SCANNED TO: MAYOR
SCANNED BY: Rachel
DATE: 2.5.14

JEFFRY T. NIERMEYER
DIRECTOR

SALT LAKE CITY CORPORATION

DEPARTMENT OF PUBLIC UTILITIES
WATER SUPPLY AND WATERWORKS
WATER RECLAMATION AND STORMWATER

RALPH BECKER
MAYOR

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FEB 05 2014
By Rachel C.

CITY COUNCIL TRANSMITTAL

David Everitt, Chief of Staff

Date Received: 02/05/2014
Date sent to Council: 02/05/2014

TO: Salt Lake City Council
Charlie Luke, Chair

DATE: February 4, 2014

FROM: Jeff Niermeyer, Public Utilities Director

SUBJECT: Street Lighting Utility Capital Improvement Program

STAFF CONTACT: Brad Stewart, 801-483-6733
Tom Ward, 801-483-6768

COUNCIL SPONSOR: n/a

DOCUMENT TYPE: Briefing per 2013 Legislative Intent

RECOMMENDATION: Request that the Council hold a briefing to discuss the Street Lighting Capital Improvement Program

BUDGET IMPACT: No current change to the Capital Improvement Budget

BACKGROUND/DISCUSSION: As part of the City Council legislation enabling formation of the Street Light Enterprise Fund in 2013, the City Council approved enterprise cost of service fees that included capital improvement funding with the goal to upgrade all the City's public street lights to high efficiency lighting within 10 years. The legislation included intent language that requested a capital plan be crafted that would address energy efficiency upgrades and methodologies for evaluating options and creating projects.

The attached document describes how projects will be evaluated and ranked based on: public safety, community priorities, cost / benefit, energy efficiency and other related criteria. Included in the plan is a list of proposed projects for this and future fiscal years and well as longer range strategies for project creation.

PUBLIC PROCESS: None for this capital plan strategy discussion. Future CIP lighting projects will include a public process as outlined in the attached document.

TO: Mayor Ralph Becker
City Council

COPY: David Everitt, Chief of Staff

FROM: Jeff Niermeyer, Director of Public Utilities

PREPARED BY: Dave Pearson/DPU Street Lighting Program Manager
Brad Stewart/DPU Senior Engineer
Jim Lewis/DPU Finance Administrator
Tom Ward/DPU Deputy Director

DATE: January 31, 2014

SUBJECT: Street Light Enterprise Utility
High Efficiency Lighting Options and Capital Improvement Program

SUMMARY

The purpose of this report is to 1) provide updated information regarding energy efficiency technology options for the City's Street Light Enterprise, and 2) provide updated prioritization criteria and project lists for the City's high efficiency street lighting capital improvement plan.

Within the ordinance forming the Street Light Enterprise utility, the City Council included legislative intent that *"...a plan to be developed by the Administration detailing available energy upgrade options, provide a proposal of how those options will be used and applied throughout the City, and a methodology for considering future technology development"*.

In summary, the criteria for considering new high efficiency lighting options, and for evaluating different lighting technologies for implementation on a project by project basis, include compatibility, light characteristics, age of the fixture, continuity of components, cost effectiveness, and standardization of materials. These are detailed further in the body of the document.

The second objective of this report outlines the prioritization criteria and process for project identification and implementation of the High Efficiency (HE) Lighting Capital Improvement Program (CIP). The criteria follows a "triple bottom line" analysis, which considers economic, social and environmental costs and benefits of each project or program element. These criteria are based upon initial guidance and direction from the Mayor, City Council, industry experts, and public representatives who participated in the street lighting subcommittee of the Public Utilities Advisory Committee in 2011 and 2012. The criteria include lights with greater public safety benefit (schools, hospitals, bus stops, bike routes, high traffic areas, etc.), power rebates

and financial incentives, cost/benefit analysis, and community priority areas (master planned neighborhood parkway streetscape or focal areas, etc.).

It is the intent of Public Utilities to receive feedback and direction from the Council, community, and Administration to update this strategy and plan for CIP implementation over the planning period. Public Utilities will provide updates and obtain feedback to refine the CIP implementation annually through the normal budget process and outreach to our customers through Community Councils and related stakeholder groups.

BACKGROUND, PURPOSE AND NEED

Salt Lake City's Street Lighting Enterprise Utility was established in January 2013. The City Council specifically allocated a portion of the new Utility fee toward capital improvements including the goal of installing high energy efficient lighting throughout the entire City system over a 10 year period. The capital improvement program funding accounts for $1.35 of each monthly $3.73 street light bill for a single family residential equivalent, generating about $1,300,000 annually for energy efficient and capital improvements to replace aging and damaged facilities.

This report addresses an important need inherent with creation of the street light enterprise fund, which is to develop an implementation strategy and plan for the street lighting CIP. This includes a framework for public involvement and methodology to evaluate and implement new devices and lighting resources to take advantage of the ongoing advances in lighting efficiency and technology.

PROJECT SCOPING AND PRIORITIZATION METHODOLOGY

Project selection is based on a number of factors including bringing neighborhoods with sub-standard streetlight service up to the base service level (e.g. standard lights at intersections and mid-block spacing of 320 feet), replacing aging or damaged pole and fixture infrastructure, energy efficiency upgrades, and coordination with other city initiatives and neighborhood needs. The criteria used for project selection and priority include criticality or safety, opportunity for higher energy efficiency, and a cost/benefit analysis.

The design approach of each project considers how well the project supports the lighting needs and goals of the City. Each community or neighborhood has different desires and needs. These are taken in consideration during the design process. In many instances system improvements can be accomplished by simple replacements such as fixture changes to enhance light levels for multiple purposes (pedestrians, bicycles, etc).

ASSET MANAGEMENT PLAN

The Department of Public Utilities is utilizing an asset management plan framework to strategically operate and implement the CIP program. The Department currently uses GIS

programs to track inventory and to help maintain that inventory. The lights in the City are listed in the GIS database along with the physical condition and attributes of each light. With these GIS programs we are able to keep track of maintenance needs, work order maintenance history, and develop proactive solutions to keep our lights functional.

Although the Department's GIS system currently has useful streetlight data, in many instances it is lacking some specific information. This information is critical in developing accurate project criticality assessments and project costs. We are indentifying inventory data gaps and gathering survey data to better understand infrastructure condition, such as pole and wire conditions and life. This improved data is very useful in identifying needs and ranking priorities.

DARK SKY STANDARDS AND B.U.G. RATING

The term "light pollution" is often used in describing three distinct negative effects of lighting, which are backlight, uplight, and glare (BUG). These are combined for each light fixture and the fixture is given a BUG rating. Light trespass occurs when uncontrolled light from a streetlight is allowed to spill into an area where it is unwanted such as onto private property into a building window. Uplight is the effect of obscuring the view of the night sky as a result of light being directed upward. Glare is created when a harsh light source detrimentally reduces an individual's ability to see objects the light is meant to illuminate. The City's standards for any new or upgraded light help to eliminate uplight and glare and to direct backlight where it will light sidewalks and not trespass onto private property.

HIGH EFFICIENCY TECHNOLOGY OPTIONS

The majority of the lights in the city are High Intensity Discharge (HID) light bulbs. There are multiple types of lights within the HID family, including mercury vapor (MV), high pressure sodium (HPS), and metal halide (MH). The energy efficiency of the HID bulb has made it a favorite for decades, but it is quickly being surpassed by more efficient technology.

Induction lights, an improved florescent type lamp, have shown advantages over the HID lights in almost every category. Induction lights are more durable, turn on instantly, and have better color rendition. They do however, have a bigger upfront cost. Induction lighting is a tried and true product that delivers energy efficiency and longevity. However, as a mature technology, it's unlikely to see any major improvements in the future.

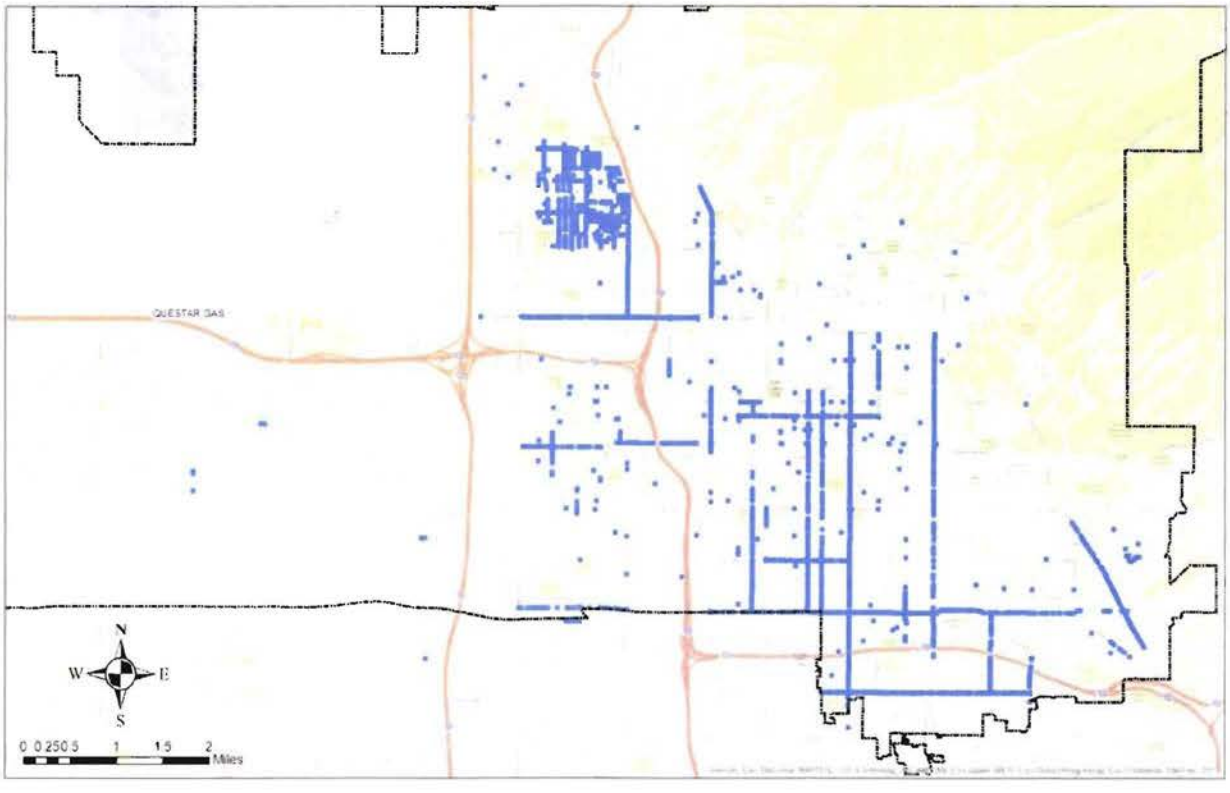
Light Emitting Diodes (LED) are relatively new to the street lighting market. LED's were once the luxury car of streetlights but costs have plummeted in the past few years and LED energy efficiency has surpassed induction lighting. LED's are versatile enough to provide widespread or focused light. LED's produce better lumens per watt and are capable of producing higher lumen packages than induction. LED's offer the same characteristics as induction at a similar price point, but all of the lighting manufacturers are focusing their research and development efforts on improving their LED offerings so there have been major advancements in LED going forward. In the future we will continue to see the prices of LED fixtures go down.

What the future holds: High efficiency technology is progressing in a way that will help the City effectively manage the street lighting program. Technology continues to advance. For example, wireless sensors that will communicate via Wi-Fi with a local hub to inform when voltage drops or goes to zero. These sensors are programmable to allow the City to dim certain lights during nighttime hours where vehicular and pedestrian traffic is at a minimum. Solar technology is becoming more affordable and may soon be a viable option to power streetlights in certain applications. With the versatility of LED technology the possibilities are endless and we hope to see many technological advances in the near future.

HIGH EFFICIENCY CAPITAL IMPROVEMENT PROGRAM

Currently, 3,147 of the City's lights have been upgraded to improve efficiency. These represent 21% of the total 15,260 light inventory, with locations shown in Figure 1. These energy efficient lights are primarily along continuously lit arterial streets.

Figure 1 - High Energy Efficiency Lighting Installed to Date



The implementation of energy efficient technology is being addressed through two general categories: 1) efficiency upgrades to lights when they need repair throughout the City in non-contiguous locations; 2) develop a strategic capital improvement program for HE upgrades through larger streetscape and neighborhoods in a master plan framework.

In addition, we have identified criteria for evaluating different lighting technologies for implementation on a project by project basis. These criteria are listed below. It is recognized that many different HE lighting technologies are available. Some technologies are better suited for particular projects, and to develop criteria which allow the City to evaluate the advantages of various current, and future, light technologies for specific project conditions and needs. Evaluation and design criteria include the following:

- **Compatibility.** The new lights should yield equivalent lighting levels as existing non-efficiency lighting (except where it is known to be too dark or too bright).

- **Light Characteristics.** The color and light pattern on the ground should be consistent or acceptable with surrounding lights.

- **Return on Investment (ROI).** The cost/benefit should be less than 10 years, including energy savings, rebate, and upfront capital for fixtures, lamps and anticipated maintenance costs. Pole costs are not included in energy efficiency calculations for ROI.

- **Age of Fixture.** If a fixture head needs to be replaced or is near the end of life, then it will be reviewed as a candidate for energy efficiency upgrades.

- **Continuity of Components**. An effort will be made to balance the life and maintenance needs of the pole, fixture, bulb and other components (example don't put a 20 year bulb into a fixture that will need to be replaced in the next several years).

- **Effectiveness.** Proven technology, long life and low maintenance are a priority. The City is open to developing technologies that have established a proven track record. However, they must meet the screening criteria noted above to assure any City lighting investment meets our project goals for return on investment, efficiency, light quality, performance and durability.

- **Standardization.** The City has found benefit and will consider the value of maintaining a limited number of standard products and systems for compatibility and cost savings relative to product inventory, maintenance, service, etc.

CIP PRIORITIZATION CRITERIA

The initial range of criteria for prioritizing street light efficiency upgrade projects was developed based upon initial guidance and direction from the Mayor, City Council, industry experts, and the 2011/2012 Street Lighting Committee. These initial criteria are listed below for review and feedback. Following internal review, the Department will engage the public through an education and outreach campaign designed to inform the community of the program needs and solicit input to the criteria and implementation approaches. Stakeholder outreach methods will include community councils, web-based media, and other methods.

The proposed criteria in ranking areas for relative priority to installing new high efficiency lights are listed below.

- **Public Safety**. Identify criticality and public safety benefits, with preference given to areas with greatest public safety benefits (schools, hospitals, bus stops, etc) and high pedestrian, bicycle, and vehicular traffic areas. Highest priority will be given to arterial and higher traffic volume streets that require "continuous" lighting. Among other benefit/need, these often are priority or emergency routes to hospitals. In general, areas with public safety concerns will be the highest overall priority projects.

- **Rebates and other Financial Incentives.**
    - Return on power savings is a function of the efficiency as recognized through the City's power agreement with Rocky Mountain Power (RMP). Prior screening and approval of the energy efficiency credits with RMP will provide baseline return on investment and assures performance goals.
    - Rebates shave years off the payback calculation. Verification of efficiency gains may make it more cost effective to "batch" projects to take advantage of economies of scale.
    - The RMP product and technology review and approval process is a useful tool for screening the performance of energy efficient products. It helps weed out those which are not tested or do not meet performance standards.

- **Community Priority Areas.** Projects may be initiated and considered higher priority areas which meet a neighborhood or City wide objective or benefit. For example, a neighborhood parkway streetscape or focal area.

- **Cost / Benefit Analysis.** Each project area is unique based upon the lighting pattern, distribution, condition of existing infrastructure, etc. In addition to subjective range of benefits, each project has unique implementation costs. It is proposed to utilize the City's funds for the most cost effective projects first. In addition to completing more light retrofits sooner, it is possible that ongoing technology developments will bring down the cost of future upgrades in challenging installations.

The criticality and prioritization criteria are partially shown for specific areas in the City on Exhibits 4 and 5.

Each lighting area and/or facility will be evaluated relative to the community priorities and criteria identified above. In general, these will consist of a score which will be transparent and shared with the community so that they can see where we understand the respective condition and justification for each project identified and ranked in the proposed CIP. General industry asset management approach framework is to evaluate each asset (light feature) as to its suitability in meeting each respective evaluation criteria. This includes a ranking or score, generally in a range of 1 to 5, with 1 being low and 5 being high. For example, a street next to a school with existing lights in poor condition would get a high priority rank (5) for Public Safety criteria.

PROJECT LISTS

Interim Project List

Two projects (400 S and 900 S) were previously scoped by the Transportation Division, and five were initially identified by Public Utilities to receive HE upgrades based upon immediate needs. These streets have older fixtures with a high percentage of non-functioning lights. These also tend to be high travel areas utilized by vehicular, bicycle, and pedestrian traffic. Pole rehabilitation as well as energy efficiency upgrades are being considered for these locations.

Draft CIP Project List Development Criteria

A 5 year CIP plan will be developed based upon the criteria and priorities identified herein, reviewed with public and stockholder outreach, and reviewed by the Mayor and City Council in the normal budget process.

PUBLIC OUTREACH AND REVIEW

The public is integral to decisions made in the street lighting program. Our ultimate goal is to enhance safety and value from the lighting of the streets of our City. The draft project list, evaluation criteria and relative ranking will be shared with the public to communicate our understanding of the conditions of the existing system and to get feedback from the community to make sure we understand their perspective and priorities.

The proposed street lighting CIP will go in front of the public via Community Council meetings and public outreach programs. The intent is to hear the voice of the people and discover what is important to them. The public will be able to review proposed project areas, schedule, and initial project plans and ideas to approve or change certain aspects of the projects.

FINAL PROJECT SELECTION

After evaluation and prioritization, as described in this document, candidate projects will follow standard funding approval through the normal budgeting processes.

STREETLIGHT REFERENCES, TOOLS, AND RESOURCES

It is important to involve the public in CIP implementation. The City and Public Utility websites are a useful tool to inform the public about the street lighting program. GIS maps are available to inform the public as to the status of CIP projects or individual streetlights. Brochures and flyers are posted to allow the citizens access to the details of the street lighting plan. Contact information is included in utility bills to provide help lines and support to residents and businesses seeking answers.

Initial Project List 2013/14

Estimated Project Costs								Potential Energy Savings Based on Current CIP Proposal						
Project Name	Total # Lamps	LED or Induction	Fixture and Lamp Cost	Design and Project Labor Cost	Project Cost	Status	Estimated Construction Date	Total Previous Wattage	Upgrade Wattage	Energy Savings (watts)	Annual Power Cost Savings	Annual Maintenaince Savings	Anticipated Rocky Mountain Power Rebate	Annual Est. Payback
Beck St, Victory Rd - Davis Co. Line	95	LED	$ 55,438	$ 3,636	$ 59,074	Completed	Fall 2013	26775	14828	11947	$ 4,121	$ 3,796	$ 9,500	3.4
Redwood Rd, N Temple - 1000 N	50	LED	$ 29,174	$ 2,817	$ 31,991	Completed	Fall 2013	20120	9477	10643	$ 3,360	$ 1,998	$ 5,000	3.1
Foothill Dr, 2300 E - Sunnyside Ave	52	LED	$ 28,590	$ 2,020	$ 30,610	Completed	Fall 2013	21950	10427	11523	$ 3,582	$ 2,078	$ 5,200	2.8
400/500 S St, 200 E - 1300 E	148	LED	$ 103,600	$ 20,720	$ 124,320	Completed	Winter 2013	40404	21608	18796	$ 5,559	$ 5,914	$ 14,800	4.7
900 S St, 900 W - 500 E	103	LED	$ 72,100	$ 14,420	$ 86,520	In Construction	Spring 2014	47450	24058	23392	$ 7,289	$ 4,116	$ 10,300	4.0
300 W St, 2100 S - 1300 S	68	LED	$ 47,600	$ 9,520	$ 57,120	Planning	Spring 2014	25750	12255	13495	$ 4,246	$ 2,717	$ 6,800	4.2
200 S St, Jordan River - Jeremy St.	28	LED	$ 19,600	$ 3,920	$ 23,520	Planning	Summer 2014	3925	1558	2367	$ 518	$ 1,119	$ 2,800	5.3
Total	**544**		**$ 356,102**	**$ 57,053**	**$ 413,155**			**186374**	**94211**	**92163**	**$ 28,675**	**$ 21,738**	**$ 54,400**	**3.9**

Exhibit 1 – Existing High Efficient Lighting as of April 2013

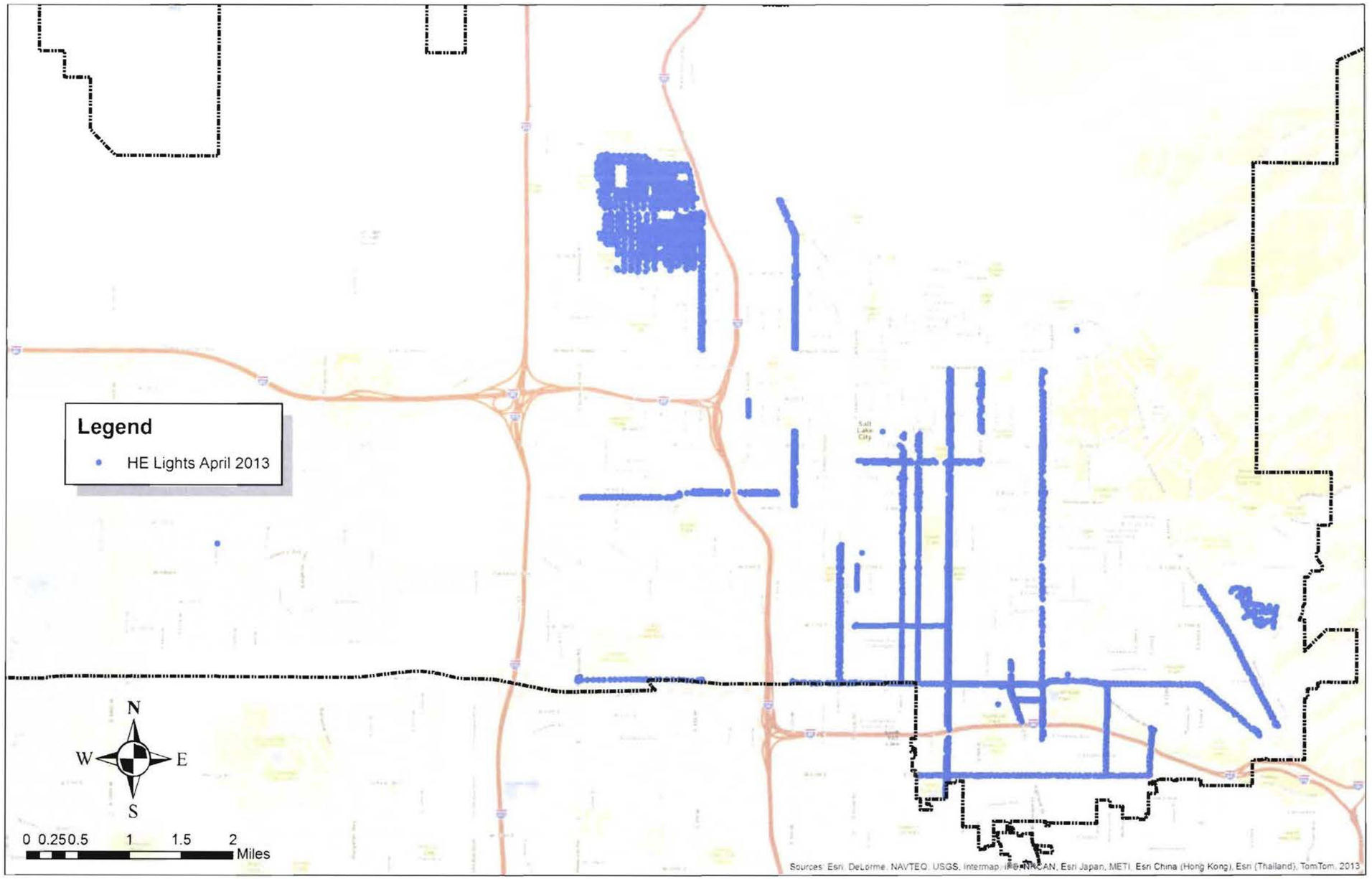


Exhibit 2 – Existing High Efficient Lighting as of August 2013

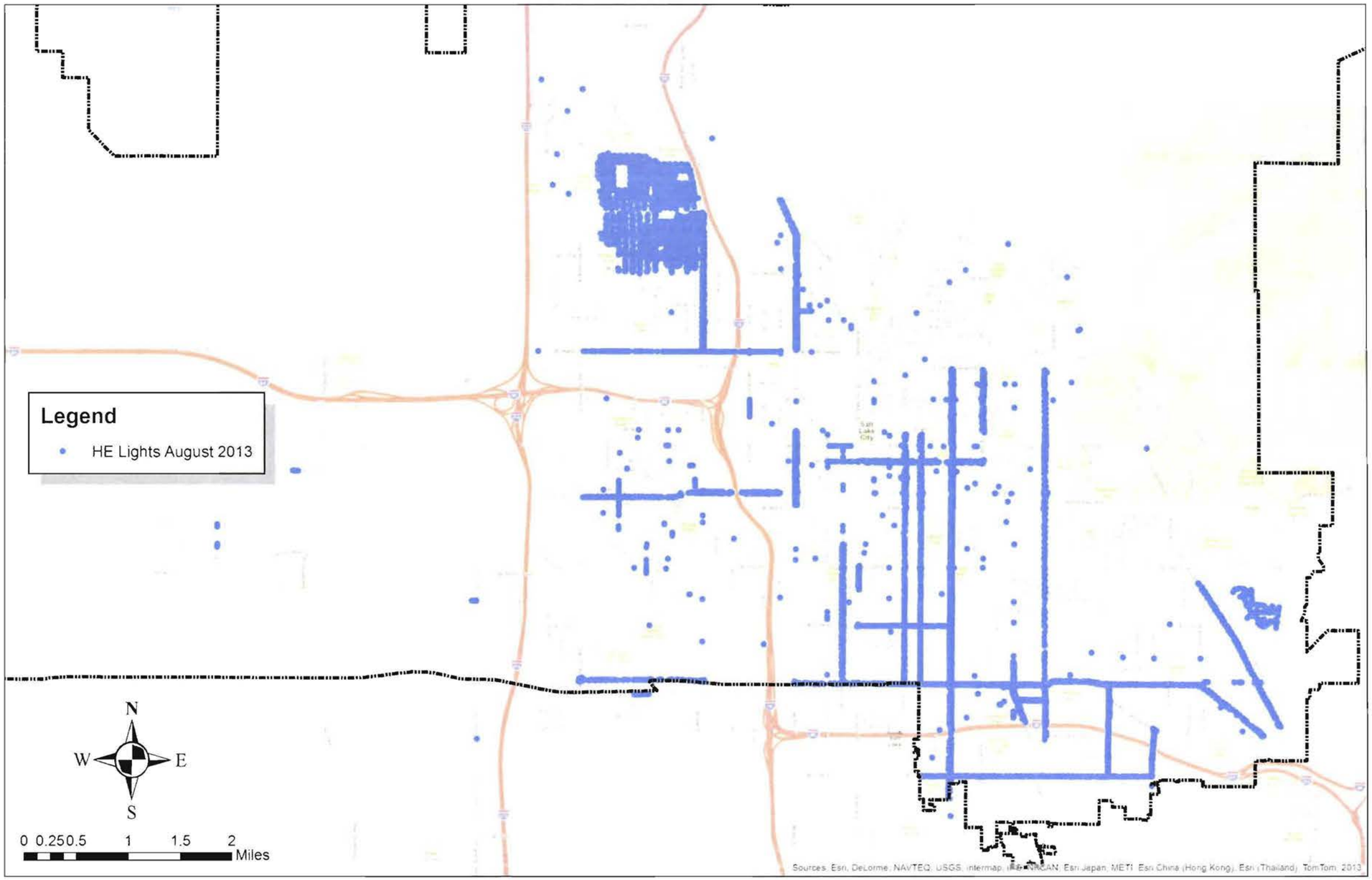


Exhibit 3 – Current High Efficient Upgrade Projects

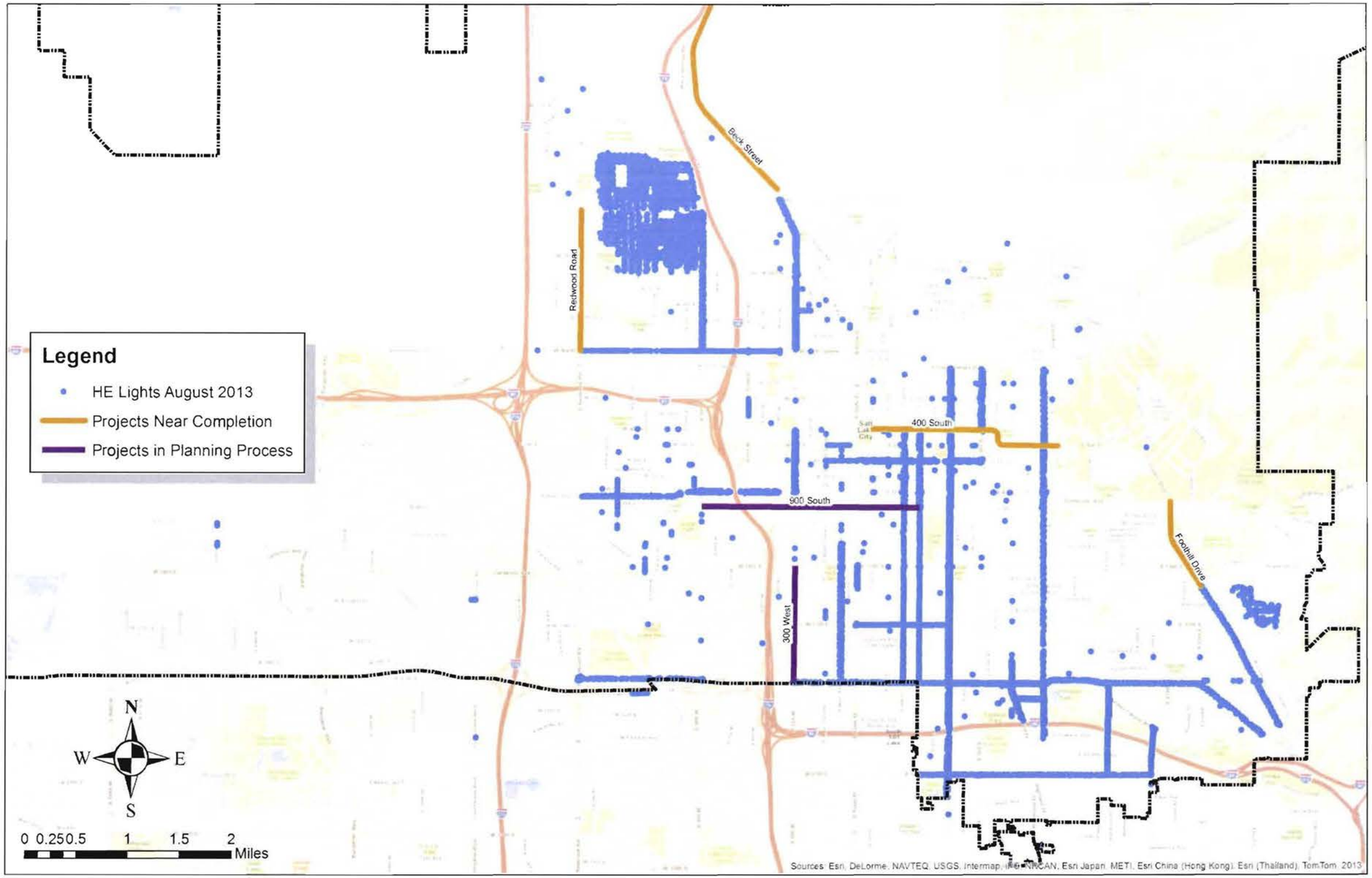


Exhibit 4 – Sensitive Areas for High Efficient Upgrades

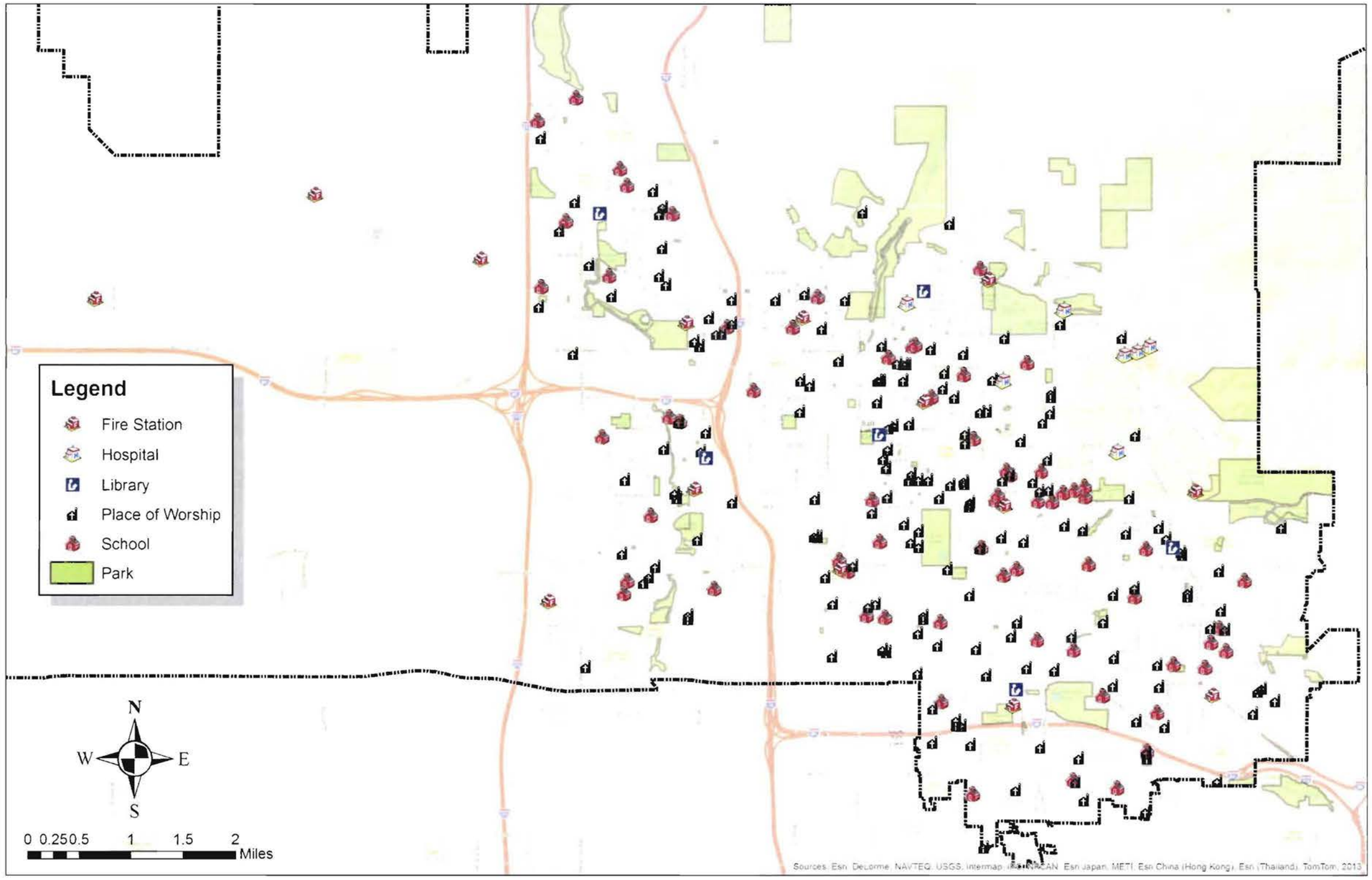


Exhibit 5 – Proposed High Efficient Upgrade Projects – Red = High Priority – Green = Low Priority