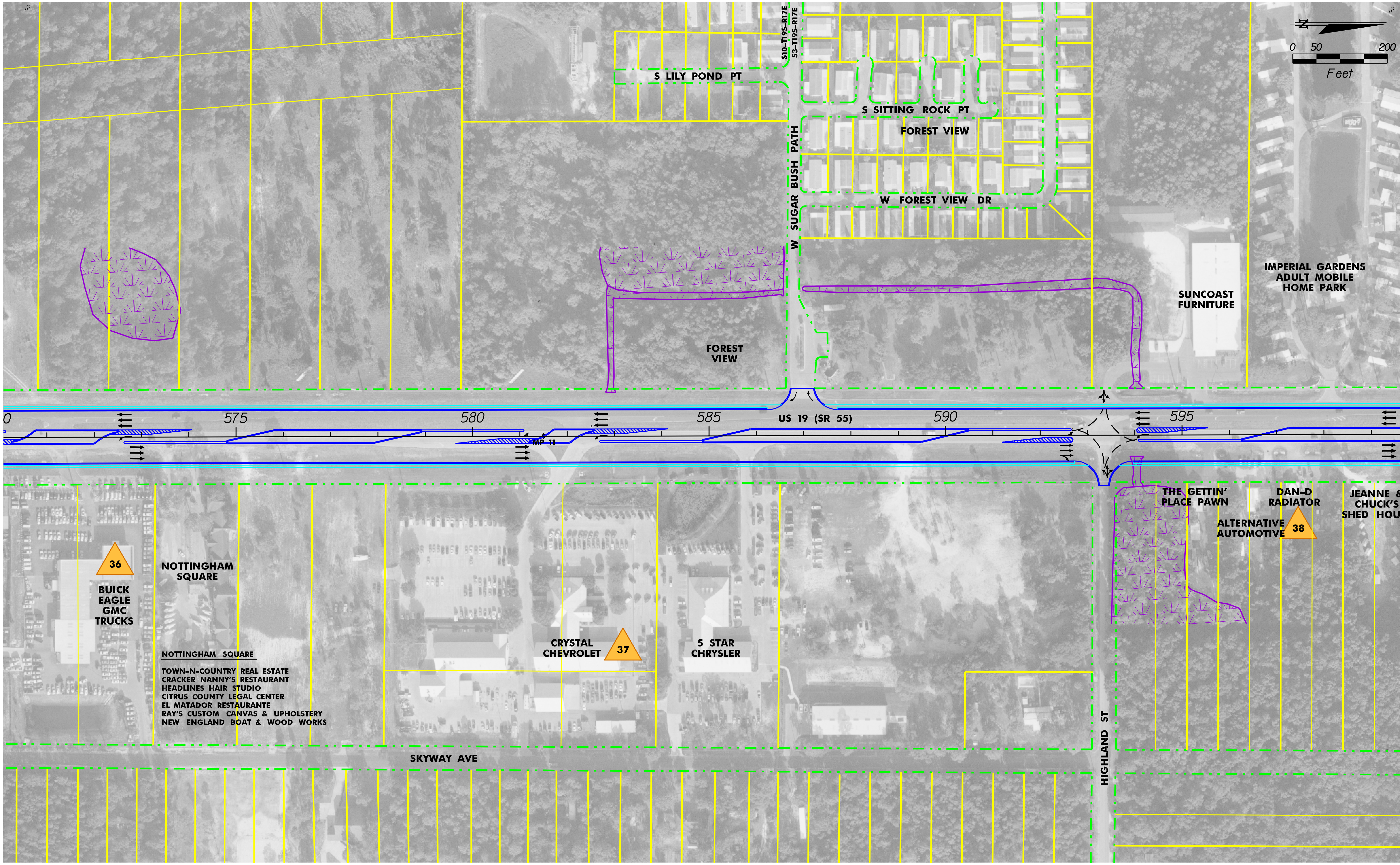
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
17

FLIGHT DATE : JUNE 11, 2001



SEGMENT 3 RECOMMENDED ALTERNATIVE

Legend	
EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION
PROPERTY LINES	PROPOSED PAVEMENT / CURB
120 MP 3 BASELINE SURVEY MILEPOST	POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
BRIDGE STRUCTURE OR RETAINING WALL	B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
PROPOSED SIDEWALK OR MULTI-USE PATH	

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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO. 18

19-MAR-2004 09:44
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SEGMENT 3 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT
CENTERLINE OF CONSTRUCTION
PROPOSED RIGHT OF WAY
WETLANDS WITHIN STUDY AREA
PROPERTY LINES
PROPOSED PAVEMENT / CURB
BRIDGE STRUCTURE OR RETAINING WALL
B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
120 MP 3 BASELINE SURVEY MILEPOST
X POTENTIAL CONTAMINATION SITE
PROPOSED SIDEWALK OR MULTI-USE PATH

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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
19

19-MAR-2004 09:45
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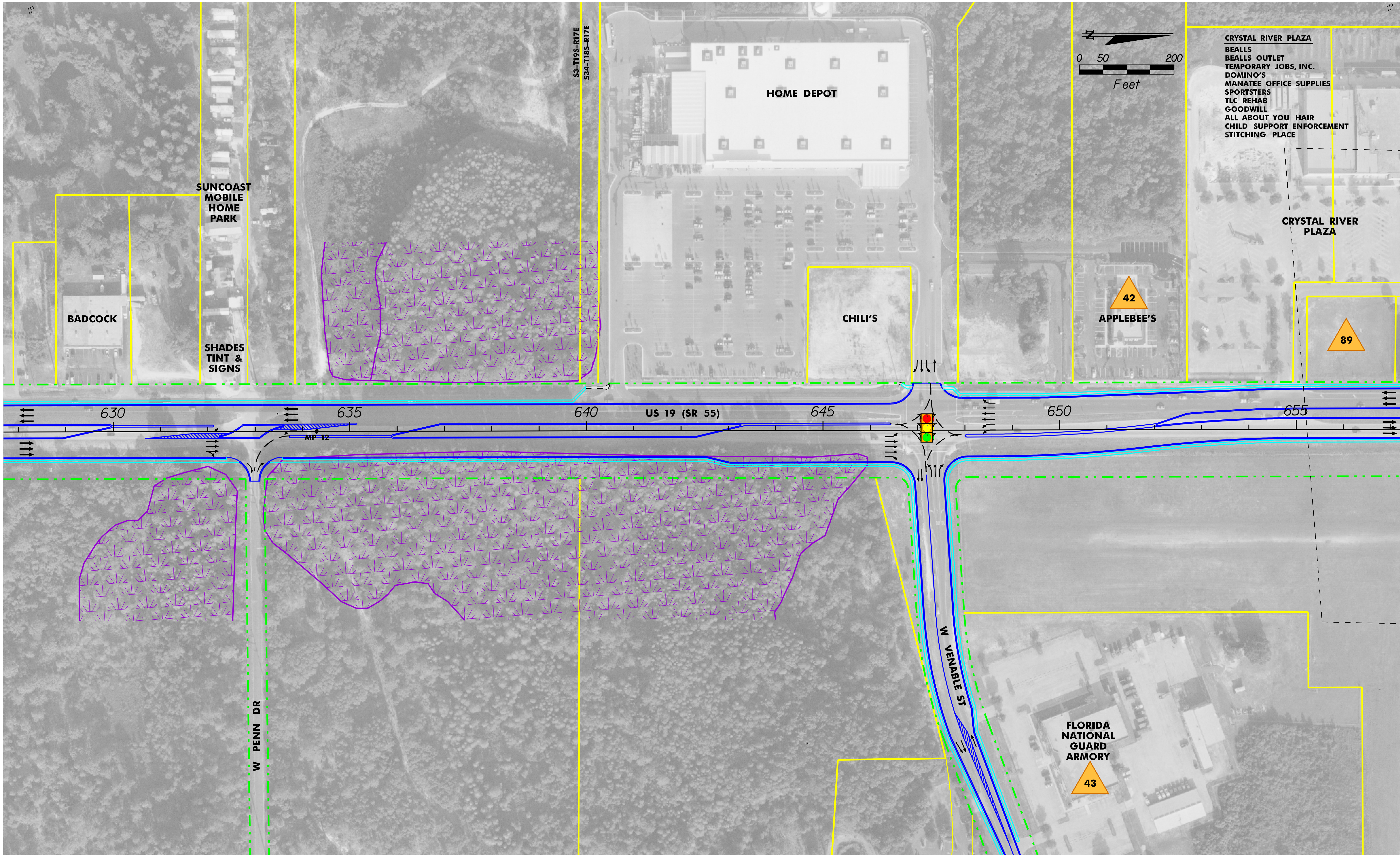
FLIGHT DATE : JUNE 11, 2001



SEGMENT 3 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION	PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
PROPERTY LINES	PROPOSED PAVEMENT / CURB	BRIDGE STRUCTURE OR RETAINING WALL	B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
120 MP 3 BASELINE SURVEY MILEPOST	X POTENTIAL CONTAMINATION SITE	PROPOSED SIDEWALK OR MULTI-USE PATH	

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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
20

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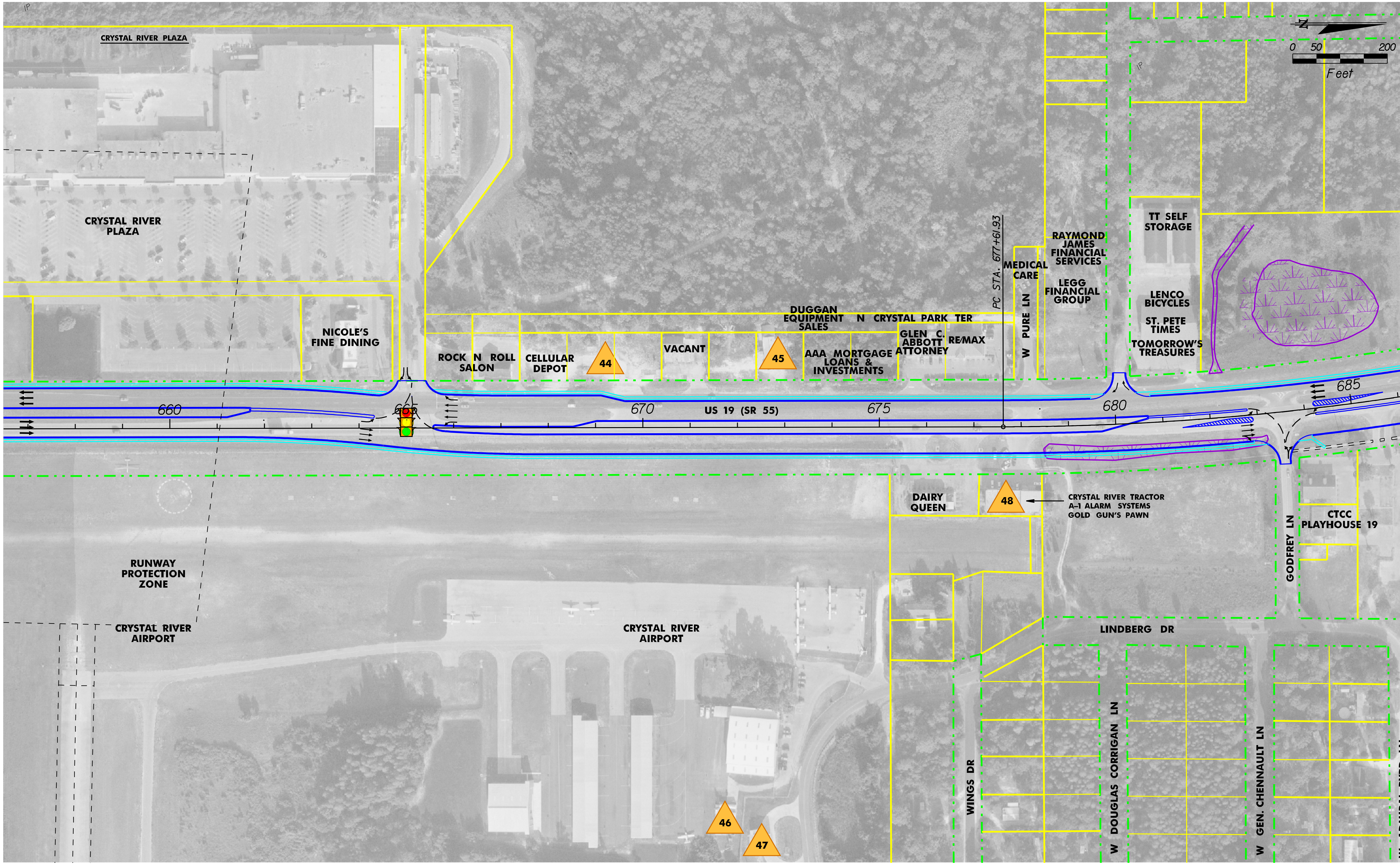
FLIGHT DATE : JUNE 11, 2001



SEGMENT 3 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT
PROPERTY LINES
BASELINE SURVEY MILEPOST (120, MP 3)
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
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SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
21

19-MAR-2004 09:45
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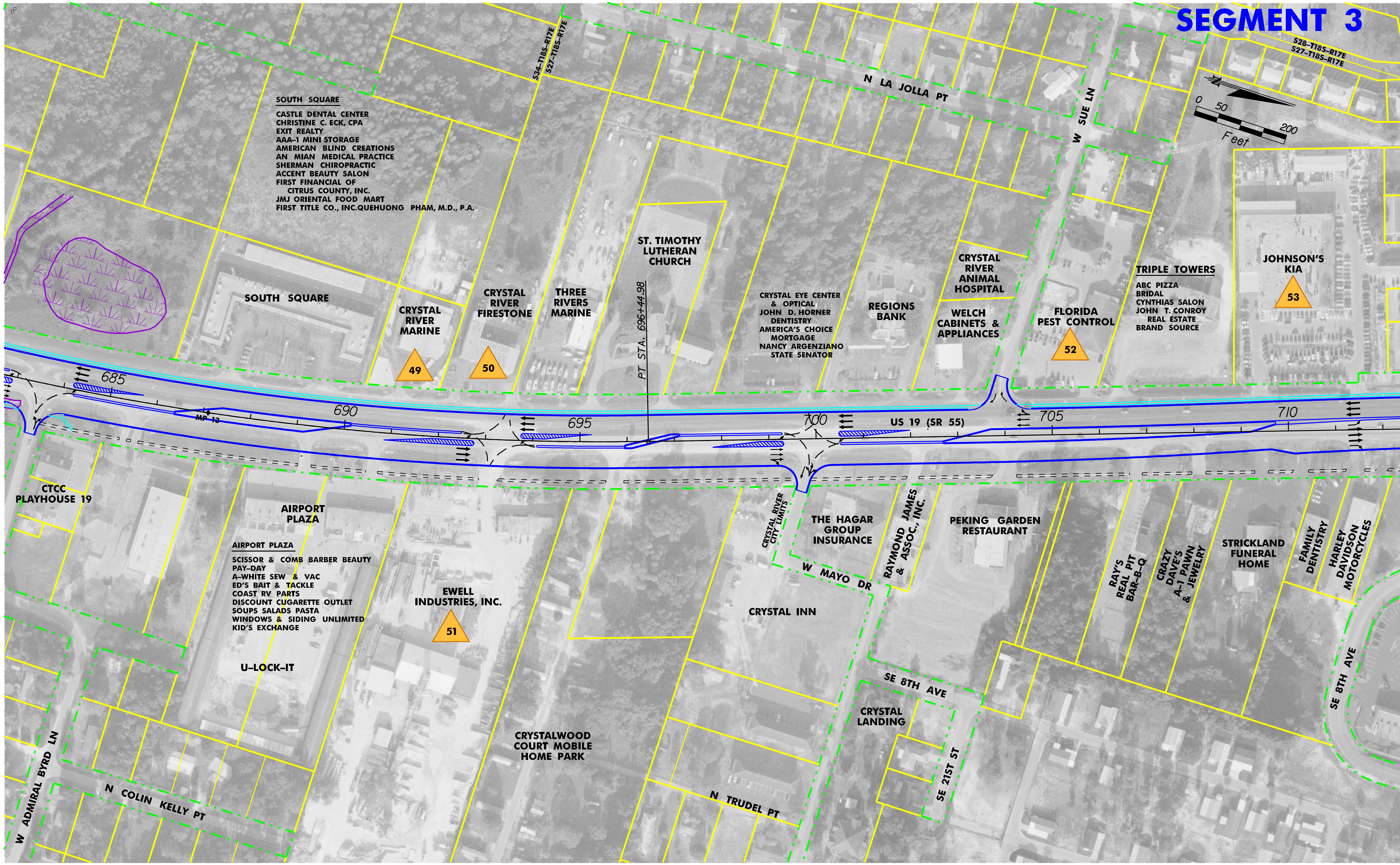
FLIGHT DATE : JUNE 11, 2001



SEGMENT 3 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT
PROPERTY LINES
BASELINE SURVEY MILEPOST (120, MP 3)
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
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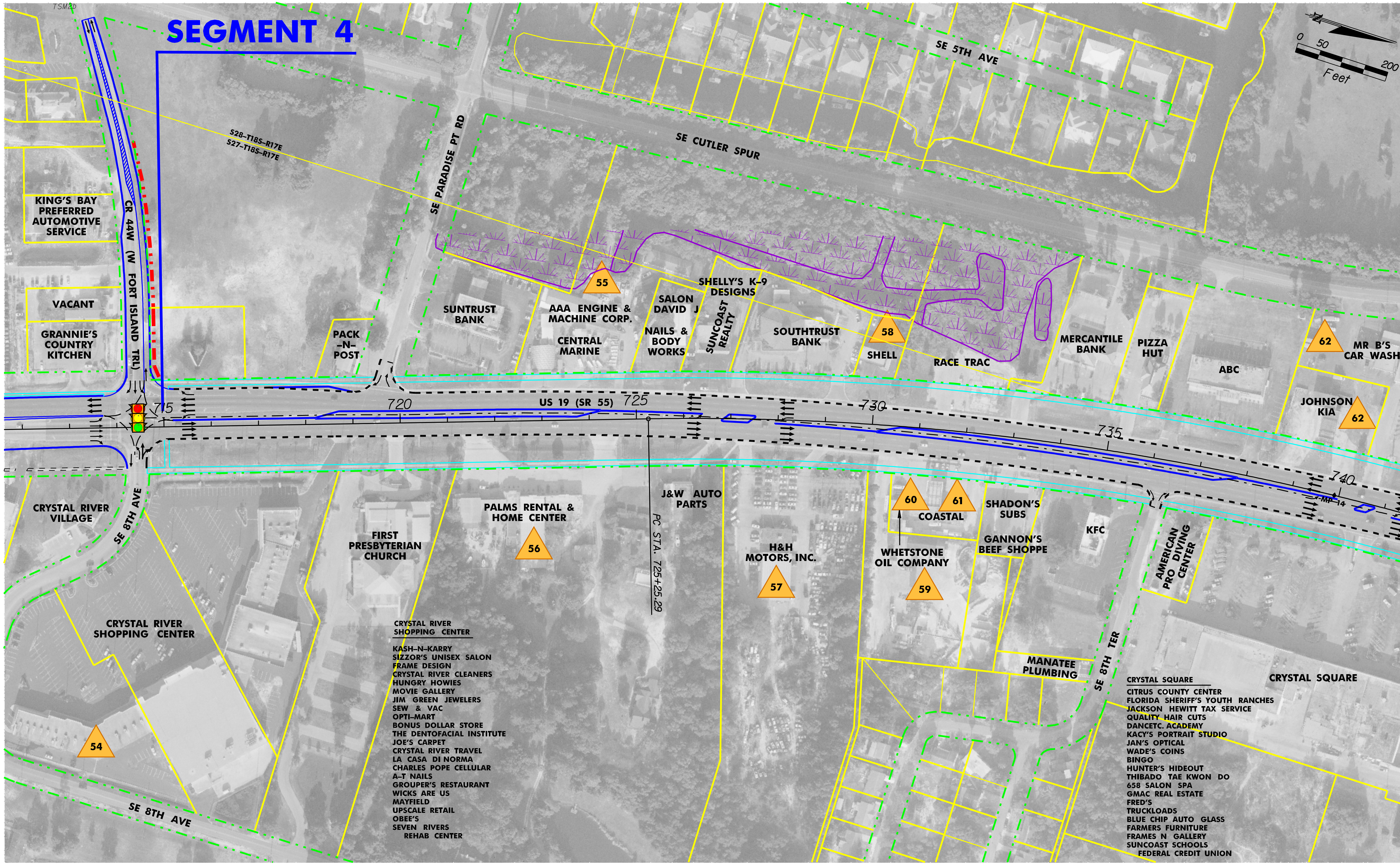
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
22

FLIGHT DATE : JUNE 11, 2001



SEGMENT 4 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT
PROPERTY LINES
BASELINE SURVEY
MP 3 MILEPOST
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
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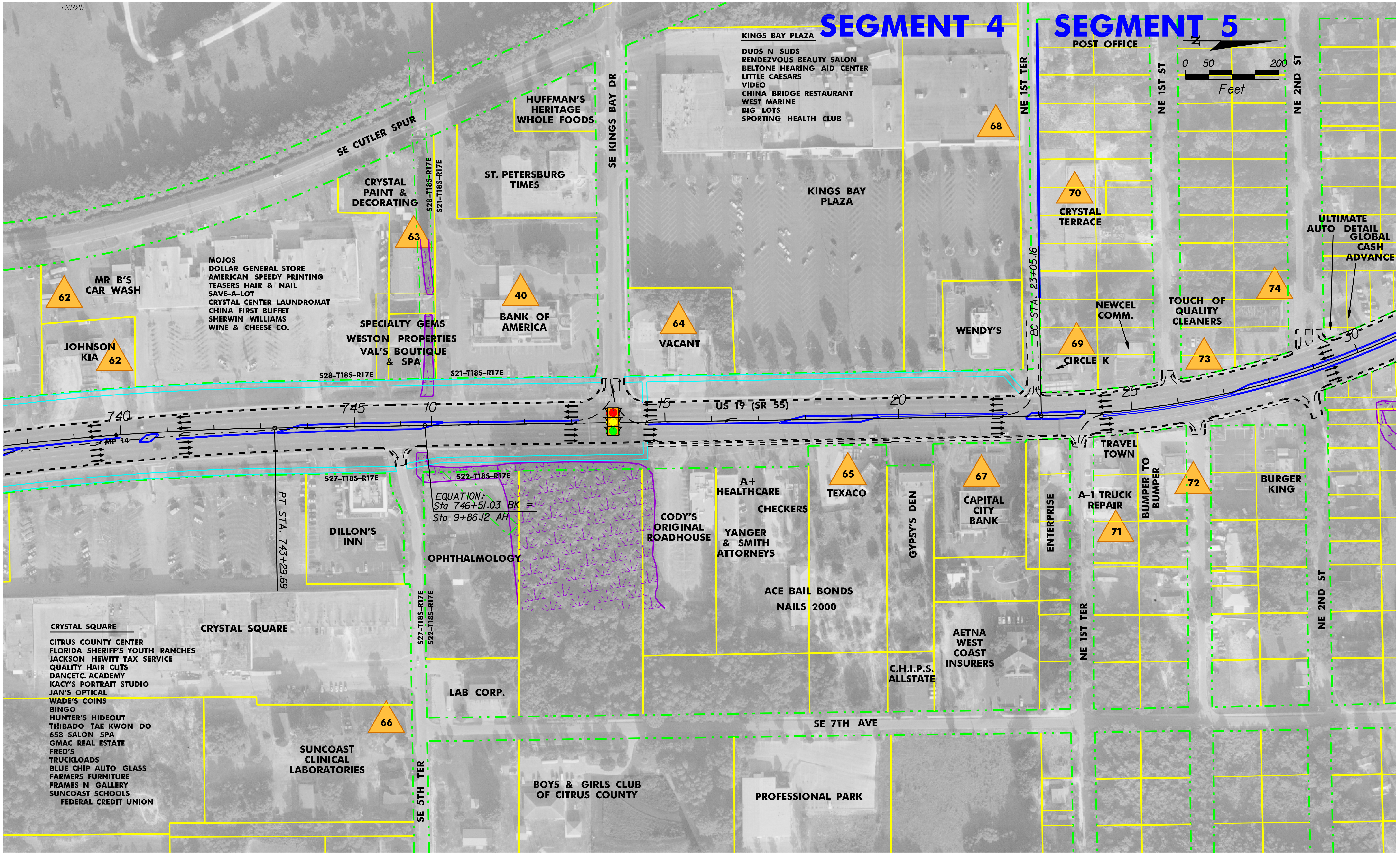
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
23

FLIGHT DATE : JUNE 11, 2001



SEGMENT 4 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION	PROPOSED RIGHT OF WAY
PROPERTY LINES	PROPOSED PAVEMENT / CURB	BRIDGE STRUCTURE OR RETAINING WALL
120 MP 3 BASELINE SURVEY MILEPOST	POTENTIAL CONTAMINATION SITE	PROPOSED SIDEWALK OR MULTI-USE PATH
WETLANDS WITHIN STUDY AREA	B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION	

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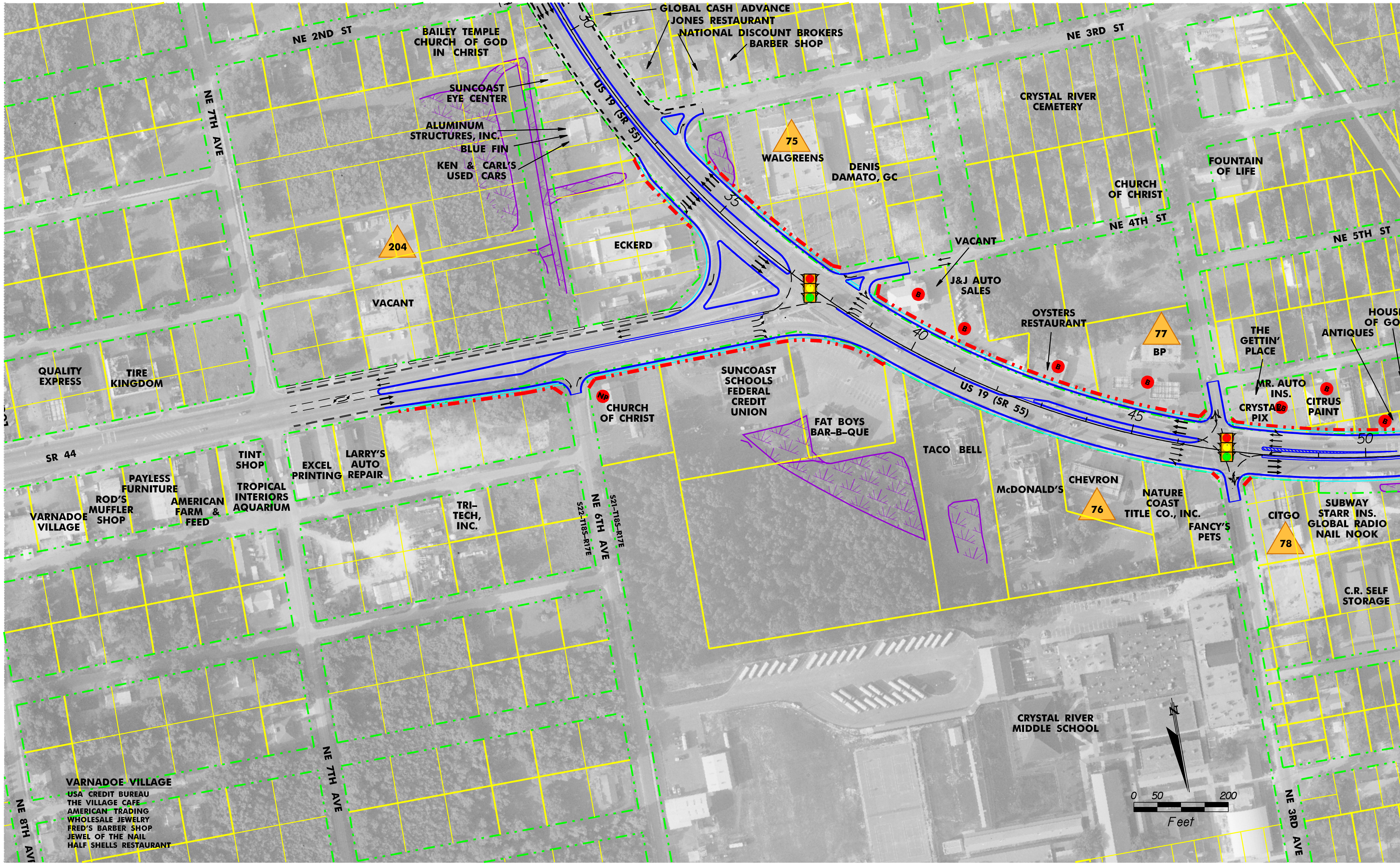
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
24

FLIGHT DATE : JUNE 11, 2001



SEGMENT 5 RECOMMENDED ALTERNATIVE

Legend	
EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION
PROPERTY LINES	PROPOSED PAVEMENT / CURB
BASELINE SURVEY MILEPOST (120, MP 3)	POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
BRIDGE STRUCTURE OR RETAINING WALL	BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
PROPOSED SIDEWALK OR MULTI-USE PATH	

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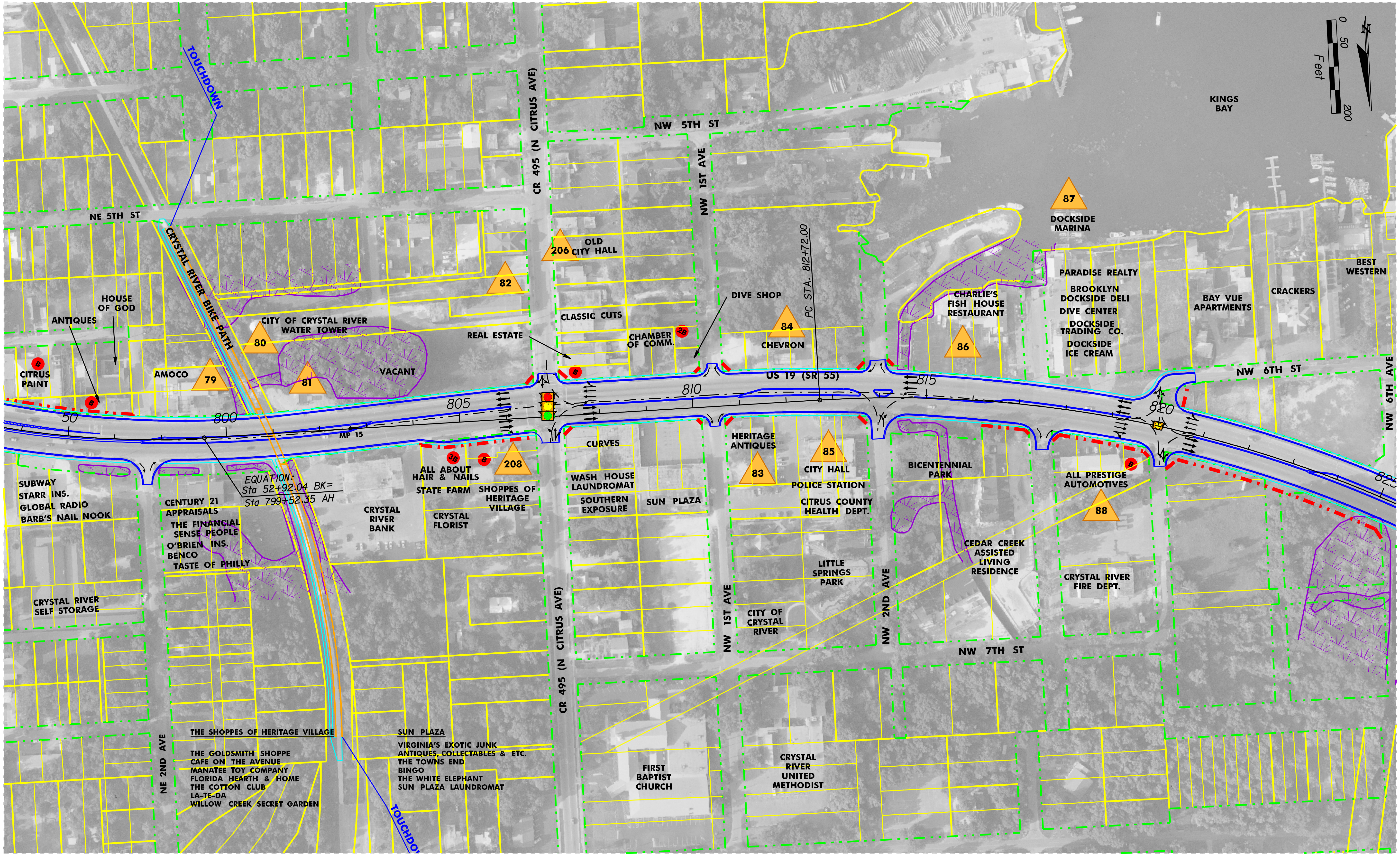
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO. 25

FLIGHT DATE : JUNE 11, 2001



SEGMENT 5 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT
PROPERTY LINES
BASELINE SURVEY
MILEPOST (120, MP 3)
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
WETLANDS WITHIN STUDY AREA
BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION

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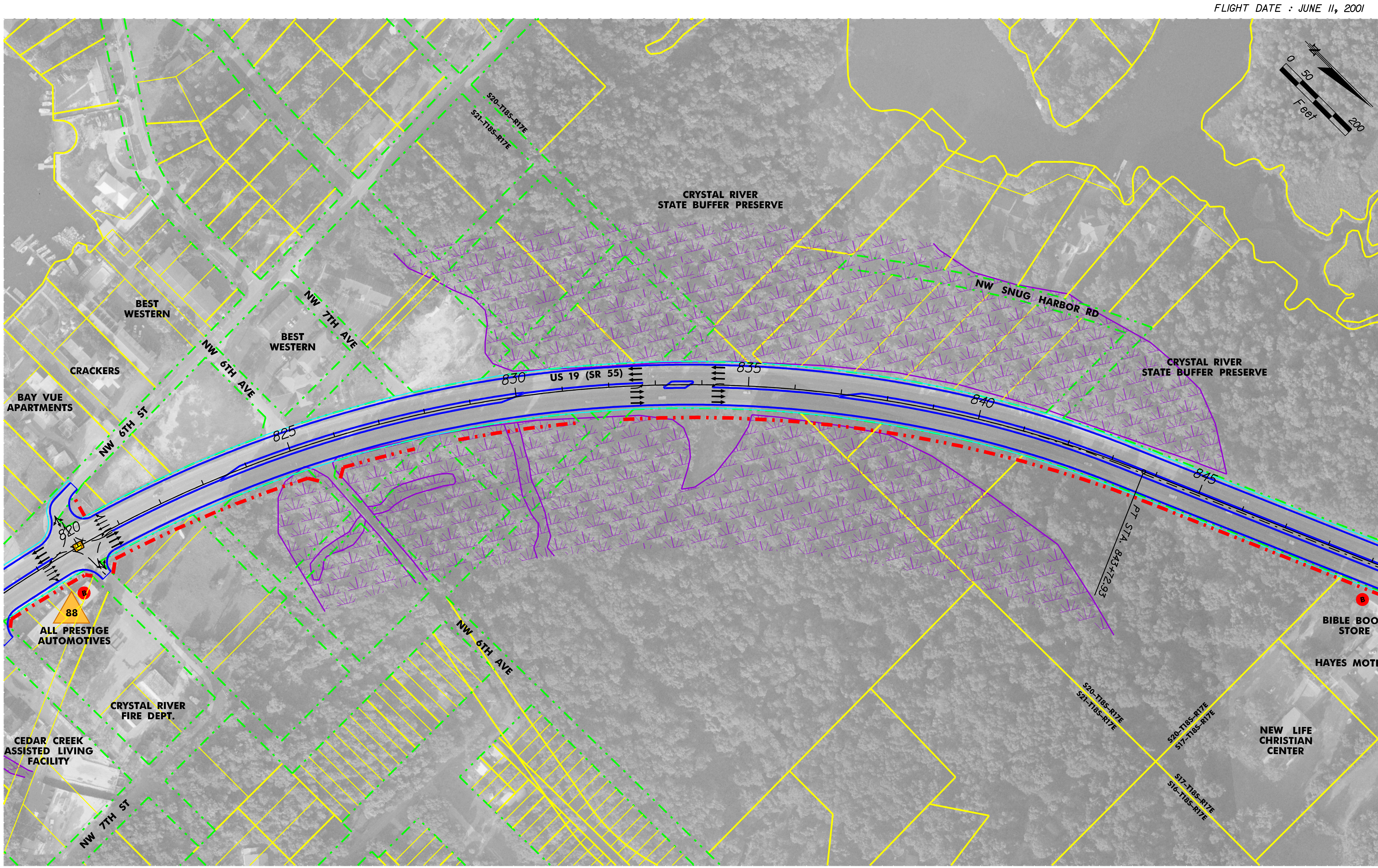
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO. 26



SEGMENT 5 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT
PROPERTY LINES
BASELINE SURVEY MILEPOST (120, MP 3)
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
WETLANDS WITHIN STUDY AREA
BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION (B, R, NP)

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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO. 27

19-MAR-2004 09:50
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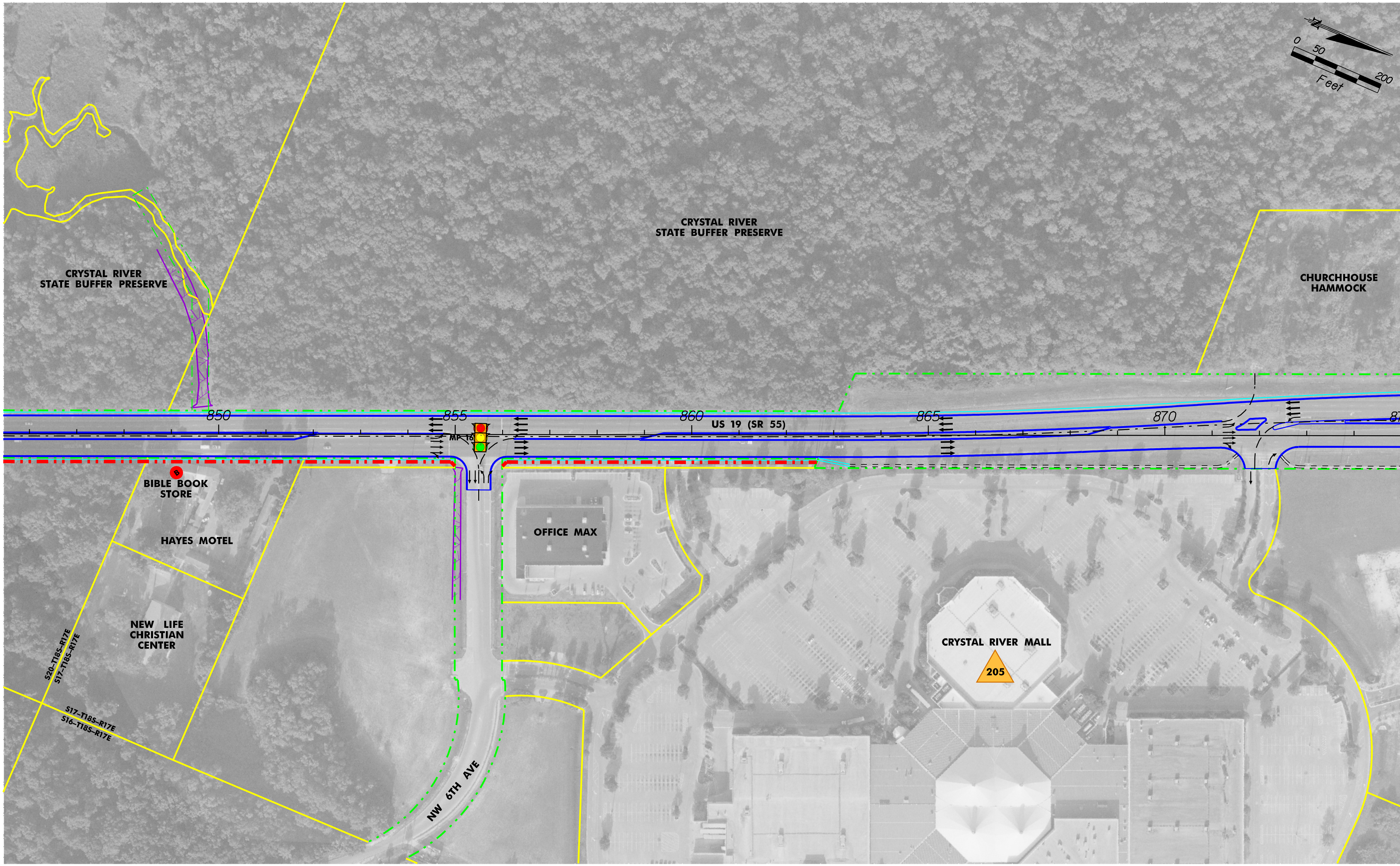
FLIGHT DATE : JUNE 11, 2001



SEGMENT 5 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION
PROPERTY LINES	PROPOSED PAVEMENT / CURB
120 MP 3 BASELINE SURVEY MILEPOST	POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
BRIDGE STRUCTURE OR RETAINING WALL	BUSINESS / NON-PROFIT ORGANIZATION / RESIDENTIAL RELOCATION
PROPOSED SIDEWALK OR MULTI-USE PATH	

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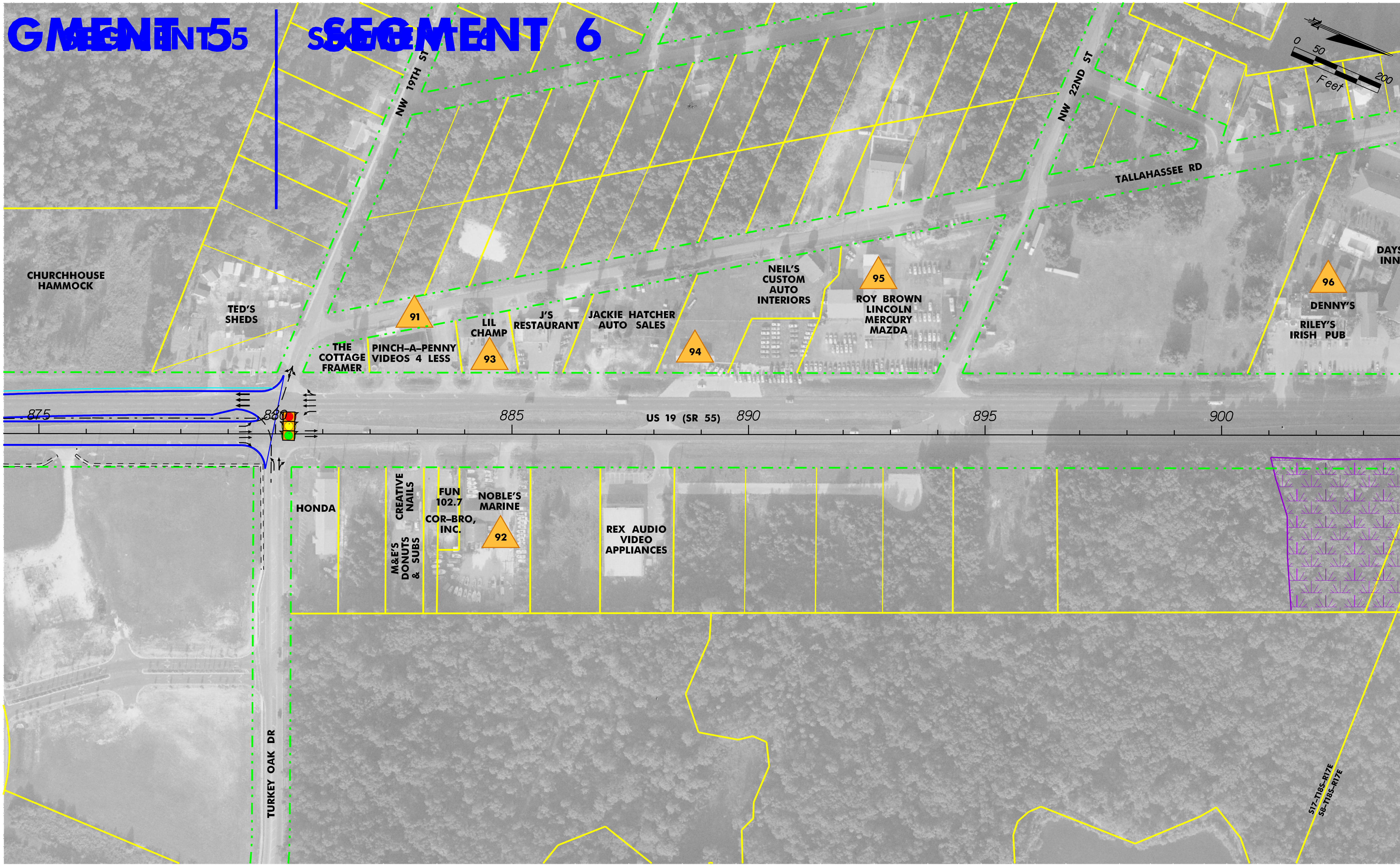
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
28

FLIGHT DATE : JUNE 11, 2001



SEGMENT 5 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION	PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
PROPERTY LINES	PROPOSED PAVEMENT / CURB	BRIDGE STRUCTURE OR RETAINING WALL	B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
120 MP 3 BASELINE SURVEY MILEPOST	X POTENTIAL CONTAMINATION SITE	PROPOSED SIDEWALK OR MULTI-USE PATH	

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US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
29

19-MAR-2004 09:52
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FLIGHT DATE : JUNE 11, 2001

SEGMENT 6 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT
PROPERTY LINES
120 MP 3 BASELINE SURVEY MILEPOST
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
WETLANDS WITHIN STUDY AREA
B R NP BUSINESS / NON-PROFIT ORGANIZATION RESIDENTIAL / RELOCATION

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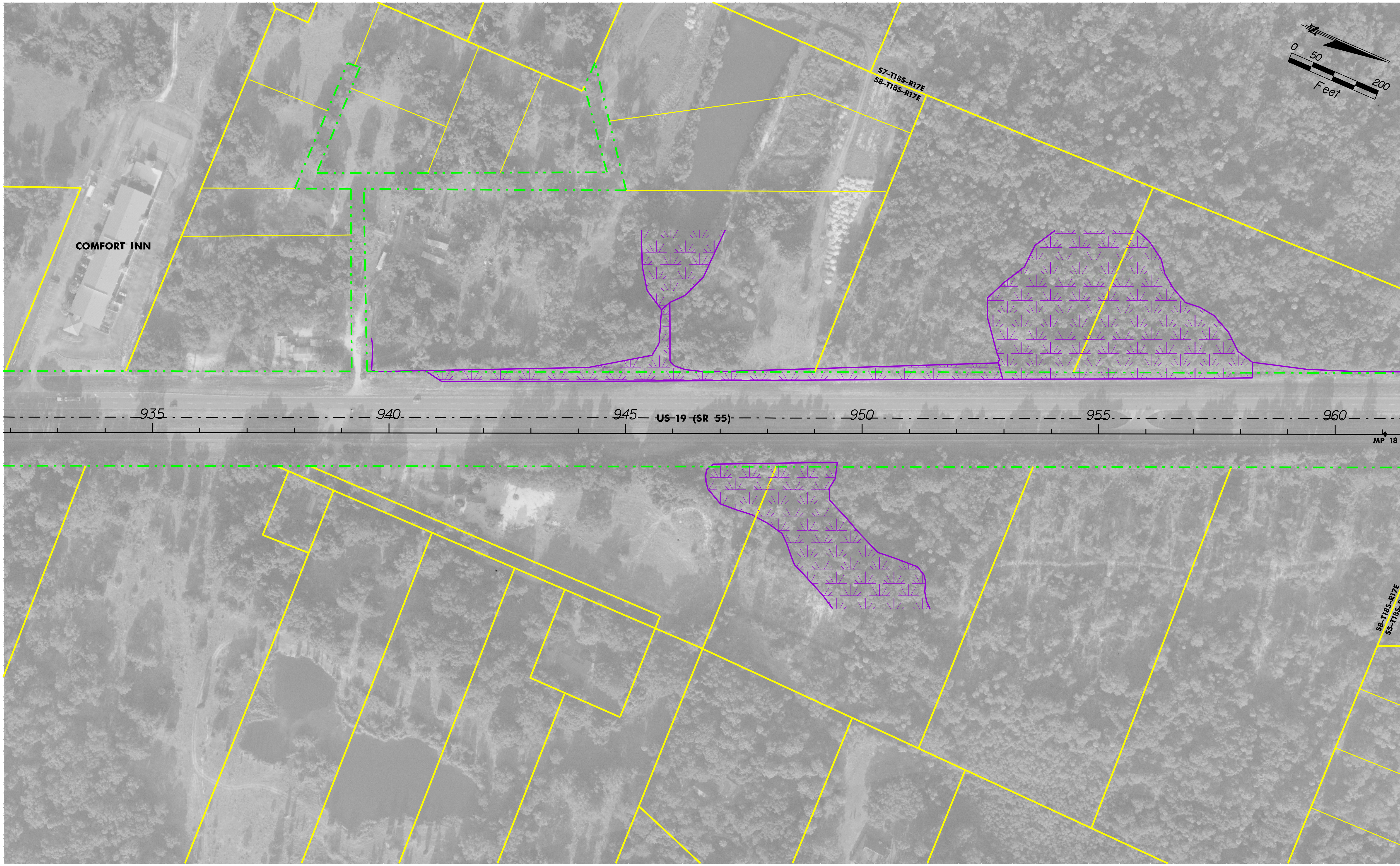
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
30

FLIGHT DATE : JUNE 11, 2001



SEGMENT 6 RECOMMENDED ALTERNATIVE

Legend	
EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION
PROPERTY LINES	PROPOSED PAVEMENT / CURB
120 MP 3 BASELINE SURVEY MILEPOST	POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
BRIDGE STRUCTURE OR RETAINING WALL	B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
PROPOSED SIDEWALK OR MULTI-USE PATH	

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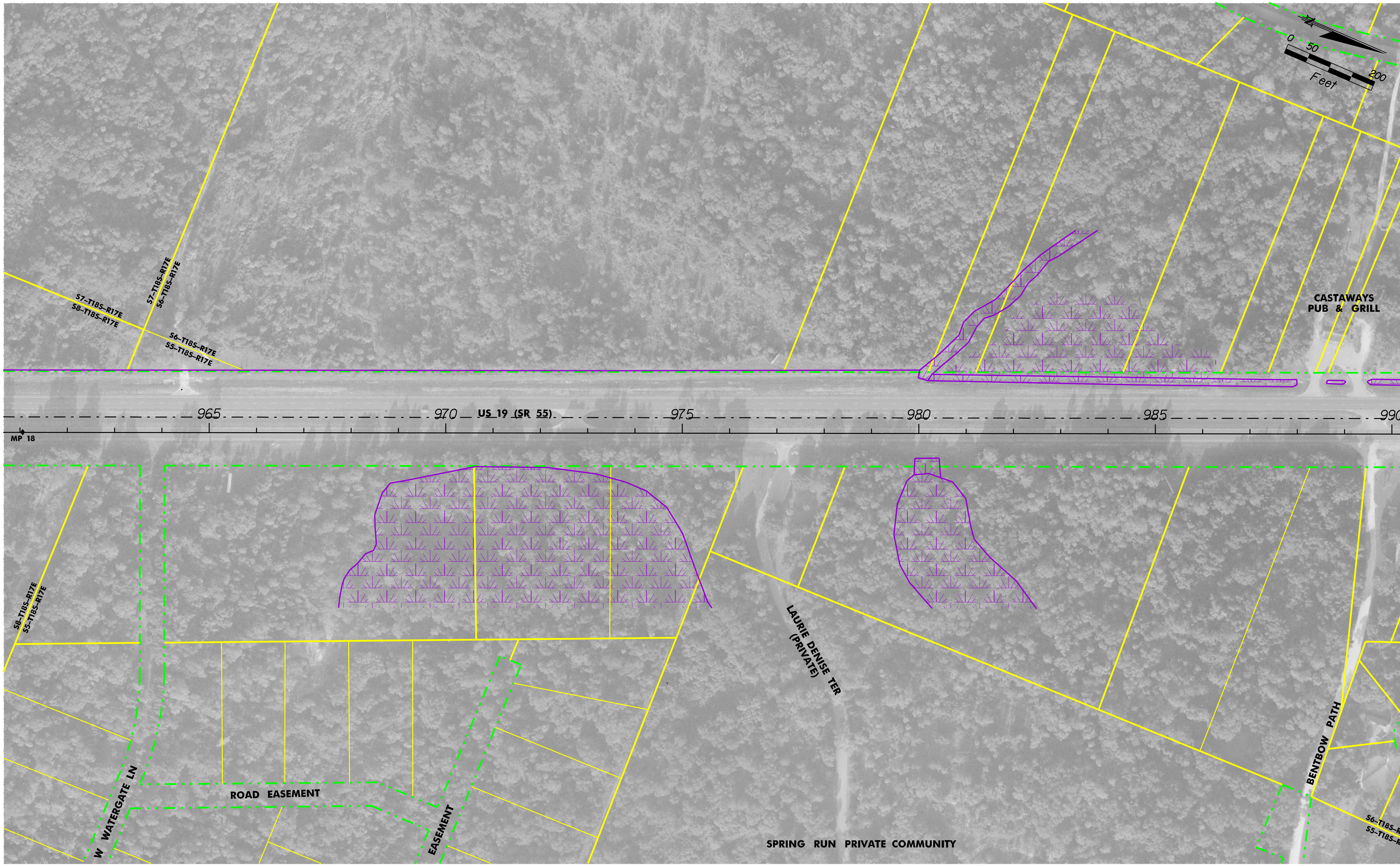
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
31

FLIGHT DATE : JUNE 11, 2001



SEGMENT 6 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION	PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
PROPERTY LINES	PROPOSED PAVEMENT / CURB	BRIDGE STRUCTURE OR RETAINING WALL	BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
120 MP 3 BASELINE SURVEY MILEPOST	POTENTIAL CONTAMINATION SITE	PROPOSED SIDEWALK OR MULTI-USE PATH	

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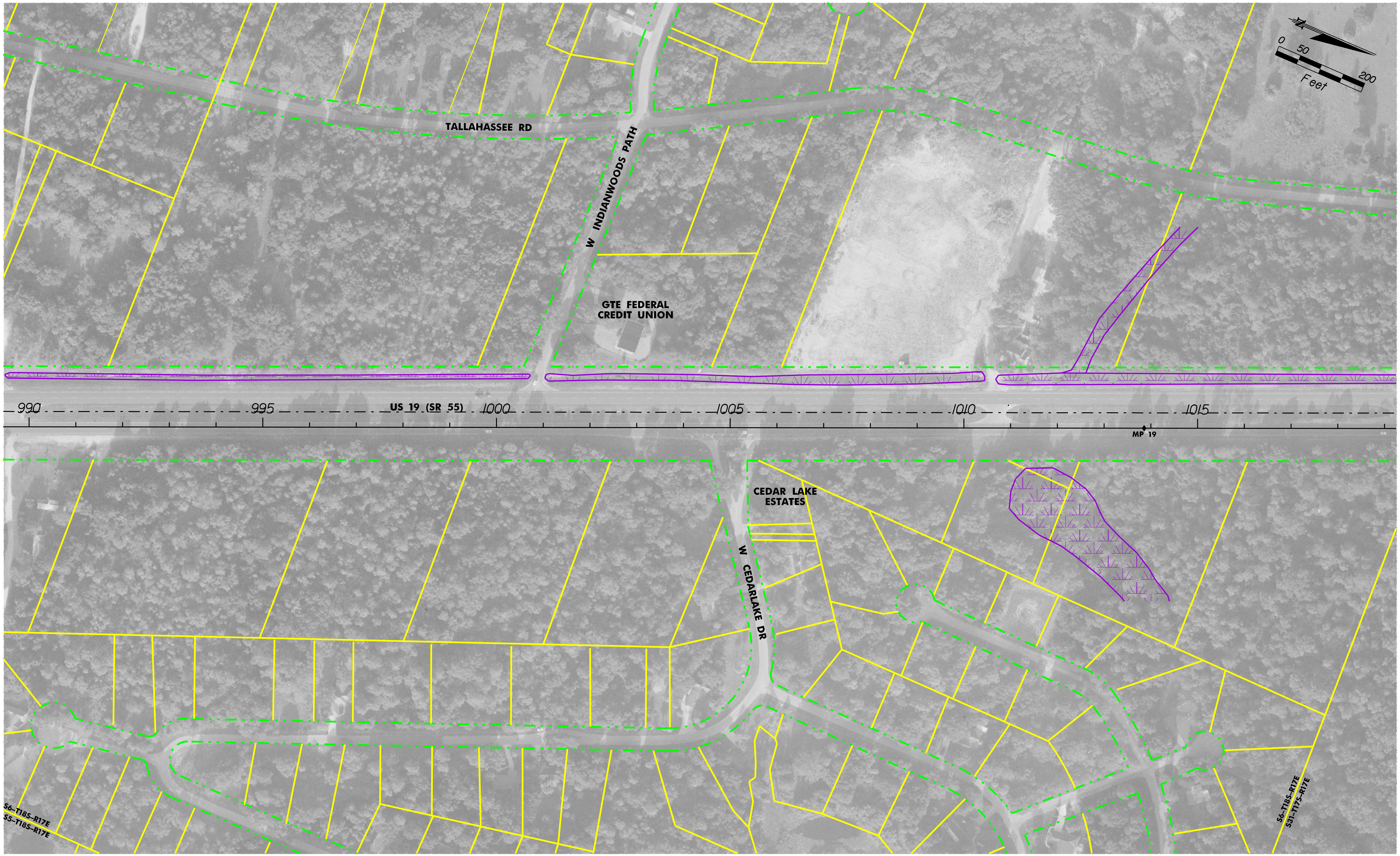
US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
32

FLIGHT DATE : JUNE 11, 2001



SEGMENT 6 RECOMMENDED ALTERNATIVE

Legend			
EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION	PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
PROPERTY LINES	PROPOSED PAVEMENT / CURB	BRIDGE STRUCTURE OR RETAINING WALL	B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
120 MP 3 BASELINE SURVEY MILEPOST	X POTENTIAL CONTAMINATION SITE	PROPOSED SIDEWALK OR MULTI-USE PATH	AREA WITHIN RIGHT OF WAY

PBS&J
5300 W. Cypress St.
Suite 300
Tampa, Fl. 33607
Phone: 813.282.7275
www.PBSJ.com

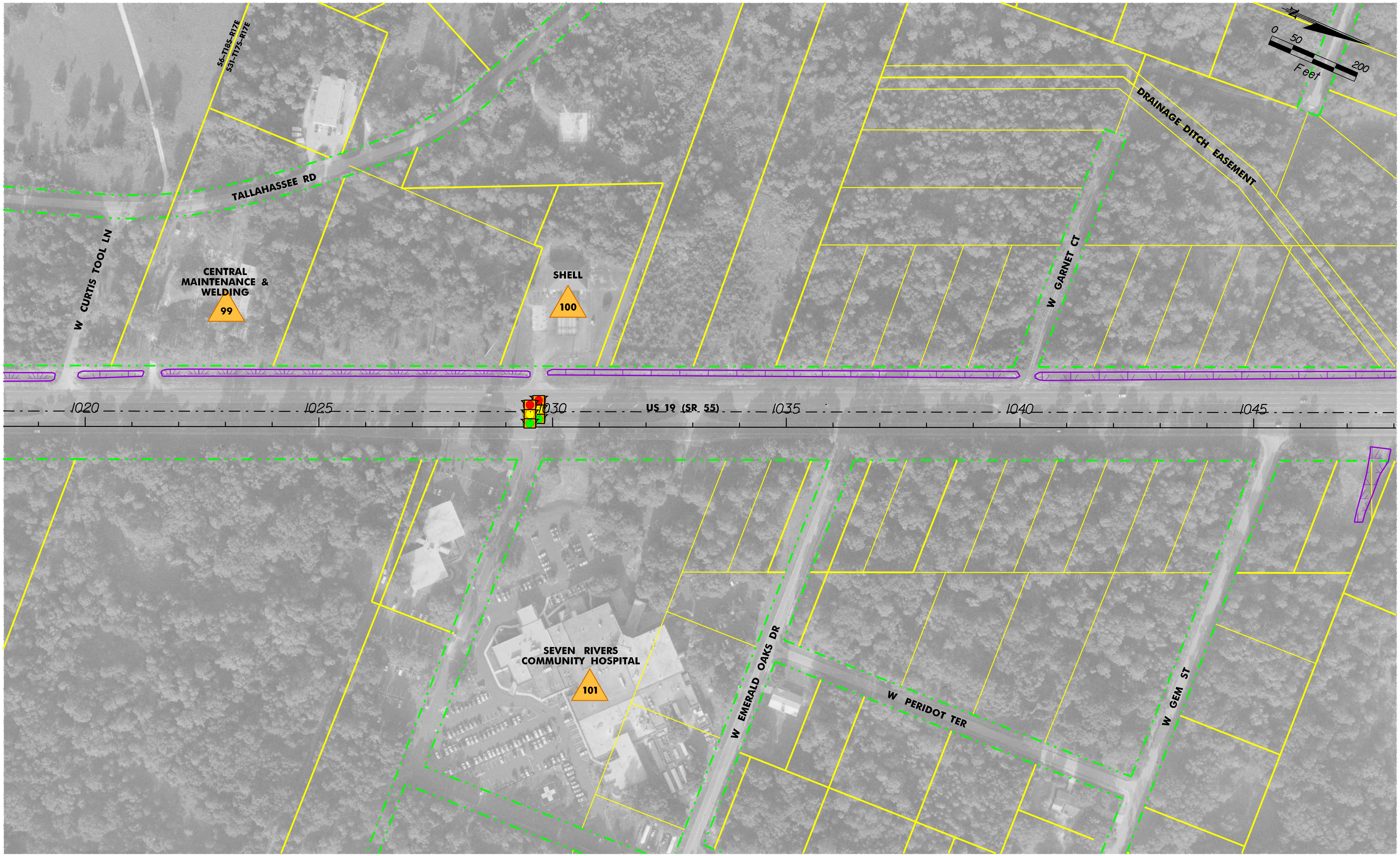
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
33

FLIGHT DATE : JUNE 11, 2001



SEGMENT 6 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT
PROPERTY LINES
120 MP 3 BASELINE SURVEY MILEPOST
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
WETLANDS WITHIN STUDY AREA
BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
AREA WITHIN RIGHT OF WAY

PBS&J
5300 W. Cypress St.
Suite 300
Tampa, Fl. 33607
Phone: 813.282.7275
www.PBSJ.com

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY FROM SOUTH OF US 98 TO CR 488 CITRUS COUNTY, FLORIDA

SHEET NO. 34

FLIGHT DATE : JUNE 11, 2001

SEGMENT 6 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT
PROPERTY LINES
120 MP 3 BASELINE SURVEY MILEPOST
CENTERLINE OF CONSTRUCTION
PROPOSED PAVEMENT / CURB
POTENTIAL CONTAMINATION SITE
PROPOSED RIGHT OF WAY
BRIDGE STRUCTURE OR RETAINING WALL
PROPOSED SIDEWALK OR MULTI-USE PATH
WETLANDS WITHIN STUDY AREA
B R NP BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
AREA WITHIN RIGHT OF WAY

19-MAR-2004 09:57
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Tampa, Fl. 33607
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
35

FLIGHT DATE : JUNE 11, 2001

SEGMENT 6 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION	PROPOSED RIGHT OF WAY
PROPERTY LINES	PROPOSED PAVEMENT / CURB	BRIDGE STRUCTURE OR RETAINING WALL
120 MP 3 BASELINE SURVEY MILEPOST	POTENTIAL CONTAMINATION SITE	PROPOSED SIDEWALK OR MULTI-USE PATH
WETLANDS WITHIN STUDY AREA	BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION	AREA WITHIN RIGHT OF WAY

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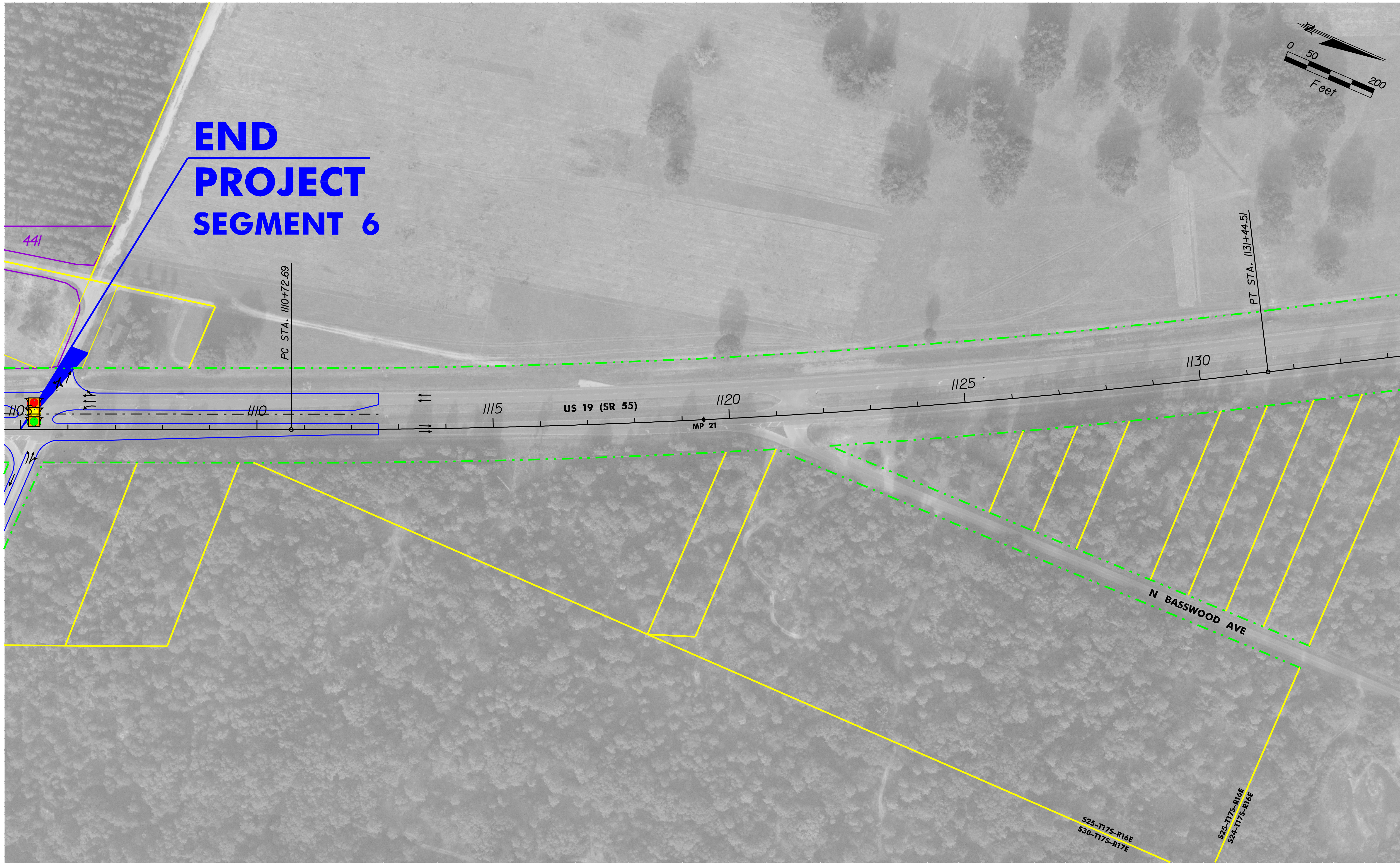
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO.
36

FLIGHT DATE : JUNE 11, 2001



SEGMENT 6 RECOMMENDED ALTERNATIVE

EXISTING RIGHT OF WAY OR EASEMENT	CENTERLINE OF CONSTRUCTION	PROPOSED RIGHT OF WAY	WETLANDS WITHIN STUDY AREA
PROPERTY LINES	PROPOSED PAVEMENT / CURB	BRIDGE STRUCTURE OR RETAINING WALL	BUSINESS / RESIDENTIAL / NON-PROFIT ORGANIZATION RELOCATION
120 MP 3 BASELINE SURVEY MILEPOST	POTENTIAL CONTAMINATION SITE	PROPOSED SIDEWALK OR MULTI-USE PATH	AREA WITHIN RIGHT OF WAY

PBSJ
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Suite 300
Tampa, Fl. 33607
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 55	CITRUS	405822-1-22-01

US 19 (SR 55) PD&E STUDY
FROM SOUTH OF US 98 TO CR 488
CITRUS COUNTY, FLORIDA

SHEET NO. 37

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APPENDIX C

Soil Survey Sheet – Sheet 38

Soil Profiles – Sheets 39 through 43

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
MATERIAL AND RESEARCH

FINANCIAL PROJECT No. 405822-1-22-01

DATE OF SURVEY: JANUARY 2002
SURVEY MADE BY: TIERRA, INC.
SUBMITTED BY: HENRI V. JEAN, P.E.

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

DISTRICT: SEVEN
ROAD No.: U.S.19
COUNTY: CITRUS

SURVEY BEGINS STA. 100+00 SURVEY ENDS STA. 1105+00

	ORGANIC CONTENT		MOISTURE CONTENT		SIEVE ANALYSIS RESULTS % PASS						ATTERBERG LIMITS (%)					CORROSION TEST RESULTS				
STRATUM NO.	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	-----	--	-----	-----	6	100	98-99	80-91	31-60	1-7	--	-----	-----	A-3	LIGHT BROWN TO DARK BROWN TO GRAY FINE SAND (FILL)	2	16,000-23,000	15	12.0-24.6	7.5-7.58
2	-----	--	-----	-----	6	100	97-98	79-88	44-58	2-6	--	-----	-----	A-3	DARK TO REDDISH-BROWN TO GRAY FINE SAND	2	11,000-12,000	30	37.2-39.6	7.02-7.17
3	-----	--	3	12-23	5	100	98-99	85-91	46-71	12-23	5	NP-25	NP-17	A-2-4	TAN TO REDDISH-BROWN SLIGHTLY SILTY FINE SAND	2	11,000-19,000	15	4.8-75.3	5.39-5.89
4	-----	--	4	15-34	7	100	98-99	85-86	50-53	20-31	4	NP-33	NP-16	A-2-4/ A-2-6	LIGHT TO TAN ORNGE SLIGHTLY SILTY TO SLIGHTLY CLAYEY FINE SAND	2	8,400-13,000	15-30	19.5-77.1	4.37-6.47
5	4	6-11	3	48-80	4	-----	-----	-----	-----	5-12	--	-----	-----	A-8	MUCK	--	-----	-----	-----	-----
6	-----	--	-----	-----	--	-----	-----	-----	-----	-----	--	-----	-----	--	WEATHERED LIMESTONE	--	-----	-----	-----	-----
7	-----	--	3	27-40	3	100	98-99	80-87	66-79	40-56	3	31-48	13-18	A-6 A-7-6	REDDISIH TO BLUE-GREEN CLAY	1	1,200	30	37.2	7.38

EMBANKMENT AND SUBGRADE MATERIAL

STRATA BOUNDARIES ARE APPROXIMATE AND REPRESENT SOIL STRATA AT EACH TEST HOLE LOCATION ONLY.

WATER TABLE ENCOUNTERED   B WITH ROCKS
A WITH ROOTS   C WITH SHELL

NOTES:

1. THE MATERIAL FROM STRATA NUMBERS 1 AND 2 APPEAR SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH INDEX 505.
2. THE MATERIAL FROM STRATUM NUMBER 3 (A-2-4) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH INDEX 505. HOWEVER, THIS MATERIAL IS LIKELY TO RETAIN EXCESS MOISTURE AND MAY BE DIFFICULT TO DRY AND COMPACT. IT SHOULD BE USED IN THE EMBANKMENT ABOVE WATER LEVEL EXISTING AT THE TIME OF CONSTRUCTION.
3. THE MATERIAL FROM STRATUM NUMBER 4 (A-2-4/A-2-6) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH INDEX 500. IT MAY BE PLACED ABOVE THE EXISTING WATER LEVEL (AT THE TIME OF CONSTRUCTION) TO WITH IN 4 FEET OR PROPOSED BASE. IT SHOULD BE PLACED UNIFORMLY IN THE LOWER PORTION OF THE EMBANKMENT FOR SOME DISTANCE ALONG THE PROJECT RATHER THEN FULL DEPTH FOR SHORTER DISTANCES.
4. THE MATERIAL FROM STRATUM 5 IS MUCK/(A-8) MATERIAL AND SHALL BE REMOVED IN ACCORDANCE WITH INDEX 500. THIS MATERIAL MAY BE USED IN EMBANKMENT CONSTRUCTION OF OUTLINED IN FDOT INDEX 505. THIS MATERIAL SHALL NOT BE USED AS A SUPPLEMENT TO STORMWATER POND BERMS WITH EXCEPTION OF MUCK USED AS A SUPPLEMENT TO CONSTRUCT TOPSOIL AS DESCRIBED IN SECTION 162 OF THE FDOT STANDARD SPECIFICATIONS. ORGANIC MATERIALS WERE ENCOUNTERED AT APPROXIMATE STATIONS 273+00, 427+00, 616+85, AND
5. THE MATERIAL FROM STRATUM 6 (WEATHERED LIMESTONE) WAS ENCOUNTERED BETWEEN STATIONS 845+00 AND 1080+00. THE LIMESTONE STRATUM IS TYPICALLY REFEREED TO AS "CAPROCK" AND WILL ADVERSELY AFFECT UTILITY EXCAVATIONS AND/OR FOUNDATION LOCATIONS. THE STRATUM WAS ENCOUNTERED AT DEPTHS RANGING FROM 2 TO 5 FEET DEEP AND EXTENDED TO DEPTHS GREATER THAN 15 FEET BELOW EXISTING GRADE.
6. THE MATERIAL FROM STRATUM NUMBER 7 IS PLASTIC A-6/A-7-6 MATERIAL AND SHALL BE REMOVED IN ACCORDANCE WITH INDEX 500. IT MAY REMAIN IN PLACE 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 SHORT DISTANCES. PLASTIC SOILS WERE ENCOUNTERED AT APPROXIMATE STATIONS 273+00, 445+58, 595+00, 766+00, 870+00, 890+00 AND 1080+00.

REVISIONS					
Date	By	Description	Date	By	Description

TIERRA GEOTECHNICAL • MATERIALS ENGINEERING
7805 PROFESSIONAL PLACE, SUITE A
TAMPA, FL. 33637
(813)-989-1354
FLORIDA ENGINEERING CERTIFICATE OF AUTHORIZATION No. 1413

U.S. 19 PD& E STUDY

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
U.S. 19	CITRUS	405822-1-22-01

ROADWAY SOILS SURVEY

SHEET NO.

TIERRA PROJECT No. 6511-01-010
SHEET 38

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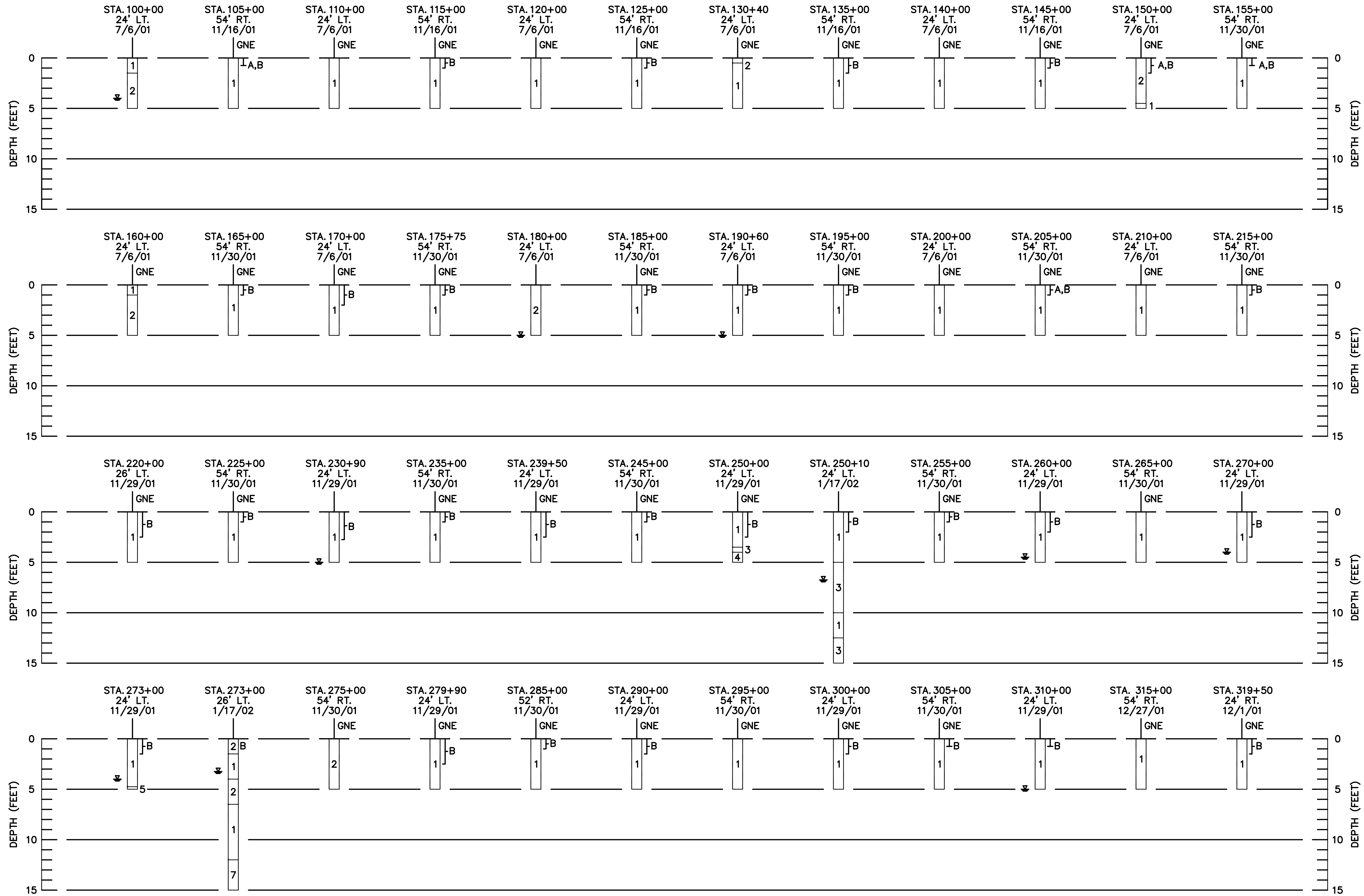

SOIL PROFILES

LEGEND

1. LIGHT BROWN TO DARK BROWN TO GRAY FINE SAND (FILL)(A–3)
2. DARK TO REDDISH–BROWN TO GRAY FINE SAND (A–3)
3. TAN CLAYEY SAND (A–2–4/A–2–6)
4. LIGHT TAN TO ORANGE SLIGHTLY SANDY CLAY (A–6)
5. MUCK (A–8)
6. WEATHERED LIMESTONE
7. REDDISH TO BLUE/GREEN CLAY (A–6/A–7–6)

A–3 AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW

GROUNDWATER LEVEL, DATE

GNE GROUNDWATER LEVEL NOT ENCOUNTERED

A WITH ROOTS

B WITH ROCKS

C WITH SHELL

0 5'

VERTICAL SCALE
HORIZONTAL N.T.S.

REVISIONS					
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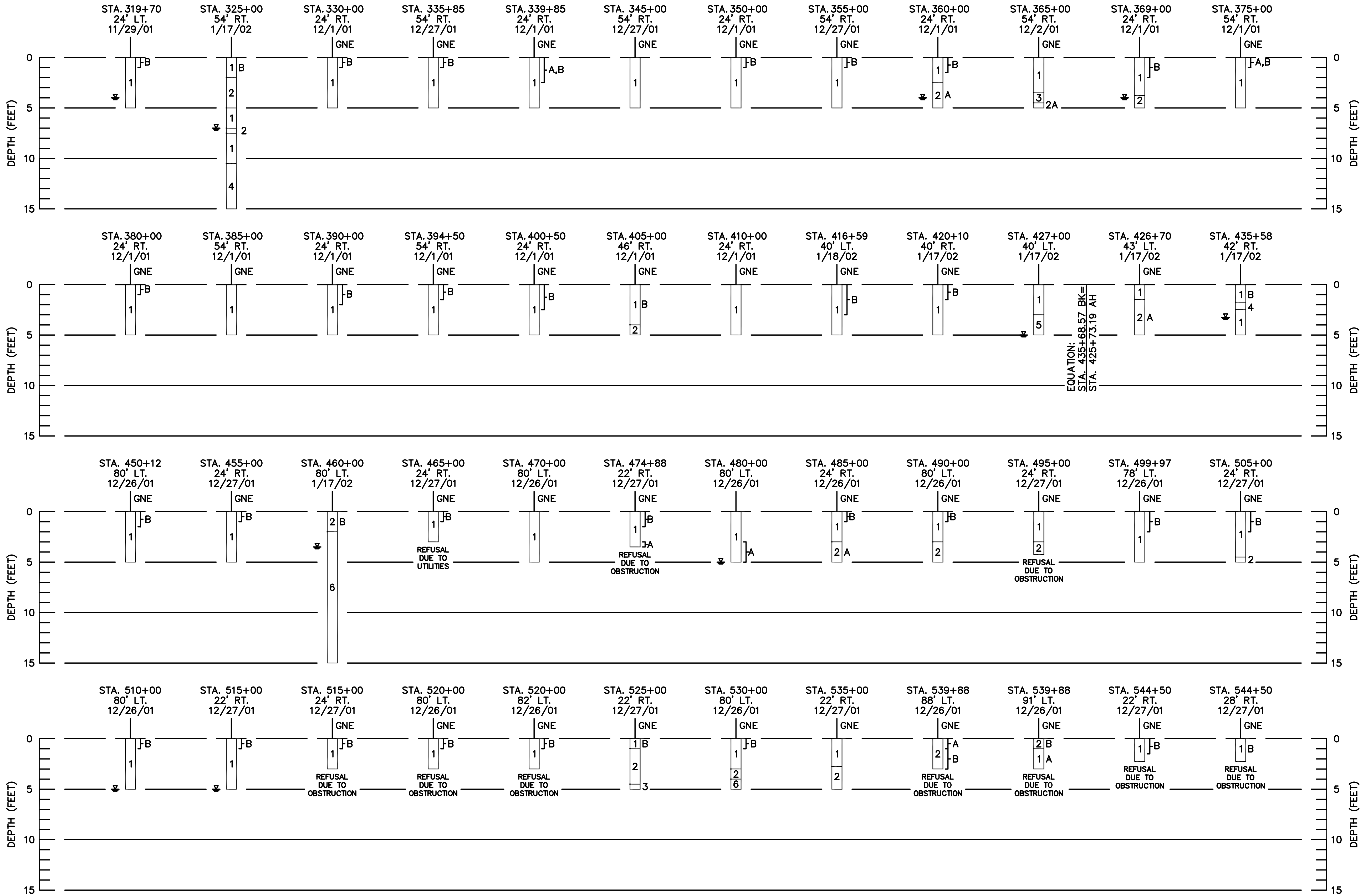
U.S. 19 PD& E STUDY

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
U.S. 19	CITRUS	405822–1–22–01

ROADWAY SOILS SURVEY

SHEET NO.



LEGEND

1. LIGHT BROWN TO DARK BROWN TO GRAY FINE SAND (FILL)(A–3)
2. DARK TO REDDISH–BROWN TO GRAY FINE SAND (A–3)
3. TAN CLAYEY SAND (A–2–4/A–2–6)
4. LIGHT TAN TO ORANGE SLIGHTLY SANDY CLAY (A–6)
5. MUCK (A–8)
6. WEATHERED LIMESTONE
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▼ GROUNDWATER LEVEL, DATE

GNE GROUNDWATER LEVEL NOT ENCOUNTERED

A WITH ROOTS

B WITH ROCKS

C WITH SHELL

0 5'

VERTICAL SCALE
HORIZONTAL N.T.S.

SOIL PROFILES

REVISIONS					
Date	By	Description	Date	By	Description

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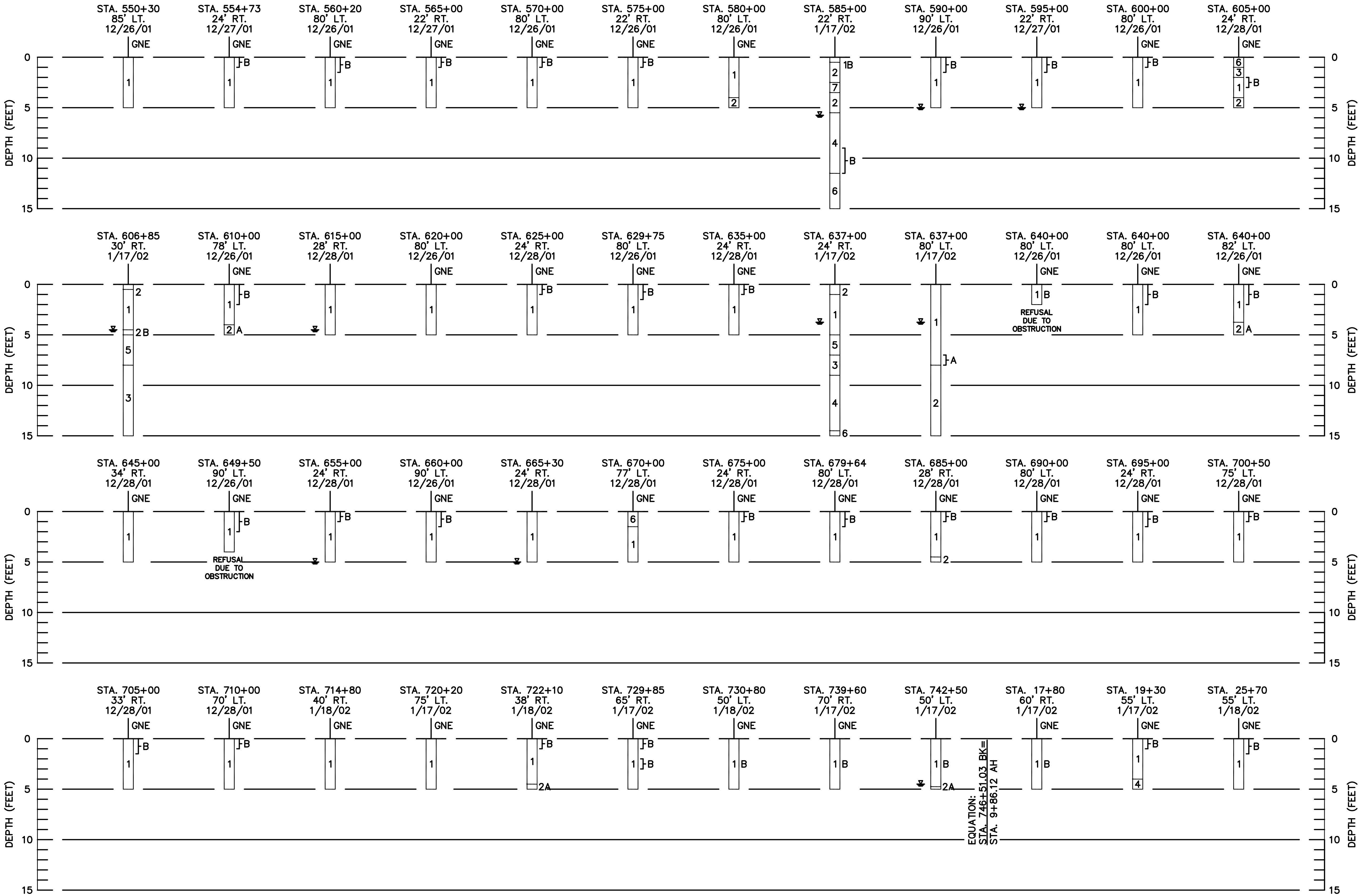
U.S. 19 PD & E STUDY

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
U.S. 19	CITRUS	405822–1–22–01

ROADWAY SOILS SURVEY

SHEET NO.



LEGEND

1. LIGHT BROWN TO DARK BROWN TO GRAY FINE SAND (FILL)(A-3)
2. DARK TO REDDISH-BROWN TO GRAY FINE SAND (A-3)
3. TAN CLAYEY SAND (A-2-4/A-2-6)
4. LIGHT TAN TO ORANGE SLIGHTLY SANDY CLAY (A-6)
5. MUCK (A-8)
6. WEATHERED LIMESTONE
7. REDDISH TO BLUE/GREEN CLAY (A-6/A-7-6)

A-3 AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW
▼ GROUNDWATER LEVEL, DATE
GNE GROUNDWATER LEVEL NOT ENCOUNTERED
A WITH ROOTS
B WITH ROCKS
C WITH SHELL

0 5'
VERTICAL SCALE
HORIZONTAL N.T.S.

SOIL PROFILES

REVISIONS

Date	By	Description	Date	By	Description

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U.S. 19 PD & E STUDY

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
U.S. 19	CITRUS	405822-1-22-01

ROADWAY SOILS SURVEY

SHEET NO.

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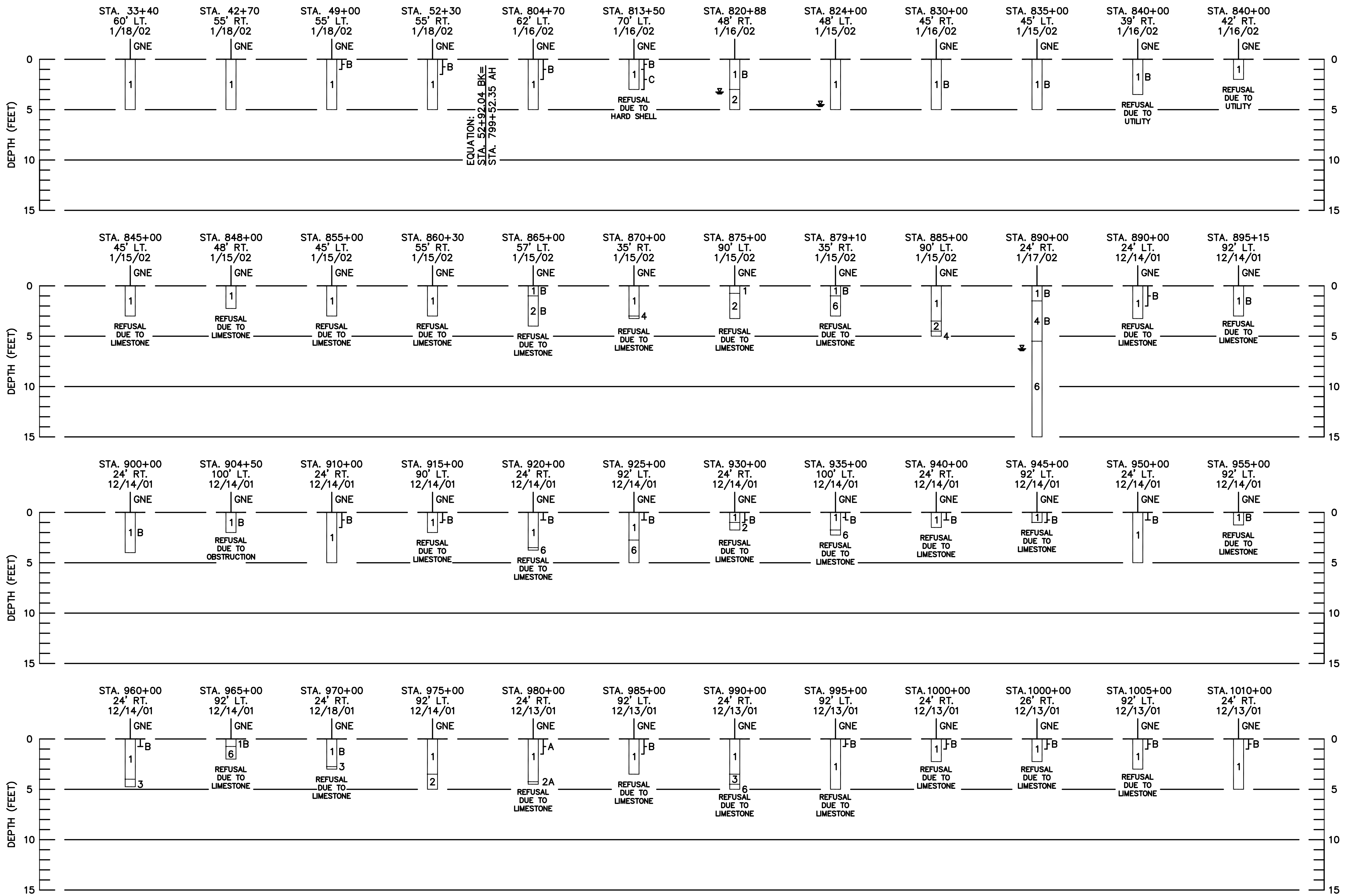

LEGEND

1. LIGHT BROWN TO DARK BROWN TO GRAY FINE SAND (FILL)(A–3)
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▼ GROUNDWATER LEVEL, DATE

GNE GROUNDWATER LEVEL NOT ENCOUNTERED

A WITH ROOTS

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C WITH SHELL

0 5'
VERTICAL SCALE
HORIZONTAL N.T.S.

SOIL PROFILES

REVISIONS					
Date	By	Description	Date	By	Description

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U.S. 19 PD & E STUDY

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
U.S. 19	CITRUS	405822–1–22–01

ROADWAY SOILS SURVEY

SHEET NO.

TIERRA PROJECT No. 6511–01–010
SHEET 42

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APPENDIX D

Summary of Laboratory Testing

Individual Laboratory Testing Results – Plates 1 through 21

Summary of Corrosion Parameter Test Results

SUMMARY OF LABORATORY TEST RESULTS
US 19 PD&E
FPN 405822 1 22 01
CITRUS COUNTY, FLORIDA
TIERRA PROJECT NO.: 6511-01-010

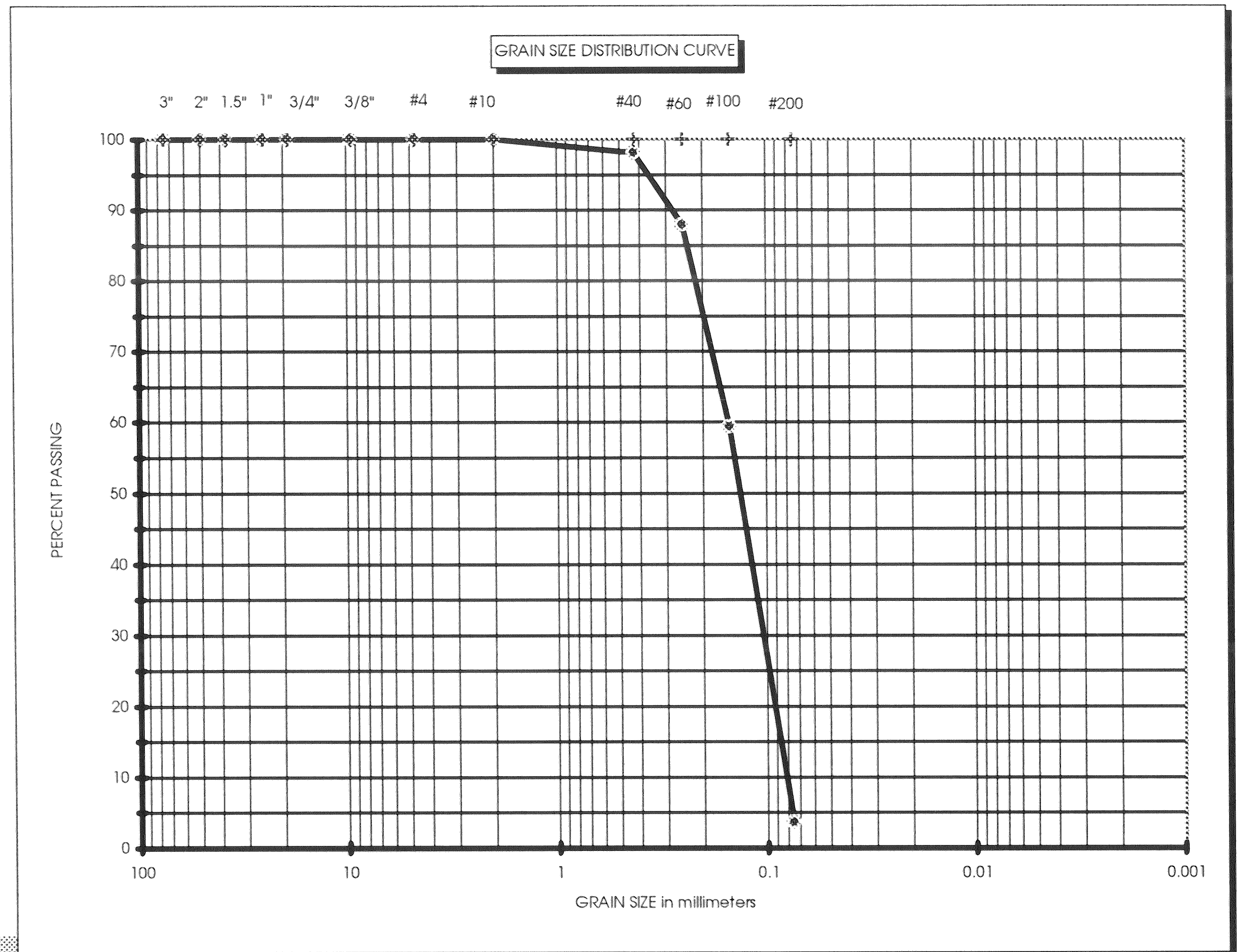
Plate Number	Station Number	Offset (Feet)	Sample Depth (Feet)	Stratum No.	AASHTO Group Symbol	Sieve Analysis (Percent Passing)								Atterberg Limits (%)			Organic Content (%)	Natural Moisture Content (%)
						19mm	9.5mm	#4	#10	#40	#60	#100	#200	Liquid Limit	Plastic Limit	Plasticity Index		
1	190+60	24 LT	2.5 - 5.0	1	A-3				100.0	98.1	87.8	59.3	3.6					
2	290+00	24 LT	1.5 - 5.0	1	A-3				100.0	98.2	89.7	59.7	2.1					
3	400+50	24 RT	2.5 - 5.0	1	A-3				100.0	98.9	90.6	59.9	1.5					
4	890+00	24 RT	2.0 - 3.2	1	A-3				100.0	97.5	87.7	56.9	6.5					
5	995+00	92 LT	0.7 - 2.5	1	A-3				100.0	97.9	80.4	30.6	2.7					
6	1075+00	94 LT	1.5 - 3.5	1	A-3				100.0	98.1	85.6	41.5	5.0					
7	100+00	24 LT	4.0 - 5.0	2	A-3				100.0	96.6	78.7	43.7	5.1					
8	150+00	24 LT	1.5 - 3.0	2	A-3			100.0	99.7	97.2	83.5	54.8	2.6					
9	160+00	24 LT	2.5 - 3.0	2	A-3				100.0	97.1	83.0	49.0	2.4					
10	180+00	24 LT	3.0 - 3.5	2	A-3				100.0	97.9	88.0	57.6	5.0					
11	275+00	54 RT	3.0 - 5.0	2	A-3				100.0	98.0	88.2	58.1	2.8					
	637+00	80 LT	8.5 - 15.0	2	A-3								6.3					
12	250+00	24 LT	3.5 - 4.0	3	A-2-4				100.0	98.5	87.1	54.2	19.4	21	16	5		
	250+10	24LT	5.0 - 10.0	3	A-2-4								22.4	21	15	6		19.0
13	525+00	22 RT	4.5 - 5.0	3	A-2-4				100.0	98.5	90.6	71.1	11.9	NP	NP	NP		22.5
14	605+00	24 RT	1.0 - 2.0	3	A-2-4				100.0	98.5	85.1	46.4	21.3	18	15	3		11.8
15	1105+00	93.LT	4.0 - 5.0	3	A-2-4				100.0	98.3	87.0	46.6	22.6	25	16	9		
16	250+00	24 LT	4.0 - 5.0	4	A-2-6				100.0	98.4	86.2	52.9	30.7	33	14	19		
	435+58	42RT	1.9 - 2.6	4	A-2-6								28.8	24	12	12		14.9
	19+30	55LT	4.0 - 5.0	4	A-2-6								30.3	30	16	14		33.7
	870+00	35RT	3.0 - 3.5	4	A-2-4								20.1	NP	NP	NP		25.0
	890+00	24RT	4.5 - 5.5	4	A-2-6								27.3	26	14	12		26.7
17	1050+00	24 RT	3.0 - 4.80	4	A-2-6				100.0	97.5	84.9	50.1	26.3	26	15	11		
18	1075+00	94 LT	3.5 - 4.0	4	A-2-4				100.0	98.1	85.0	50.8	23.0	23	16	7		
	273+00	24 LT	4.8 - 6.0	5	A-8								12.0				7.0	79.5
	427+00	40 LT	3.0 - 5.0	5	A-8								6.2				6.9	48.4
	606+85	30RT	5.0 - 8.0	5	A-8								9.7				11.0	71.9
	637+00	24RT	5.0 - 7.0	5	A-8								5.3				6.1	62.4
19	273+00	26LT	12.0 - 13.0	7	A-7-6				100.0	98.9	86.6	78.6	56.3	48	18	30		39.5
20	273+00	26LT	13.0 - 15.0	7	A-6				100.0	97.6	82.3	69.2	44.0	31	13	18		26.9
21	585+00	22RT	2.5 - 3.5	7	A-6				100.0	98.0	79.8	66.4	39.7	39	15	24		31.4

TIERRA. INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E DATE: 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 190+60 OFFSET: 24 LT DEPTH (ft): 2.5 - 5.0

SOIL DESCRIPTION: A-3

% NATURAL MOISTURE CONTENT : N/A

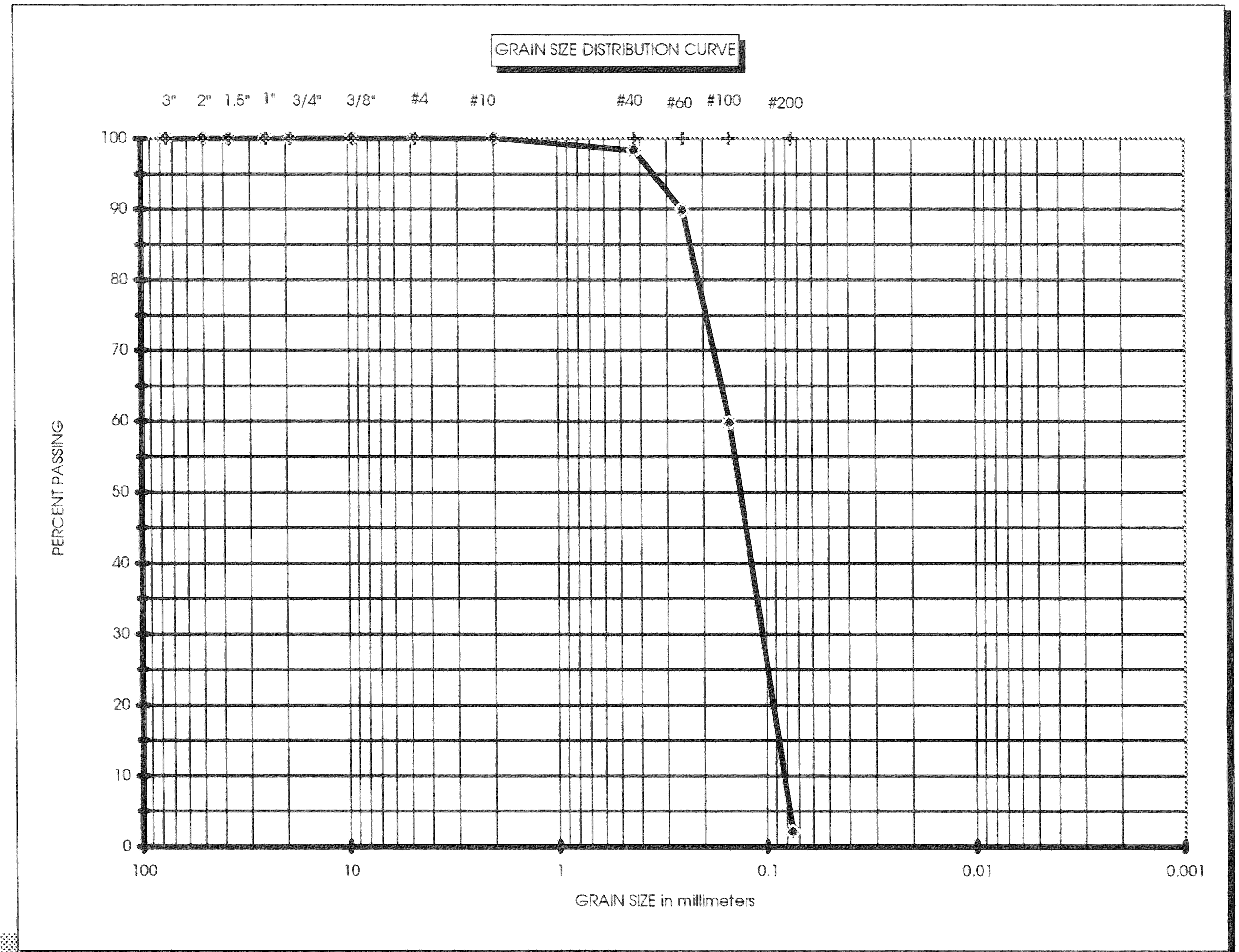
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	
PLASTIC LIMIT	
PLASTIC INDEX	

TIERRA, INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E **DATE:** 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 290+00 **OFFSET:** 24 LT **DEPTH (ft):** 1.5 - 5.0

SOIL DESCRIPTION: A-3

% NATURAL MOISTURE CONTENT : N/A

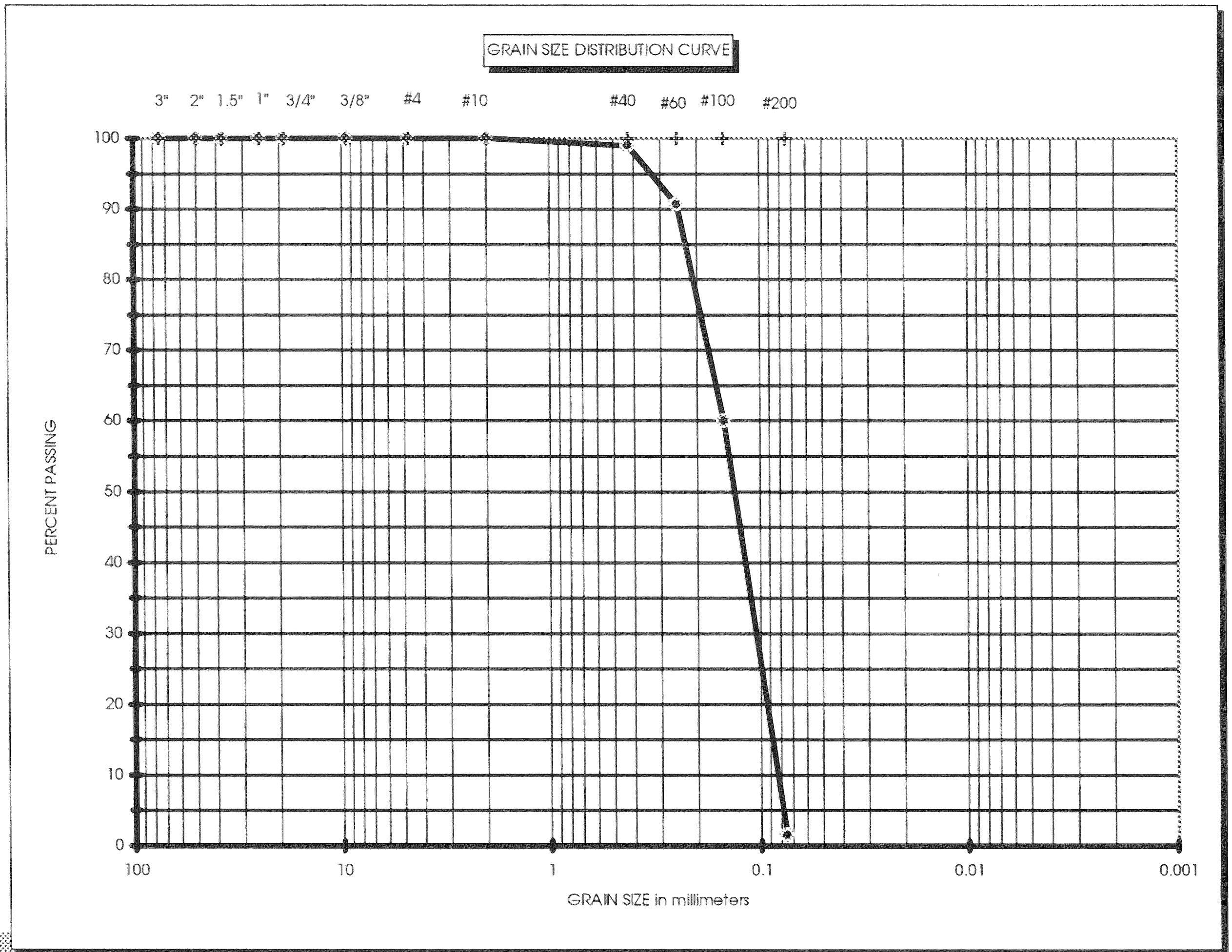
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	
PLASTIC LIMIT	
PLASTIC INDEX	

TIERRA. INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E **DATE:** 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 400+50 **OFFSET:** 24 RT **DEPTH (ft):** 2.5 -5.0

SOIL DESCRIPTION: A-3

% NATURAL MOISTURE CONTENT : N/A

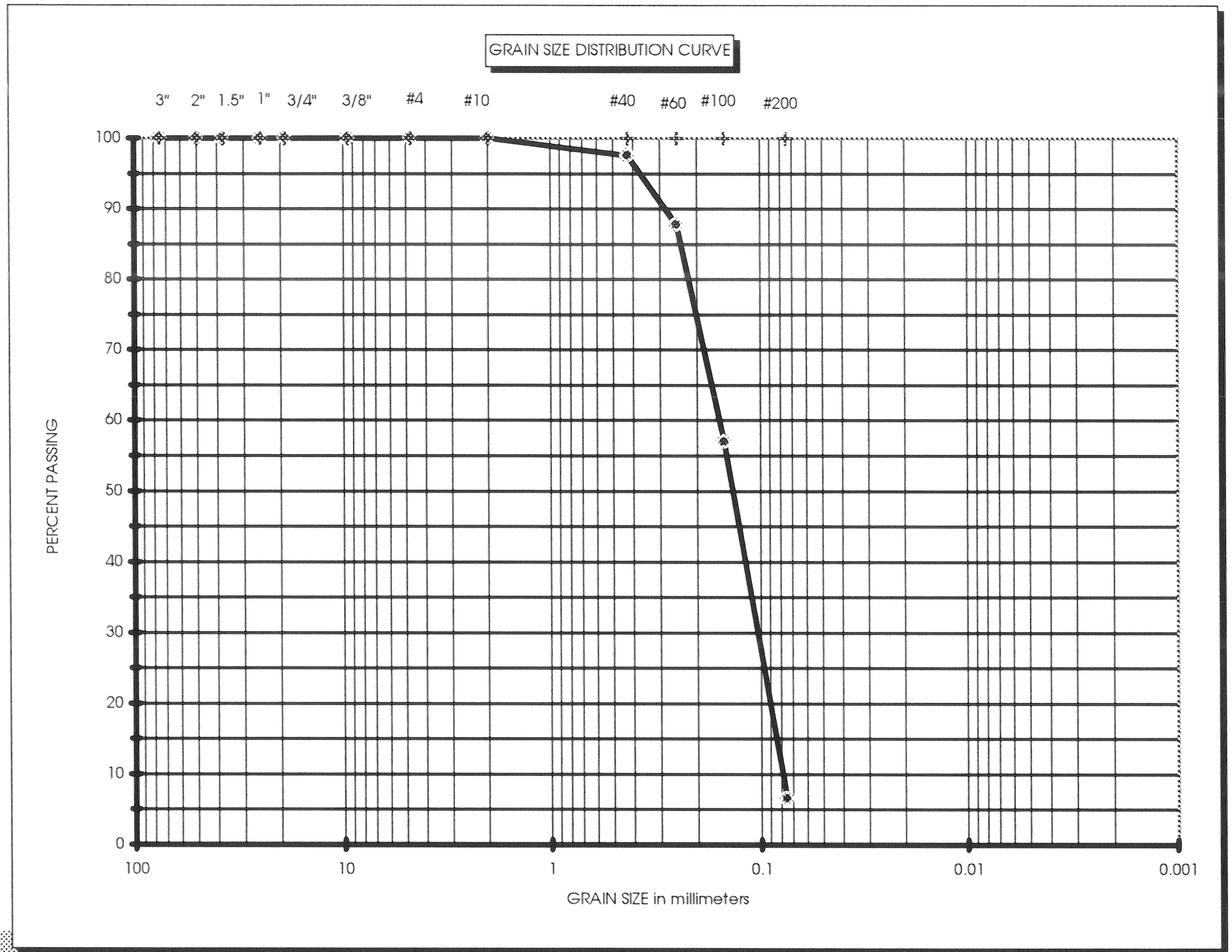
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	
PLASTIC LIMIT	
PLASTIC INDEX	

TIERRA, INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E **DATE:** 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 890+00 **OFFSET:** 24 RT **DEPTH (ft):** 2.0 - 3.2

SOIL DESCRIPTION: A-3

% NATURAL MOISTURE CONTENT : N/A

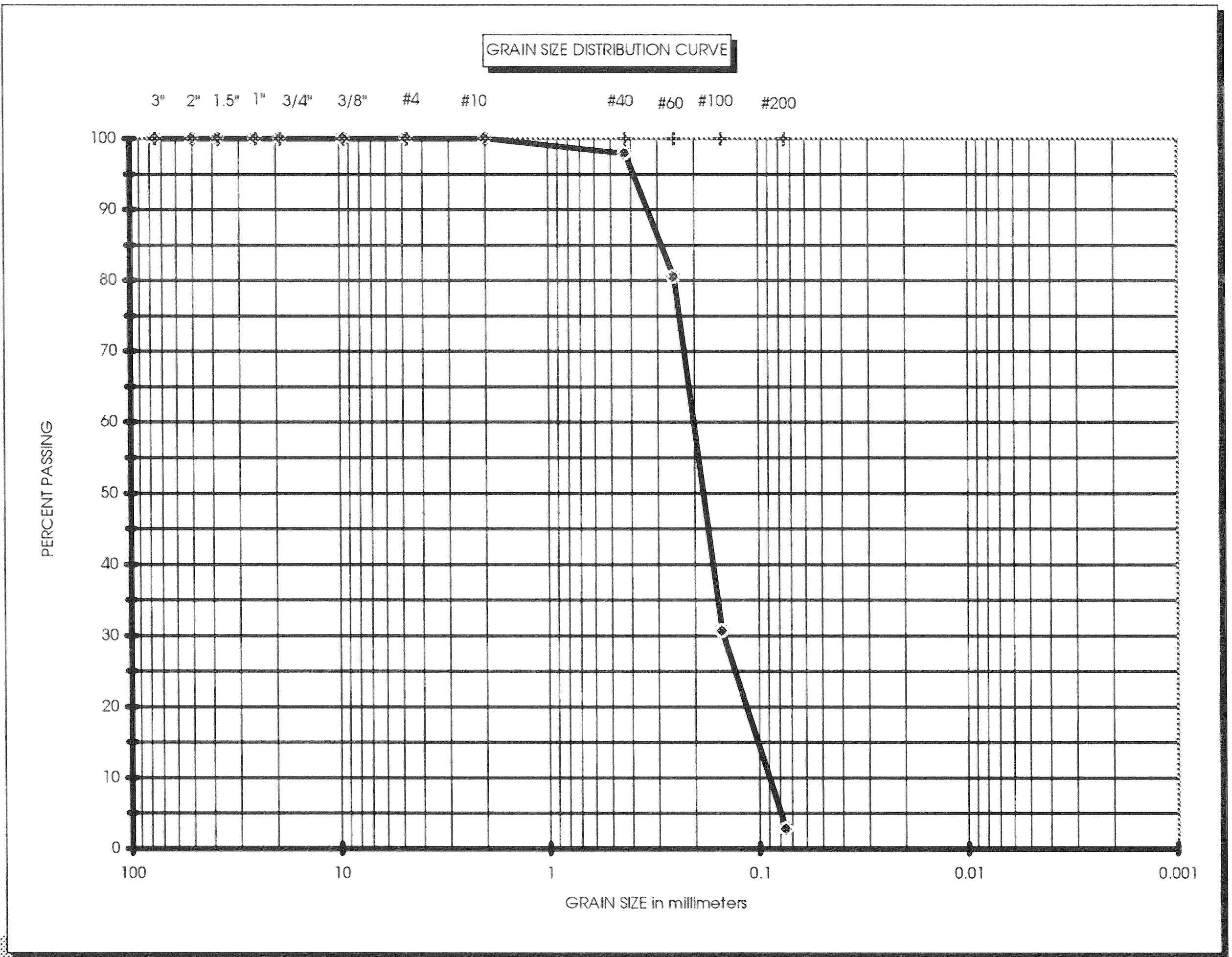
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	
PLASTIC LIMIT	
PLASTIC INDEX	

TIERRA. INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E **DATE:** 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 995+00 **OFFSET:** 92 LT **DEPTH (ft):** 0.7 - 2.5

SOIL DESCRIPTION: A-3

% NATURAL MOISTURE CONTENT : N/A

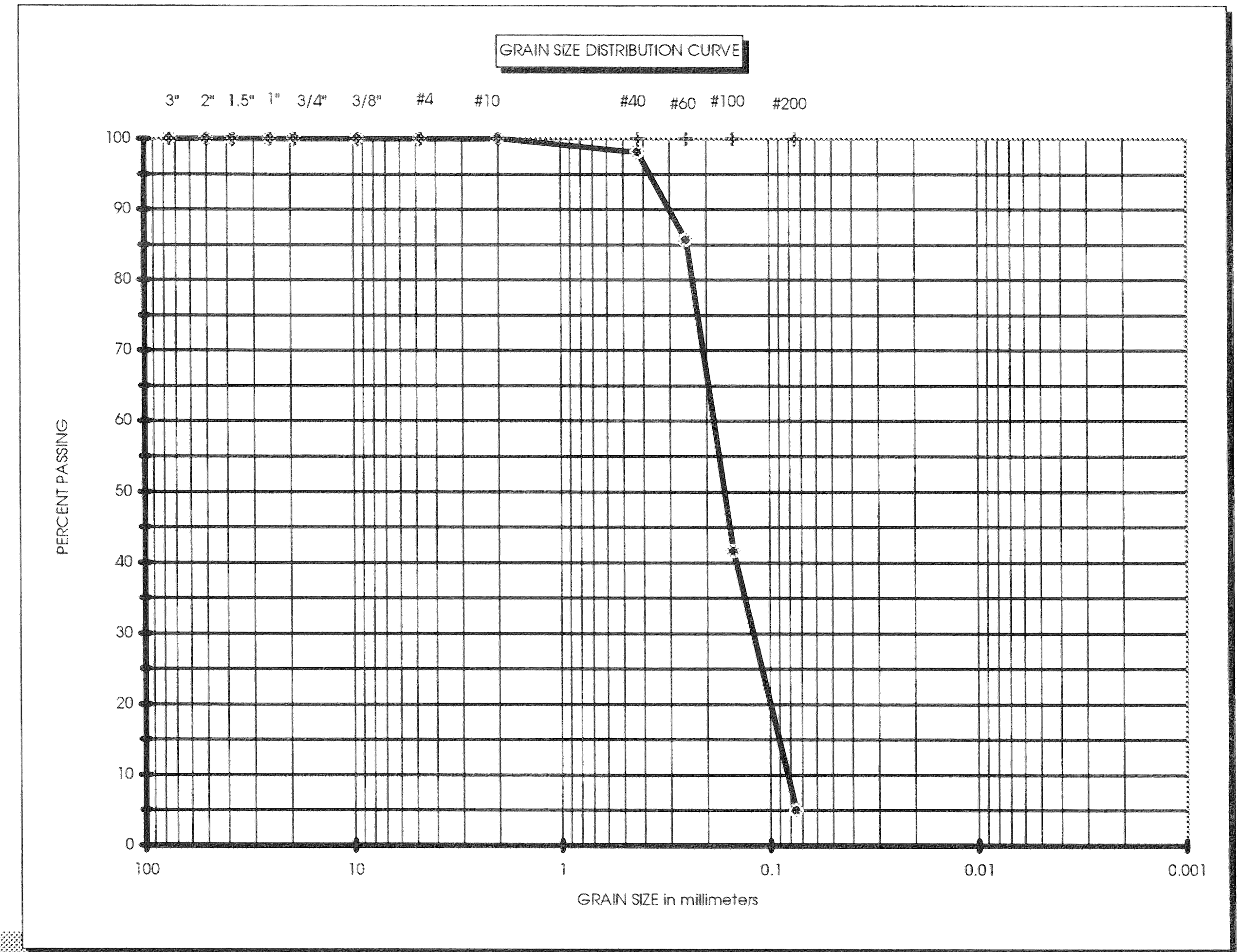
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	
PLASTIC LIMIT	
PLASTIC INDEX	

TIERRA. INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E DATE: 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 1075+00 OFFSET: 94 LT DEPTH (ft): 1.5 - 3.5

SOIL DESCRIPTION: A-3

% NATURAL MOISTURE CONTENT : N/A

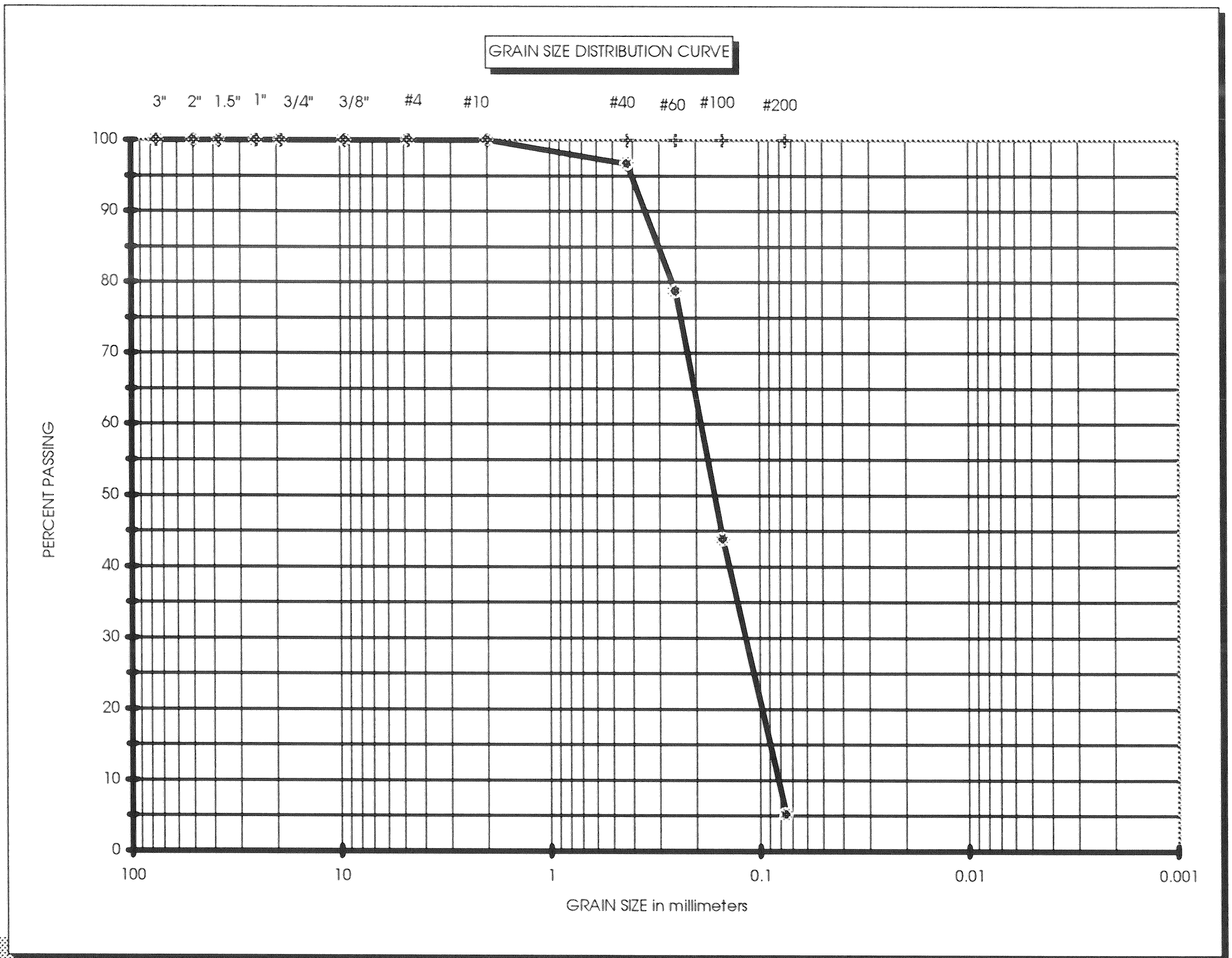
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	
PLASTIC LIMIT	
PLASTIC INDEX	

TIERRA. INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E **DATE:** 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 100+00 **OFFSET:** 24 LT **DEPTH (ft):** 4.0 - 5.0

SOIL DESCRIPTION: A-3

% NATURAL MOISTURE CONTENT : N/A

ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	
PLASTIC LIMIT	
PLASTIC INDEX	

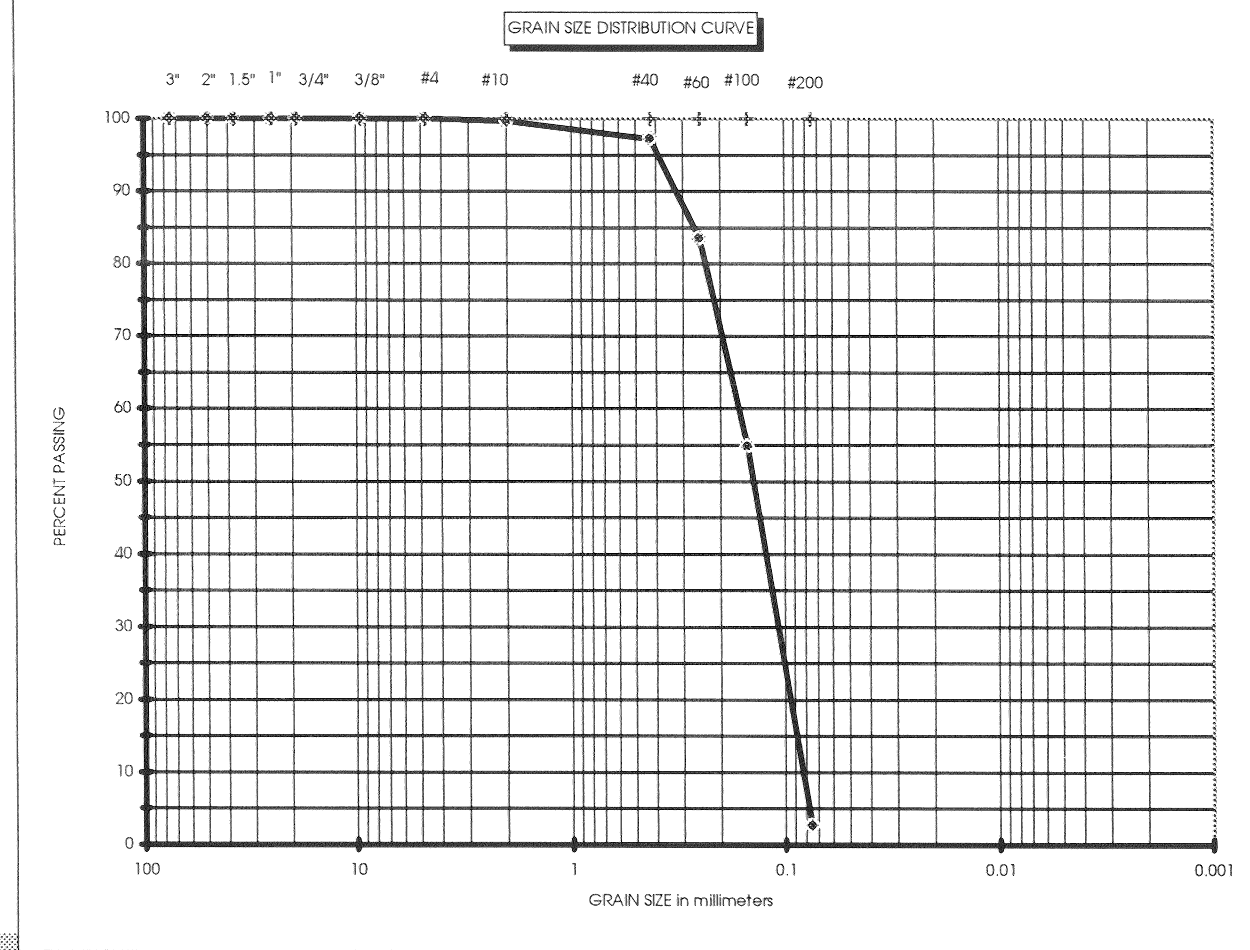
TIERRA, INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E

DATE: 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 150+00 OFFSET: 24 LT DEPTH (ft): 1.5 - 3.0

SOIL DESCRIPTION: A-3

% NATURAL MOISTURE CONTENT : N/A

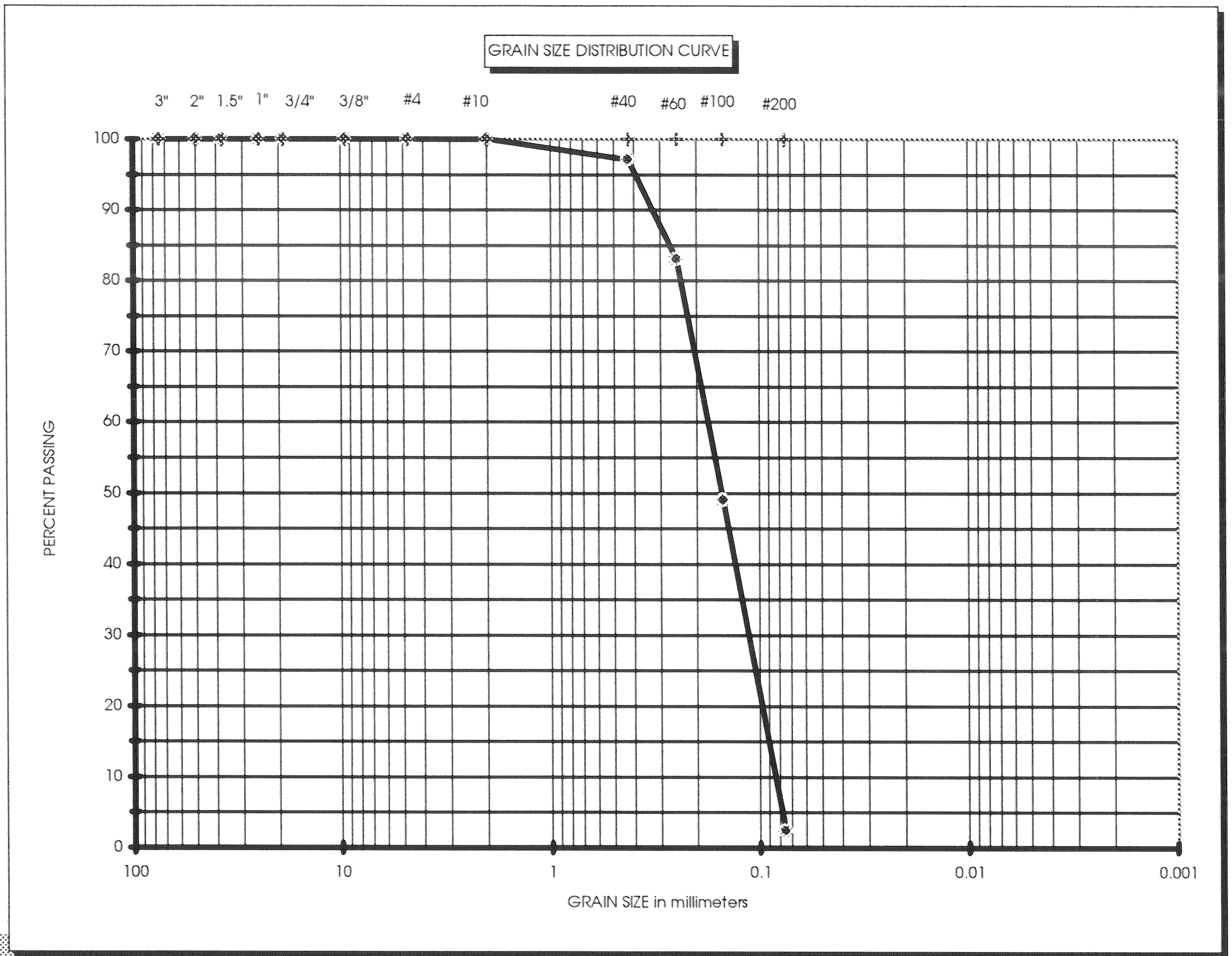
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	
PLASTIC LIMIT	
PLASTIC INDEX	

TIERRA. INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E DATE: 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 160+00 OFFSET: 24 LT DEPTH (ft): 2.5 - 3.0

SOIL DESCRIPTION: A-3

% NATURAL MOISTURE CONTENT : N/A

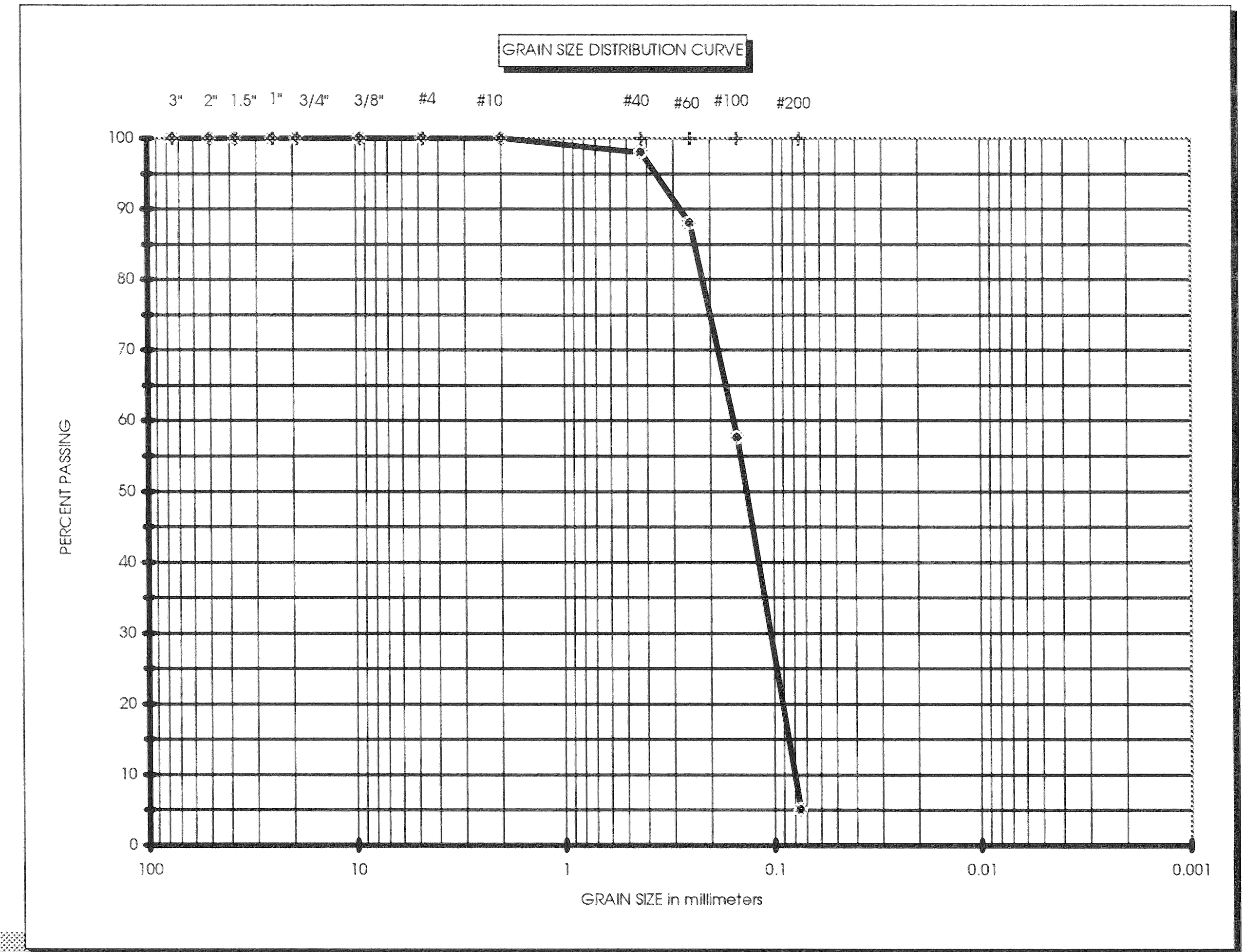
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	
PLASTIC LIMIT	
PLASTIC INDEX	

TIERRA, INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E **DATE:** 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 180+00 **OFFSET:** 24 LT **DEPTH (ft):** 3.0 - 3.5

SOIL DESCRIPTION: A-3

% NATURAL MOISTURE CONTENT : N/A

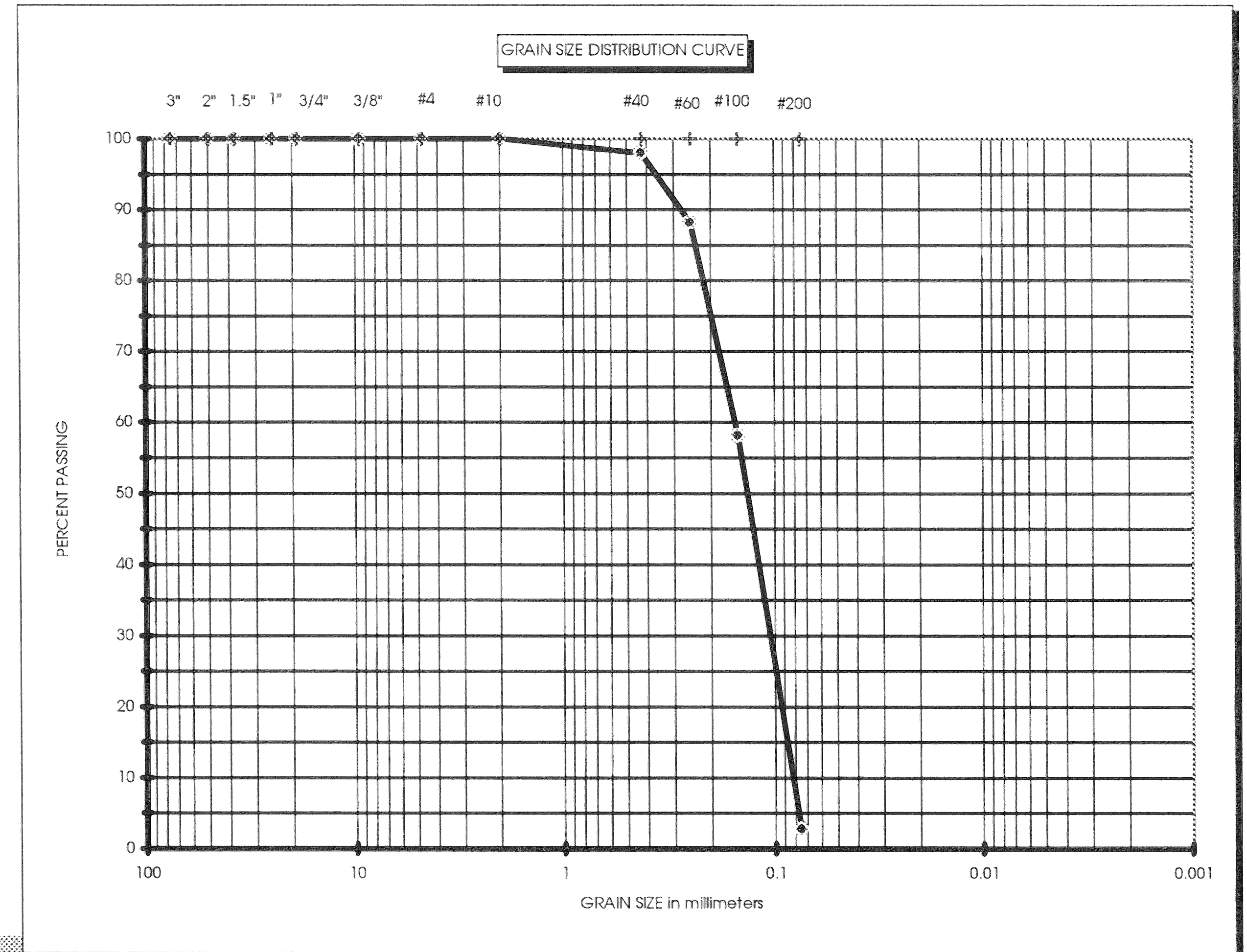
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	
PLASTIC LIMIT	
PLASTIC INDEX	

TIERRA. INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E **DATE:** 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 275+00 **OFFSET:** 54 RT **DEPTH (ft):** 3.0 - 5.0

SOIL DESCRIPTION: A-3

% NATURAL MOISTURE CONTENT : N/A

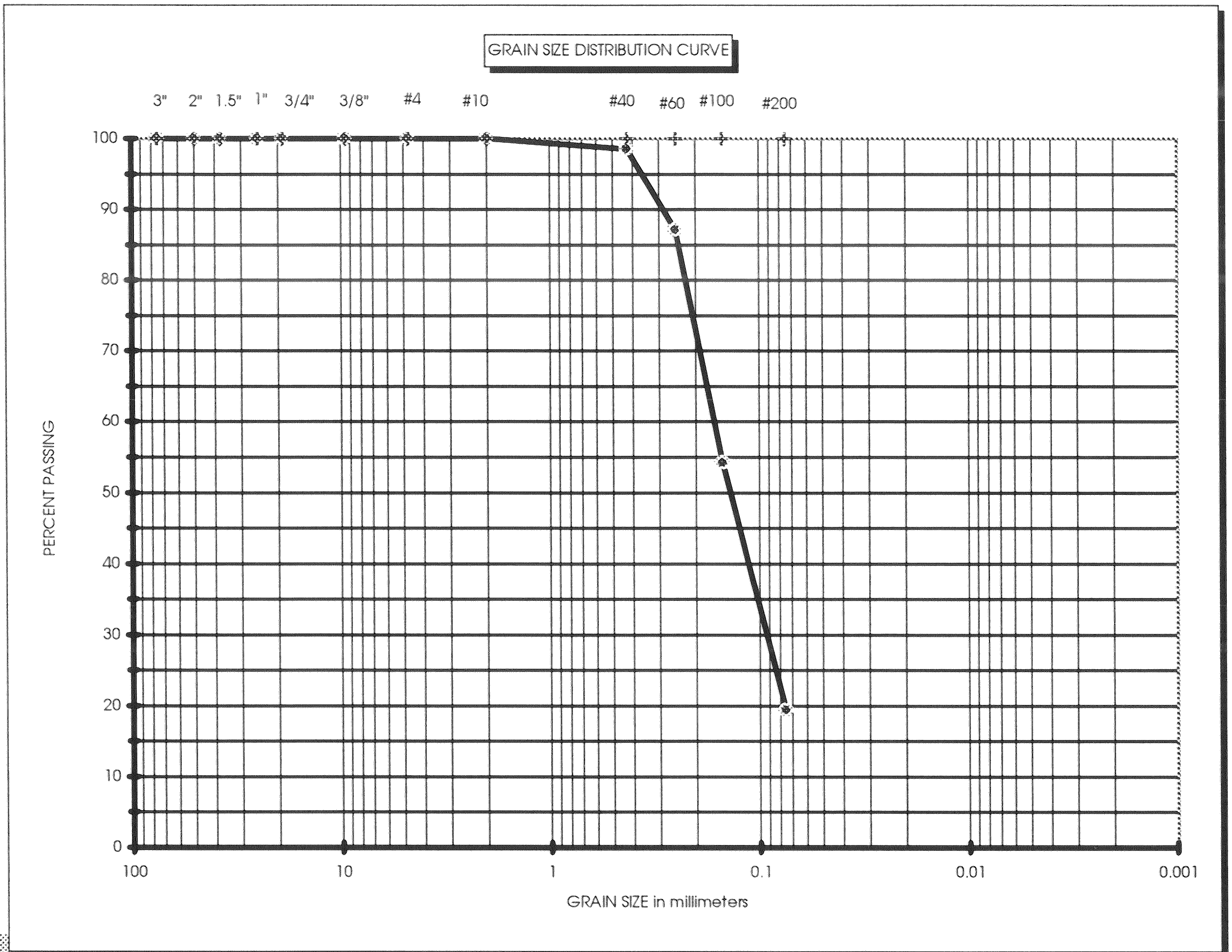
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	
PLASTIC LIMIT	
PLASTIC INDEX	

TIERRA, INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E **DATE:** 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 250+00 **OFFSET:** 24 LT **DEPTH (ft):** 3.5 - 4.0

SOIL DESCRIPTION: A-2-4

% NATURAL MOISTURE CONTENT : N/A

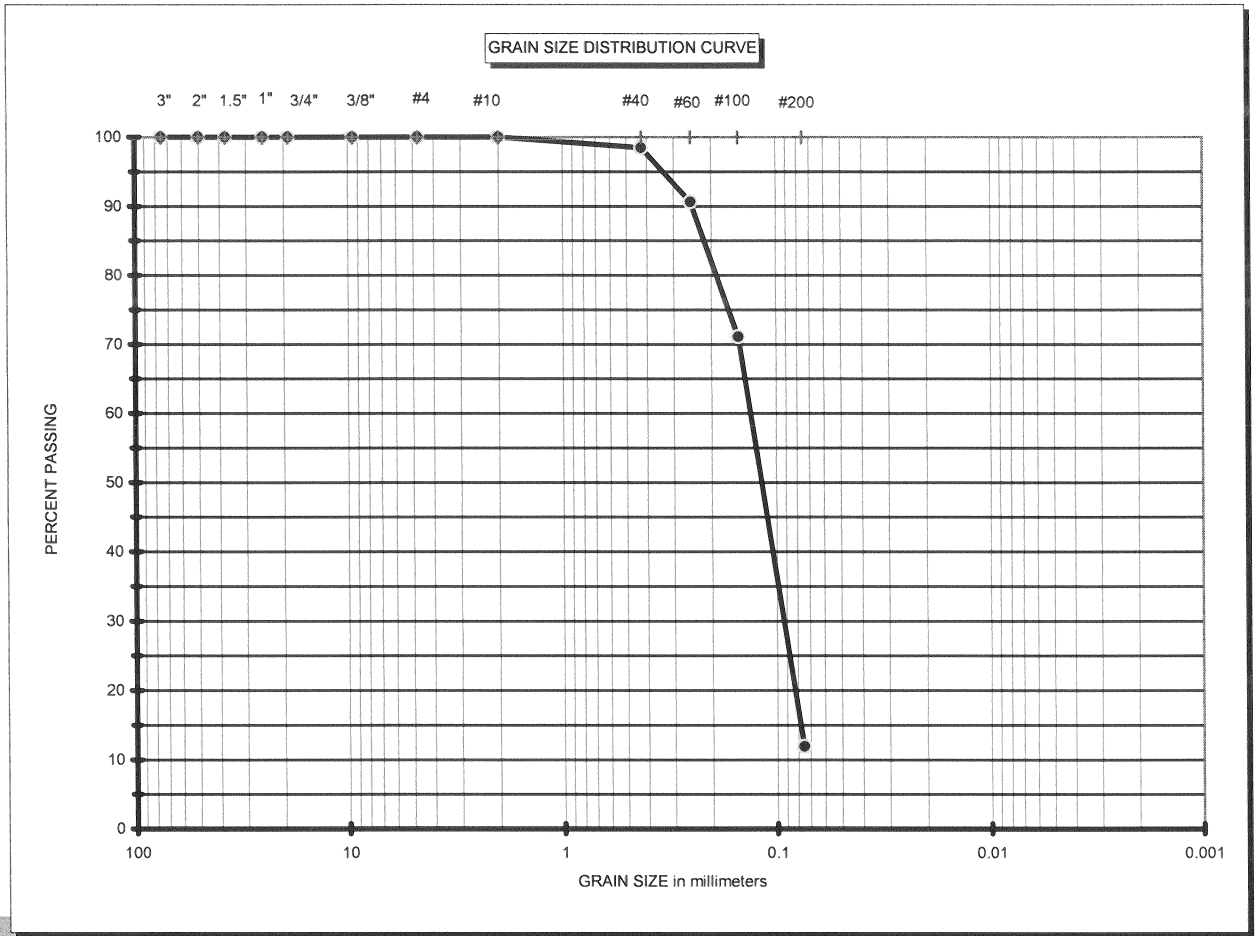
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	21
PLASTIC LIMIT	16
PLASTIC INDEX	5

TIERRA. INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E **DATE:** 1/7/2002

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 525+00 **OFFSET:** 22 RT **DEPTH (ft):** 4.5 - 5.0

SOIL DESCRIPTION: A-2-4

% NATURAL MOISTURE CONTENT : 23%

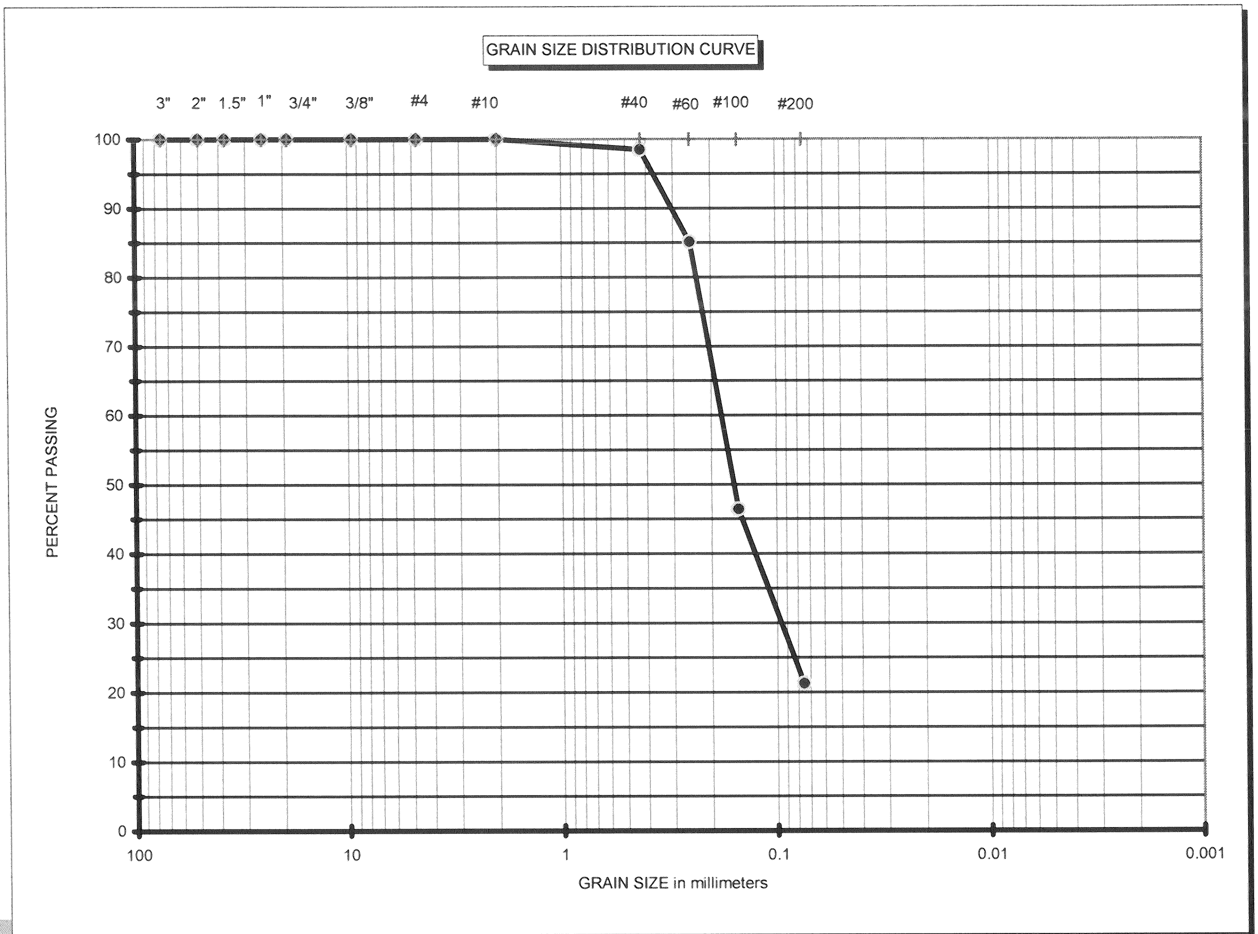
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	NP
PLASTIC LIMIT	NP
PLASTIC INDEX	NP

TIERRA. INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E **DATE:** 1/7/2002

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 605+00 **OFFSET:** 24 RT **DEPTH (ft):** 1.0 - 2.0

SOIL DESCRIPTION: A-2-4

% NATURAL MOISTURE CONTENT : 12%

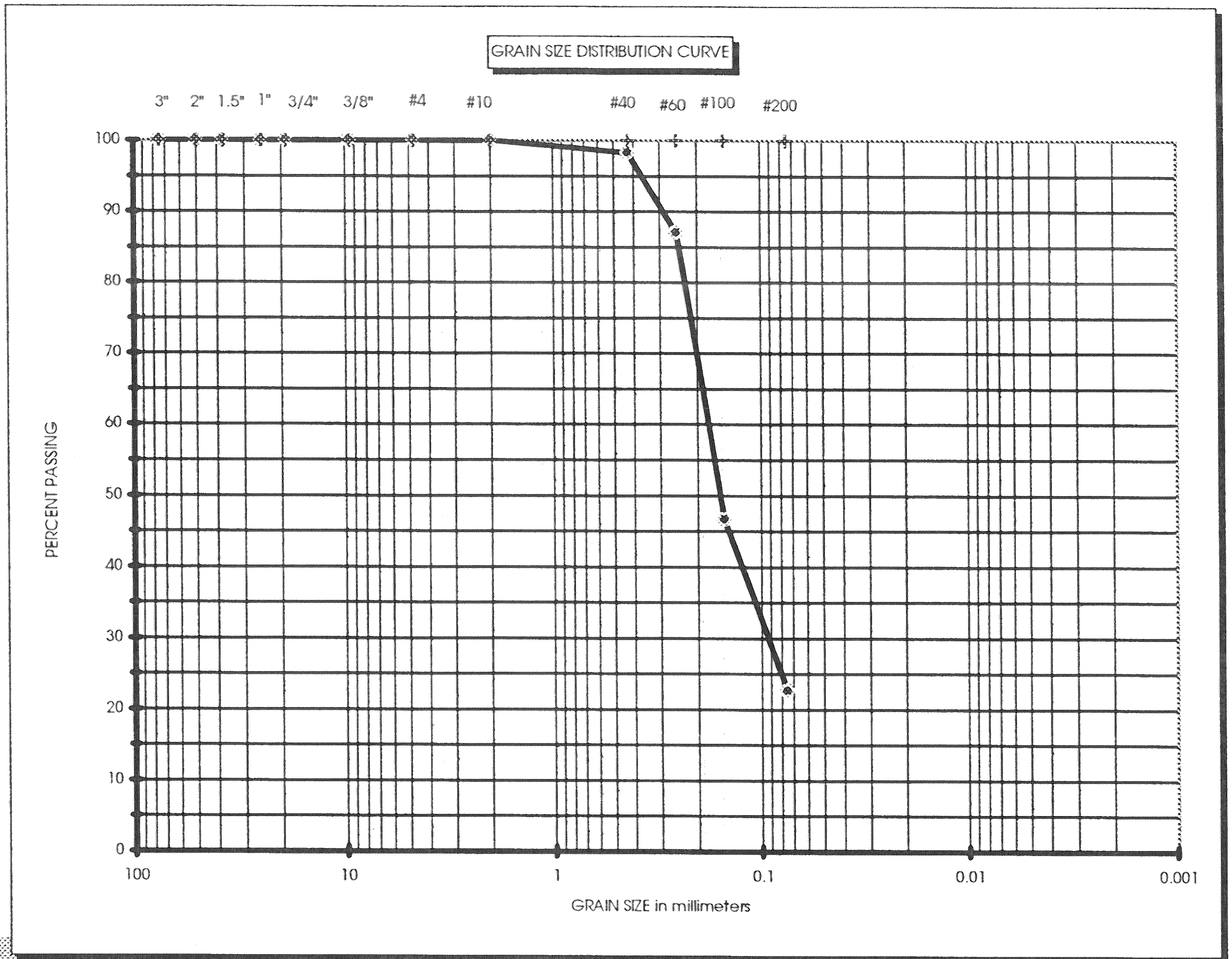
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	18
PLASTIC LIMIT	15
PLASTIC INDEX	3

TIERRA, INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E DATE: 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 1105+00 OFFSET: 93 LT DEPTH (ft): 4.0 - 5.0

SOIL DESCRIPTION: A-2-4

% NATURAL MOISTURE CONTENT : N/A

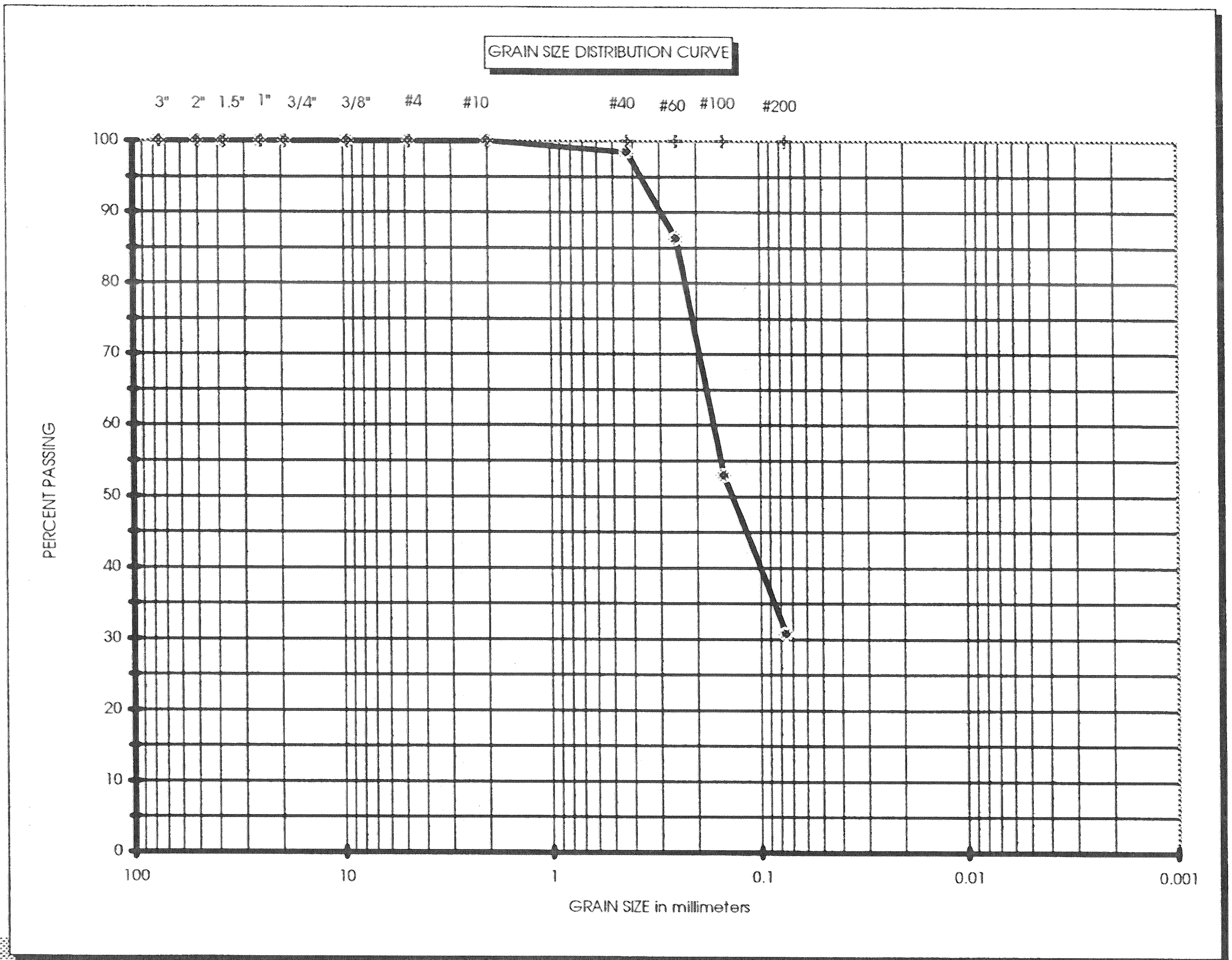
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	25
PLASTIC LIMIT	16
PLASTIC INDEX	9

TIERRA, INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E DATE: 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 250+00 OFFSET: 24 LT DEPTH (ft): 4.0 - 5.0

SOIL DESCRIPTION: A-2-6

% NATURAL MOISTURE CONTENT : N/A

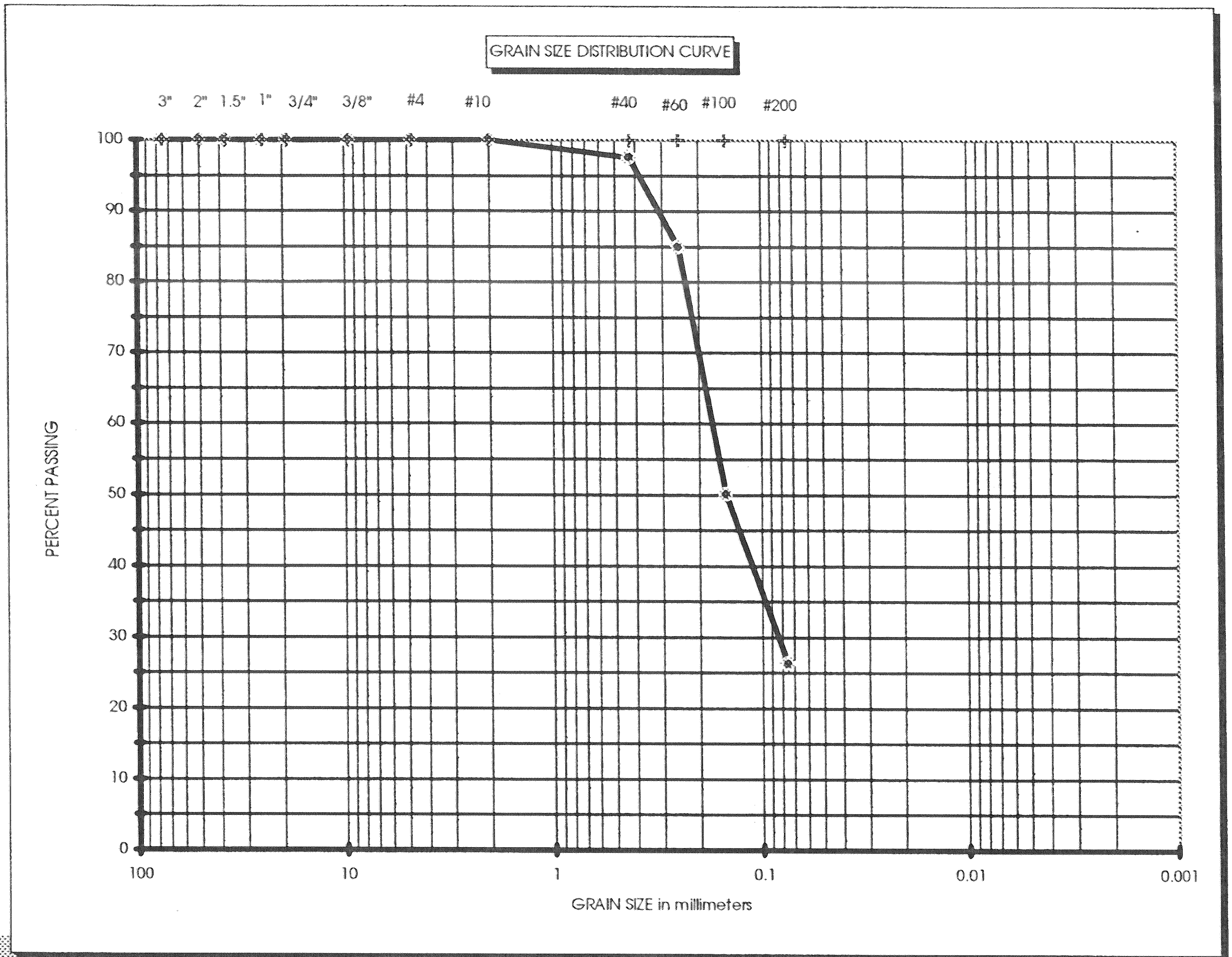
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	33
PLASTIC LIMIT	14
PLASTIC INDEX	19

TIERRA, INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E DATE: 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 1050+00 OFFSET: 24 RT DEPTH (ft): 3.0 - 4.8

SOIL DESCRIPTION: A-2-6

% NATURAL MOISTURE CONTENT : N/A

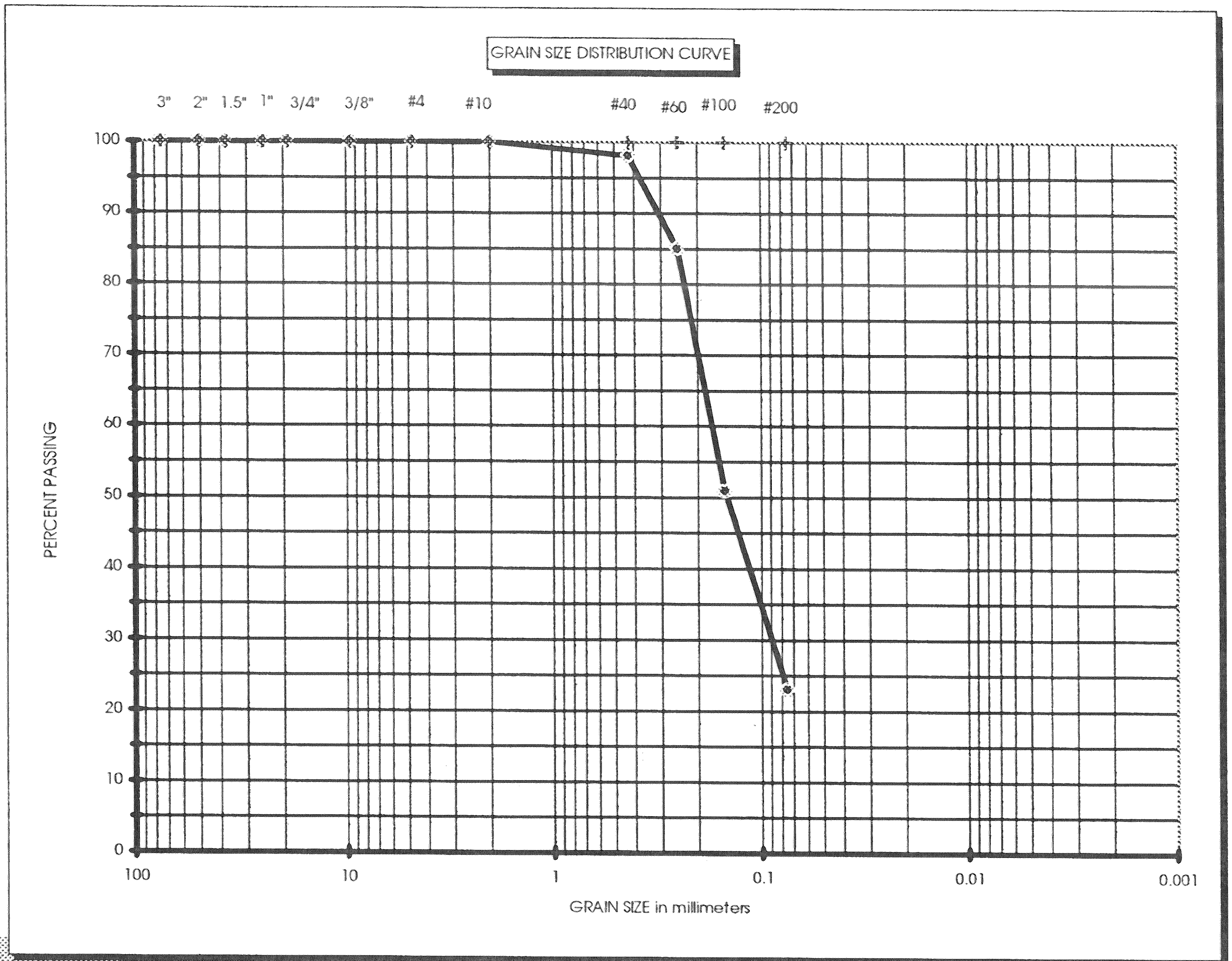
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	26
PLASTIC LIMIT	15
PLASTIC INDEX	11

TIERRA, INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E DATE: 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 1075+00 OFFSET: 94 LT DEPTH (ft): 3.5 - 4.0

SOIL DESCRIPTION: A-2-4

% NATURAL MOISTURE CONTENT : N/A

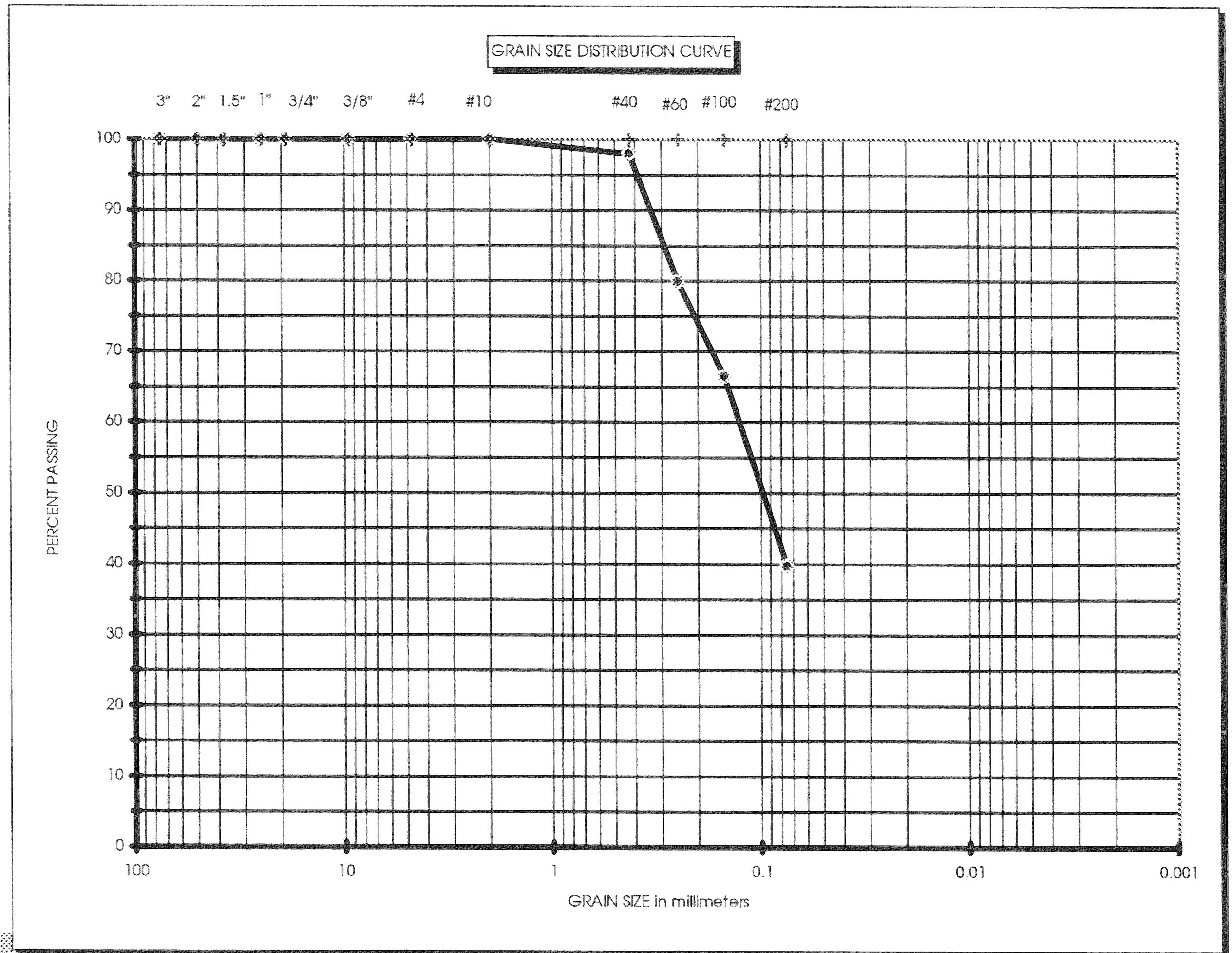
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	23
PLASTIC LIMIT	16
PLASTIC INDEX	7

TIERRA, INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E **DATE:** 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 273+00 **OFFSET:** 26 LT **DEPTH (ft):** 12.0-13.0

SOIL DESCRIPTION: A-7-6

% NATURAL MOISTURE CONTENT : 40%

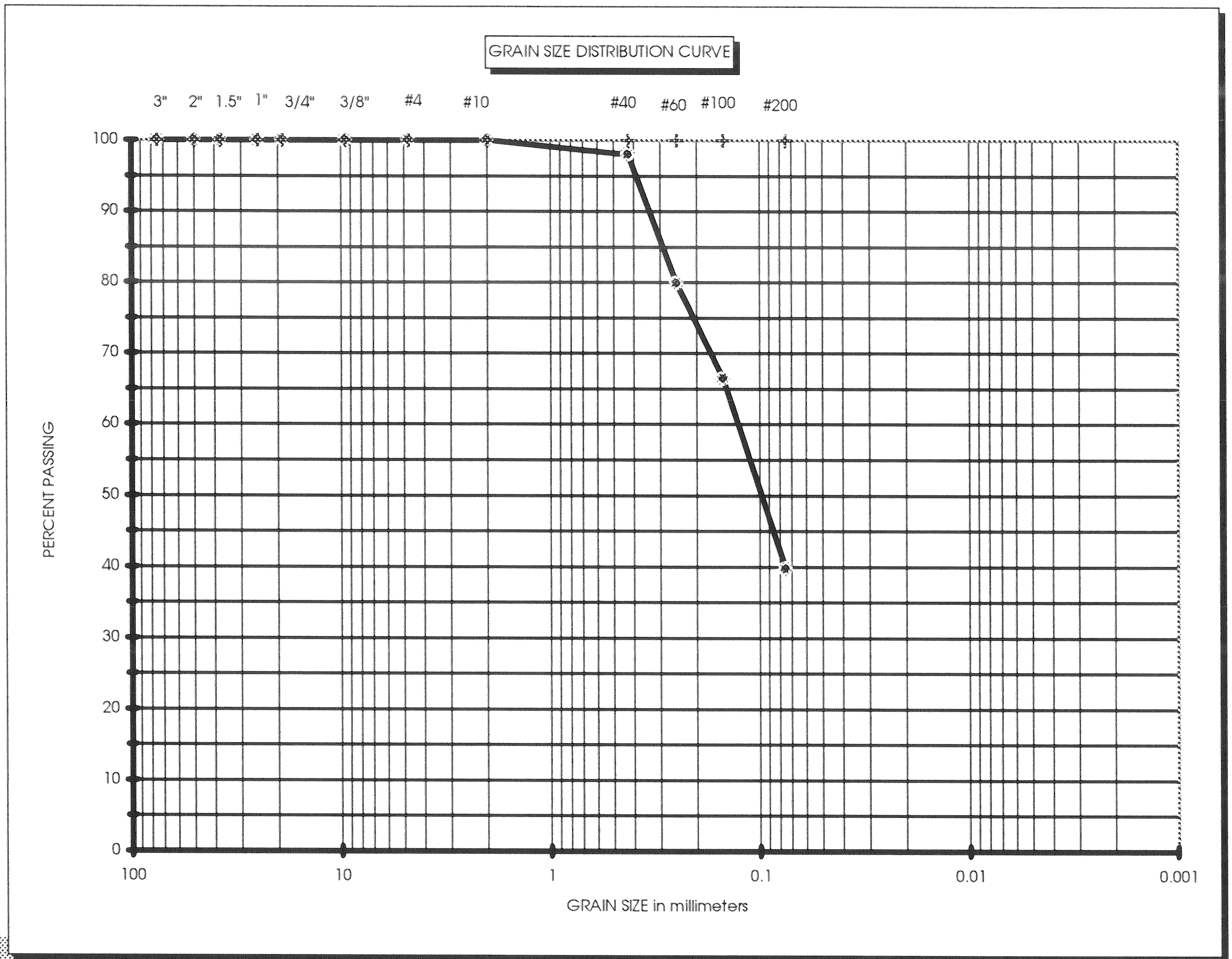
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	48
PLASTIC LIMIT	18
PLASTIC INDEX	30

TIERRA, INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E DATE: 1/7/02

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 273+00 OFFSET: 26 LT DEPTH (ft): 13.0-15.0

SOIL DESCRIPTION: A-6

% NATURAL MOISTURE CONTENT : 27%

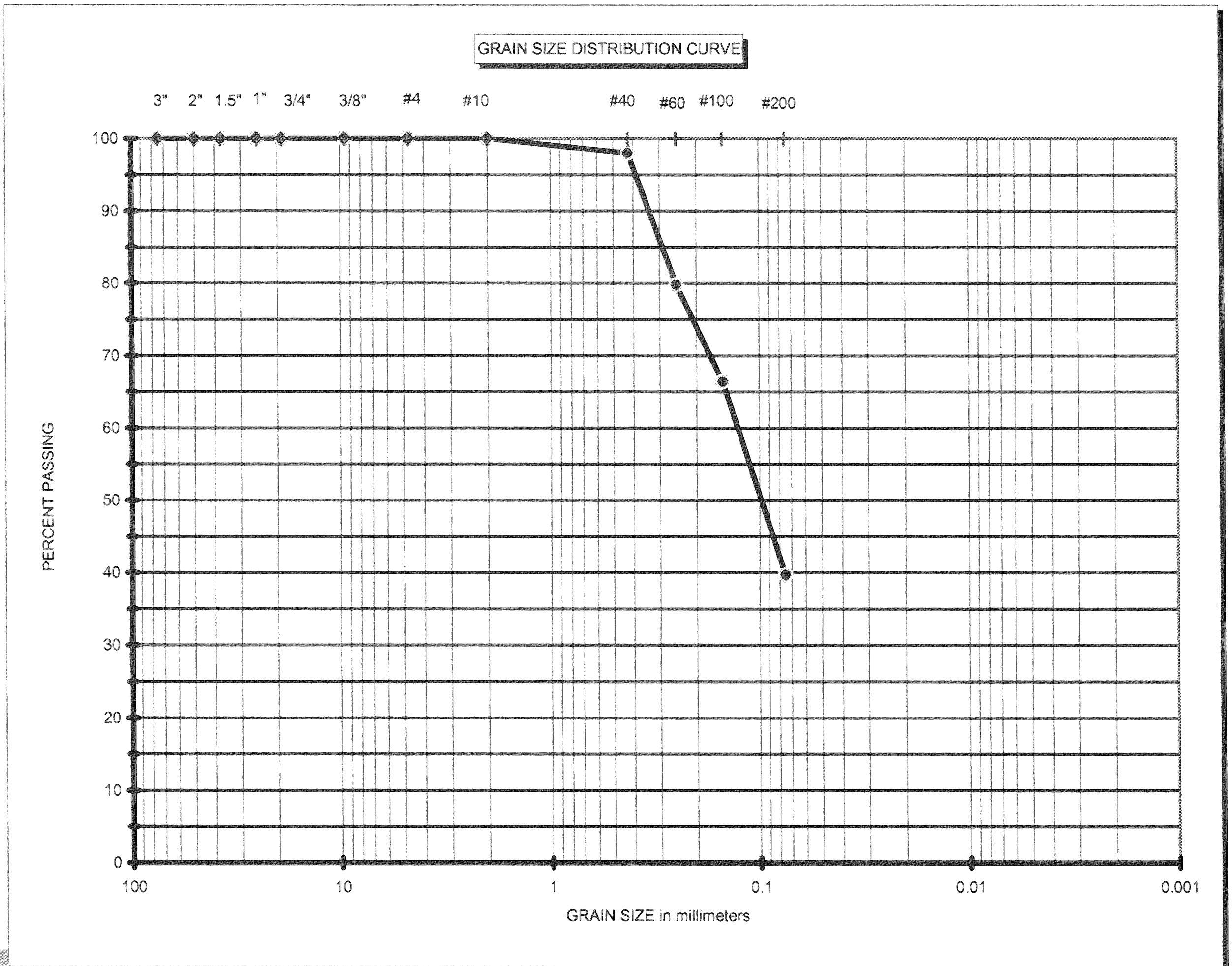
ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	31
PLASTIC LIMIT	13
PLASTIC INDEX	18

TIERRA. INC.

GRAIN SIZE DATA SHEET

PROJECT NAME: US 19 PD&E **DATE:** 1/7/2002

PROJECT #: 6511-01-010



ASTM D 2487 Classification of Soil for Engineering Purposes			Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"		Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4		Fine Sand	< #40 and > #200	

STATION #: 585+00 **OFFSET:** 22 RT **DEPTH (ft):** 2.5 - 3.5

SOIL DESCRIPTION: A-6

% NATURAL MOISTURE CONTENT : 31%

ATTERBERG LIMIT (- #40 Material)	
LIQUID LIMIT	39
PLASTIC LIMIT	15
PLASTIC INDEX	24

SUMMARY OF CORROSION TEST RESULTS

US 19 PD&E
Citrus County, Florida
FPN 405822 1 22 01
Tierra Project No.: 6511-01-010

Station No. Offset (ft)	Depth (ft)			Environmental Classification	pH	Resistivity (ohm-cm)	Chlorides (ppm)	Sulfates (ppm)
250+10, 24 LT	2.0	-	5.0	Slightly Aggressive	7.6	23,000	12	15
250+10, 24 LT	12.5	-	15.0	Extremely Aggressive	5.9	19,000	4.8	15
325+00, 54 RT	10.5	-	15.0	Extremely Aggressive	4.4	8,400	77.1	30
585+00, 22 RT	2.5	-	3.5	Moderately Aggressive	7.4	1,200	37.2	30
605+00, 24 RT	4.0	-	5.0	Slightly Aggressive	7.2	12,000	37.2	30
606+85, 30 RT	8.0	-	15.0	Extremely Aggressive	5.4	11,000	75.3	15
885+00, 90 LT	3.6	-	4.6	Slightly Aggressive	7.0	11,000	39.6	30
885+00, 90 LT	4.6	-	5.0	Slightly Aggressive	6.7	13,000	19.5	15
945+00, 92 LT	1.0	-	1.5	Slightly Aggressive	7.5	16,000	24.6	15

APPENDIX E

Federal Highway Administration (FHWA) Checklist

GTR REVIEW CHECKLIST (SITE INVESTIGATION)

A. Site Investigation Information

Since the most important step in the geotechnical design process is the conduct of an adequate site investigation, presentation of the subsurface information in the geotechnical report and on the plans deserves careful attention.

Geotechnical Report Text (Introduction) (Pages 322-325)	YES	NO	UNKNOWN OR N/A
1. Is the general location of the investigation described and/or a vicinity map included?	✓		
2. Is scope and purpose of the investigation summarized?	✓		
3. Is concise description given of geologic setting and topography of area?	✓		
4. Are the field explorations and laboratory tests on which the report is based listed?	✓		
5. Is general description of subsurface soil, rock, and groundwater conditions given?	✓		
*6. Is the following information included with the geotechnical report (typically included in report appendices):			
a. Test hole logs? (Pages 25-33)	✓		
b. Field test data?	✓		
c. Laboratory test data? (Pages 74 - 75)	✓		
d. Photographs (if pertinent)?	✓		
Plan and Subsurface Profile (Pages 24, 47-49, 335)			
*7. Is a plan and subsurface profile of the investigation site provided?		✓	
8. Are the field explorations located on the plan view?		✓	
*9. Does the conducted site investigation meet minimum criteria outlined in Table 2?		✓	

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (SITE INVESTIGATION)	YES	NO	UNKNOWN OR N/A
Plan and Subsurface Profile (Pages 24, 47-49, 335) Continued			
10. Are the explorations plotted and correctly numbered on the profile at their true elevation and location?			✓
11. Does the subsurface profile contain a word description and/or graphic depiction of soil and rock types?	✓		
12. Are groundwater levels and date measured shown on the subsurface profile?	✓		
Subsurface Profile or Field Boring Log (Pages 16-17, 25-29)			
13. Are sample types and depths noted?	✓		
*14 Are SPT blow counts, percent core recovery, and RQD values shown?			✓
15. If cone penetration tests were made, are plots of cone resistance and friction ratio shown with depth?			✓
Laboratory Test Data (Pages 60, 74-75)			
*16 Were lab soil classification tests such as natural moisture content, gradation, Atterberg limits, performed on selected representative samples to verify field visual soil identifications?	✓		
17. Are laboratory test results such as shear strength (Page 62), consolidation (Page 68), etc., included and/or summarized?			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (CENTERLINE CUTS & EMBANKMENTS)

B. Centerline Cuts and Embankments (Pages 6-9)

In addition to the basic information listed in Section A, is the following information provided in the project geotechnical report?

Are station to station descriptions included for:	YES	NO	UNKNOWN OR N/A
1. Existing surface and subsurface drainage?			✓
2. Evidence of springs and excessively wet areas?			✓
3. Slides, slumps, and faults noted along the alignment?			✓
Are station to station recommendations included for:			
General Soil Cut or Fill			
4. Specific surface/subsurface drainage recommendations?			✓
5. Excavation limits of unsuitable materials?			✓
*6. Erosion protection measures for backslopes, side slopes, and ditches, including riprap recommendations or special slope treatments?			✓
Soil Cuts (Pages 101-102)			
*7. Recommended cut slope design?			✓
8. Are clay cut slopes designed for minimum F.S. = 1.50?			✓
9. Special usage of excavated soils?			✓
10. Estimated shrink-swell factors for excavated materials?			✓
11. If answer to 3 is YES, are recommendations provided for design treatments?			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (CENTERLINE CUTS & EMBANKMENTS)			
Fills (Pages 77-79)	YES	NO	UNKNOWN OR N/A
11. Recommended fill slope design?			✓
12. Will fill slope design provide minimum F.S. = 1.25?			✓
Rock Slopes			
*13 Are recommended slope designs and blasting specifications provided?			✓
*14 Is the need for special rock slope stabilization measures, e.g., rockfall catch ditch, wire mesh slope protection, shotcrete, rock bolts, addressed?			✓
15. Has the use of "template" designs been avoided (such as designing all rock slopes on 1/4 to 1 rather than designing based on orientation of major rock jointing)?			✓
*16 Have effects of blast induced vibrations on adjacent structures been evaluated?			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (EMBANKMENTS OVER SOFT GROUND)

C. Embankments over Soft Ground

Where embankments must be built over soft ground (such as soft clays, organic silts, or peat), stability and settlement of the fill should be carefully evaluated. In addition to the basic information listed in Section A, is the following information provided in the project geotechnical report?

Embankment Stability (Pages 77-79, 95-97)	YES	NO	UNKNOWN OR N/A
*1 Has the stability of the embankment been evaluated for minimum safety factors of 1.25 for side slope stability and 1.30 for end slope stability of bridge approach embankments?			✓
*2. Has the shear strength of the foundation soil been determined from lab testing and/or field vane shear or static cone penetrometer tests?			✓
*3. If the proposed embankment does not provide minimum factors of safety given above, are recommendations given for feasible treatment alternates which will increase factor of safety to minimum acceptable (such as change alignment, lower grade, use stabilizing counterberms, excavate and replace weak subsoil, fill stage construction, lightweight fill, geotextile fabric reinforcement, etc.)?			✓
*4. Are cost comparisons of treatment alternates given and a specific alternate recommended?			✓
Settlement of Subsoil (Pages 146-160)			
5. Have consolidation properties of fine grained soils been determined from laboratory consolidation tests?			✓
*6. Have settlement amount and settlement time been estimated?			✓
7. For bridge approach embankments, are recommendations made to get the settlement out before the bridge abutment is constructed (waiting period, surcharge, or wick drains)?			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (EMBANKMENTS OVER SOFT GROUND)			
Settlement of Subsoil (Pages 146-160)	YES	NO	UNKNOWN OR N/A
8. If geotechnical instrumentation is proposed to monitor fill stability and settlement, are detailed recommendations provided on the number, type, and specific locations of the proposed instruments?			✓
9. Construction Considerations (Pages 183, 331-334)			
a. If excavation and replacement of unsuitable shallow surface deposits (peat, muck, top soil) is recommended - are vertical and lateral limits of recommended excavation provided?			✓
b. Where a surcharge treatment is recommended, are plan and cross-section of surcharge treatment provided in geotechnical report for benefit of the roadway designer?			✓
c. Are instructions or specifications provided concerning instrumentation, fill placement rates and estimated delay times for the contractor?			✓
d. Are recommendations provided for disposal of surcharge material after the settlement period is complete?			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (LANDSLIDE CORRECTIONS)			
D. Landslide Corrections (Pages 77-80, 103-105) In addition to the basic information listed in Section A, is the following information provided in the landslide study geotechnical report? (Refer to Table 4 for guidance on the necessary technical support data for correction of slope instabilities.)			
	YES	NO	UNKNOWN OR N/A
*1. Is a site plan and scaled cross-section provided showing ground surface conditions both before and after failure?			✓
*2. Is the past history of the slide area summarized - including movement history, summary of maintenance work and costs, and previous corrective measures taken (if any?)			✓
*3. Is a summary given of results of site investigation, field and lab testing, and stability analysis, including cause(s) of the slide?			✓
Plan			
4. Are detailed slide features - including location of ground surface cracks, head scarp, and toe bulge - shown on the site plan?			✓
Cross Section			
*5. Are the cross sections used for stability analysis included with the soil profile, water table, soil unit weights, soil shear strengths, and failure plane shown as it exists?			✓
*6. Is slide failure plane location determined from slope indicators?			✓
*7. For an active slide, was soil strength along the slide failure plane backfigured using a safety factor equal to 1.0 at the time of failure?			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (LANDSLIDE CORRECTIONS)			
Landslide Corrections (Continued)	YES	NO	UNKNOWN OR N/A
Text			
*8. Is the following information presented for each proposed correction alternate: (typical correction methods include buttress, shear key, rebuild slope, surface drainage, subsurface drainage-interceptor, drain trenches or horizontal drains and retaining structures)?			✓
a. Cross-section of proposed alternate?			✓
b. Estimated safety factor?			✓
c. Estimated cost?			✓
d. Advantages and disadvantages?			✓
9. Is a recommended correction alternate(s) given which provide a minimum F.S. = 1.25?			✓
10. If horizontal drains are proposed as part of slide correction, has subsurface investigation located definite water bearing strata that can be tapped with horizontal drains?			✓
11. If a toe counterberm is proposed to stabilize an active slide, has field investigation confirmed that the toe of the existing slide does not extend beyond the toe of the proposed counterberm?			✓
12. Construction Considerations:			
a. Where proposed correction will require excavation into the toe of an active slide (such as for buttress or shear key), has the "during construction backslope F.S." with open excavation been determined?			✓
b. If open excavation F.S. is near 1.0, has excavation stage construction been proposed?			✓
c. Has seasonal fluctuation of groundwater table been considered?			✓
d. Are special construction features, techniques and materials described and specified?			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (RETAINING WALLS)			
E. Retaining Walls (See Section 5 of "Geotechnical Engineering Notebook") In addition to the basic information listed in Section A, is the following information provided in the project geotechnical report?			
	YES	NO	UNKNOWN OR N/A
*1. Does the geotechnical report include recommended soil strength parameters and groundwater elevation for use in computing wall design lateral earth pressures and factor of safety for overturning, sliding, and external slope stability?			✓
2. Is it proposed to bid alternate wall designs?			✓
*3. Are acceptable reasons given for the choice and/or exclusion of certain wall types (gravity, reinforced soil, tieback, cantilever, etc.)?			✓
*4. Is an analysis of the wall stability included with minimum acceptable factors of safety against overturning (F.S. = 2.0), sliding (F.S. = 1.5), and external slope stability (F.S. = 1.5)?			✓
5. If wall will be placed on compressible foundation soils, is estimated total settlement, differential settlement, and time rate of settlement given?			✓
6. Will wall types selected for compressible foundation soils allow differential movement without distress?			✓
7. Are wall drainage details including materials and compaction provided?			✓
8. Construction Considerations			
a. Are excavation requirements covered - safe slopes for open excavations, need for sheeting or shoring?			✓
b. Fluctuation of groundwater table?			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (SPREAD FOOTINGS)

F. Structure Foundations - Spread Footings
(Pages 191-205)

In addition to the basic information listed in Section A, is the following information provided in the project foundation report?

	YES	NO	UNKNOWN OR N/A
*1. Are spread footings recommended for foundation support? If not, are reasons for not using them discussed?			✓
If spread footing supports are recommended, are conclusions/recommendations given for the following:			
*2. Is recommended bottom of footing elevation and reason for recommendation (e.g., based on frost depth, estimated scour depth, or depth to competent bearing material) given?			✓
*3. Is recommended allowable soil or rock bearing pressure given?			✓
*4. Is estimated footing settlement and time given?			✓
5. Where spread footings are recommended to support abutments placed in the bridge end fills, are special gradation and compaction requirements provided for select end fill and backwall drainage material? (Pages 137-141)			✓
6. Construction Considerations:			
a. Have the materials been adequately described on which the footing is to be placed so the project inspector can verify that material is as expected?			✓
b. Have excavation requirements been included for safe slopes in open excavations, need for sheeting or shoring, etc?			✓
c. Has fluctuation of the groundwater table been addressed?			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (PILE FOUNDATIONS)			
G. <u>Structure Foundations - Piles</u> (Pages 224-311) In addition to the basic information listed in Section A, if pile support is recommended or given as an alternate, conclusions/recommendations should be provided in the project geotechnical report for the following:			
	YES	NO	UNKNOWN OR N/A
*1. Is the recommended pile type given (displacement, nondisplacement, pipe pile, concrete pile, H-pile, etc.) with valid reasons given for choice and/or exclusions? (Pages 224-226)			✓
2. Do you consider the recommended pile type(s) to be the most suitable and economical?			✓
*3. Are estimated pile lengths and estimated tip elevations given for the recommended allowable pile design loads?			✓
4. Do you consider the recommended design loads to be reasonable?			✓
5. Has pile group settlement been estimated (only of practical significance for friction pile groups ending in cohesive soil)? (Pages 245-247)			✓
6. If a specified or minimum pile tip elevation is recommended, is a clear reason given for the required tip elevation, such as underlying soft layers, scour, downdrag, piles uneconomically long, etc.?			✓
*7. Has design analysis (wave equation analysis) verified that the recommended pile section can be driven to the estimated or specified tip elevation without damage (especially applicable where dense gravel-cobble-boulder layers or other obstructions have to be penetrated?			✓
8. Where scour piles are required, have pile design and driving criteria been established based on mobilizing the full pile design capacity below the scour zone?			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (PILE FOUNDATIONS)

G. Structure Foundations - Piles (Pages 224-311) - Continued	YES	NO	UNKNOWN OR N/A
9. Where lateral load capacity of large diameter piles is an important design consideration, are P-Y curves (load vs. deflection) or soil parameters given in the geotechnical report to allow the structural engineer to evaluate lateral load capacity of all piles?			✓
*10. For pile supported bridge abutments over soft ground:			✓
a. Has the abutment pile downdrag load been estimated and solutions such as bitumen coating considered in design? Not generally required if surcharging of the fill is being performed (Pages 248-251)			✓
b. Is bridge approach slab recommended to moderate differentials settlement between bridge ends and fill?			✓
c. If the majority of subsoil settlement will not be removed prior to abutment construction (by surcharging), has estimate been made of the amount of abutment rotation that can occur due to lateral squeeze of soft subsoil? (Pages 114-115)			✓
d. Does the geotechnical report specifically alert the structural designer to the estimated horizontal abutment movement?			✓
11. If bridge project is large, has pile load test program been recommended? (Pages 299-302)			✓
12. For a major structure in high seismic risk area, has assessment been made of liquefaction potential of foundation soil during design earthquake (note: only loose saturated sands and silts are "susceptible" to liquefaction)?			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (PILE FOUNDATIONS)			
G. Structure Foundations - Piles (Pages 224-311) - Continued	YES	NO	UNKNOWN OR N/A
13. Construction Considerations: (Pages 279-311)			
Have the following important construction considerations been adequately addressed?			
a. Pile driving details such as: boulders or obstructions which may be encountered during driving - need for preaugering, jetting, spudding, need for pile tip reinforcement, driving shoes, etc.?			✓
b. Excavation requirements - safe slope for open excavations, need for sheeting or shoring? Fluctuation of groundwater table?			✓
c. Have effects of pile driving operation on adjacent structures been evaluated - such as protection against damage caused by footing excavations or pile driving vibrations?			✓
d. Is preconstruction condition survey to be made of adjacent structures to prevent unwarranted damage claims?			✓
e. On large pile driving projects, have other methods of pile driving control been considered such as dynamic testing or wave equation analysis?			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (DRILLED SHAFTS)

H. <u>Structure Foundations - Drilled Shafts</u>
(Pages 252-260)

In addition to the basic information listed in Section A, if drilled shaft support is recommended or given as an alternate, are conclusions/recommendations provided in the project foundation report for the following:

	YES	NO	UNKNOWN OR N/A
*1. Are recommended shaft diameter(s) and length(s) for allowable design loads based on an analysis using soil parameters for side friction and end bearing?			✓
*2. Settlement estimated for recommended design load?			✓
*3. Where lateral load capacity of shaft is an important design consideration, are P-Y (load vs. deflection) curves or soils data provided in geotechnical report which will allow structural engineer to evaluate lateral load capacity of shaft?			✓
4. Is static load test (to plunging failure) recommended?			✓
5. Construction Considerations:			
a. Have construction methods been evaluated, (i.e., can less expensive dry method or slurry method be used or will casing be required)?			✓
b. If casing will be required, can casing be pulled as shaft is concreted (this can result in significant cost savings on very large diameter shafts)?			✓
c. If artesian water was encountered in explorations, have design provisions been included to handle it (such as by requiring casing and tremie seal)?			✓
d. Will boulders be encountered? (Note: If boulders will be encountered, then the use of shafts should be seriously questioned due to construction installation difficulties and resultant higher costs the boulders can cause.)			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (MATERIAL SITES)

I. Material Sites

In addition to the basic information listed in Section A, is the following information provided in the project Material Site Report?

	YES	NO	UNKNOWN OR N/A
1. Material site location, including description of existing or proposed access routes and bridge load limits (if any)?			✓
*2. Have soil samples representative of all materials encountered during the pit investigation been submitted and tested?			✓
*3. Are laboratory quality test results included in the report?			✓
4. For aggregate sources, do the laboratory quality test results (such as L.A. abrasion, sodium sulfate, degradation, absorption, reactive aggregate, etc.) indicate if specification materials can be obtained from the deposit using normal processing methods?			✓
5. If the lab quality test results indicate that specification material cannot be obtained from the pit materials as they exist naturally - has the source been rejected or are detailed recommendations provided for processing or controlling production so as to ensure a satisfactory product?			✓
*6. For soil borrow sources, have possible difficulties been noted - such as above optimum moisture content clay-silt soils, waste due to high PI, boulders, etc?			✓
*7. Where high moisture content clay-silt soils must be used, are recommendations provided on the need for aeration to allow the materials to dry out sufficiently to meet compaction requirements?			✓
8. Are estimated shrink-swell factors provided?			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (MATERIAL SITES)			
I. Material Site - Continued	YES	NO	UNKNOWN OR N/A
*9. Do the proven material site quantities satisfy the estimated project quantity needs?			✓
10. Where materials will be excavated from below the water table, has seasonal fluctuation of the water table been determined?			✓
11. Are special permits requirement covered?			✓
12. Have pit reclamation requirements been covered adequately?			✓
13. Has a material site sketch (plan and profile) been provided for inclusion in the plans, which contains:			
* Material site number?			✓
* North arrow and legal subdivision?			✓
* Test hole or test pit logs, locations, number and date?			✓
* Water table elevation and date?			✓
* Depth of unsuitable overburden which will have to be stripped?			✓
* Suggested overburden disposal area?			✓
* Proposed mining area and previously mined areas?			✓
* Existing stockpile locations?			✓
* Existing or suggested access roads?			✓
* Bridge load limits?			✓
* Reclamation details?			✓
14. Are recommended special provisions provided?			✓

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.