

Lake Forest Creek Proposal for Preparation of a Watershed Management Plan City of Gainesville, Florida

Amec Foster Wheeler Proposal No.: 6063-15-0245

**February 2016
Revised January 2017
Revised April 2017
Revised June 2017
Revised July 2017
Revised July 2017_2**

Submitted to:

City of Gainesville, Florida
405 NW 39th Avenue
Gainesville, Florida 32627

Submitted by:

**Amec Foster Wheeler
Environment & Infrastructure, Inc.**
404 SW 140th Terrace
Newberry, FL 32669



July 26, 2017

Alice Rankeillor, PE
City of Gainesville Public Works Department, Stormwater Division
405 NW 39th Avenue
Gainesville, Florida 32627



Sent via email: RankeilloAI@cityofgainesville.org

Re: Request for Proposal for Lake Forest Creek Watershed Management Plan, City of Gainesville Public Works Department; Revised Per June 30, 2017 Comments

Dear Ms. Rankeillor:

Per our discussion on July 18, 2017, Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) has revised the attached proposal to:

- 1) Make reference to the FEMA acceptance of certain portions of the LOMR, and
- 2) Include additional survey money to verify some channel cross sections for modeling.

We are pleased to submit the enclosed proposal and fee to provide the above-referenced services to the City of Gainesville (City). Amec Foster Wheeler understands that the main focus of this study is to develop solutions to improve the water quality within the Lake Forest Creek watershed. The watershed contributes to Newnans Lake, an impaired water body. We understand that at this time, Phase I and Phase II of the project will be authorized at the same time.

In the attached, Amec Foster Wheeler has provided:

1. Scope of Work and Approach
2. List of Documents Procured (Appendix A)
3. Figures (Appendix B)
4. Costing by Task (Appendix C)
5. Schedule (Appendix D)

Please let us know if you have any questions or would like to discuss any aspects further. Thank you and we look forward to working with you on this project.

Sincerely,
Amec Foster Wheeler Environment & Infrastructure, Inc.

A handwritten signature in blue ink, appearing to read "Charlene Stroehlen".

Charlene Stroehlen, PE
Project Manager
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A handwritten signature in blue ink, appearing to read "Tiffany Davies".

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Senior Engineer
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Page 1 of 2

July 6 2017

Alice Rankeillor, PE
City of Gainesville Public Works Department, Stormwater Division
405 NW 39th Avenue
Gainesville, Florida 32627



Sent via email: RankeilloAI@cityofgainesville.org

Re: Request for Proposal for Lake Forest Creek Watershed Management Plan, City of Gainesville Public Works Department; Revised Per June 30, 2017 Comments

Dear Ms. Rankeillor:


Per your email request on June 30, 2017, Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) has revised the attached proposal to address your comments. We are pleased to submit the enclosed proposal and fee to provide the above-referenced services to the City of Gainesville (City). Amec Foster Wheeler understands that the main focus of this study is to develop solutions to improve the water quality within the Lake Forest Creek watershed. The watershed contributes to Newnans Lake, an impaired water body. We understand that at this time, Phase I and Phase II of the project will be authorized at the same time.


In the attached, Amec Foster Wheeler has provided:

6. Scope of Work and Approach
7. List of Documents Procured (Appendix A)
8. Figures (Appendix B)
9. Costing by Task (Appendix C)
10. Schedule (Appendix D)

Please let us know if you have any questions or would like to discuss any aspects further. Thank you and we look forward to working with you on this project.

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Amec Foster Wheeler Environment & Infrastructure, Inc.


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June 21 2017

Alice Rankeillor, PE
City of Gainesville Public Works Department, Stormwater Division
405 NW 39th Avenue
Gainesville, Florida 32627



Sent via email: RankeilloAI@cityofgainesville.org

Re: Request for Proposal for Lake Forest Creek Watershed Management Plan, City of Gainesville Public Works Department; Revised Per June 2017 Comments

Dear Ms. Rankeillor:

Per your request, Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) has revised the attached proposal to include additional items under the Phase II tasks. We are pleased to submit the enclosed proposal and fee to provide the above-referenced services to the City of Gainesville (City). Amec Foster Wheeler understands that the main focus of this study is to develop solutions to improve the water quality within the Lake Forest Creek watershed. The watershed contributes to Newnans Lake, an impaired water body. We understand that at this time, Phase I and Phase II of the project will be authorized at the same time.

In the attached, Amec Foster Wheeler has provided:

11. Scope of Work and Approach
12. List of Documents Procured (Appendix A)
13. Figures (Appendix B)
14. Costing by Task (Appendix C)
15. Schedule for Phase I of the project (Appendix D)

Please let us know if you have any questions or would like to discuss any aspects further. Thank you and we look forward to working with you on this project.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure, Inc.

A handwritten signature in blue ink, appearing to read "Charlene Stroehlen".

Charlene Stroehlen, PE
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April 26, 2017

Alice Rankeillor, PE
City of Gainesville Public Works Department, Stormwater Division
405 NW 39th Avenue
Gainesville, Florida 32627

Sent via email: RankeilloAI@cityofgainesville.org

Re: Request for Proposal for Lake Forest Creek Watershed Management Plan, City of Gainesville Public Works Department; Revised Per April 2017 Comments

Dear Ms. Rankeillor:

Per your request, Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) has revised the attached proposal to address the comments you emailed to our office on April 25, 2017. We are pleased to submit the enclosed proposal and fee to provide the above-referenced services to the City of Gainesville (City). Amec Foster Wheeler understands that the main focus of this study is to develop solutions to improve the water quality within the Lake Forest Creek watershed. The watershed contributes to Newnans Lake, an impaired water body. We understand that, as Phase II of this project to be approved at a later date, the City would like Amec Foster Wheeler to provide a scope of work and fee for Water Quantity and Flood Plain analysis for three alternative footprints within the Lake Forest Creek watershed.

In the attached, Amec Foster Wheeler has provided:

16. Scope of Work and Approach
17. List of Documents Procured (Appendix A)
18. Figures (Appendix B)
19. Costing by Task (Appendix C)
20. Schedule for Phase I of the project (Appendix D)

Please let us know if you have any questions or would like to discuss any aspects further. Thank you and we look forward to working with you on this project.

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Page 1 of 2



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January 19, 2017

Alice Rankeillor, PE
City of Gainesville Public Works Department, Stormwater Division
405 NW 39th Avenue
Gainesville, Florida 32627

Sent via email: RankeilloAI@cityofgainesville.org

Re: Request for Proposal for Lake Forest Creek Watershed Management Plan, City of Gainesville Public Works Department; Revised Per November 2016 Comments

Dear Ms. Rankeillor:

Per your request, Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) has revised the attached proposal to address the comments you sent to our office on November 15, 2016. We are pleased to submit the enclosed proposal and fee to provide the above-referenced services to the City of Gainesville (City). Amec Foster Wheeler understands that the main focus of this study is to develop solutions to improve the water quality within the Lake Forest Creek watershed. The watershed contributes to Newnans Lake, an impaired water body. In addition, we understand that the City would like Amec Foster Wheeler to provide a scope of work and fee for Water Quantity and Flood Plain analysis for three alternative footprints within the Lake Forest Creek watershed.

In the attached, Amec Foster Wheeler has provided:

21. Scope of Work and Approach
22. List of Documents Procured (Appendix A)
23. Figures (Appendix B)
24. Costing by Task (Appendix C)

Please let us know if you have any questions or would like to discuss any aspects further. Thank you and we look forward to working with you on this project.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure, Inc.

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March 14, 2016

Andrew Roberts, Engineer IV
City of Gainesville Public Works Department
405 NW 39th Avenue
Gainesville, Florida 32627



Sent via email: robertsas@cityofgainesville.org

Re: Request for Proposal for Lake Forest Creek Watershed Management Plan, City of Gainesville Public Works Department; Revised with Public Meeting

Dear Mr. Roberts:

Per your request, Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) has revised the attached to include one public meeting for the project. We are pleased to submit the enclosed proposal and fee to provide the above-referenced services to the City of Gainesville (City). Amec Foster Wheeler understands that the main focus of this study is to develop solutions to improve the water quality within the Lake Forest Creek watershed. The watershed contributes to Newnans Lake, an impaired water body. In addition, we understand that the City would like Amec Foster Wheeler to provide a scope of work and fee for Water Quantity and Flood Plain analysis for three alternative footprints within the Lake Forest Creek watershed.

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1. Scope of Work and Approach
2. List of Documents Procured (Appendix A)
3. Figures (Appendix B)
4. Costing by Task (Appendix C)

Our project team will be led by Ms. Charlene Stroehlen, Senior Principal Engineer, who is assigned to our Newberry office, located 20 minutes from the City's Public Works Department. Ms. Stroehlen has over three decades of project management experience with watershed projects related to water quality, water quantity, and restoration and protection. She routinely interfaces with local governments, state and federal agencies, and the public during discovery meetings related to projects throughout the State.

Amec Foster Wheeler recently celebrated 50 years of business specifically within the Gainesville area, and maintains 14 full-service offices within the state of Florida. With nearly 500 professional and technical personnel in Florida, our team of engineers, scientists, hydrologists, planners, and communications specialists regularly work together to provide integrated approaches for the effective management of our natural resources.

Correspondence:

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We offer our expertise, enthusiasm, personal commitment and availability of all project team members throughout the duration of this contract and are ready to begin work immediately upon receiving a notice to proceed. Thank you for the opportunity to submit our proposal.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure, Inc.



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Scope of Work and Approach

1.0 Background and Understanding of Scope

1.1 Phase 1

The main focus of this project is to develop cost-effective water quality improvement projects that will contribute to reducing nutrient loadings to Newnans Lake as required by the Florida Department of Environmental Protection's (FDEP) Nutrient total maximum daily load (TMDL) for Newnans Lake (Gao and Gilbert, 2003) the Orange Creek Basin Basin Management Action Plan [Basin Management Action Plan (BMAP); FDEP, 2008, updated 2014], and St. Johns River Water Management District (SJRWMD) Pollutant Load Reduction Goals (PLRGs) for Newnans Lake (Di and others, 2009). This Water Management Plan is focused on addressing the BMAP.

Various studies have further refined understanding of the nutrient sources affecting Newnans Lake and the significance of loadings from the Lake Forest Creek Watershed. Lake Forest Creek discharges to Newnans Lake, where total phosphorus (TP) and total nitrogen (TN) cause water quality impairment. Erosion of tributary stream beds and banks has exposed the phosphatic clays of the Hawthorn Group allowing transport of TP to the lake. This erosion has been exacerbated by poor stormwater infrastructure in the urbanized portion of the watershed and development constructed prior to present day stormwater management requirements.

The current project is identified as an element of the Newnans Lake BMAP Existing projects and developments will be considered and reviewed during the project analysis as appropriate to determine current load ratings for the basis of existing loadings.

1.2 Phase 2 – Hydrologic and Hydraulic Modeling

As a Phase II scope element to this project, the City has requested the contractor update its Hydrology and Hydraulics (H&H) ICPR model for the Lake Forest Creek Watershed. The model, used with the City's 2010 Stormwater Master Plan as prepared by Alachua County Public Works, reflects stormwater infrastructure constructed through 2007 and was largely based on topographic data (LiDAR) from 2001. During Phase II of the project, Amec Foster Wheeler will update this model by using Environmental Resource Permit (ERP) information from new stormwater infrastructure projects subsequent to 2007, and by using more recent LiDAR data collected in 2017. Updating the City's H&H will allow more accurate evaluation of the stormwater management system, as it affects pollutant loadings; verify that any water quality improvement projects will not exacerbate flooding; and may also be used to revise floodplain maps in the future. The City has decided to proceed with alterative 3 for the H&H modeling task.

2.0 Watershed Management Plan

2.1 Project Initiation

Amec Foster Wheeler will schedule a kickoff meeting with City of Gainesville staff within 10 working days of project initiation. The purpose of the meeting is to refine our understanding of City objectives and the scope of work; and define points of contact between Amec Foster Wheeler, the City and cooperating agencies. Amec Foster Wheeler will prepare meeting minutes within 5 working days after the kickoff meeting.

2.2 Literature Review

Amec Foster Wheeler has already obtained and conducted a review of monitoring, scientific and planning information related to the Lake Forest Creek Watershed. Publications obtained thus far are listed in **Attachment A**. Amec Foster Wheeler will contact a variety of entities for additional resources that may be relevant to the development of the Watershed Management Plan. We will work with the City to finalize a list of stakeholders which may include:

- ▶ Alachua Audubon Society
- ▶ Alachua Conservation Trust
- ▶ Alachua County Public Works Department
- ▶ Alachua County Environmental Protection Department
- ▶ City of Gainesville
- ▶ Florida Department of Environmental Protection
- ▶ Florida Department of Transportation
- ▶ Florida Division of Historical Resources
- ▶ Florida Fish and Wildlife Conservation Commission
- ▶ Friends of Newnan's Lake
- ▶ Gainesville Community Redevelopment Agency
- ▶ Natural Resources Conservation Service
- ▶ The Nature Conservancy
- ▶ SJRWMD
- ▶ United States Geological Survey
- ▶ University of Florida Department of Fisheries and Aquatic Sciences
- ▶ University of Florida School of Forest Resources and Conservation
- ▶ University of Florida Water Institute

2.3 Data Gathering, Inventory, and Characterization

2.3.1 Data Gathering and Inventory

Amec Foster Wheeler has already performed significant data gathering and inventory efforts in the Lake Forest watershed, as shown in the figures located in **Attachment B**. These include project alternative boundaries, land use, watershed and sub-basin boundaries, Florida Natural Areas Inventory (FNAI), soils, property owner identification, hydrological soil groups, National Wetlands Inventory (NWI), floodplains, and USGS topographic maps. Additional data will be collected and analyzed as relevant. A list of additional items that might be useful in the watershed analysis include the following:

- ▶ Watershed and sub-basin boundaries
- ▶ Orthophotography
- ▶ Jurisdictional boundaries
- ▶ As-Built Drawings
- ▶ Precipitation Data and Statistics
- ▶ Flood Hazard Areas and Flood Hazard Lines

- ▶ Digital Flood Insurance Rate Maps (DFIRMs)
- ▶ Water Lines (stream centerlines, bank lines for wider streams, shoreline, and profile baselines for streams modeled by detailed methods)
- ▶ PLSS (Public Land Survey System) Areas and Lines
- ▶ Cross Sections and detailed survey data for stormwater infrastructure and related data
- ▶ Structure locations and information (culverts, bridges, weirs, etc for detailed study streams)
- ▶ GIS data from the City and Alachua County, specifically as it aids in determining impervious areas, land uses, and existing stormwater quantity and quality practices.
- ▶ GIS data for identified wetlands such as the National Wetlands Inventory data.
- ▶ Stormwater information obtained from recent permits
- ▶ Comprehensive Landuse Plans for the City and/or Alachua County.
- ▶ Water quality databases and biological inventories.
- ▶ Data obtained from the Orange Creek Basin Management Action Plan and Final Nutrient Total Maximum Daily Load for Newnans Lake
- ▶ Ordinances and regulations for the City and Alachua County that pertain to land development and stormwater quantity and quality.
- ▶ Landuse data from local, state, and federal agencies to use in developing rainfall-runoff models and determining pollutant loadings.
- ▶ Data used by the City and County for annual reporting for NPDES program compliance.
- ▶ Pertinent system data, monitoring data, and proposed projects from stakeholders including local, state, and federal agencies and local utilities.
- ▶ Other pertinent data and studies that are brought to light throughout the project particularly those offered by agency coordinators.
- ▶ Existing ICPR Model
- ▶ 2009/2017 LiDAR Data
- ▶ Duval Stormwater Park design and implementation information
- ▶ City of Gainesville Street Sweeping schedules and locations

After review of the gathered data, relevant data will be ground-truthed to verify its accuracy. The deliverable for this task is a discussion of the data collected, cataloged and analyzed for the study; a discussion of the resource documents and publications collected and reviewed; and a discussion of identified data gaps and recommended actions to fill in these gaps. This information will be included in the Watershed Management Plan.

2.3.2 Characterizing the Watershed and Water Bodies

The Lake Forest Creek Watershed is located south of Northwest 39th Avenue, east of North Main Street, west of Newnans Lake, and roughly north of State Road 20. The watershed area consists of 4,858 acres, approximately 2,201 acres are located in the City of Gainesville. A total of 3 alternatives have been proposed for costing of this project. Alternative 1 includes 451 acres, Alternative 2 includes 1,028 acres and Alternative 3 is the entire watershed within the City limits, approximately 2,201 acres. The City has decided to proceed with Alternative 3. Figures with the 3 areas are included in Attachment B.

The most prominent land use type in the portion of the Lake Forest Creek watershed within the City limits is residential (29%) followed by commercial and institutional (23%), upland forests (23%), recreational facilities (11%) and wetlands (10%). Soils present include Wauchula-Urban Land Complex and Millhopper-Urban Land Complex in the west side of the watershed, Pomona Sand and Myakka Sand in the north side of the watershed, Tavares Sand and Candler Fine Sand in the east side of the watershed, and Wauchula Sand in the center of the watershed. The majority of the soils are type A and A/D within the watershed. Within the urban areas of the watershed, the soils vary to include type C/D. Type A and some A/D soils can be good soils for infiltration, while type C/D soils do not infiltrate as well as type A soils.

Other data to be used, as available, to summarize and characterize pertinent features of the watershed include but are not limited to:

- ▶ Geographic boundaries;
- ▶ Sub-watershed drainage boundaries;
- ▶ Wetlands;
- ▶ Potential point sources of pollution;
- ▶ Potential non-point sources of pollution;
- ▶ Water Quality impairment areas;
- ▶ Soil types and characteristics for infiltration and erosion potential;
- ▶ Threatened and endangered plant and animal species;
- ▶ Population, demographics and growth potential;
- ▶ Historical and cultural assets;
- ▶ Watershed and basin drainage boundaries;
- ▶ Streams, lakes, and conveyance connectivity;
- ▶ Topography;
- ▶ Existing and predicted 'future' land uses;
- ▶ Existing water quality facilities; and
- ▶ Conservation and natural areas

Amec Foster Wheeler will include the written characterization of the watershed in the Watershed Management Plan.

Team Meeting: One initial team meeting will be scheduled to discuss resource issues, ongoing agency efforts, funding opportunities, additional issues and problems, opportunities, local desires, and potential cooperative funding projects. Amec Foster Wheeler assumes the City will provide a meeting place for an in person and GoToMeeting™ with the City and others, including but not limited to the Gainesville Clean Water Partnership, City of Gainesville, Alachua County and FDOT as agreed to by the City, to exchange ideas and items of concern for locations and types of water quality / water quantity improvements projects. This meeting will be designed to exchange information with the City and cooperating agencies. Additional contact with team members will be conducted thereafter as necessary to obtain information or seek clarification. Amec Foster Wheeler will draft the meeting agenda and handouts for City review and prepare and submit meeting minutes within 2 weeks after the meeting.

The agenda at the agency meeting would include but not be limited to:

- ▶ Review resource issues and seek additional input,
- ▶ Review potential water quality / water quantity improvement project locations,
- ▶ Review types of Best Management Practices (BMP) to be considered and their maintenance requirements,
- ▶ Review the known agency efforts and seek additional input,
- ▶ Review funding sources and ask for additions and corrections,
- ▶ Solicit input on additional issues, problems, and
- ▶ Discuss potential cooperative projects.

3.0 Watershed Management Plan – Water Quality

In the Handbook for Developing Watershed Plans to Restore and Protect Our Waters, the US Environmental Protection Agency (USEPA) outlines nine minimum elements that are critical for addressing nonpoint source pollution reductions and management. In addition, the City of Gainesville's Stormwater Management Master Plan also provides criteria for water quality analysis. Knowing that many of these elements may be required as part of the Watershed Management Plan for funding agencies, Amec Foster Wheeler will incorporate these elements when providing the conceptual plans for five projects per the City's request.

- a. Identification of Causes of Impairment and Pollutant Sources
- b. Estimation of Load reductions
- c. Nonpoint Source Management Measures
- d. Estimation Technical and Financial Assistance Needed
- e. Implementation of Information and Education Components for Public
- f. Implementation Schedule of Nonpoint Source Management Measures
- g. Identification of Measurable Milestones
- h. Application of the City of Gainesville Criteria for Load Reduction Efficacy outlined in the Stormwater Management Master Plan
- i. Development of Monitoring Program to Gauge Efficacy

These considerations are generally addressed in this approach section.

3.1 Identify Areas of Water Quality Concern

Lake Forest Creek is the most urban sub-basin in the Newnans Lake Watershed with 38% urban land use types. Upland forests, wetlands and agriculture are also significant land uses (29, 21, and 7% respectively) in the Lake Forest Creek sub-basin.

Cohen and others (2008) found that phosphorus concentrations in the Newnans Lake Watershed were generally better correlated with areas where the phosphatic clays of the Hawthorn Formation were at or near the land surface (depth to Hawthorn less than 2 ft). The depth to the Hawthorn is generally greater than 2 ft throughout the headlands of the Lake Forest Creek sub-basin; and other water quality indicators, e.g., fluoride, indicate that Lake Forest Creek phosphorus loadings likely are not largely affected by erosion of phosphatic clays from the Hawthorn Formation. This will be verified during the project analysis. Considering this, and the greater percentage of this sub-basin in urban land uses, it indicates that the spatial distribution of phosphorus loadings is likely largely correlated with land use. It is expected there will be greater phosphorus concentrations in the urbanized areas of east Gainesville that dominate the western headlands of the Lake Forest Creek sub-basin.

Given the expected relationship between land use and nutrient loadings in the Lake Forest Creek sub-basin, as summarized above, the customary "Simple Method" of estimating loadings using an Event Mean Concentration (EMC), which is a function of land use, times the annual runoff volume (defined by annual precipitation, impervious surface, and runoff curve numbers) will be an effective approach to define the spatial distribution of loadings from the sub-basin and identify areas of water quality concern. For a given catchment, pollutant and time period (e.g., year); loads can be estimated as the product of EMC and volume:

$$\text{Pollutant Load (mass)} = \text{EMC (mass/volume)} \\ * \text{Runoff (volume)}$$

EMC values will be assigned to different land use types, such as commercial, industrial, forest, agricultural and residential areas and may be further refined based on the amount of imperviousness within a given land use category. Amec Foster Wheeler's GIS-based approach will also allow EMCs to be customized for specific sites if such data becomes available. As scientific research and water

quality data collection efforts continue, EMCs can be adjusted using the updated information. In order to generate pollutant loads from EMCs, the runoff volume must be computed. There are a number of ways to estimate total stormwater runoff volumes. The Simple Method calculates annual runoff as a product of annual rainfall volume, and a runoff coefficient (Rv) which expresses the volumetric fraction of the rainfall that occurs as runoff. Amec Foster Wheeler is aware that FDEP has calculated loading and assigned loading allocations for the Newnan's Lake watershed, which includes Lake Forest Creek. The analysis performed by Amec Foster Wheeler will be an independent assessment for comparison with the FDEP study.

Pollutant Load Delivered (Lbs) = EMC (mg/L) X Volume (Acre-ft) X Conversion Factor

Computing the rainfall runoff volume in an accurate manner is critical to estimating the pollutant loads as accurately as possible due to the proportional relationship that exists. Amec Foster Wheeler routinely analyzes historical rainfall data to predict the rainfall runoff volume for different depths of rainfall. This results in accounting for the influence of initial abstraction on the smaller storm events and overall reduces the amount of error used when a simple yearly rainfall volume average is used.

Implementation of this Simple Method will result in showing "hot spots" within the watershed, which are areas that discharge higher concentrations of nutrients. Identified hot spots will be prime candidates for focus of water quality improvement projects.

3.2 Identify and Evaluate Potential Projects

Potential projects will focus on water quality and water quantity improvement projects. These projects also will likely need to be implemented in urbanized areas, as it is expected this is where the basin hot spots will be located.

By definition, a BMP is a control technique that is used for a given set of conditions to achieve water quality and water quantity enhancement at a minimum cost. Therefore, potential projects will be evaluated and prioritized based primarily on cost-effectiveness in reducing loadings of pollutants identified as causing water quality impairment of Newnans Lake for which TMDLs have been established. Reduction of TP and TN loadings in stormwater has a greater priority in this watershed. Therefore the most important factor to be used to prioritize potential projects will be reduction of TP loading (tons/yr) and reduction of TN loadings (tons/yr) divided by the Net Present Worth cost of the project. Additional evaluation factors will also be considered:

- ▶ TSS load reduction per Net Present Worth cost
- ▶ Land required and availability
 - Projects on public lands are strongly preferred
 - The cost of land acquisition would be included in project cost, while the opportunity cost of devoting land to this purpose rather than other desirable uses will be considered, even on public lands
- ▶ Feasibility, primarily permitability but also preference for proven technologies
- ▶ Priorities of the City of Gainesville and community acceptance
- ▶ Available funding sources and grant programs
- ▶ City determined ranking system based on Comprehensive Plan factors

Load reductions will be estimated using procedures that Amec Foster Wheeler has implemented on many similar projects, including projects for Orange County, the City of Lakeland and if relevant the City of Lake City (wetland treatment implementation). Prior to analysis, Amec Foster Wheeler will discuss conceptual BMP implementation and anticipated load reduction analysis with the City of Gainesville to obtain their input/feedback on the proposed path. Depending on the five proposed BMPs, the approach for load reduction analysis could vary slightly. The City of Gainesville can weigh in on calculations, software implementation, and the BMP types and implementation.

These load reduction analysis procedures utilize the EMC method, as discussed above, and are recommended by FDEP and USEPA in the following reports and guidance documents:

- ▶ Stormwater Best Management Practices Performance Analysis, prepared for USEPA, 2010.
- ▶ Stormwater Best Management Practice Design Guide, USEPA, 2004.
- ▶ Methodology for Calculating Nutrient Load Reductions Using the FSA Assessment Tool, FSA and FDEP, 2012.
- ▶ Guidance Manual for Implementing Municipal Storm Water Management Programs, USEPA, 1997.
- ▶ Nonpoint Source Components of Total Maximum Daily Loads, FDEP, 1998.
- ▶ Florida Nonpoint Source Management Program Update, FDEP, 2000.

The steps that will be taken to identify potential projects include:

- ▶ Create a water quality model using an EMC and land use based analysis,
- ▶ Review nutrient loadings and basin hot spots to determine properties and locations to implement BMPs,
- ▶ Select five conceptual BMP projects and determine the percent reduction in nutrient loading based on implementation,
- ▶ Review and discuss conceptual BMPs with the City to get feedback,
- ▶ Update the projects and proposed sites based on City input,
- ▶ Finalize the water quality model and load reductions per site based on adjusted five projects and locations, and
- ▶ Review and update the existing ICPR hydrologic model to ensure no adverse impacts based on BMP implementation (Water Quantity only - Phase II)
- ▶ Finalize the hydrologic model to review water quantity effects based on implementing the BMP. All projects must reduce flooding potential or maintain current flood stages, subject to requirements of the Federal Emergency Management Agency (FEMA). (Water Quantity only - Phase II)

Analysis documenting the conceptual projects and the paring down of the conceptual projects to feasible projects will be documented in the Watershed Management Plan.

Cost Benefit Analysis

Amec Foster Wheeler will produce preliminary cost estimates for each proposed BMP project, in order to assess the cost benefit analysis of the projects. Once the five (5) proposed selected projects are selected, conceptual estimates of the construction information related to appropriate pipe sizes, ditch dimensions, berm heights, and other design features will be evaluated. Estimates of earthwork quantities will also be obtained. A spreadsheet will then be created with a line item for each project element and its associated components. Unit prices are determined through a variety of sources including RSMeans, construction cost data from prior projects, and FDOT 6 Month Moving Statewide Averages. If needed, quotes can also be obtained from local vendors and manufacturers. Other information to be included in the cost benefit analyses is the required maintenance of each BMP, life expectancy of each BMP, and property acquisition costs, as required. Upon calculation, the total cost for each proposed BMP is then divided by the total removal of the impairment to obtain an efficiency for each recommended BMP (i.e., total \$/lb of phosphorus removed). This will allow the City to evenly compare the efficiency of each BMP based on the benefit the total watershed will receive.

The cost benefit analysis of the selected conceptual projects will be documented in the Watershed Management Plan.

Available Grants

Once projects are identified, funding opportunities will be identified. Amec Foster Wheeler has been developing a master list of funding mechanisms for stormwater and watershed related projects for

several years. We have already contacted Dale Jenkins, Bureau Chief in the Division of Project Management at SJRWMD, regarding cost-share funding and the specific goals that must be included in the Watershed Management Plan in order for it to be eligible for funding. Funding opportunities through additional avenues will be pursued as relevant:

- ▶ State and Federal matching contributions,
- ▶ Community Development Block Grant (CDBG) development,
- ▶ Florida Recreational Development Assistance Program,
- ▶ FDEP: TMDL Grants, 319(h) & Water Facilities,
- ▶ SJRWMD,
- ▶ USEPA,
- ▶ FEMA,
- ▶ US Army Corps of Engineers (USACE), and
- ▶ Natural Resources Conservation Service (NRCS).

An analysis of available grants acceptable for correlating conceptual projects will be documented in the Watershed Management Plan.

3.3 Recommend Five WQIPs

The five recommended projects will be beneficial to the City and the watershed, and the selection will be based on the results of the preliminary cost-benefit analysis. There are several types of projects that can accomplish the above stated goals. Some typical types of projects that are generally beneficial in urban settings for reduction of TP, TN and TSS include curb-inlet baskets, nutrient-separating baffle boxes, sediment sumps (either at grade or below grade boxes), street sweeping, community awareness, dry infiltration swales with ditch blocks, and the potential to adjust control structures in existing ponds. Additional watershed-wide project implementations could include a wetland treatment pond, wet retention pond creation/modifications, or dry detention pond creation/modifications. There is a decent amount of publically owned land within the watershed. The northwest portion of the watershed is all government owned property near the correctional facilities. In addition, there is a large area of publically owned land south of University Avenue/SR 20. In addition, the City has reached an agreement with the Alachua County School Board to be able to use their properties for stormwater treatment, therefore these properties will also be given a higher priority. These areas would be candidates to review implementing BMPs. The project analysis and BMP citing will identify City owned land and explore BMP options on those lands, as well as in other areas and the land acquisition cost will be included in the cost benefit analysis. The BMP projects will be recommended to address both water quality and water quantity issues.

Analysis documenting the five recommended projects will be provided in the Watershed Management Plan.

3.4 Public Input

Amec Foster Wheeler proposes to develop a presentation to include on the agenda of a regular City Commission meeting. Amec Foster Wheeler is prepared to make the presentation or support City staff during the presentation. The presentation at the City Commission meeting would provide an overview of each potential BMP project and solicit input from the Commission and citizens.

The meeting would be planned using the following steps:

1. Obtain a list of interested parties from the City, who will be notified of the meeting directly by email or other contact information available
2. Send out an email with a “save the date” message with the selected dates and times. Call people who do not have email access.
3. Draft the meeting agenda, presentation and handouts and seek feedback from City staff
4. Request the City to send out the public notice of the meeting to the Florida Administrative Register, as needed

5. Send out by email the meeting agendas, handouts, and a meeting reminder one week prior to the meeting date
6. Attend the City Commission meeting, present as requested to the Commission, and answer questions as needed

The agenda would focus on these items:

- ▶ Present, via a poster or other printed material the procedure used to develop the recommended projects
- ▶ Provide a presentation at which each of the five projects can be discussed
- ▶ Provide an opportunity for questions and comments via speaking or a comment box
- ▶ Review resource issues and seek additional input
- ▶ Solicit input on additional issues, problems, local desires
- ▶ Discuss potential cooperative projects and associated agencies

3.5 Prepare Draft and Final Watershed Management Plan Document

The Watershed Management Plan will incorporate the above mentioned tasks, as described in the above tasks. The plan is intended to document the process of analyzing the watershed water quality, listing all the conceptual projects evaluated using the City's criteria, along with the pros, cons and cost benefit analysis; document the City's feedback and comments; document the public feedback from the City Commission Meeting and comments; and provide the five recommended BMP projects within the watershed to best suit the needs of the City and improve the watershed water quality.

4.0 Plan Development

4.1 Develop Draft Conceptual Plans for Five Selected Projects (Phase I)

Based upon the recommended five projects, Amec Foster Wheeler will draft conceptual plans detailing these five BMP projects utilizing GIS. The conceptual plans will detail the location and type of the BMPs proposed. It is anticipated the deliverable for this task will be a figure showing the location of the BMP along with the conceptual layout of the BMP.

The conceptual plans will be submitted to the City for review and comment, and will be finalized to address any comments the City provides.

5.0 Water Quantity and Flood Plain Analysis (Phase II)

During Phase II of this project, Amec Foster Wheeler will evaluate the water quantity analysis for flooding within the watershed based on the alternative selected by the City. It is understood that the City will proceed with the alternative 3 area for flood analysis and hydrologic and hydraulic modeling, which totals 2,201 acres. This portion of the watershed is also largely urbanized, and includes residential and commercial areas, with some upland coniferous forests and recreational areas on the eastern boundary of the city limits. The flood analysis for this alternative will evaluate the entire City limits within the Lake Forest Creek watershed. Amec Foster Wheeler has prepared flood models in the past and is familiar with the process used to evaluate the flood stages, flows, level of service and pre- post flood analysis.

It is understood that this 2017 LiDAR is USGS quality level 1 data. In addition, we understand that the City will provide a hydro-flattened DEM for use in this contract. The DEM will be compared to the most current aerial imagery to identify areas where the DEM does not reflect current ground conditions (Topo Voids), if any. Amec Foster Wheeler will review As-Built plans to determine if the DEM will need to be reconditioned to reflect current ground conditions. Amec Foster Wheeler will burn in the roadway culverts, stormwater piping and ditches from the MS4 geodatabase, to use as the hydro-enforced DEM for modeling as needed.

Amec Foster Wheeler will update the existing model subbasin boundaries using the project DEM. Amec Foster Wheeler will generate subbasins using ArcHydro tools, which will be compared to the current existing model subbasin boundaries for potential updates to model scale (aggregation or disaggregation) and recently developed areas. Amec Foster Wheeler does not anticipate significant updates to the model subbasins, updates are expected for rural areas and areas developed since 2010.

Amec Foster Wheeler will use the existing ICPR model as the base model to perform water quantity analysis updates with. We understand that the current model is in ICPRv3, and will make the model updates in the same version. Amec Foster Wheeler will review As-Built information and City structure information to update the model parameters, connectivity, and information generated using the new LiDAR data. Amec Foster Wheeler will conduct 2-days of field verification to locate and verify hydraulic features and connectivity for the ICPR model, and will build into the ICPR model the City's structure data for the routing model. Only minor cross section collection is included with this scope, in order to obtain submerged channel inverts between top of banks and to correlate to the LiDAR data. Per FEMA guidelines, Amec Foster Wheeler will incorporate channel modeling and appropriate cross sections in order to appropriately model the floodplain areas. It is intended that the areas within the City limits will be updated with more detail to include structure data and channel data, and the areas outside of the City limits will be reviewed for accuracy and incorporated to the best detail available, though it is anticipated this area will incorporate slightly less detail than the area within the City limits.

Amec Foster Wheeler will simulate the 10-year, 25-year, 50-year, 100-year and 500-year storm events. Amec Foster Wheeler will adjust model parameters for model stability and accuracy. The majority of the ICPR model infrastructure is located in the southern and western portion of the watershed. This captures a good portion of the commercial and residential areas of the basin. However, it should be noted that there is no model infrastructure built into the western side of the basin. There is only a single node to capture the basin runoff for that portion of the basin. Therefore, Amec Foster Wheeler will build into the model some of the infrastructure west of SR24 in order to better analyze level of service (LOS) within the residential / commercial area. Some of the nodes in the model on the eastern side of the watershed have a direct weir connection to Newnans Lake, and therefore the tailwater condition at Lake Newnan will be important for the analysis.

Overall, there isn't a lot of detail within the basins in the existing model. It is intended that the updated model will include a higher level of detail sufficient for overall analysis, and in some sensitive flood areas specific additional detail will need to be built into the model in order to better analyze the system.

The updated model will be used as the base model for the existing conditions model. Any proposed water quantity improvements BMP projects will be built into the existing model to represent a proposed conditions model. This proposed conditions model will be compared against the existing conditions model to determine the effects the proposed water quantity BMPs have on the watershed. Stages will be compared to determine if flood stages are reduced in flood prone areas, thus improving level of service of certain roadways and/or structures that are known to flood. In addition, flows at peak stages will be analyzed to determine if additional storage is occurring in places and thus reducing the total outflow at certain points. An increased residence time could result in less flooding and an improvement in water quality. Amec Foster Wheeler will coordinate with the City regarding flood prone areas to focus our efforts on. In addition, we will obtain flood complaints from the City's Public Works Department in order to focus on known areas of flooding to reduce the flood potential and provide an increased level of service.

Amec Foster Wheeler will develop preliminary floodplains from the results of the 100-year storm event. The ICPR model and associated mapped floodplain areas will be done to FEMA standards, and will depict transition zones, representative A zones, 1-foot inundation areas, and other estimated flood areas will be included in the preliminary floodplains. Per FEMA communication received July 18, 2017, the model will be updated within FEMA guidelines and regulations, in order to be acceptable to FEMA for the LOMR submittal. The 100 year inundated areas will be presented to the City for review and comment. Upon finalization of the updated model, a Letter of Map Revision (LOMR) will be obtained from FEMA, which will establish new Base Flood Elevations (BFEs) in the 100 year floodplain. The areas within the City limits will be tied into the areas outside of the City limits within a 0.5 ft accuracy of the current floodplain elevations. The LOMR is an official modification of the FEMA Flood Insurance Rate Map (FIRM), which establish new Base Flood Elevations (BFEs) that allow the City of Gainesville to regulate development within the floodplain according to the most updated and accurate hydrologic and hydraulic modeling. Amec Foster Wheeler anticipates modeling the northern portion of the watershed where the existing floodplain extends across the watershed boundary, with a time stage node representing the culverts under NE 39th Ave near the airport, in order to obtain acceptable 100 year 24 hour floodplain values within the Lake Forest Creek watershed.

Prior to beginning the LOMR stage of the project, a pre-submittal meeting will be held via phone with FEMA in order to confirm project deliverables, as recently digital files have been acceptable and the requirement for a topographic work map and annotated FIRM have been waived. Below are the general requirements and deliverables for LOMR submittals, which will be provided with this project. Please note FEMA review fees are not included with this proposal, and will be the responsibility of the City at the time of submittal.

PART A: GENERAL REQUIREMENTS

ELEMENTS
NARRATIVE: Please provide a written description about the purpose of the request and the scope of the proposed/as-built project and the methodology used to analyze the project effects.
MT-2 APPLICATION FORMS: Please provide completed forms applicable to your request. Ensure that MT-2 Form 1 was signed by the requester, certifying engineer, and each community affected by the revision.
HYDROLOGIC ANALYSIS: If applicable, please provide a FEMA acceptable hydrologic analysis in digital format, drainage area map and associated backup information (e.g., calculations used to determine lag time, CN and loss values as well as landuse and soil maps). FEMA-acceptable models can be accessed at www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/numerical-models-meeting-minimum-requirements .
HYDRAULIC ANALYSIS: Please provide a FEMA acceptable hydraulic analysis in digital format. FEMA-acceptable models can be accessed at www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/numerical-models-meeting-minimum-requirements .
CERTIFIED TOPOGRAPHIC WORK MAP: Please provide a certified topographic work map that meets the mapping requirements outlined in MT-2 Form 2. If available, please provide digital Computer-Aided Design (CAD) or Geographic Information System (GIS) data that is spatially referenced.
ANNOTATED FIRM: Please submit a revised FIRM, at the scale of the effective FIRM, which shows the revised boundary delineation of the base floodplain, 0.2-percent-annual-chance floodplain, and regulatory floodway and how it ties into the boundary delineation shown on the effective FIRM at the downstream and upstream ends of the revised reach.
REVIEW FEE PAYMENT: Please include the appropriate review fee payment. The current fee schedule is available on the FEMA Web site at https://www.fema.gov/flood-map-related-fees .
MEET 65.10 REQUIREMENT: If the request intends to show that a berm/levee/flood wall provides flood protection, please submit all of the data requirements outlined in Section 65.10 of the NFIP regulations.
OPERATION AND MAINTENANCE PLAN: If the request involves a berm, levee, flood wall, dam, and/or detention basin project, please submit an officially adopted maintenance and operation plan.
PROPOSED/AS-BUILT PLANS: If applicable, please submit proposed/as-built plans, certified by a registered Professional Engineer, for all the project elements.
FLOODWAY NOTICE: If the revision result in changing or establishing floodway boundaries, please provide floodway public notice or a statement by your community that it has notified all affected property owners, in compliance with NFIP regulation Subparagraph 65.7(b)(1).
PROPERTY OWNER NOTIFICATION: If the revision result in any widening/shifting/establishing of the base floodplain and/or any BFE increases/establishing BFEs, please provide copy of the individual legal notices sent to all the property owners affected by any increases in the flood hazard information.

Task 5.1 – Field Safety Inspections

Amec Foster Wheeler will perform 3 weeks of engineering field surveys for safety inspections of all minor and major ditches and channels located within the Alternative 3 project area. There is approximately 120,000 linear feet of ditches within the alternative 3 area slated for field surveys, along with approximately 650 water control structures for inspection. The Florida Department of Transportation (FDOT) *Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways 2016 Edition*, commonly known as the Florida Greenbook, will be used as the regulatory basis for review. Safety inspections will include a review of side slopes on all culverts/pipe locations, evaluation of the side slopes and drop offs adjacent to sidewalk and roadway locations, evaluation of existing handrails on sidewalks adjacent to culverts versus the need for handrails, and an evaluation of the required roadway clear zone in relation to swales and culverts. The field surveys will be documented in the field with notes and photos, and a final deliverable with a technical memo indicating areas of concern along with an associated field photo log will be prepared. Concurrently with the field safety evaluations, erosion evaluations will be performed on all ditches, in order to determine if any stabilization measures are required in order to reduce potential incising occurring within the ditch system. These items will be noted and will be included in the field survey technical memo and photo log deliverable.

The following steps will be taken to perform the water quantity flood analysis:

- 1) Burn in the roadway culverts, storm sewer structures, and ditches from the City MS4 geodatabase, to create a hydro-enforced DEM to be used for modeling.
- 2) Coordinate with the City to discuss flood prone areas within the chosen alternative 3 area
- 3) Request flood complaints from the City's Public Works Department and set points in GIS for the complaints with the information and appropriate pictures, if applicable
- 4) Perform the Field Safety Analysis, Erosion Evaluation and ground truthing. Prepare the Field Analysis Technical Memo and associated Photo Log.
- 5) Finalize the base Existing Conditions Model, incorporating the ground truthing as needed. Calibrate the model by ensuring the identified flood areas correlate with the existing conditions model via mapping the flood inundation areas from the model and comparing with known flood complaints. Model calibration and optimization needs will be discussed with the City, as certain levels of calibration will be required based on the future uses of the model.
- 6) Prepare and obtain a LOMR as needed for areas requiring a FIRM revision.
- 7) Evaluate facility LOS provided by City for pass/fail based on the Existing Condition Model Results. Identify areas of high erosion potential.
- 8) Create a Proposed Conditions Model that incorporates the previously selected proposed BMP projects from the water quality analysis, as appropriate
- 9) Analyze the flood stage and flow results in the Proposed Conditions Model to the Existing Conditions Model to determine areas of flood reduction and reduced flows. This step includes floodplain mapping of the proposed stages. In addition, mapping will be provided showing the existing flood stages versus the proposed flood stages in order to visually determine flood extent reductions after BMP implementation.
- 10) Discuss the results with the City to obtain their feedback on the results and effects of the proposed BMPs.
- 11) The final results will be used to finalize the proposed BMP projects. For as many of the five projects as possible, the BMP project will try to address dual water quality and water quantity issues. In addition, if FEMA funding can be used for any of the proposed BMPs, that will be addressed as identified as potential additional funding for the BMP project
- 12) The final deliverable will include a written report section in the Watershed Management Plan discussing the steps taken to evaluate the existing watershed, a description of the flood prone areas, and conceptual recommendations for addressing the water quantity issues in alternative 3.

6.0 Schedule

6.1 Project Schedule

The project schedule will be finalized with the City upon execution of the Notice to Proceed. It is anticipated that the Phase I schedule of the project will last for a duration of 48 weeks from the Notice to Proceed, as outlined on the follow page.

7.0 Costing

7.1 Costing

Please see **Attachment C** for detailed costing to complete the requested project. Tasks 1 through 4, as outlined above, are summarized in the spreadsheet. Task 5, which includes the Hydrologic and Hydraulic Modeling and Field Survey Task, is listed separately.

8.0 References

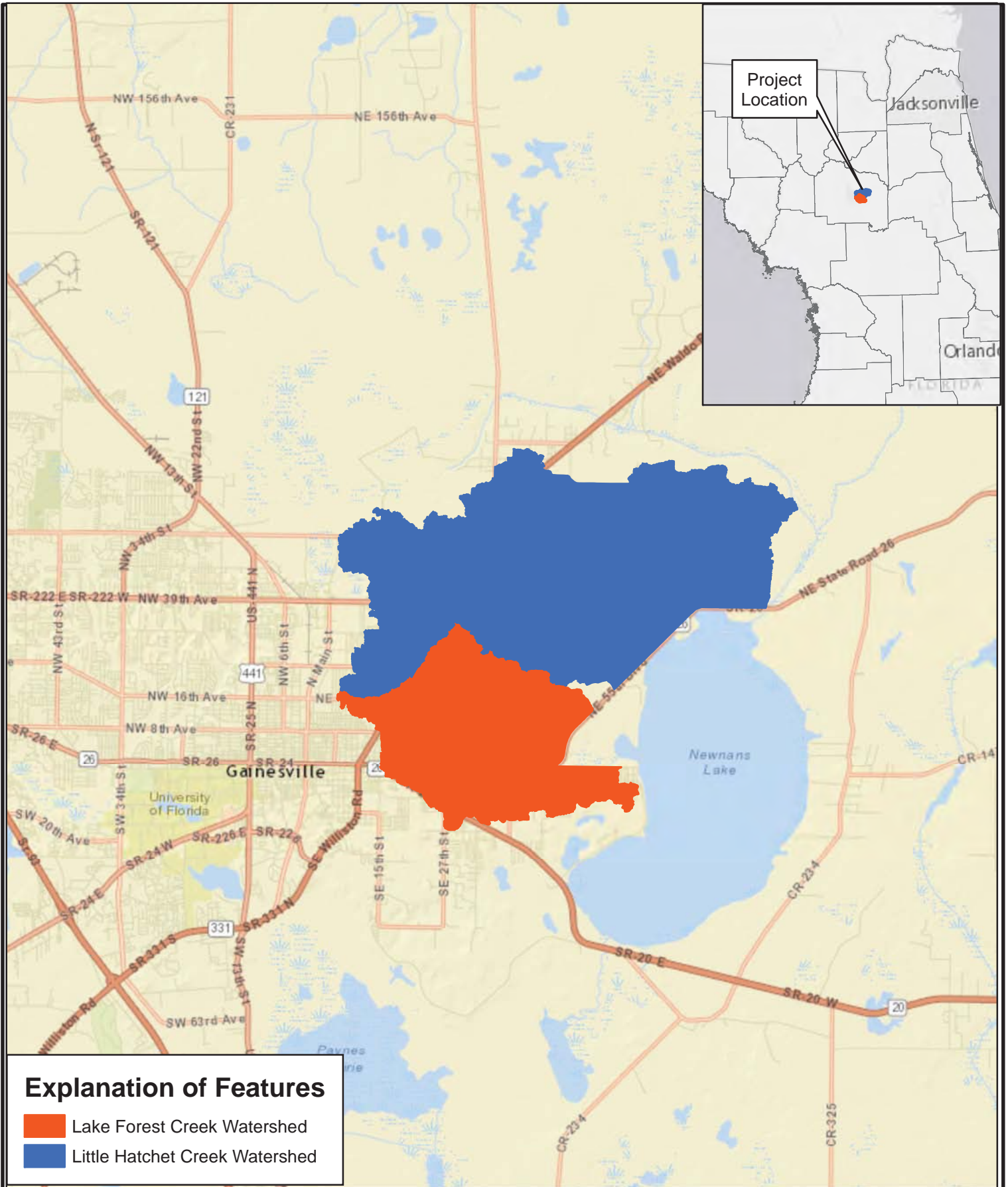
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(<http://floridaswater.com/technicalreports/pdfs/TP/SJ2010-1.pdf>)
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- Gao, X. and D. Gilbert. 2003. *Nutrient Total Maximum Daily Load for Newnans Lake, Alachua County, Florida*. Florida Department of Environmental Protection, Watershed Assessment Section, Tallahassee, FL.

Attachment A
List of Documents Procured

- Adkins, M. and D.V. Rao. 1995. *A surface water hydrologic reconnaissance: Upper Orange Creek Basin, north-central Florida*. Technical Publication SJ95-4. St. Johns River Water Management District, Palatka, FL.
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Attachment B Figures



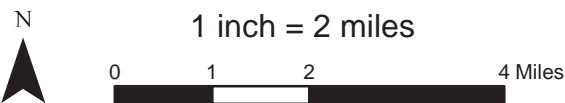
Explanation of Features

- Lake Forest Creek Watershed
- Little Hatchet Creek Watershed

Source: Imagery, ESRI 2012; AMECFW 2015

City of Gainesville - WMP

Project Location Map



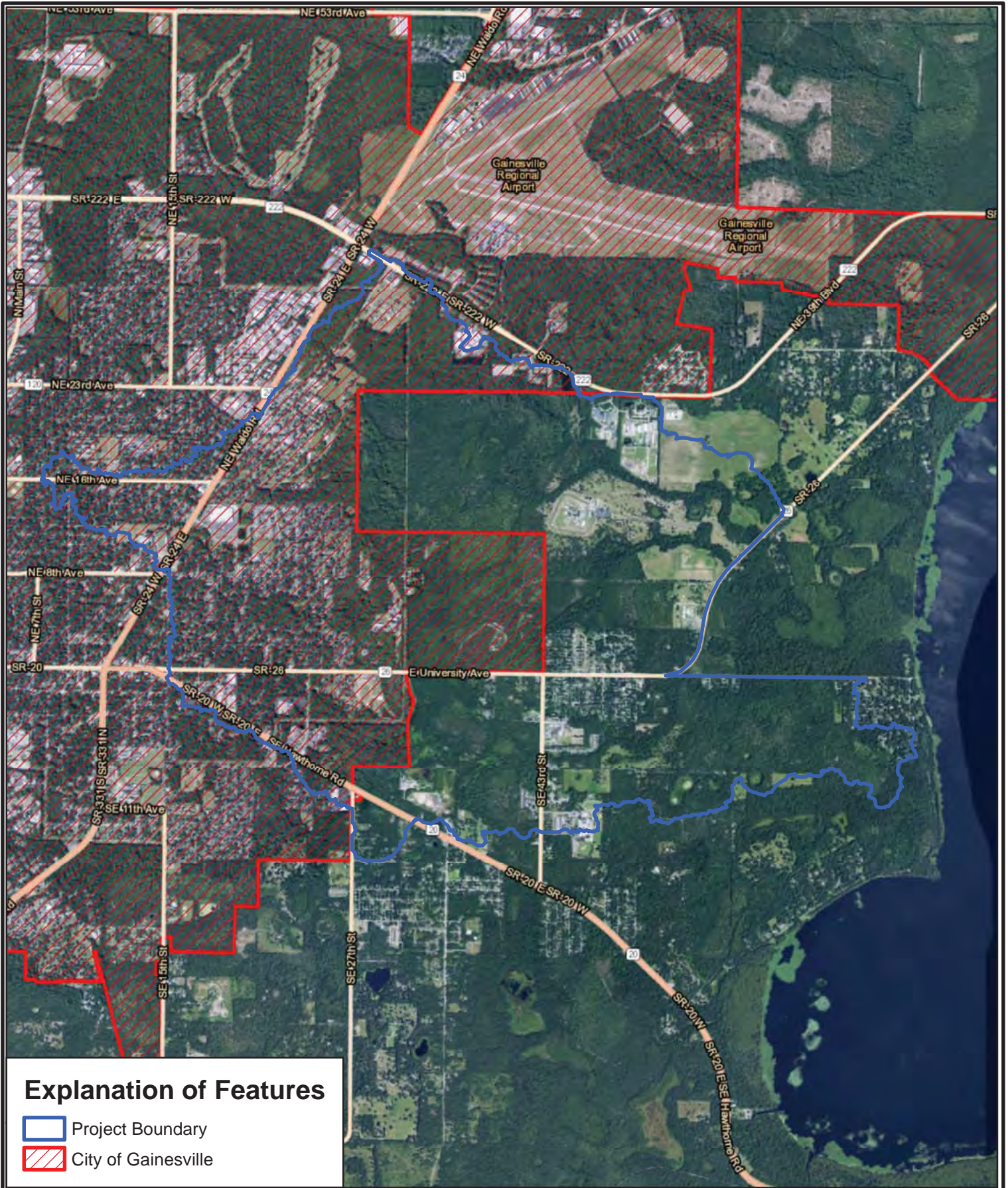
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Gainesville
Florida
Project No.

amec foster wheeler





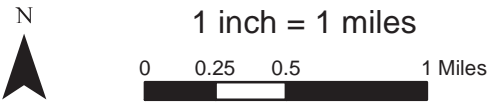
Figure
1



Source: Imagery, ESRI 2012; AMECFW 2015

Explanation of Features

-  Project Boundary
-  City of Gainesville



City of Gainesville - Lake Forest Creek - WMP

Aerial Photograph Map

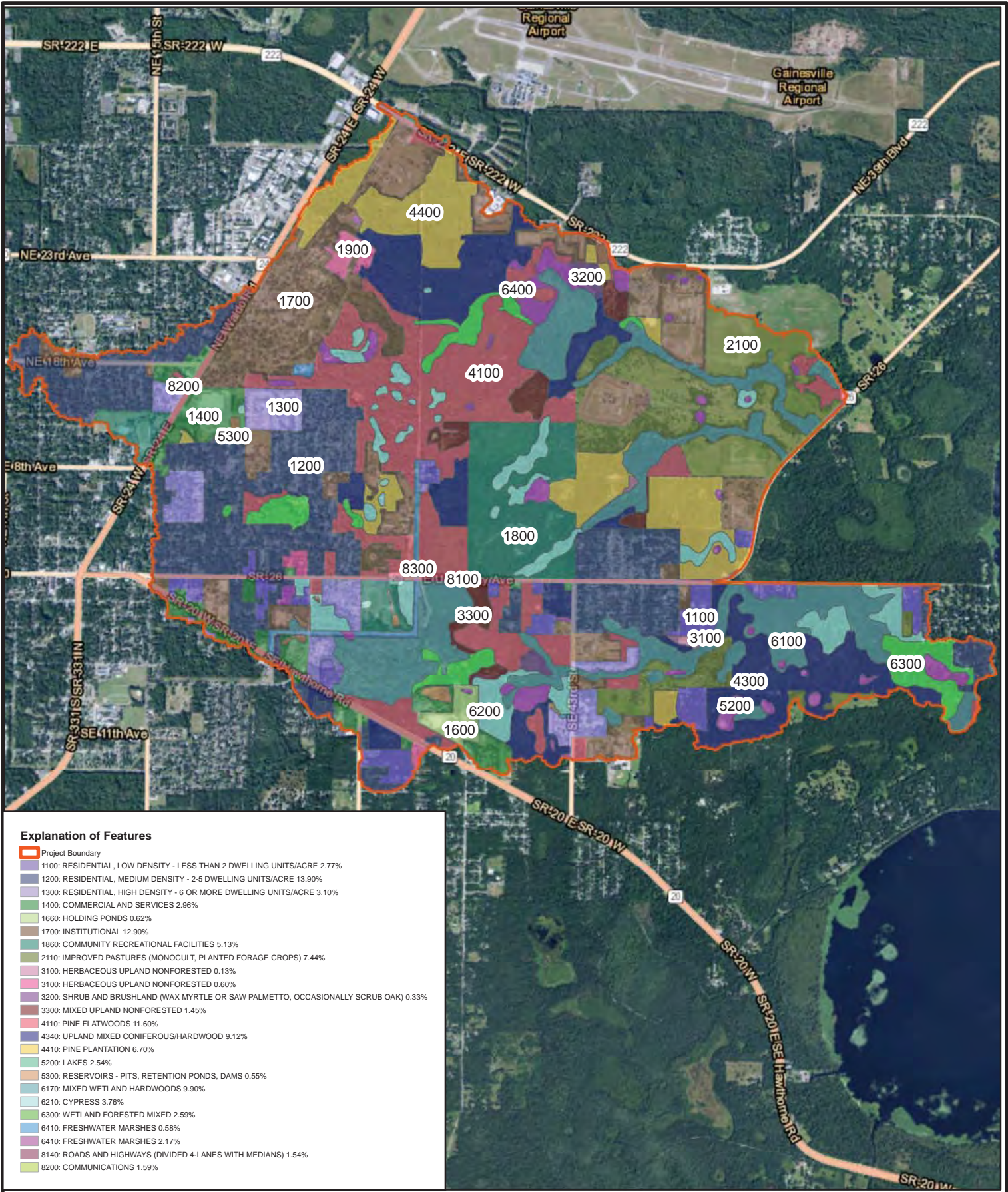
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Gainesville
Florida
Project No.

amec foster wheeler



Figure 2



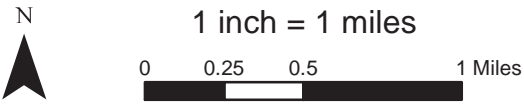
Explanation of Features

- Project Boundary
- 1100: RESIDENTIAL, LOW DENSITY - LESS THAN 2 DWELLING UNITS/ACRE 2.77%
- 1200: RESIDENTIAL, MEDIUM DENSITY - 2-5 DWELLING UNITS/ACRE 13.90%
- 1300: RESIDENTIAL, HIGH DENSITY - 6 OR MORE DWELLING UNITS/ACRE 3.10%
- 1400: COMMERCIAL AND SERVICES 2.96%
- 1660: HOLDING PONDS 0.62%
- 1700: INSTITUTIONAL 12.90%
- 1860: COMMUNITY RECREATIONAL FACILITIES 5.13%
- 2110: IMPROVED PASTURES (MONOCULT, PLANTED FORAGE CROPS) 7.44%
- 3100: HERBACEOUS UPLAND NONFORESTED 0.13%
- 3100: HERBACEOUS UPLAND NONFORESTED 0.60%
- 3200: SHRUB AND BRUSHLAND (WAX MYRTLE OR SAW PALMETTO, OCCASIONALLY SCRUB OAK) 0.33%
- 3300: MIXED UPLAND NONFORESTED 1.45%
- 4110: PINE FLATWOODS 11.60%
- 4340: UPLAND MIXED CONIFEROUS/HARDWOOD 9.12%
- 4410: PINE PLANTATION 6.70%
- 5200: LAKES 2.54%
- 5300: RESERVOIRS - PITS, RETENTION PONDS, DAMS 0.55%
- 6170: MIXED WETLAND HARDWOODS 9.90%
- 6210: CYPRESS 3.76%
- 6300: WETLAND FORESTED MIXED 2.59%
- 6410: FRESHWATER MARSHES 0.58%
- 6410: FRESHWATER MARSHES 2.17%
- 8140: ROADS AND HIGHWAYS (DIVIDED 4-LANES WITH MEDIANS) 1.54%
- 8200: COMMUNICATIONS 1.59%

Source: Imagery, ESRI 2012; AMECFW 2015; SJRWMD 2015

City of Gainesville - Lake Forest Creek - WMP

Land Use Map



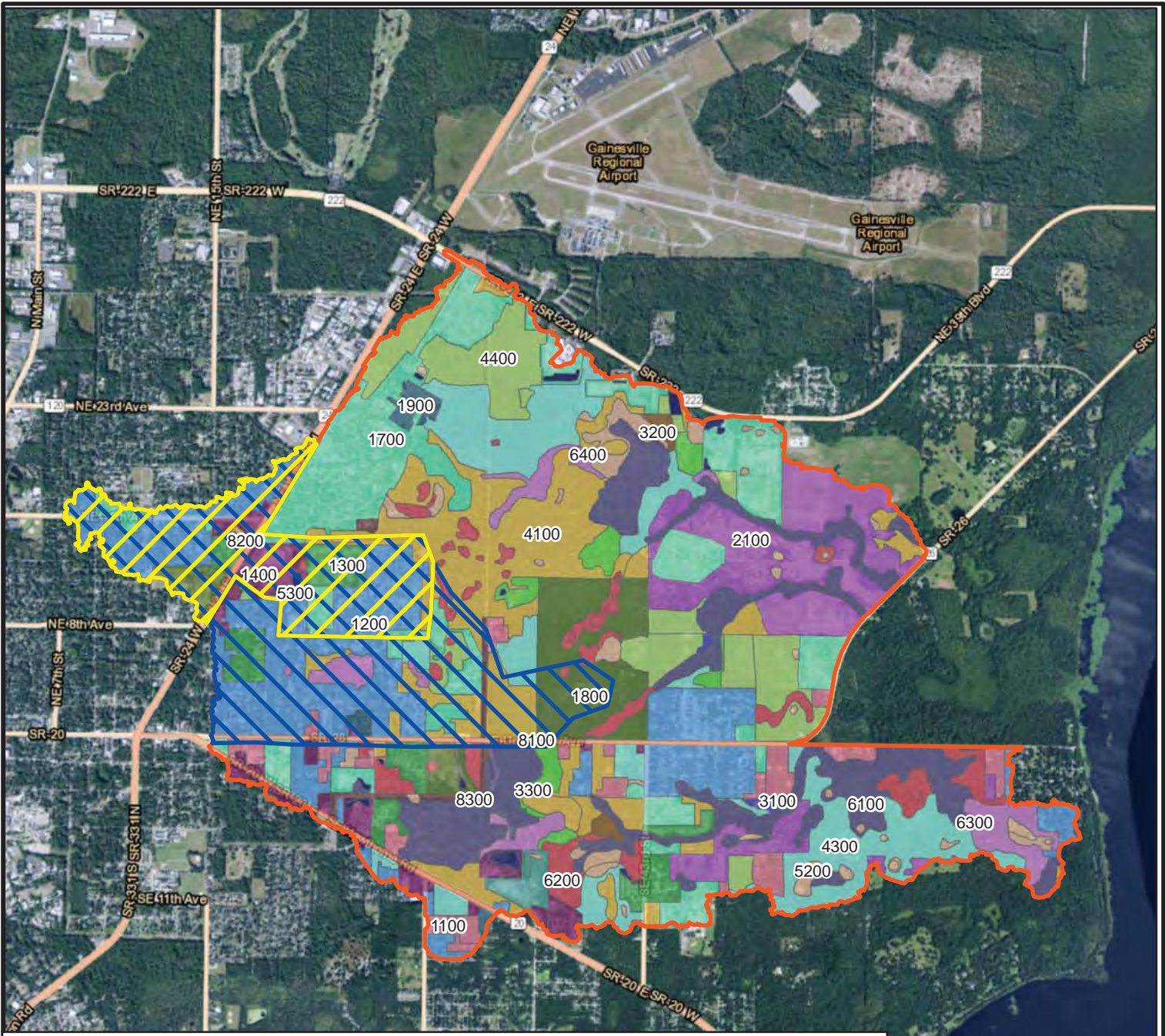
Drawn	Date
NMB	1/7/2016
Checked	Date
DLA	1/7/2016

Gainesville
Florida
Project No.

amec foster wheeler



Figure
3a



Explanation of Features

- Watershed Boundary
- Alternate Area #1
- Alternate Area #2
- 1100, RESIDENTIAL LOW DENSITY
- 1200, RESIDENTIAL MEDIUM DENSITY
- 1300, RESIDENTIAL HIGH DENSITY
- 1400, COMMERCIAL AND SERVICES
- 1600, EXTRACTIVE
- 1700, INSTITUTIONAL
- 1800, RECREATIONAL
- 1900, OPEN LAND
- 2100, CROPLAND AND PASTURELAND
- 3100, HERBACEOUS (DRY PRAIRIE)
- 3200, SHRUB AND BRUSHLAND
- 3300, MIXED RANGELAND
- 4100, UPLAND CONIFEROUS FORESTS
- 4300, UPLAND HARDWOOD FORESTS
- 4400, TREE PLANTATIONS
- 5200, LAKES
- 5300, RESERVOIRS
- 6100, WETLAND HARDWOOD FORESTS
- 6200, WETLAND CONIFEROUS FORESTS
- 6300, WETLAND FORESTED MIXED
- 6400, VEGETATED NON-FORESTED WETLANDS
- 8100, TRANSPORTATION
- 8200, COMMUNICATIONS
- 8300, UTILITIES

Source: Imagery, ESRI 2012; AMECFW 2015; SJRWMD 2015

City of Gainesville - Lake Forest Creek - WMP

Land Use Map

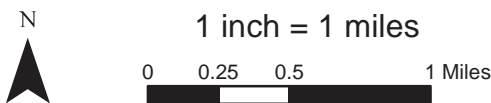
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Checked	Date
DLA	2/2/2016

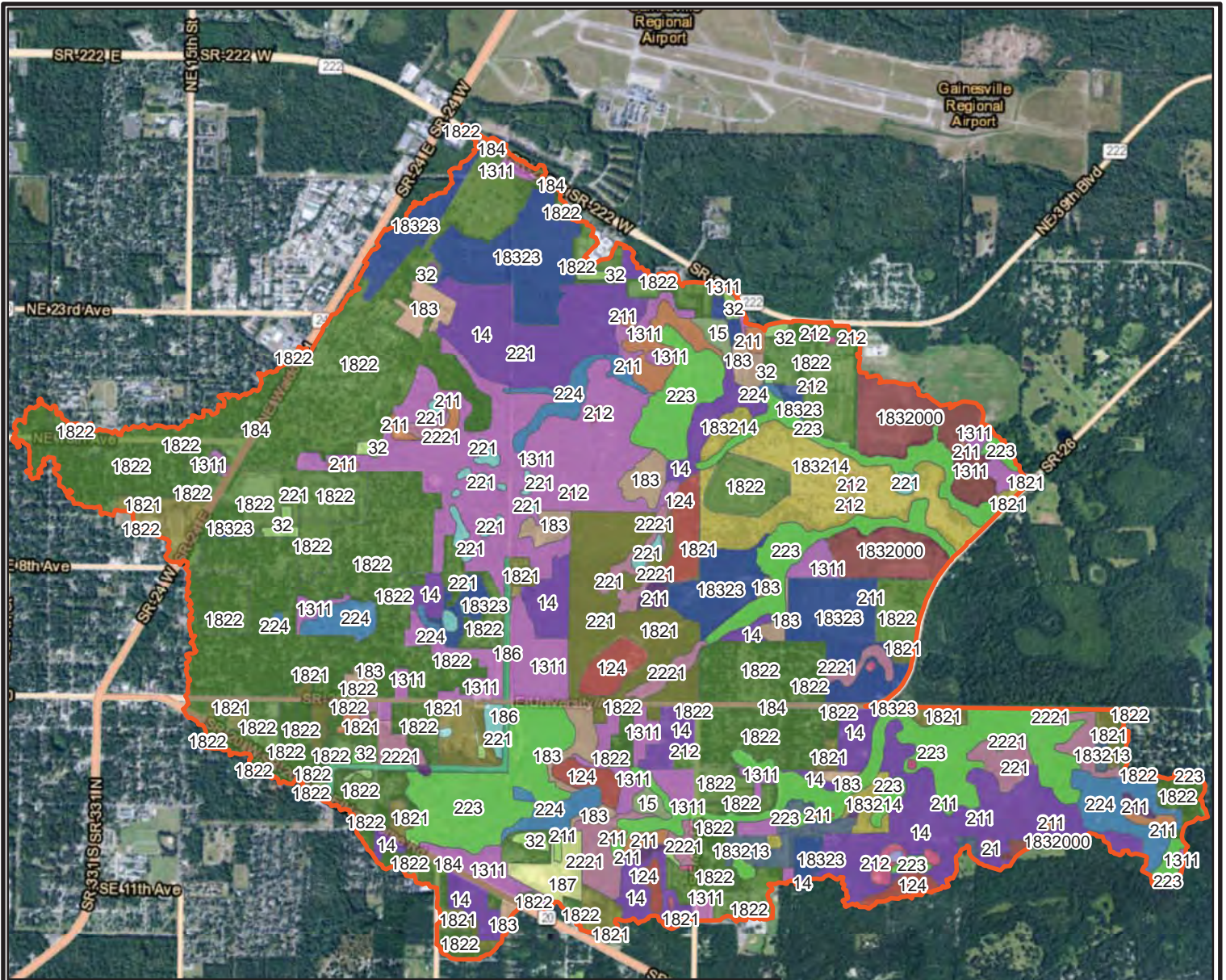
Gainesville
Florida
Project No.

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Figure
3b





Explanation of Features

- | | |
|--------------------------------------|---------------------------------------|
| Project Boundary | 185 - Communication |
| 124 - Sandhill | 186 - Utilities |
| 1311 - Mesic Flatwoods | 187 - Extractive |
| 14 - Mixed Hardwood-Coniferous | 21 - Freshwater Non-Forested Wetlands |
| 15 - Shrub and Brushland | 211 - Prairies and Bogs |
| 1821 - Low Intensity Urban | 2111 - Wet Prairie |
| 1822 - High Intensity Urban | 212 - Freshwater Marshes |
| 183 - Rural Lands | 221 - Cypress/Tupelo |
| 1832 - Agriculture | 2221 - Wet Flatwoods |
| 183213 - Improved Pasture | 223 - Mixed Wetland Hardwoods |
| 183214 - Unimproved/Woodland Pasture | 224 - Other Wetland Forested Mixed |
| 18323 - Tree Plantations | 31 - Natural Lakes and Ponds |
| 184 - Transportation | 32 - Artificial Lakes and Ponds |

Source: Imagery, ESRI 2012; AMECFW 2015; FNAI 2015

City of Gainesville - Lake Forest Creek - WMP

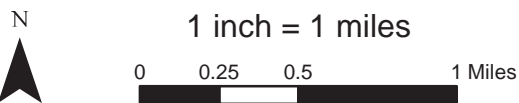
Florida Natural Areas Inventory Map

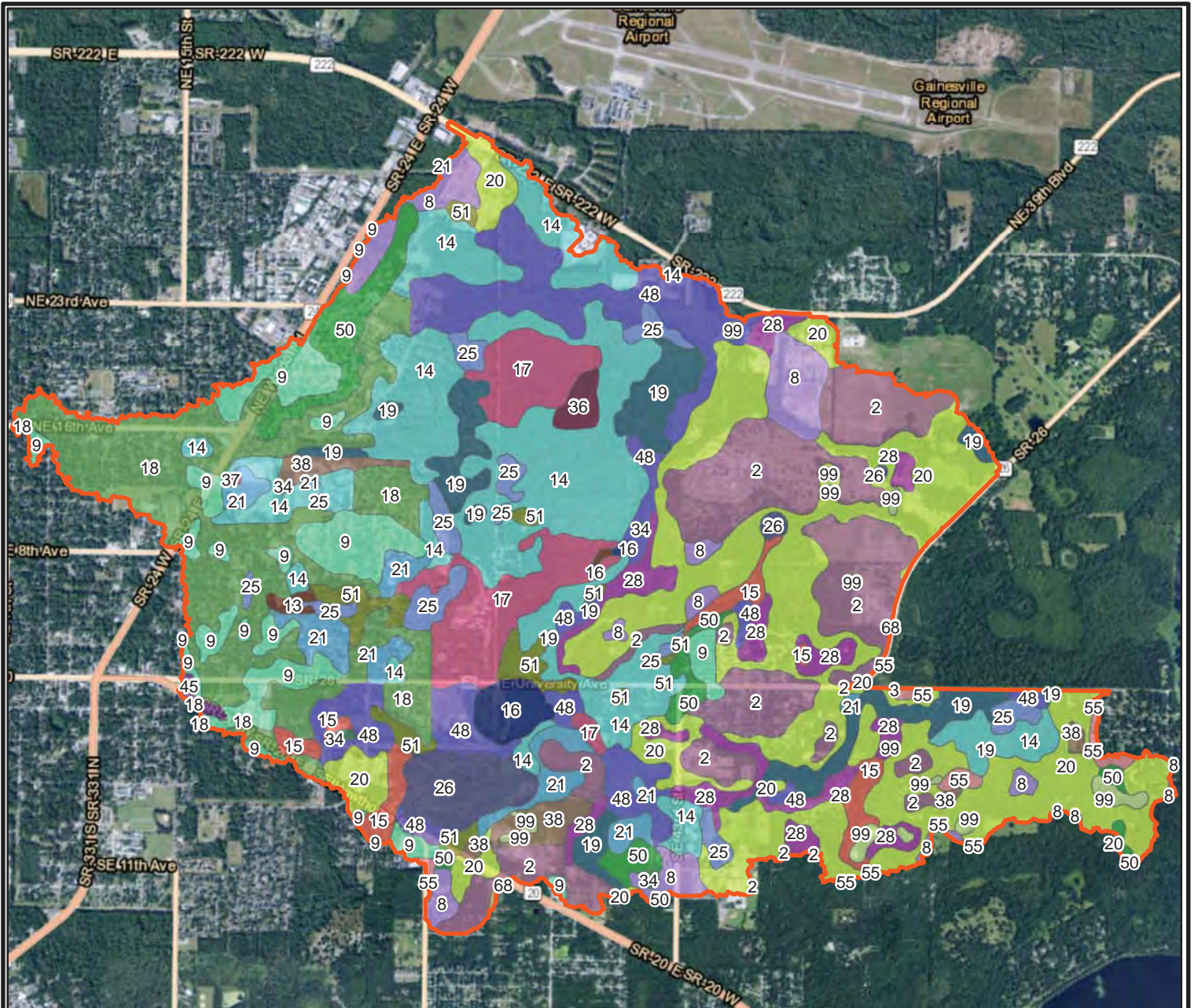
Drawn	Date	Gainesville Florida Project No.
NMB	1/5/2016	
Checked	Date	
DLA	1/5/2016	

amec foster wheeler



Figure
4





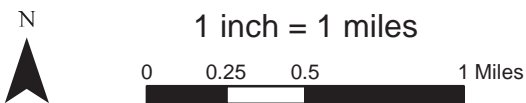
Explanation of Features

- Project Boundary
- 13; PELHAM SAND
- 14; POMONA SAND
- 15; POMPANO SAND
- 16; SURRENCY SAND
- 17; WAUCHULA SAND
- 18; WAUCHULA-URBAN LAND COMPLEX
- 19; MONTEOCHA LOAMY SAND
- 20; TAVARES SAND, 0 TO 5 PERCENT SLOPES
- 21; NEWNAN SAND
- 25; POMONA SAND, DEPRESSIONAL
- 26; SAMSULA MUCK
- 28; CHIPLEY SAND
- 2; CANDLER FINE SAND, 0 TO 5 PERCENT SLOPES
- 34; PLACID SAND, DEPRESSIONAL
- 36; ARENTS, 0 TO 5 PERCENT SLOPES
- 37; ZOLFO SAND
- 38; PITS AND DUMPS
- 3; ARREDONDO FINE SAND, 0 TO 5 PERCENT SLOPES
- 45; URBAN LAND-MILLHOPPER COMPLEX
- 48; MYAKKA SAND
- 50; SPARR FINE SAND
- 51; PLUMMER FINE SAND
- 55; LAKE SAND, 0 TO 5 PERCENT SLOPES
- 68; CANDLER FINE SAND, 5 TO 8 PERCENT SLOPES
- 8; MILLHOPPER SAND, 0 TO 5 PERCENT SLOPES
- 99; WATER
- 9; MILLHOPPER-URBAN LAND COMPLEX, 0 TO 5 PERCENT SLOPES

Source: Imagery, ESRI 2012; AMECFW 2015; NRCS 2012

City of Gainesville - Lake Forest Creek - WMP

NRCS Soils Map



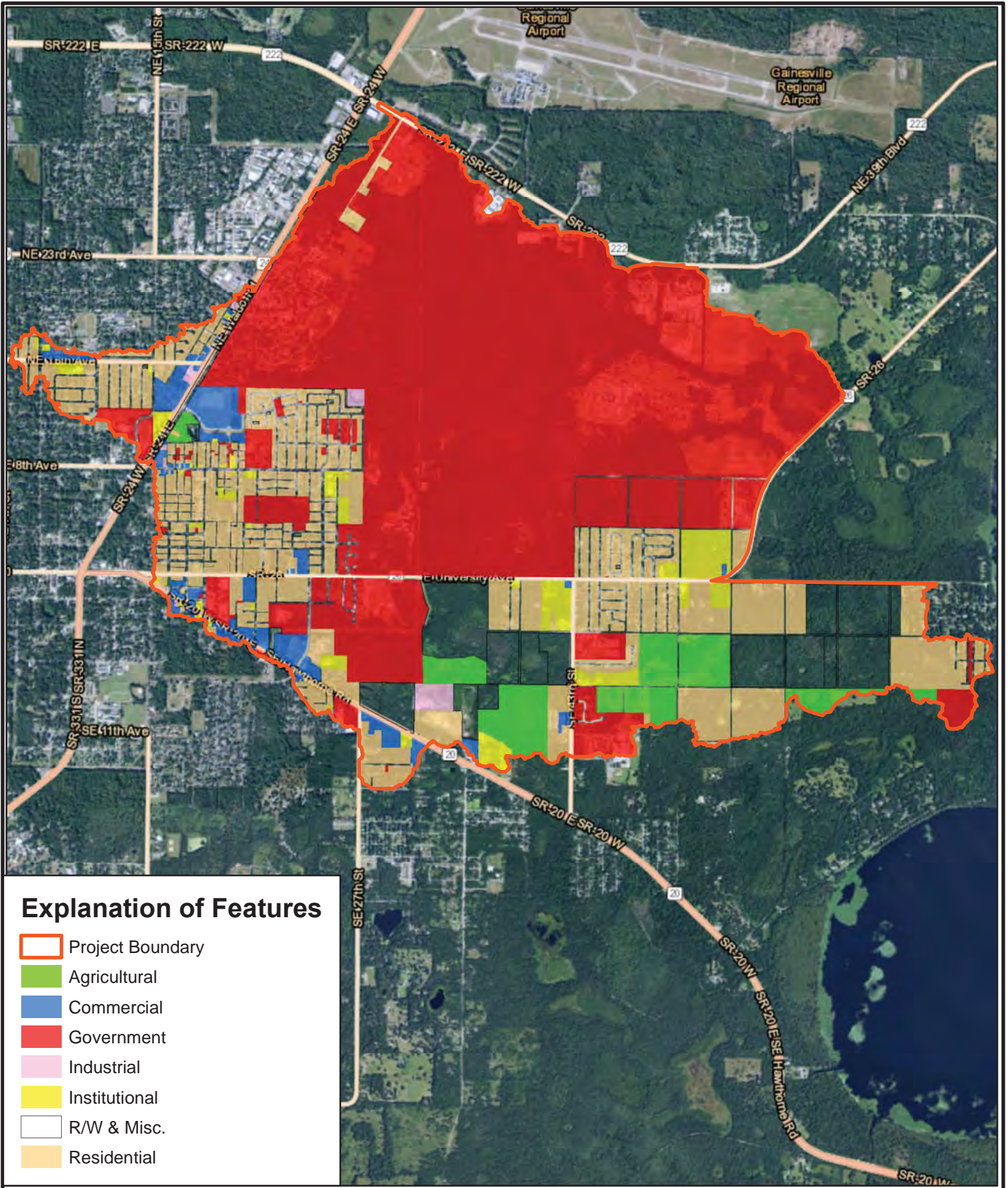
Drawn	Date
NMB	1/6/2016
Checked	Date
DLA	1/6/2016

Gainesville
Florida
Project No.








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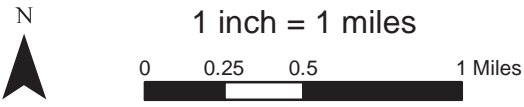
Figure
5



Explanation of Features

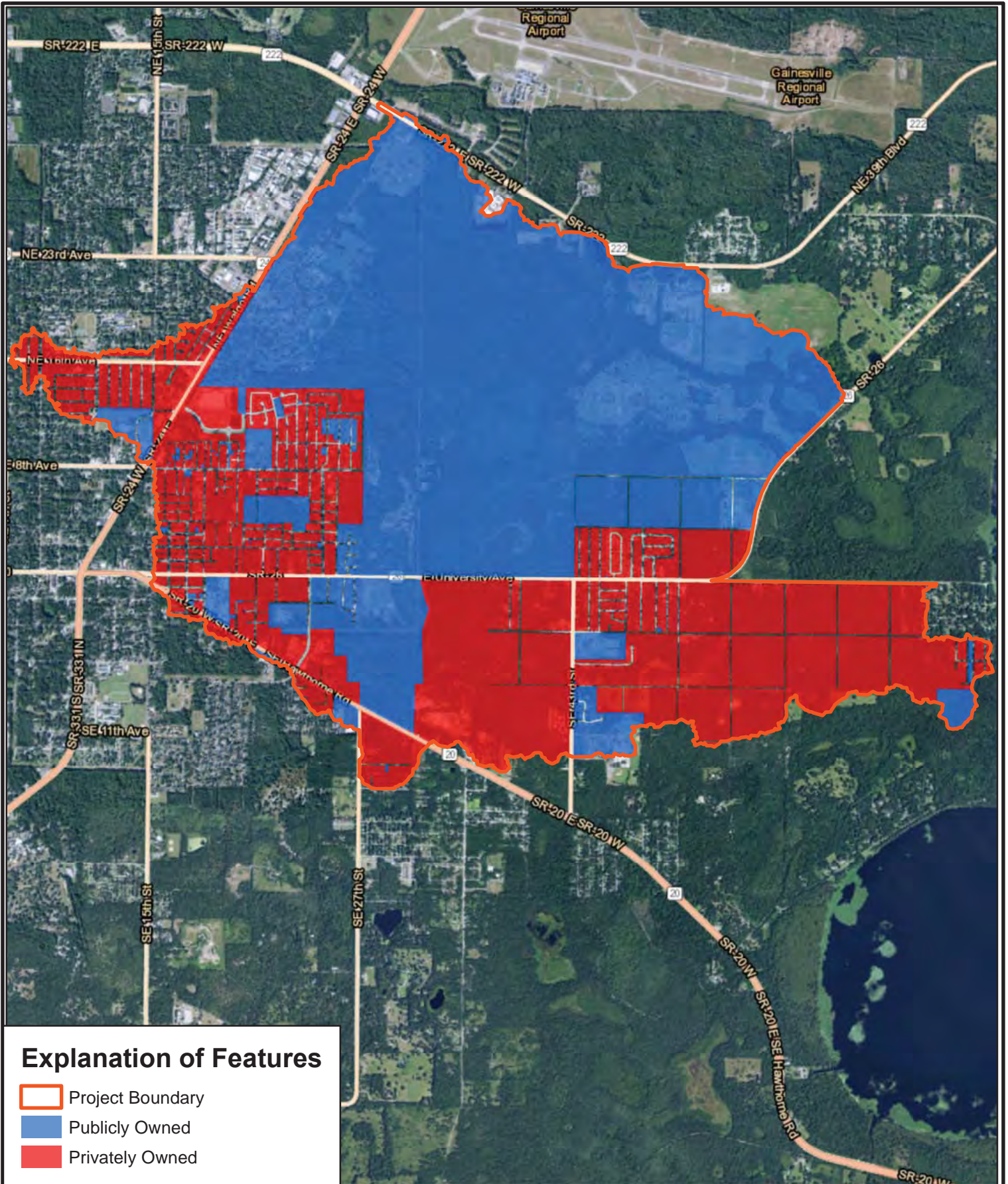
-  Project Boundary
-  Agricultural
-  Commercial
-  Government
-  Industrial
-  Institutional
-  R/W & Misc.
-  Residential

Source: Imagery, ESRI 2012; AMECFW 2015; Alachua County 2015



City of Gainesville - Lake Forest Creek - WMP			
Adjacent Property Owners Map			
Drawn	Date	Gainesville Florida Project No.	amec foster wheeler 
NMB	1/7/2016		
Checked	Date		
DLA	1/7/2016		

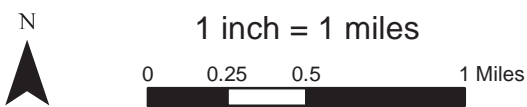
Figure 6a



Explanation of Features

- Project Boundary
- Publicly Owned
- Privately Owned

Source: Imagery, ESRI 2012; AMECFW 2015; Alachua County 2015



City of Gainesville - Lake Forest Creek - WMP

Adjacent Property Owners Map

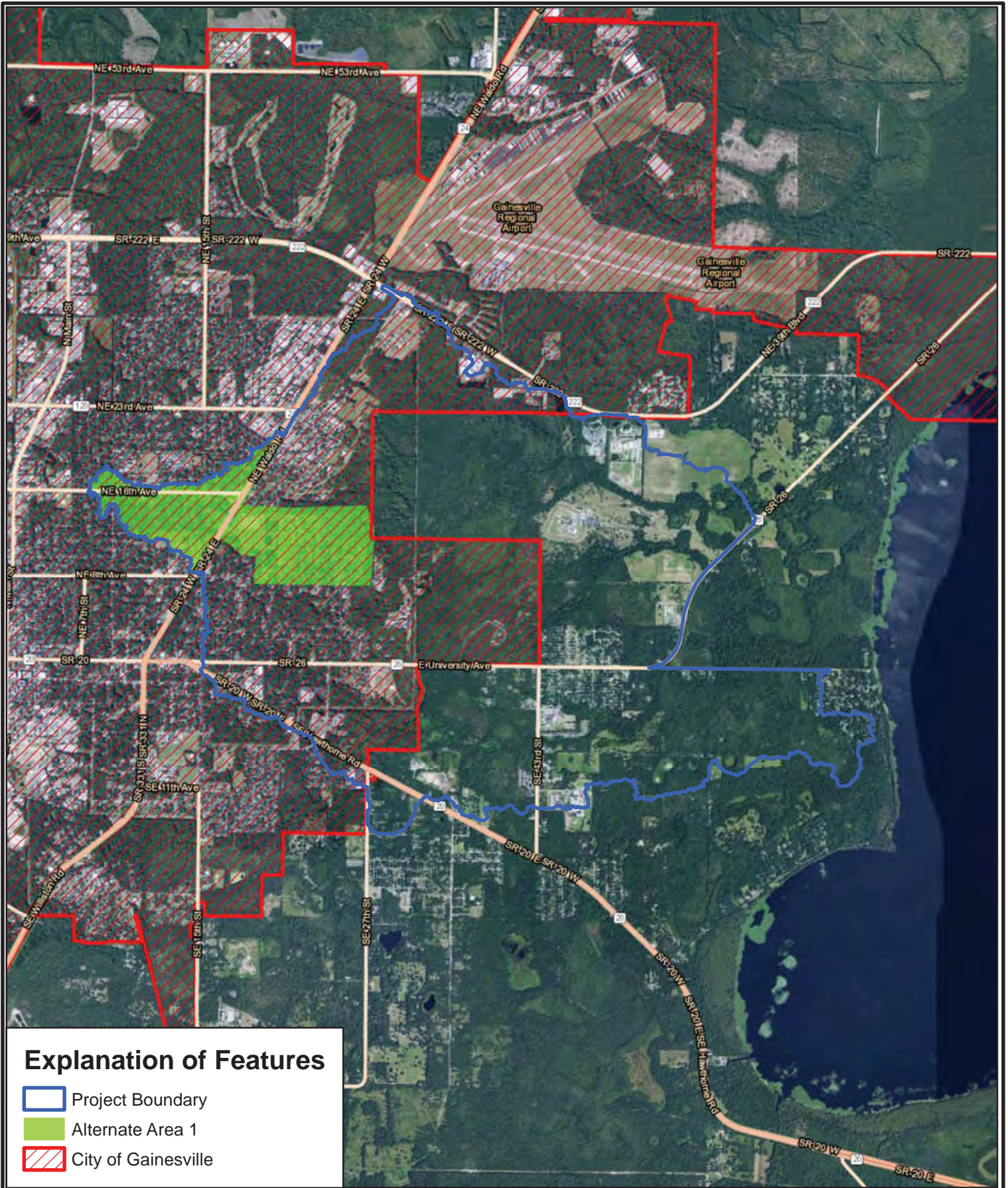
Drawn	Date
NMB	1/7/2016
Checked	Date
DLA	1/7/2016

Gainesville
Florida
Project No.




amec foster wheeler



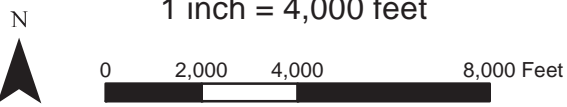
Figure
6b



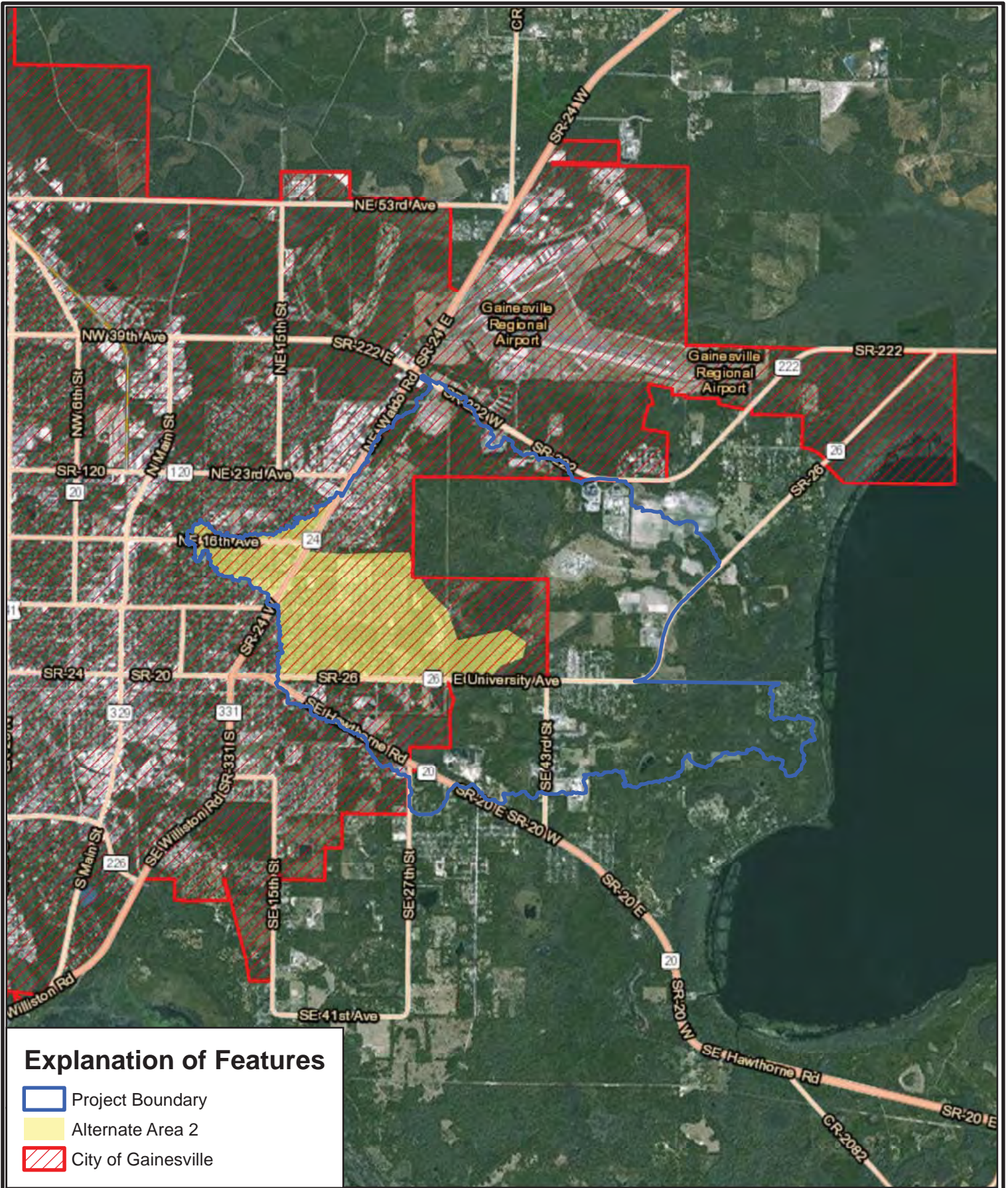
Explanation of Features

-  Project Boundary
-  Alternate Area 1
-  City of Gainesville

Source: Imagery, ESRI 2012; AMECFW 2015






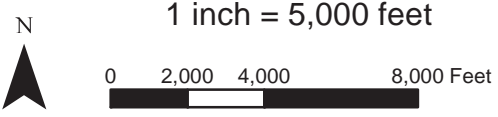
City of Gainesville - Lake Forest Creek - WMP			
Alternate Area #1 Map			
Drawn	Date	Gainesville Florida Project No.	
NMB	1/8/2016		
Checked	Date		
DLA	1/8/2016		Figure 7a



Source: Imagery, ESRI 2012; AMECFW 2015

Explanation of Features

-  Project Boundary
-  Alternate Area 2
-  City of Gainesville



City of Gainesville - Lake Forest Creek - WMP

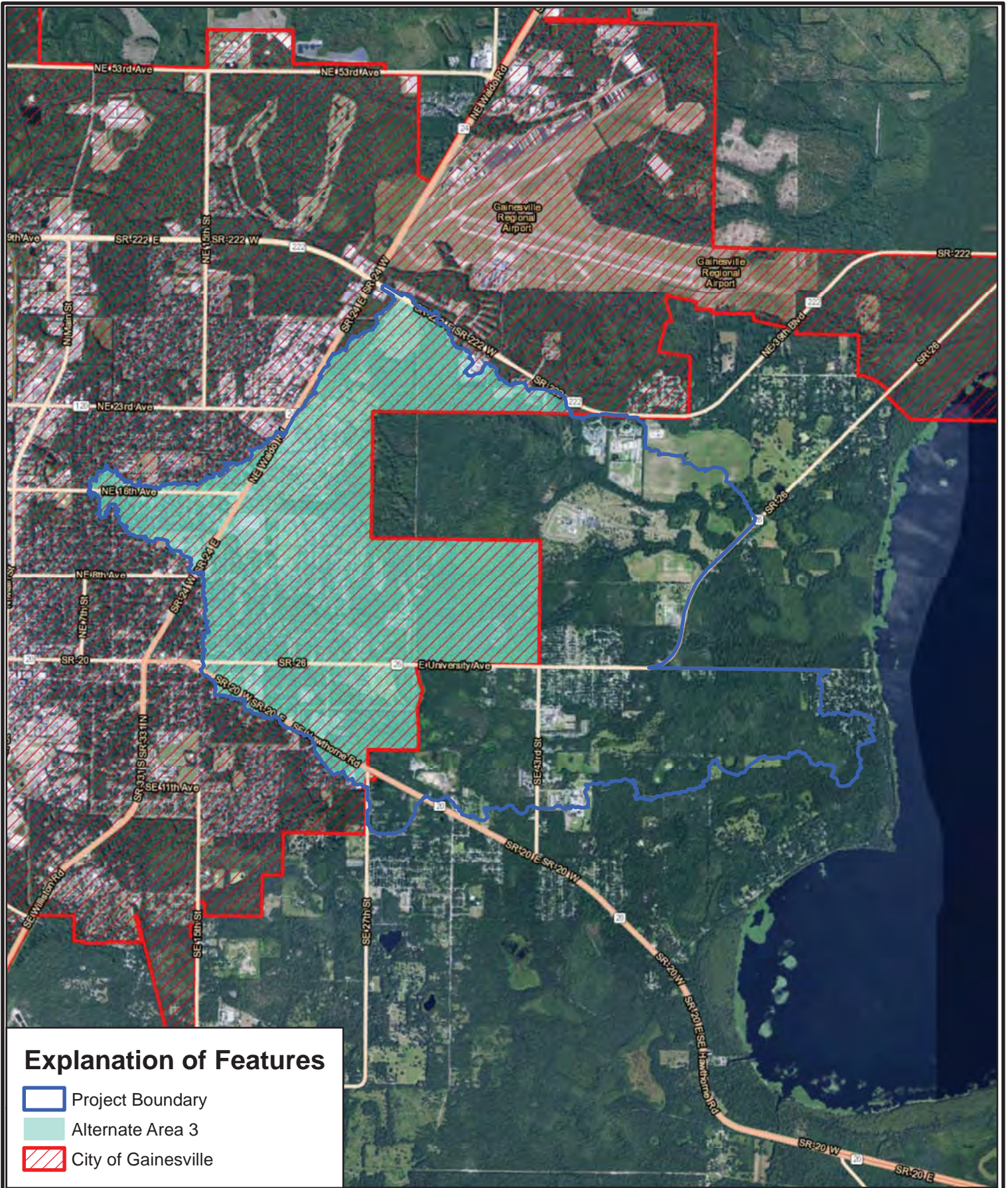
Alternate Area #2 Map

Drawn	Date	Gainesville Florida Project No. 6063-15-0???
NMB	2/5/2016	
Checked	Date	
DLA	2/5/2016	




amec foster wheeler



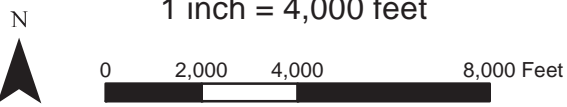
Figure 7b



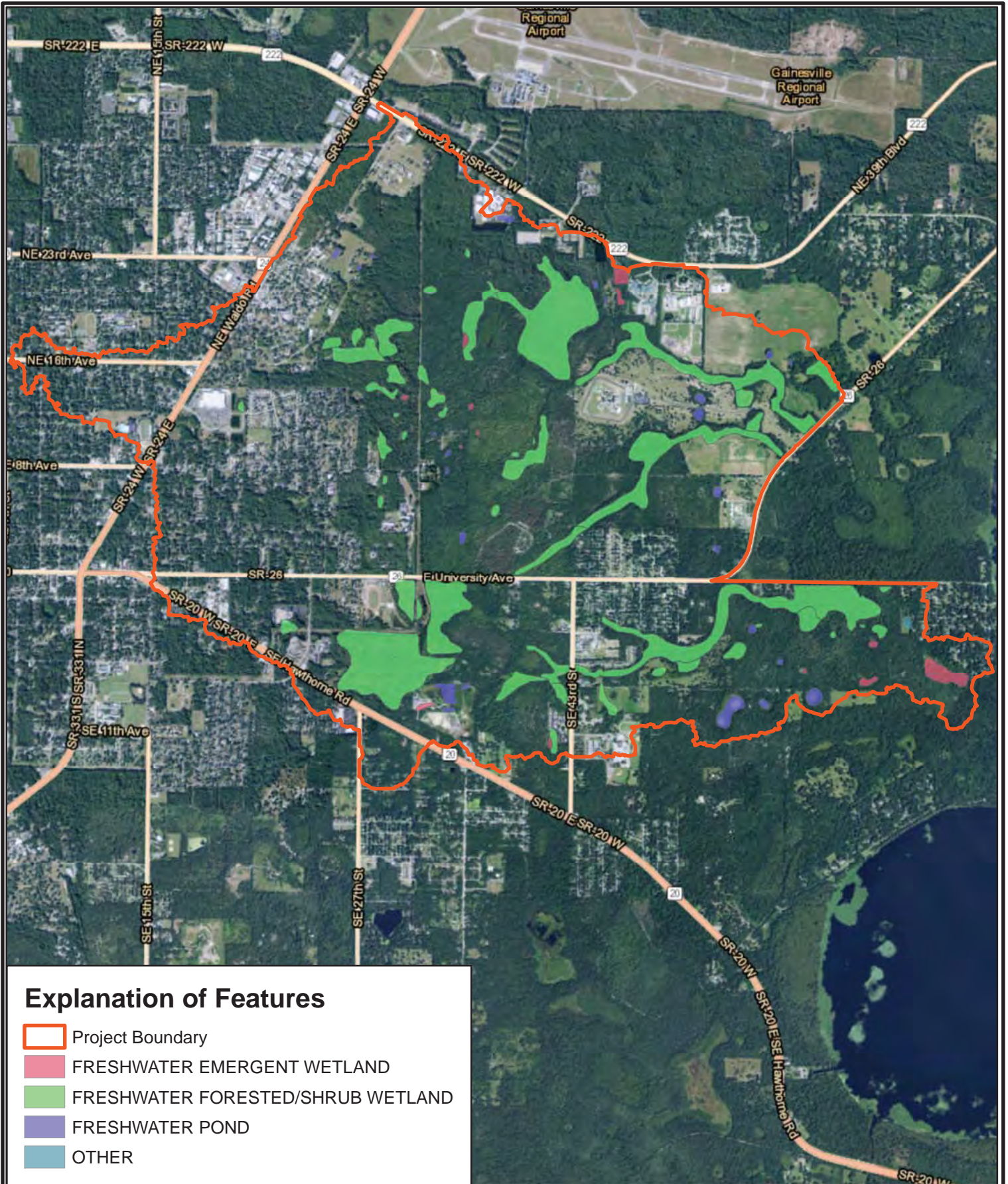
Explanation of Features

-  Project Boundary
-  Alternate Area 3
-  City of Gainesville

Source: Imagery, ESRI 2012; AMECFW 2015



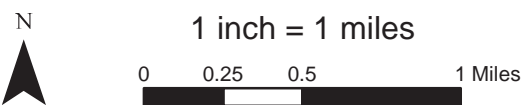
City of Gainesville - Lake Forest Creek - WMP			
Alternate Area #3 Map			
Drawn	Date	Gainesville Florida Project No.	
NMB	1/8/2016		
Checked	Date		
DLA	1/8/2016		
			Figure 7c



Source: Imagery, ESRI 2012; AMECFW 2015; NWI 2011

Explanation of Features

- Project Boundary
- FRESHWATER EMERGENT WETLAND
- FRESHWATER FORESTED/SHRUB WETLAND
- FRESHWATER POND
- OTHER



City of Gainesville - Lake Forest Creek - WMP

National Wetland Institute Map

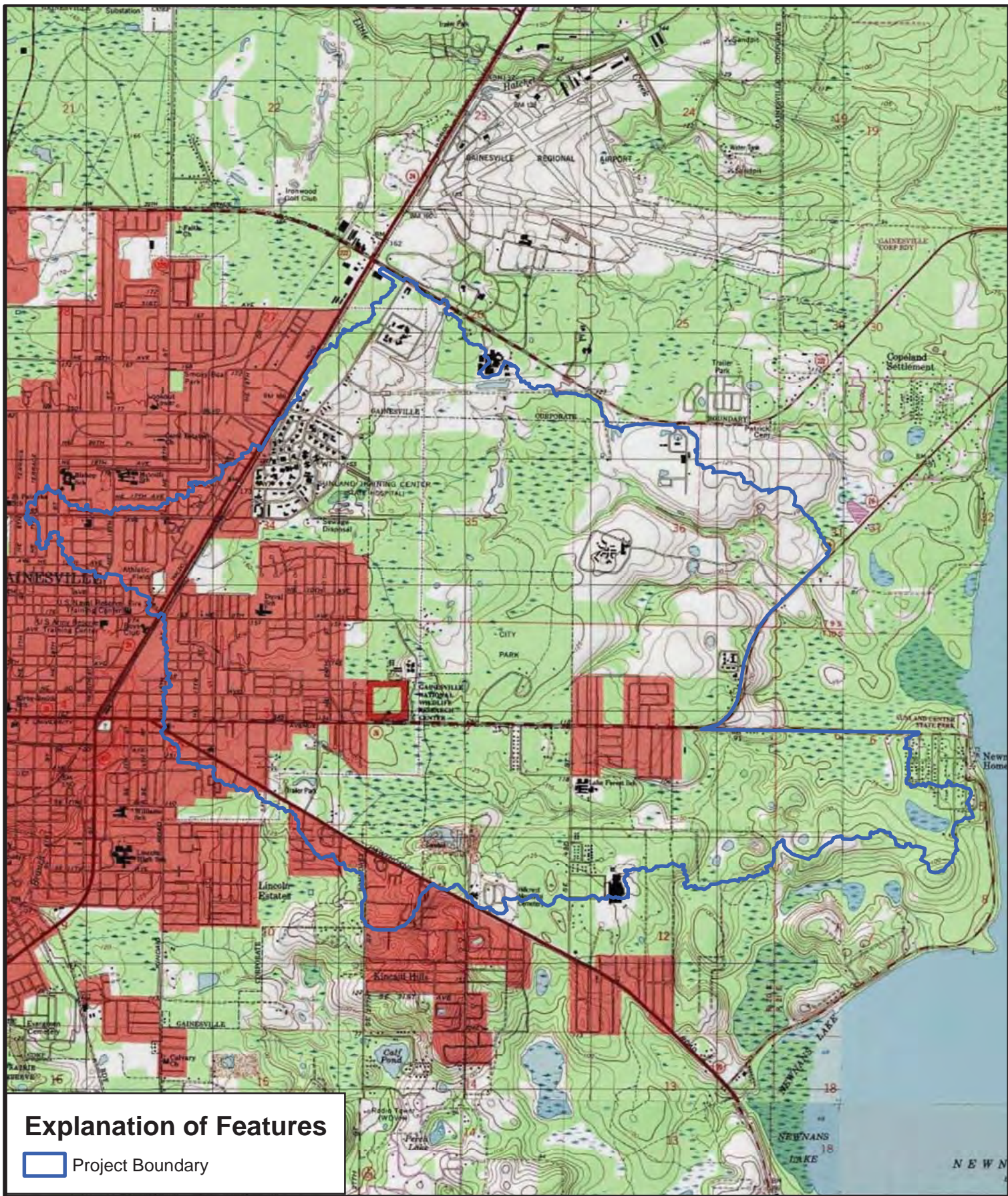
Drawn	Date
NMB	1/5/2016
Checked	Date
DLA	1/5/2016

Gainesville
Florida
Project No.

amec foster wheeler



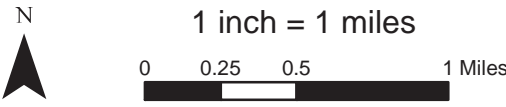
Figure
8




Source: Imagery, ESRI 2012; AMECFW 2015; USGS 2015

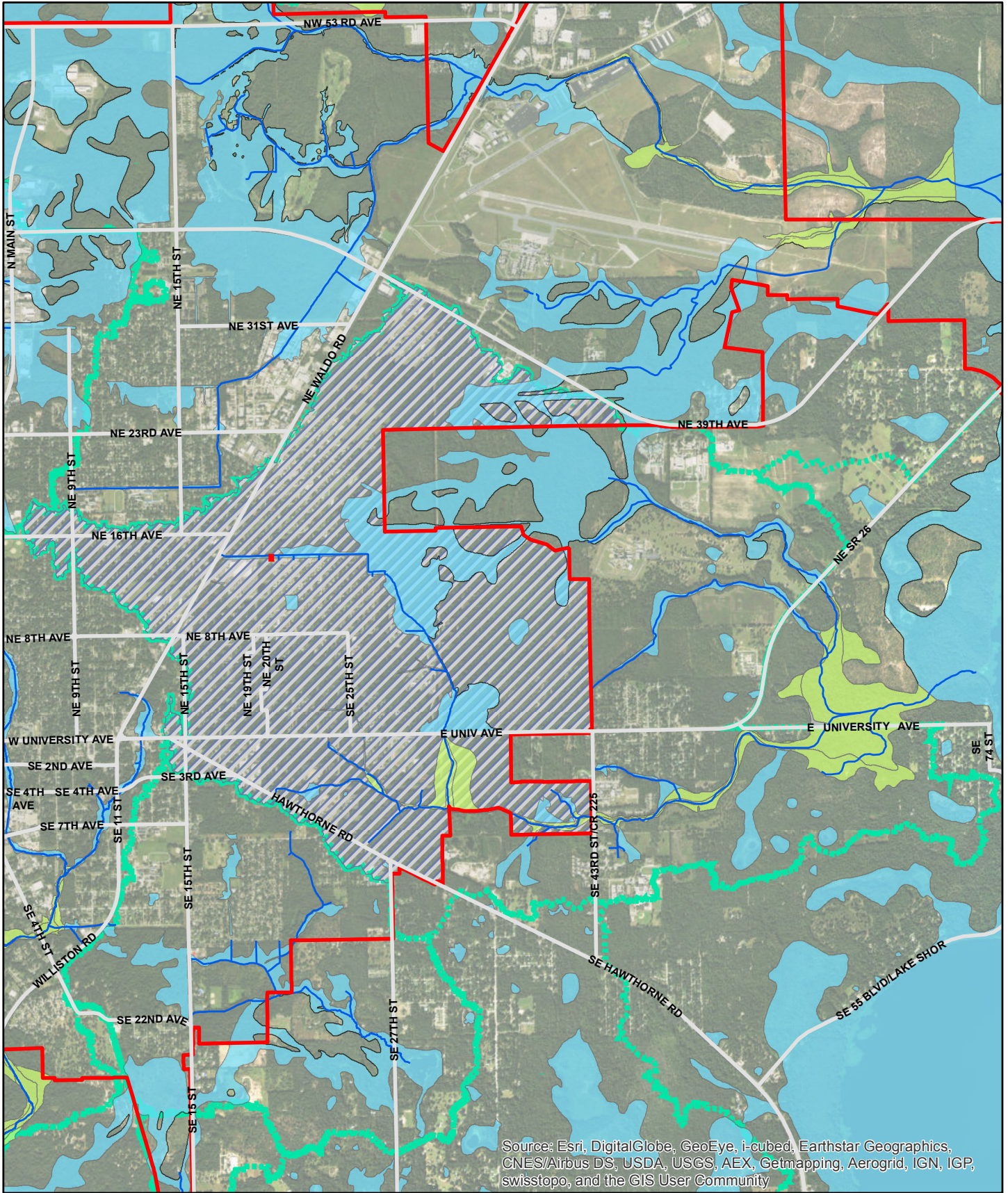
Explanation of Features

 Project Boundary



City of Gainesville - Lake Forest Creek - WMP			
USGS Topography Map			
Drawn	Date	Gainesville Florida Project No.	amec foster wheeler 
NMB	1/5/2016		
Checked	Date		
DLA	1/5/2016		Figure 9

This map is for informational purposes only. Do not rely on this map for accuracy of dimensions, size, or location. The City of Gainesville does not assume responsibility to update this information or for any error or omission on this map.



Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

	FIRM Zone	COG Boundary
	X500-- Low Risk, area of minimal flooding protected by Levy	Project Boundary
	A-- Annual 1% chance- 100 year	
	AE-- Annual 1% chance- 100 year- Elevations known	
	X-- Low Risk	

**LAKE FOREST CREEK
ALTERNATE AREA #3**

Attachment C Costing Spreadsheets



Scope: Lake Forest Creek with Alternative 3

I. LABOR SUMMARY		Task 2.1		Task 2.2		Task 2.3.1		Task 2.3.2		Task 2.3.2		Task 3.1			
		Watershed Management Plan										Watershed Management Plan - Water Quality			
		Kickoff Meeting with the City		Literature Review		Data Gathering & Inventory		Characterize Watershed and Water Bodies- Geodatabase		Agency / Team Meeting		Identify Areas with WQ Concerns			
HOURLY RATE		HOURS	COST	HOURS	COST	HOURS	COST	HOURS	COST	HOURS	COST	HOURS	COST		
Chief Engineer	\$178.00		\$0		\$0		\$0		\$0		\$0		\$0		
Chief Scientist	\$178.00		\$0		\$0	4	\$712		\$0	6	\$1,068	4	\$712		
Senior Project Engineer	\$173.00	4	\$692		\$0		\$0	4	\$692	4	\$692		\$0		
Senior Engineer	\$134.00		\$0	2	\$268	8	\$1,072	8	\$1,072		\$0	12	\$1,608		
Senior Engineering Technician	\$78.00	8	\$624	15	\$1,170		\$0	40	\$3,120	8	\$624	32	\$2,496		
Senior Scientist	\$173.00		\$0		\$0		\$0		\$0		\$0		\$0		
Project Engineer	\$119.00		\$0		\$0		\$0		\$0		\$0		\$0		
Engineering Intern	\$66.00		\$0		\$0		\$0		\$0		\$0		\$0		
Engineering Technician	\$45.00		\$0		\$0	36	\$1,620	50	\$2,250		\$0		\$0		
Geotechnical Engineer	\$119.00		\$0		\$0		\$0		\$0		\$0		\$0		
Geotechnical Technician	\$64.00		\$0		\$0		\$0		\$0		\$0		\$0		
Scientist	\$75.00		\$0		\$0		\$0	4	\$300		\$0	40	\$3,000		
Environmental Specialist	\$72.00		\$0		\$0		\$0		\$0		\$0		\$0		
CADD/Computer Technician	\$65.00		\$0		\$0		\$0		\$0		\$0		\$0		
Project GIS Specialist	\$119.00	4	\$476		\$0	30	\$3,570	82	\$9,758	24	\$2,856	24	\$2,856		
GIS Specialist	\$72.00		\$0		\$0		\$0		\$0		\$0		\$0		
Senior Surveyor & Mapper	\$126.00		\$0		\$0		\$0		\$0		\$0		\$0		
Senior Technician	\$58.00		\$0		\$0		\$0		\$0	32	\$1,856		\$0		
Surveying Intern	\$65.00		\$0		\$0		\$0		\$0		\$0		\$0		
Survey Technician	\$44.00		\$0		\$0		\$0		\$0		\$0		\$0		
Senior Accountant	\$65.00		\$0		\$0		\$0		\$0		\$0		\$0		
Secretary/Clerical	\$57.00		\$0		\$0		\$0		\$0		\$0		\$0		
LABOR SUBTOTAL		16	\$1,792	17	\$1,438	78	\$6,974	188	\$17,192	74	\$7,096	112	\$10,672		
II. UNIT RATES		COST PER UNIT		Kickoff Meeting with the City		Literature Review		Data Gathering & Inventory		Characterize Watershed and Water Bodies- Geodatabase		Agency / Team Meeting		Identify Areas with WQ Concerns	
		UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST
Car - Mileage	\$0.45		\$0		\$0	80	\$36	40	\$18		\$0		\$0		\$0
Miscellaneous	\$1.00		\$0		\$0		\$0		\$0		\$0		\$0		\$0
Per Diem	\$46.00		\$0		\$0		\$0		\$0		\$0		\$0		\$0
Boat Rental	\$300.00		\$0		\$0		\$0		\$0		\$0		\$0		\$0
IN-HOUSE RECOVERABLES SUBTOTAL		0	\$0	0	\$0	80	\$36	40	\$18	0	\$0	0	\$0		
TASK SUBTOTAL			\$1,792		\$1,438		\$7,010		\$17,210		\$7,096		\$10,672		
PHASE I TOTAL															
PHASE II TOTAL															
PROJECT TOTAL															

Note:

City of Gainesville 02-05-2016
 Lake Forest Creek
 Revised 07-2017



I. LABOR SUMMARY		HOURLY RATE		Task 3.2		Tasks 3.2 and 4.1		Task 3.4		Task 3.5		Task 5.0		Task 5.1		Task		TOTAL			
		Identify Potential Projects		Preliminary Conceptual Plans and Cost Benefit Analysis		Public Presentation		Draft and Final Watershed Management Plan		Floodplain, LOMR and Water Quantity Analysis Alternative 3 (2,201 acres)		Field Safety Analysis and Technical Memo with Photo Log		Bi-weekly status updates							
		HOURS	COST	HOURS	COST	HOURS	COST	HOURS	COST	HOURS	COST	HOURS	COST	HOURS	COST	HOURS	COST	HOURS	COST		
Chief Engineer	\$178.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	\$0		
Chief Scientist	\$178.00	\$712	\$0	\$0	\$0	\$2,848	\$0	\$0	\$4,272	\$0	\$890	\$0	\$0	\$0	\$0	\$0	\$0	63	\$11,214		
Senior Project Engineer	\$173.00	\$1,384	\$1,384	\$1,384	\$1,384	\$2,076	\$2,076	\$2,768	\$2,768	\$8,650	\$8,650	\$692	\$692	\$0	\$0	\$0	\$0	110	\$19,030		
Senior Engineer	\$134.00	\$2,144	\$2,144	\$2,144	\$2,144	\$1,340	\$1,340	\$4,288	\$4,288	\$24,120	\$24,120	\$2,680	\$2,680	\$2,680	\$2,680	\$2,680	\$2,680	20.0	\$44,488		
Senior Engineering Technician	\$78.00	\$4,212	\$4,212	\$9,360	\$9,360	\$1,560	\$1,560	\$1,560	\$1,560	\$42,900	\$42,900	\$27,300	\$27,300	\$0	\$0	\$0	\$0	1,197	\$93,366		
Senior Scientist	\$173.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	\$0		
Project Engineer	\$119.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	\$0		
Engineering Intern	\$68.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	\$0		
Engineering Technician	\$45.00	\$0	\$0	\$1,800	\$1,800	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	126	\$5,670		
Geotechnical Engineer	\$119.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	\$0		
Geotechnical Technician	\$64.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	\$0		
Scientist	\$75.00	\$3,000	\$3,000	\$0	\$0	\$1,800	\$1,800	\$6,150	\$6,150	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	190	\$14,250		
Environmental Specialist	\$72.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	\$0		
CADD/Computer Technician	\$65.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	\$0		
Project GIS Specialist	\$119.00	\$5,712	\$5,712	\$2,856	\$2,856	\$1,904	\$1,904	\$1,904	\$1,904	\$35,700	\$35,700	\$10,115	\$10,115	\$0	\$0	\$0	\$0	653	\$77,707		
GIS Specialist	\$72.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10,800	\$10,800	\$0	\$0	\$0	\$0	\$0	\$0	150	\$10,800		
Senior Surveyor & Mapper	\$126.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,024	\$3,024	\$0	\$0	\$0	\$0	\$0	\$0	24	\$3,024		
Senior Technician	\$58.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,800	\$5,800	\$0	\$0	\$0	\$0	\$0	\$0	132	\$7,656		
Surveying Intern	\$65.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	\$0		
Survey Technician	\$44.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,320	\$1,320	\$0	\$0	\$0	\$0	\$0	\$0	30	\$1,320		
Senior Accountant	\$65.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	\$0		
Secretary/Clerical	\$57.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$228	\$228	\$0	\$0	\$0	\$0	4	\$228		
LABOR SUBTOTAL		170	\$17,164	216	\$18,616	78	\$9,968	190	\$20,942	1,389	\$133,204	85	\$10,115	20	\$2,680	3,011	\$288,753				
II. UNIT RATES		COST PER		Identify Potential Projects		Preliminary Conceptual Plans and Cost Benefit Analysis		Public Presentation		Draft and Final Watershed Management Plan		Floodplain, LOMR and Water Quantity Analysis Alternative 3 (2,201 acres)		Field Safety Analysis		Bi-weekly status updates		TOTAL			
		UNIT		UNITS		UNITS		UNITS		UNITS		UNITS		UNITS		UNITS		UNITS		UNITS	
		UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST		
Car - Mileage	\$0.45	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	420	\$187	
Miscellaneous	\$1.00	\$0	\$0	\$0	\$0	\$600	\$600	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	600	\$600	
Per Diem	\$46.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,380	\$1,380	\$0	\$0	30	\$1,380		
Boat Rental	\$300.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	\$0	
IN-HOUSE RECOVERABLES SUBTOTAL		0	\$0	0	\$0	600	\$600	0	\$0	0	\$0	30	\$1,380	0	\$0	1,050	\$2,167				
TASK SUBTOTAL			\$17,164		\$18,616		\$10,568		\$20,942		\$133,204		\$42,529		\$2,680						
PHASE I TOTAL																			\$115,187		
PHASE II TOTAL																			\$175,733		
PROJECT TOTAL																			\$290,920		

Note: