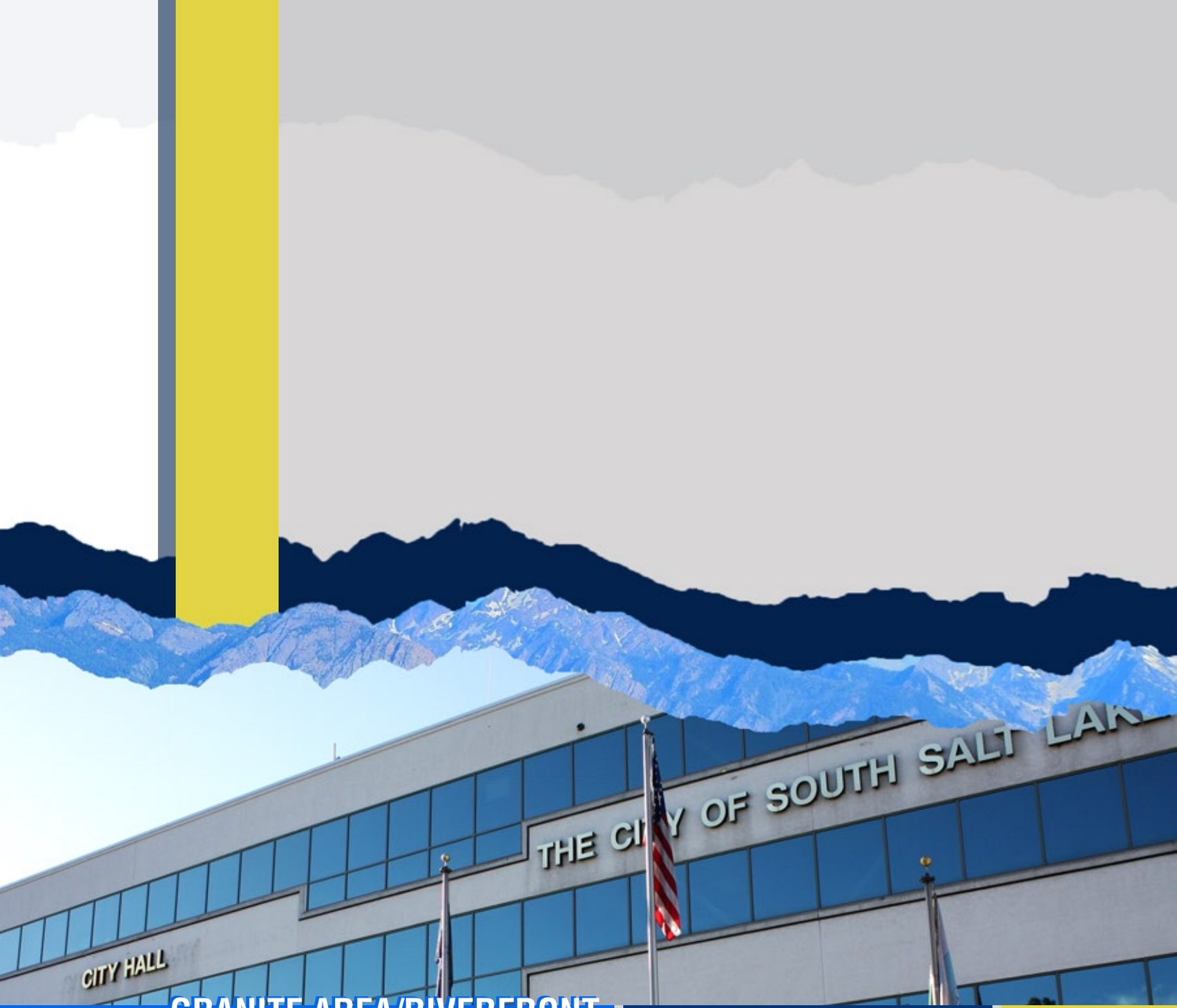

GRANITE AREA/RIVERFRONT
SIDEWALK MASTER PLAN

SOUTH SALT LAKE CITY ON THE MOVE

HORROCKS ENGINEERS

Table of Contents

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1 Introduction

South Salt Lake City is concerned about pedestrian safety and accessibility. This concern led to the development of the Granite Area/Riverfront Sidewalk Master Plan. This plan promotes pedestrian safety and access to ensure that South Salt Lake City is a safe, convenient, and attractive place to walk. It also identifies pedestrian routes, sidewalk trip hazards, absent sidewalks, and other pedestrian obstructions. The study area boundary is shown in Figure 1.1

The walkability of a community is very important for the long term development of a pedestrian friendly environment. The following plan identifies prioritized locations for sidewalk maintenance and construction within the study area. These recommendations should be used to determine where public funds could best be utilized to provide new sidewalks and repair existing sidewalks where needed.

1.1 Project Goals

The project goals are as follows:

- Identify potential hazards on sidewalks within the study area
- Mitigate hazards systematically based on highest priority
- Increase pedestrian safety on sidewalks within the study area
- Ensure sidewalks comply with ADA standards

Horrocks Engineers has done an assessment of all the potential sidewalk hazards within the boundaries of the study area and created a repair priority matrix, which prioritizes locations for repair and replacement.

1.2 Methodology

The methodology used in this study relies on accepted pedestrian traffic modeling studies and FEMA's (Federal Emergency Management Agency) risk assessment processes. Sidewalk hazards were documented by Horrocks Engineers during field visits between May and August 2015. Using the ESRI Collector App for mobile devices, Horrocks Engineers were able to document every hazard with a picture and location. The hazards that were identified during these field visits form the basis of the risk ranking in this document.

Each hazard was analyzed based on the cost to repair the hazard, the safety concern of the hazard, and the number of pedestrians that cross that hazard on a daily basis. Using this methodology, which is described in detail in Section 3, each identified sidewalk hazard location within the study area was ranked by priority.

1.3 Document Maintenance

This document was created to be a living document. Its purpose is to aid in the capital improvement of sidewalks. It should be reviewed on an annual basis and updated on a 3 year cycle. Geographic Information System (GIS) data accompanying this plan should be used and updated regularly to record the progress of sidewalk maintenance.

1.4 Accompanying Digital Files

A sidewalk hazard geodatabase accompanies this report. All of the data collected and created during this planning process is included in the database. The sidewalk hazard feature class in that database contains the hazard ranking information in the assessment matrix.

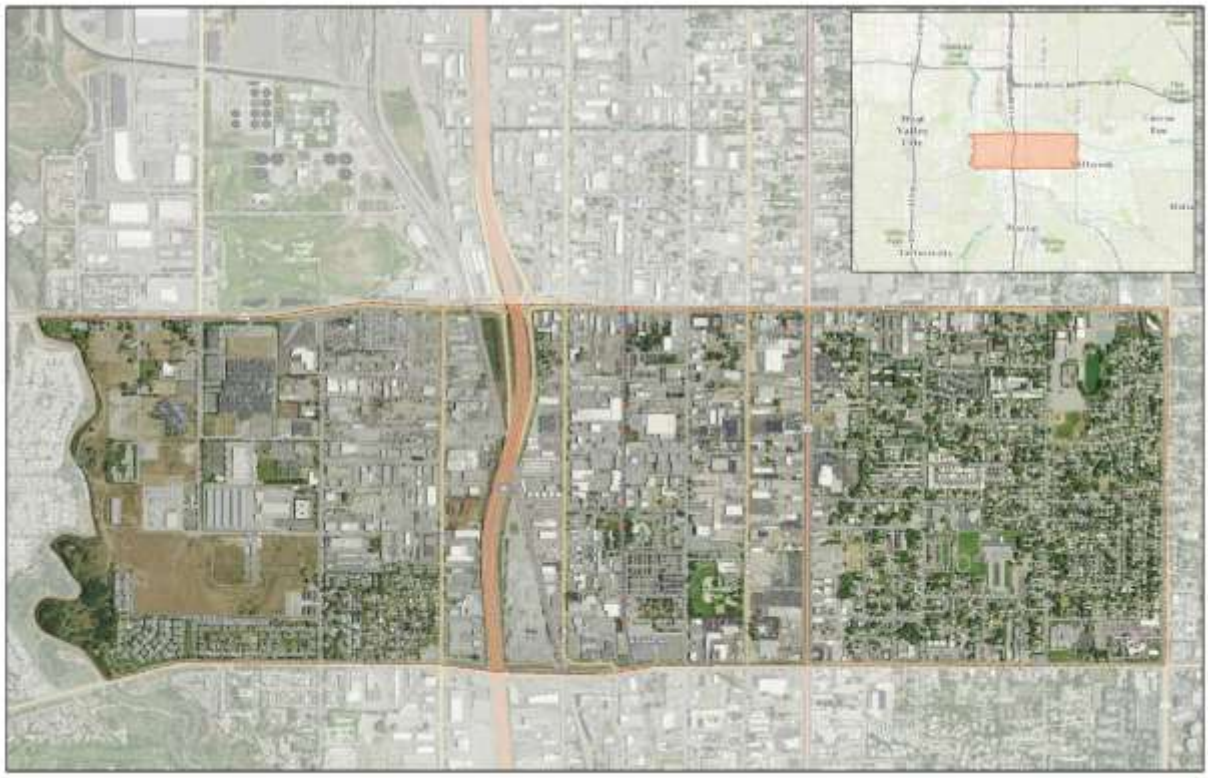


Figure 1.1

2 Data Collection

2.1 Overview

A sidewalk survey of the Granite and Riverfront areas within the study limits was performed. During the field data collection, each sidewalk was walked and any potential hazards or obstructions were logged. Each sidewalk deficiency was logged with photos of the defect. The width of the sidewalk was also measured at each location. Data was collected using a tablet and each hazard location and geographic data was collected through GPS. The collected field data was combined with land use, traffic, and crash data to perform the ranking and analysis in this plan.

Absent sidewalk areas were also mapped. These include areas where pedestrians walk, but a sidewalk has not been constructed. In many of these walking corridors pedestrians were observed walking on the side of fairly busy streets. This is a safety concern that is considered in this plan.

2.2 Field Collection

During the field data collection process the sidewalk defects in the following figure below were identified. These are fairly typical when evaluating the existing sidewalk condition. The defects can be grouped into two broad categories: sidewalk deterioration and potential hazards to pedestrian safety. Spalling and cracking are directly related to sidewalk deterioration, while cross-slope, horizontal displacement, obstructions, ponding, and vertical displacement are directly related to pedestrian safety.

Spalling: A splinter or chip into fragments or flake from a piece of concrete	
Cracking: The formation of a fracture or partial fracture in a solid material	

Cross Slope: A side slope, perpendicular to the length of the sidewalk, mostly caused by tree roots or ground erosion.	
Horizontal Displacement: This was measured by the space between the two segments of concrete, if the space was abnormal to normal it was documented	
Obstructions (trees, shrubs, overgrown grass): A blockage or an obstacle that impedes or prevents the passage.	

Ponding: Where water collects in a puddle.	
Vertical Displacement: shifting of concrete in a vertical direction, resulting in a long term change in elevation.	

Figure 2.1

Figures 2.2 - 2.7 on the following pages show the distribution of sidewalk inspection data by sidewalk defect. Overall sidewalk maintenance and pedestrian safety hazards were more prevalent on the eastern side of the study area. This is mainly due to the age and type of development. Cross slope defects are much more prevalent in older residential neighborhoods with established trees. Spalling, which is indicative of sidewalk deterioration was also prevalent in the same areas. A few ponding areas within the study area were identified, which indicate that the sidewalk was not properly leveled when it was installed.

2.3 Land Use

Land use data at the parcel level was collected from South Salt Lake City. This data was instrumental in modeling how people walk in the study area. Using the land use data, each parcel was assigned a trip origin and destination number, which represents the number of people walking to and from that parcel. Land use within ½ mile of the study limits was included to produce accurate pedestrian volumes within the study area. Figure 2.8 shows land use by parcel for the study area.

2.4 Vehicle/Pedestrian Accidents

Vehicle/Pedestrian crash data for the study area from 2010 to 2014 was obtained from UDOT to identify significant safety issues related to the relationship between pedestrians and vehicles. The

data was also used to rank sub-regions according to vehicle/pedestrian safety. Figure 2.9 shows a map of the data that was used in this study. Clustering of vehicle/pedestrian crashes were identified toward the north and south boundaries of the study area. 3300 South had the highest frequency of crashes within study area.

2.5 Pedestrian Ramps

Data about pedestrian ramps within the study area was captured as part of the study. Ramps were mapped and categorized by three American Disabilities Act (ADA) requirements: color, texture, and slope present. Slope was not measured during the study and it was assumed that any ramps that have color and texture also meet slope requirements. Pedestrian ramp locations are shown in Figure 2.10

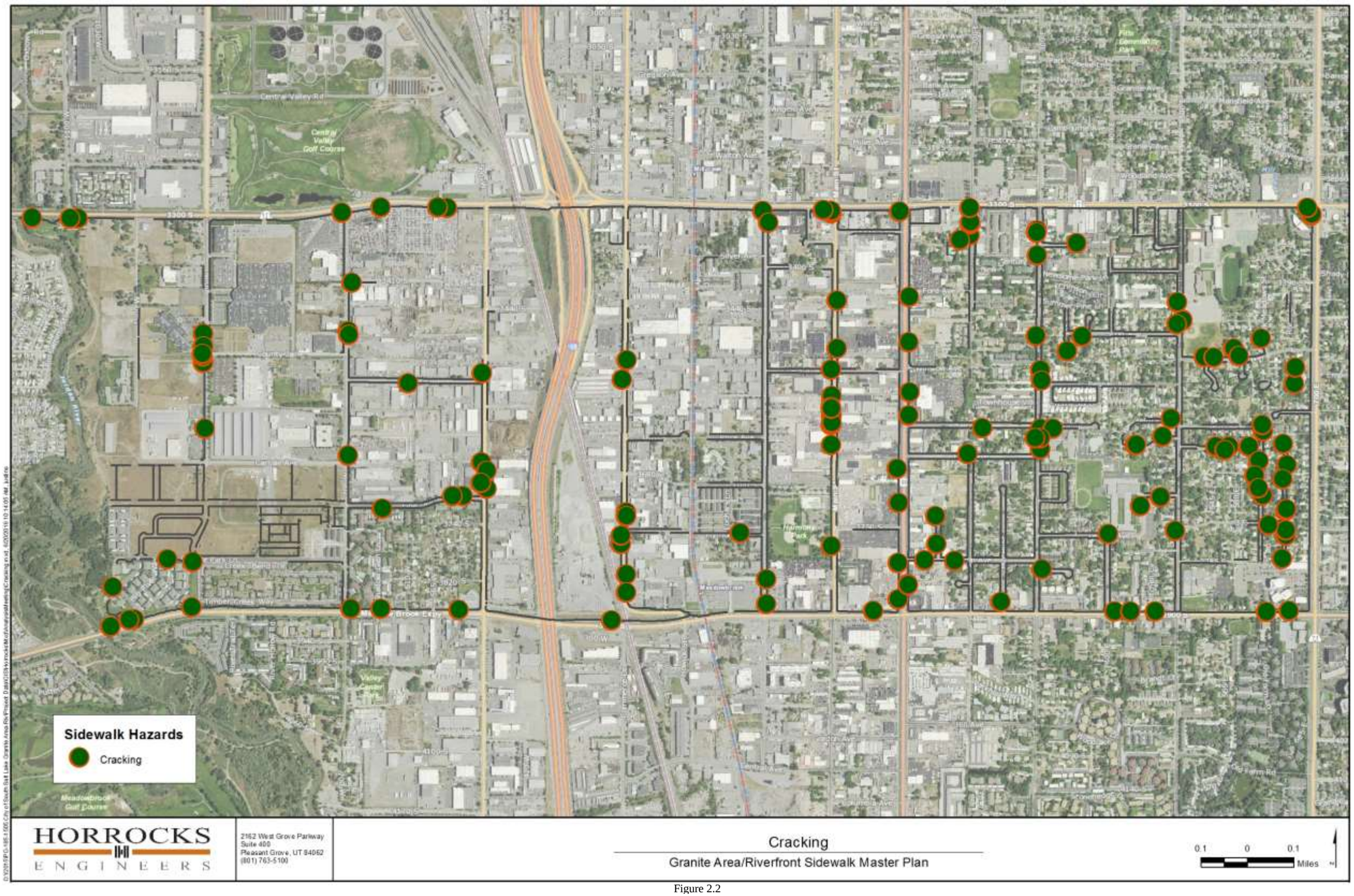

Central Valley Golf Course
Sidewalk Hazards
Cracking
HORROCKS
ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Cracking
Granite Area/Riverfront Sidewalk Master Plan
0.1 0 0.1
Miles

Figure 2.2

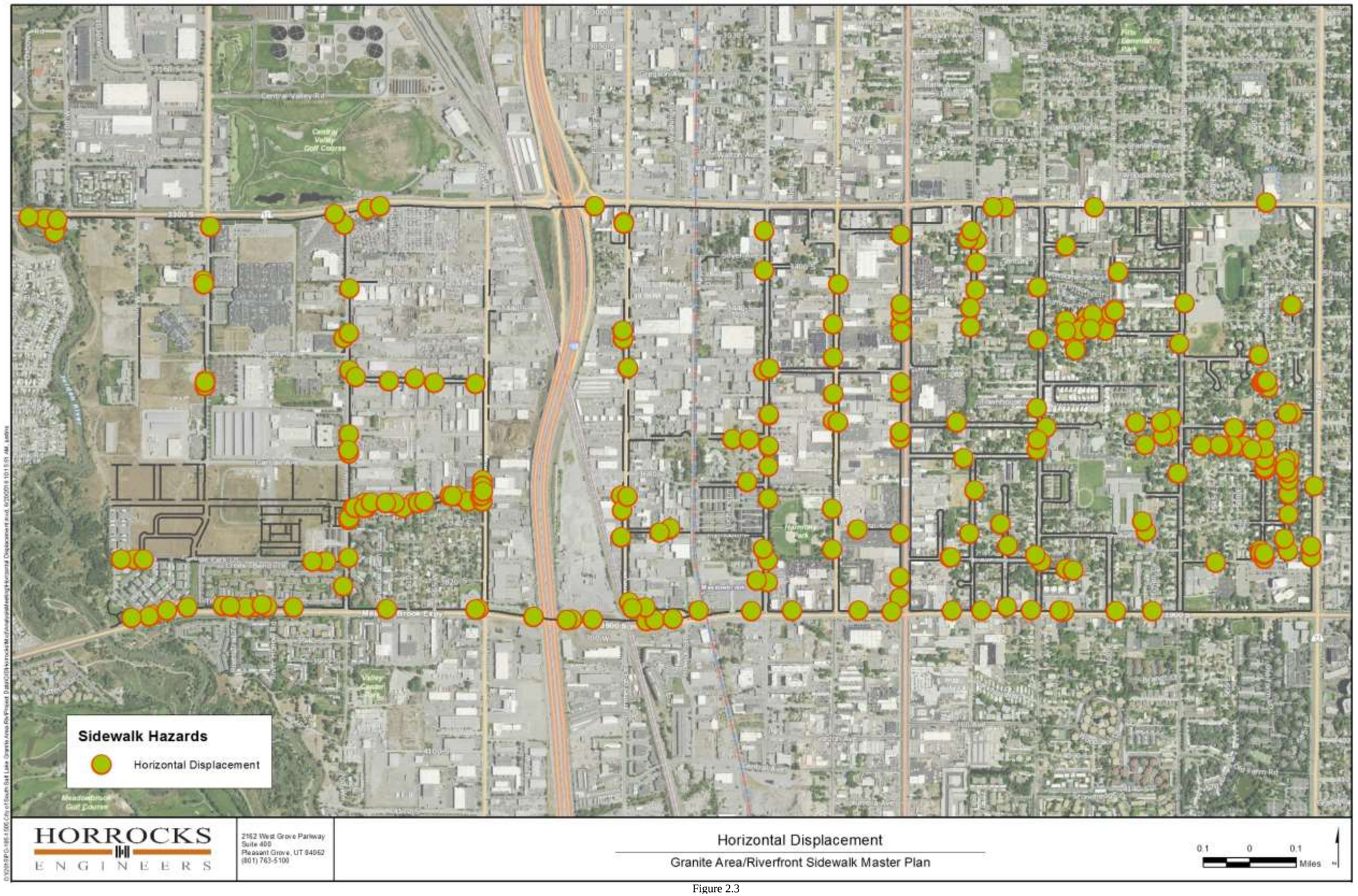

Central Valley Golf Course
Sidewalk Hazards
Horizontal Displacement
HORROCKS ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Horizontal Displacement
Granite Area/Riverfront Sidewalk Master Plan
0.1 0 0.1
Miles

Figure 2.3

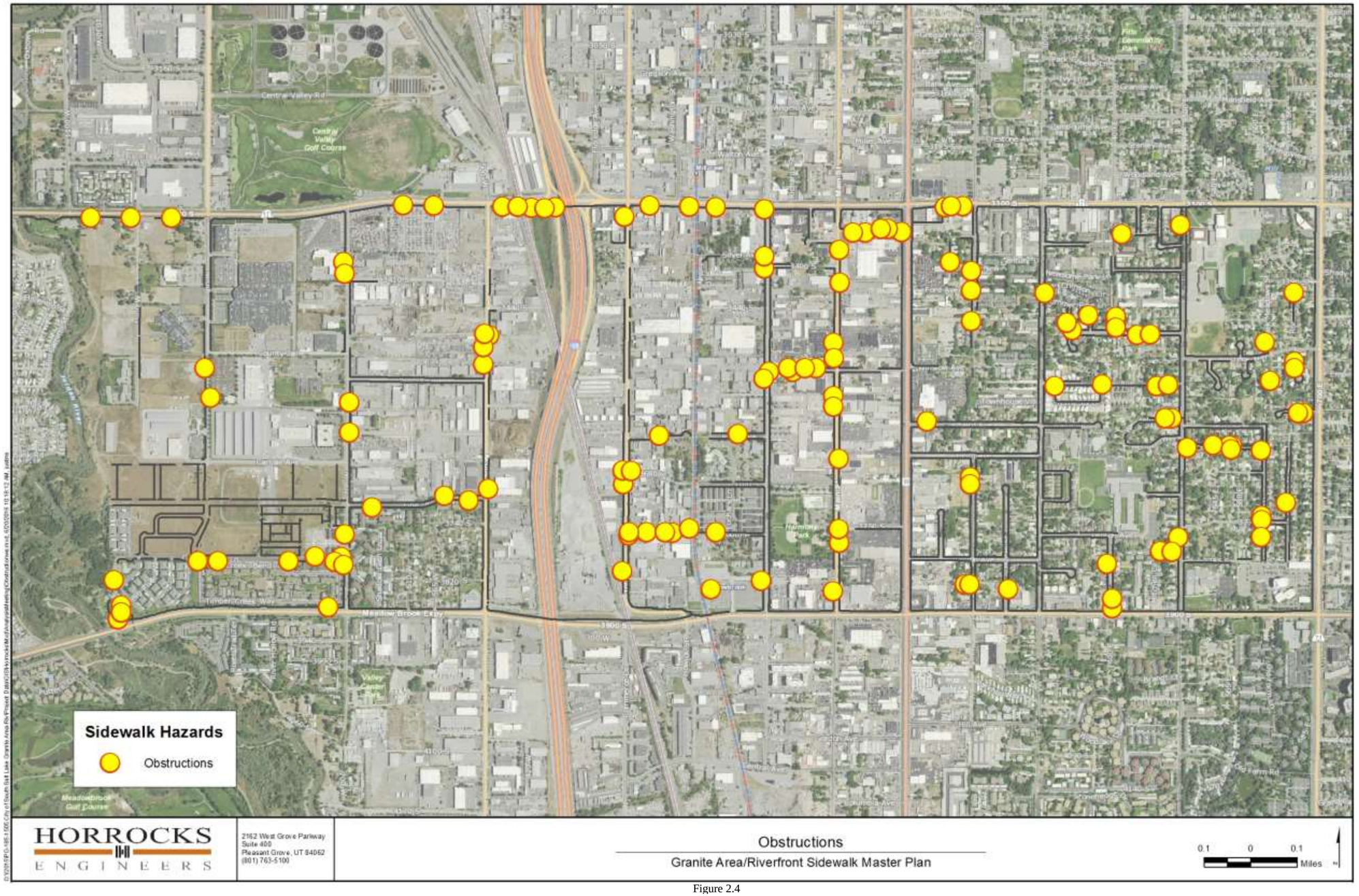

Central Valley Golf Course
Meadowbrook Golf Course
Sidewalk Hazards
Obstructions
HORROCKS
ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Obstructions
Granite Area/Riverfront Sidewalk Master Plan
0.1 0 0.1
Miles

Figure 2.4


Central Valley Golf Course
Sidewalk Hazards
Ponding
HORROCKS ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Ponding
Granite Area/Riverfront Sidewalk Master Plan
0.1 0 0.1
Miles

Figure 2.5

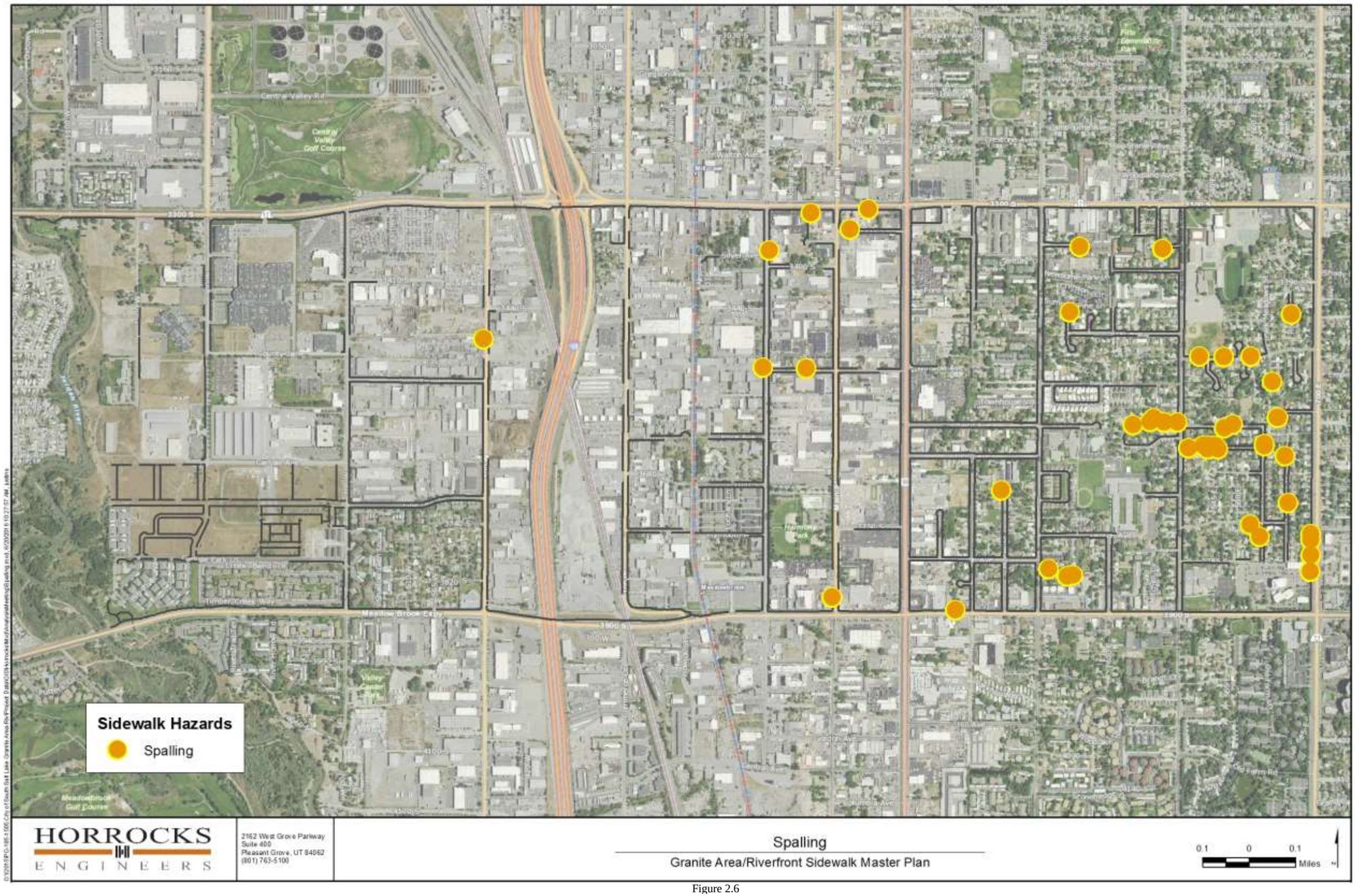

Central Valley Golf Course
Sidewalk Hazards
Spalling
HORROCKS ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Spalling
Granite Area/Riverfront Sidewalk Master Plan
0.1 0 0.1
Miles

Figure 2.6

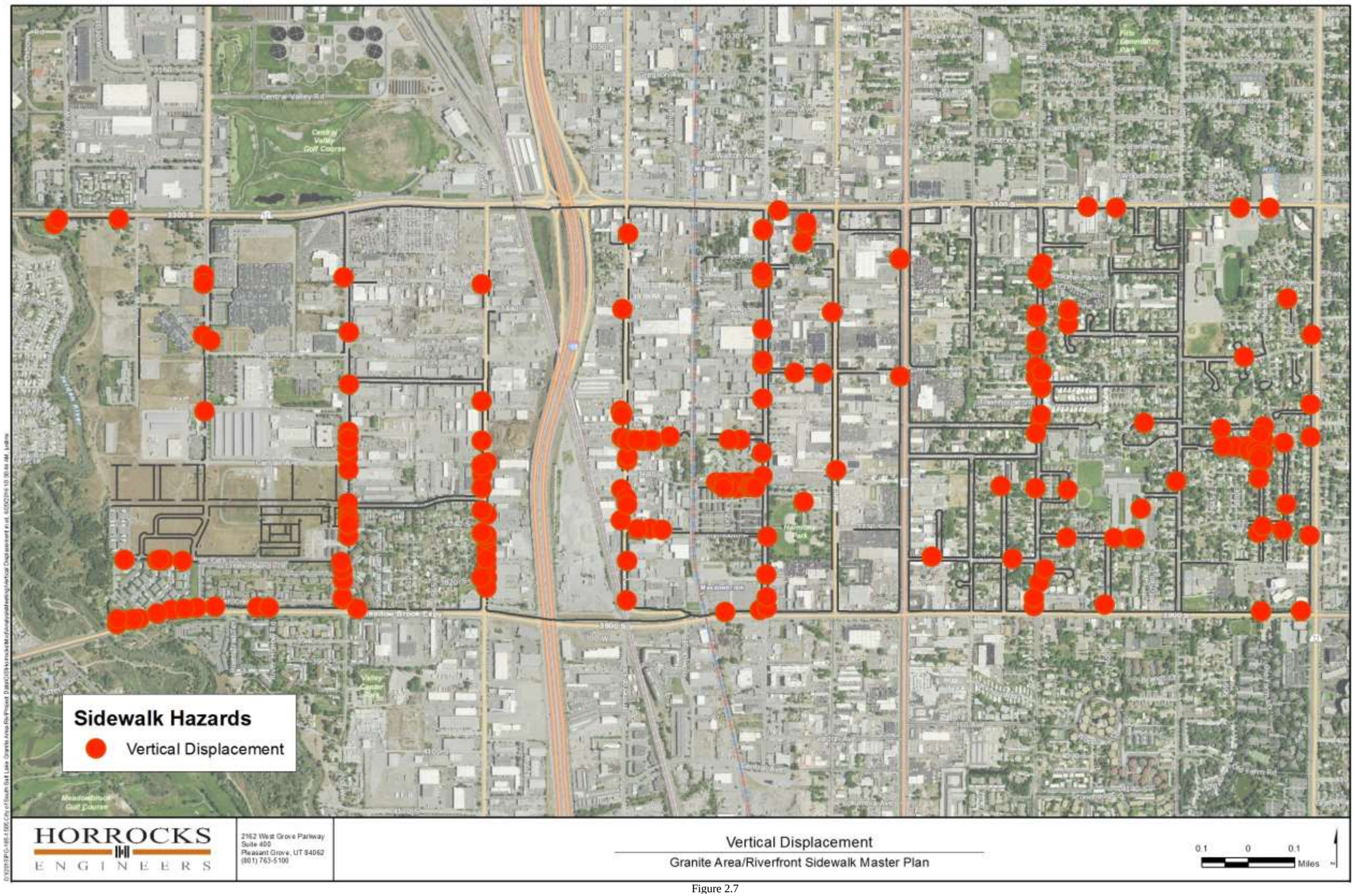

Central Valley Golf Course
Sidewalk Hazards
Vertical Displacement
HORROCKS ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Vertical Displacement
Granite Area/Riverfront Sidewalk Master Plan
0.1 0 0.1
Miles

Figure 2.7

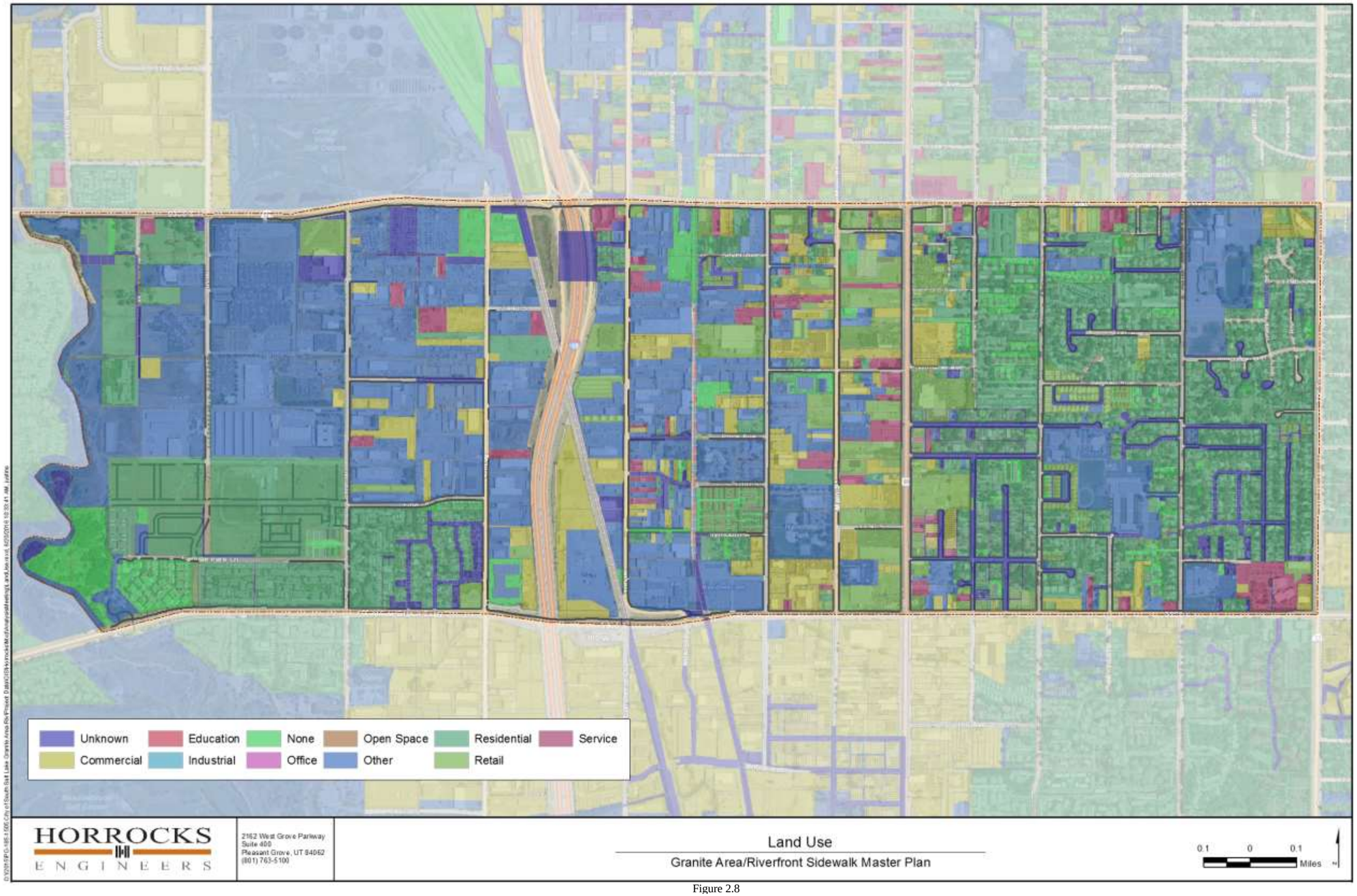

Unknown
Education
None
Open Space
Residential
Service
Commercial
Industrial
Office
Other
Retail
HORROCKS
ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Land Use
Granite Area/Riverfront Sidewalk Master Plan
0.1
0
0.1
Miles

Figure 2.8

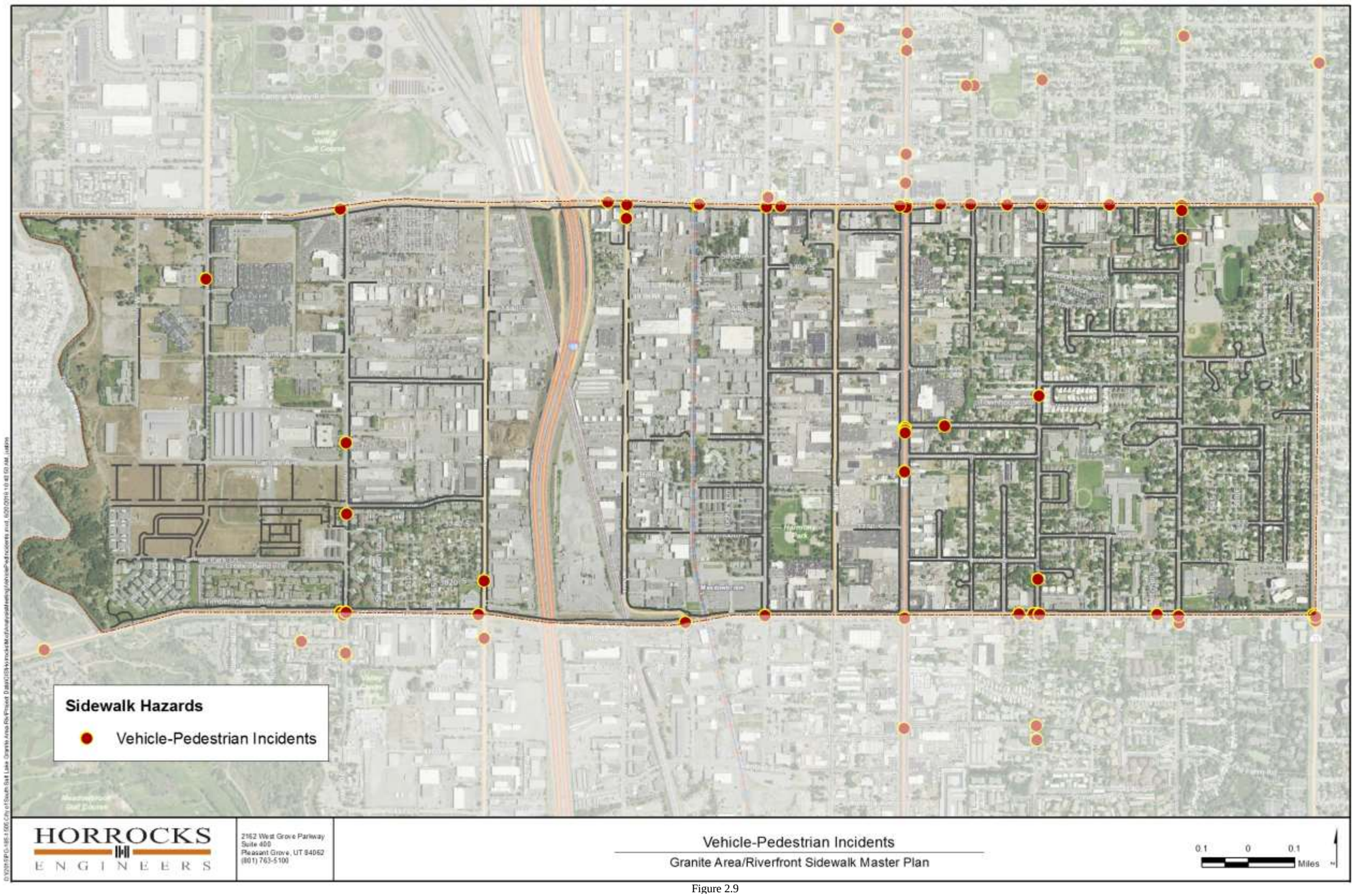

Sidewalk Hazards
Vehicle-Pedestrian Incidents
HORROCKS
ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Vehicle-Pedestrian Incidents
Granite Area/Riverfront Sidewalk Master Plan
0.1 0 0.1
Miles

Figure 2.9

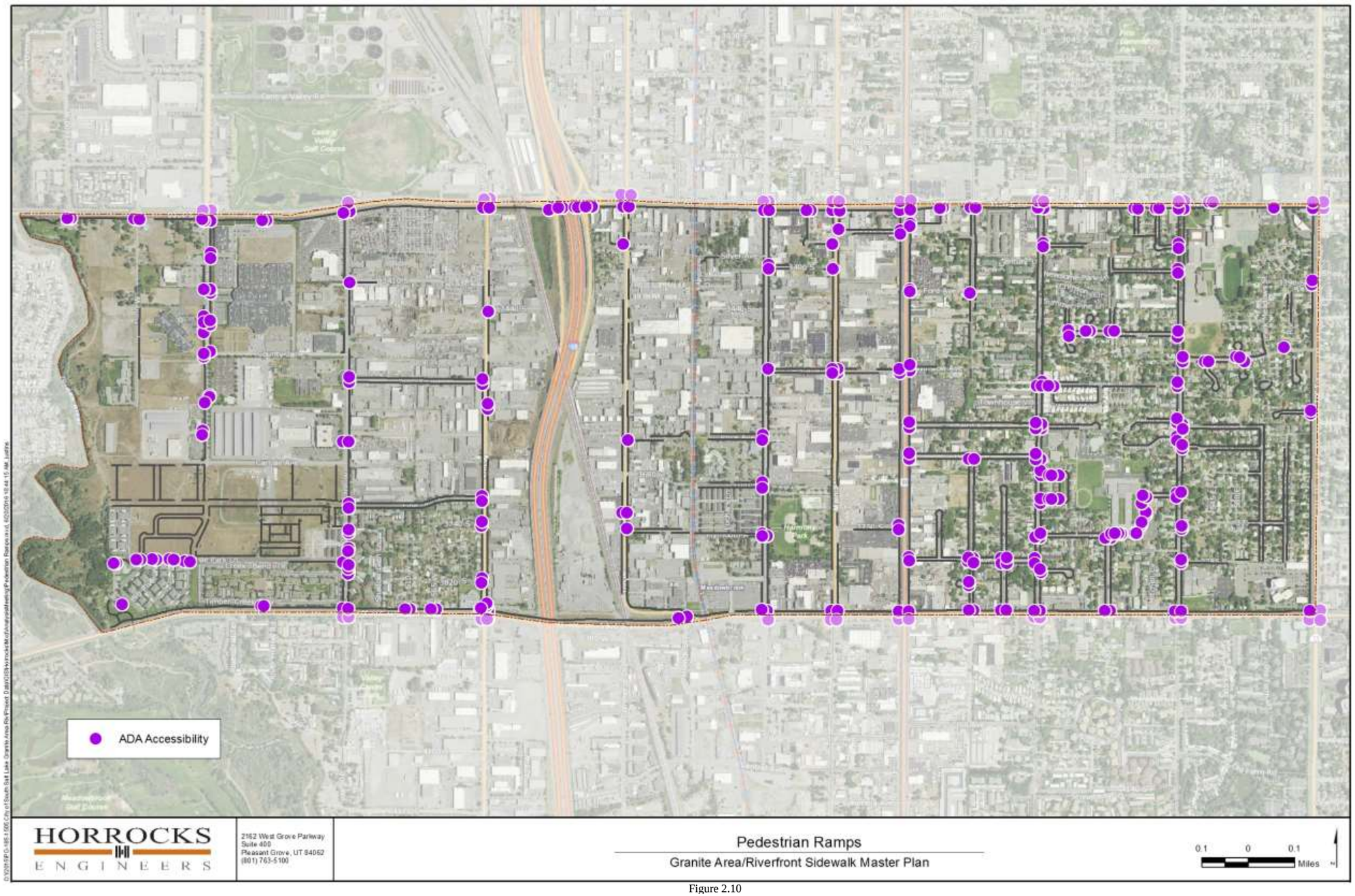

ADA Accessibility
HORROCKS
ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Pedestrian Ramps
Granite Area/Riverfront Sidewalk Master Plan
0.1
0
0.1
Miles

Figure 2.10

3 Sidewalk Assessment

The data was analyzed using a GIS to classify and rank pedestrian safety hazards and prioritize locations for sidewalk installation, repairs, and maintenance. A number of factors were used in the analysis. Each factor was weighted equally in the final ranking score.

The study area was broken into 8 zones bounded by geographic features. The data within each zone was summarized to display the score for each variable in each zone. The following sections describe the analysis that was completed.

3.1 Absent Sidewalks

Absent sidewalks are defined as areas where pedestrians walk, but there is not an existing sidewalk. Examples of absent sidewalks are roads that don't have sidewalk in the right of way, but people still walk on the side of the road. In Figure 3.1 absent sidewalks were mapped and categorized by the need to add sidewalk to complete a walking network and provide for the safety of the pedestrians. Priority was also given to areas with higher pedestrian traffic.

3.1.1 Pedestrian Frequency Ranking

The pedestrian modeling methodology used in this study is a derivative of the methodology developed by Dr. Kelly J. Clifton Ph.D. for the National Center for Smart Growth Research and Education. This methodology follows the traditional four-stage urban transportation modeling process, used extensively in regional travel demand models. But unlike regional travel demand models, this model functions at the pedestrian scale (e.g. at the neighborhood and block scale), uses existing data, and operates entirely within a GIS framework.

This model utilizes three components of the four-stage process. The mode choice component was not used because only one mode of transportation was being analyzed. The three utilized components are:

- Trip Generation: Estimates the numbers of pedestrian trips that originate and end at each street block face.
- Trip Distribution: Connects these trip origins and destinations to estimate pedestrian flows.
- Network Assignment: Predicts routes that pedestrians are likely to take on their journey.

The end result is an estimate of the pedestrian volumes which will occur on sidewalks in the study area over a 24 hour period. The data was summarized by zone and normalized by the total length of sidewalk in each area. The model was calibrated using 24 hour pedestrian counts in five locations across the study area. In Figure 3.2 the map shows the different zones and where the pedestrian volumes are located.

3.1.2 Priority New Sidewalk Ranking

Figure 3.3 shows the priority of the new sidewalk. This analysis takes into account absent sidewalks that are highly traveled and/or aid in the completion of the sidewalk network. Areas

are ranked highest priority and the installation of sidewalks will help complete a safe walking network.

3.1.3 Hazard Density

The greater the density of sidewalk hazards the higher the risk to pedestrians. The density of sidewalk hazards was calculated per zone. Sidewalk segments with the most hazards per foot of sidewalk received a higher rank, while sidewalks with a lower density of hazards received a lower rank. The density of each sidewalk segment was summarized per area. In Figure 3.4 shows the density of the sidewalk hazards according to the zones.

3.1.4 Pedestrian Safety Ranking

Figure 3.5 shows a zonal summary of pedestrian-vehicle crashes from 2010-2014. These crashes occurred on roadways throughout the study area, but the majority of incidents occurred along the boundary of the study area. This indicates that the major of pedestrian-vehicle safety concerns are associated pedestrians entering or leaving the study area. Because of the error associated with mapping traffic crash data, a buffer was added to each study zone for border sections to include crashes that are along the entire segment of the street. The final score of each zone was weighted by the severity of crashes that occur in that zone. For example, a fatal crash received a higher score than one where no medical attention was required.

3.1.5 Trip Hazard Magnitude

Hazard magnitude as it pertains to this study is the potential danger that the hazard poses to pedestrians. Vertical displacement of one to two inches pose the greatest danger to pedestrians, while hazards greater than four inches the least amount of danger. Figure 3.6 below outlines how hazards were ranked for this study.

Rank	Hazard Size Description
4	1-2 inch
3	<1-inch
2	2-4 inch
1	>4 inch

Figure 3.6

3.1.6 Composite Ranking

Using the above criteria, a composite hazard score was calculated for each zone. Each of the criteria was equally with the exception of trip hazard magnitude which was weighted double, and the composite score shows the areas with the highest repair or new sidewalk installation priority. This priority is not based on cost, rather it is based on the number of people walking in the area and their safety.

The figures below illustrate the individual category rankings and the total composite ranking. The commercial and older residential areas ranked highest because of pedestrian traffic and deteriorating sidewalk conditions.

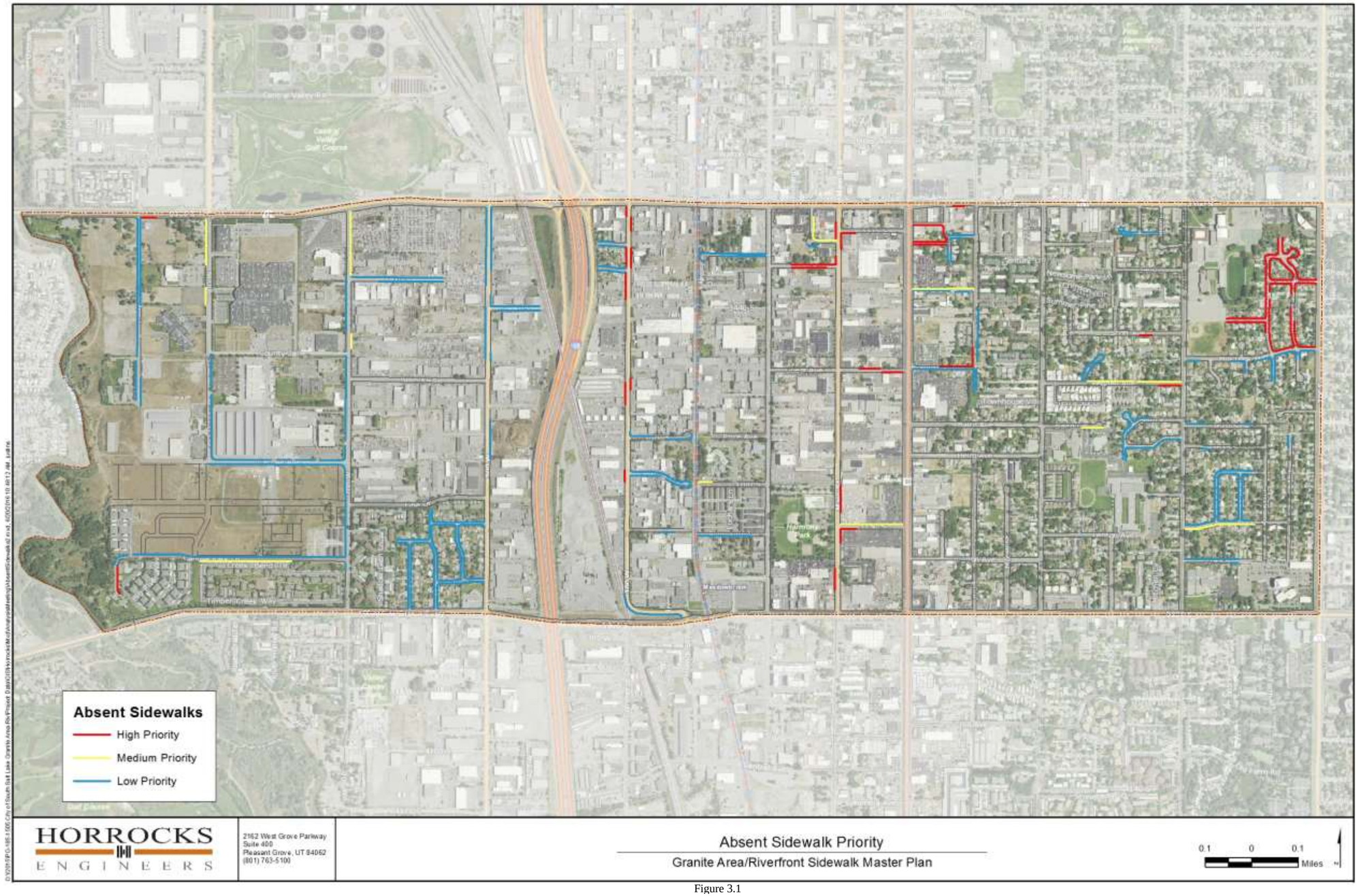

Absent Sidewalks
High Priority
Medium Priority
Low Priority
HORROCKS
ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Absent Sidewalk Priority
Granite Area/Riverfront Sidewalk Master Plan
0.1 0 0.1
Miles

Figure 3.1

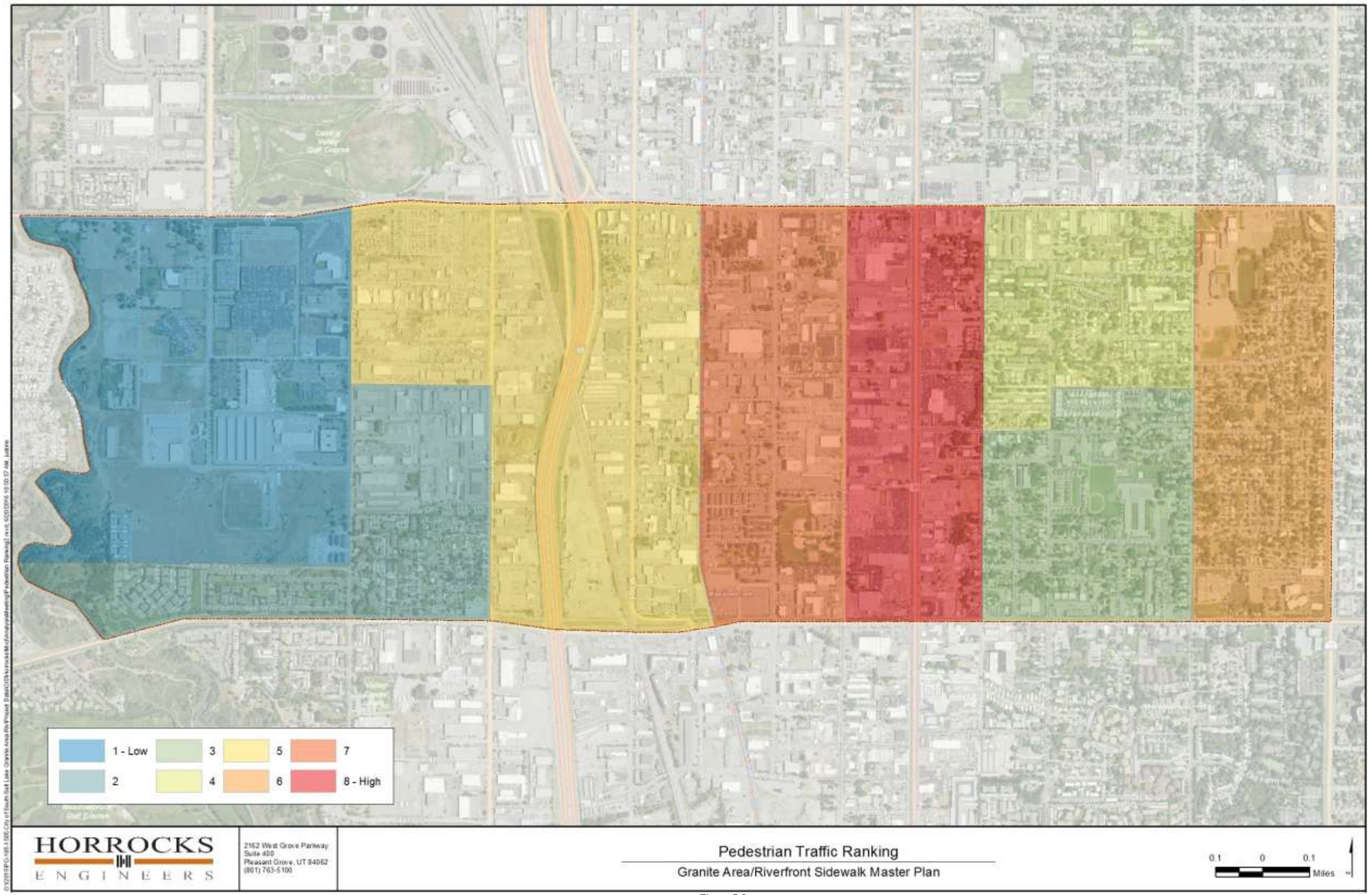

1 - Low
2
3
4
5
6
7
8 - High
HORROCKS
ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Pedestrian Traffic Ranking
Granite Area/Riverfront Sidewalk Master Plan
0.1 0 0.1
Miles

Figure 3.2

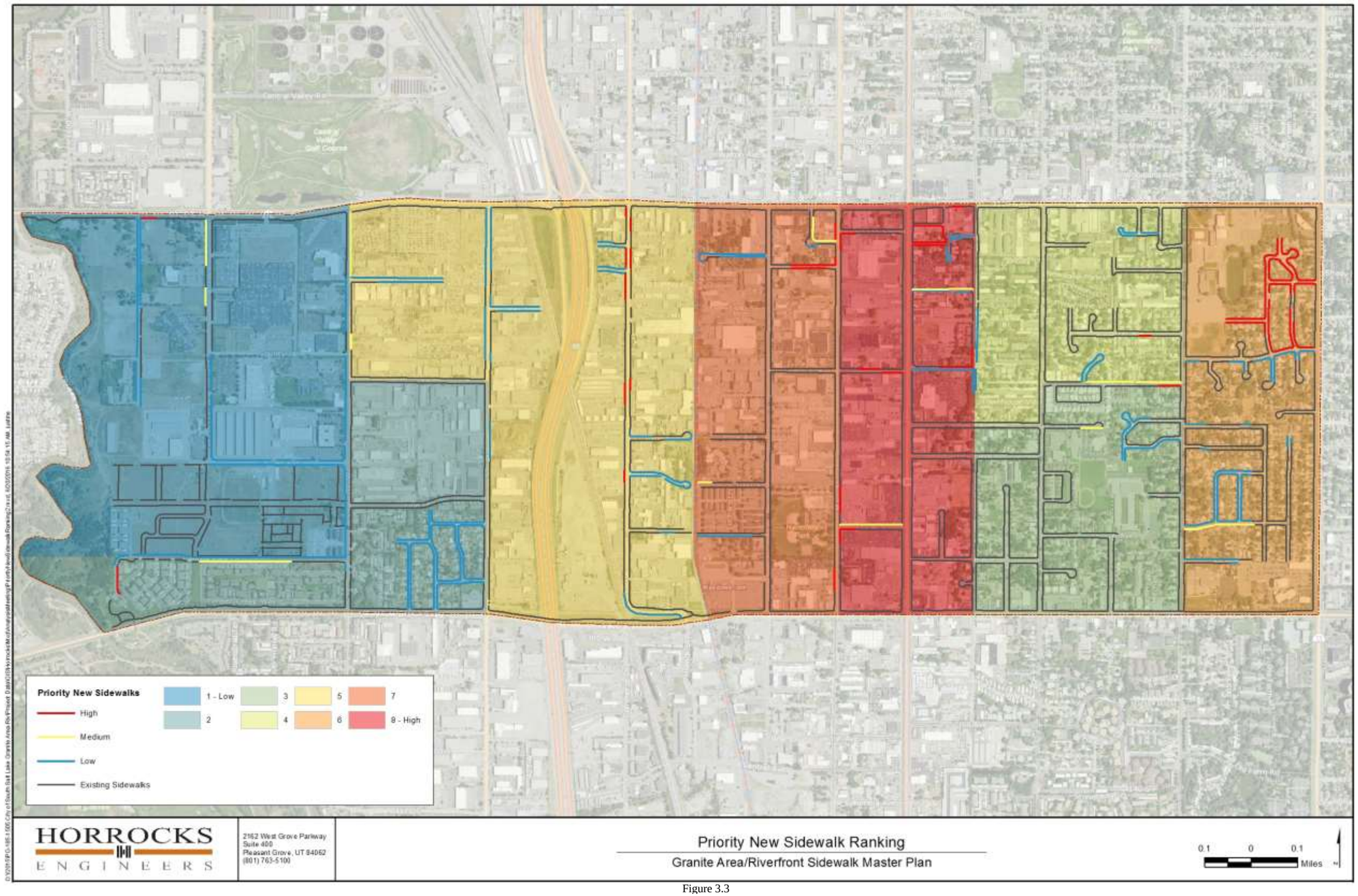

Priority New Sidewalks
High
Medium
Low
Existing Sidewalks
1 - Low
2
3
4
5
6
7
8 - High
HORROCKS ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Priority New Sidewalk Ranking
Granite Area/Riverfront Sidewalk Master Plan
0.1
0
0.1
Miles

Figure 3.3

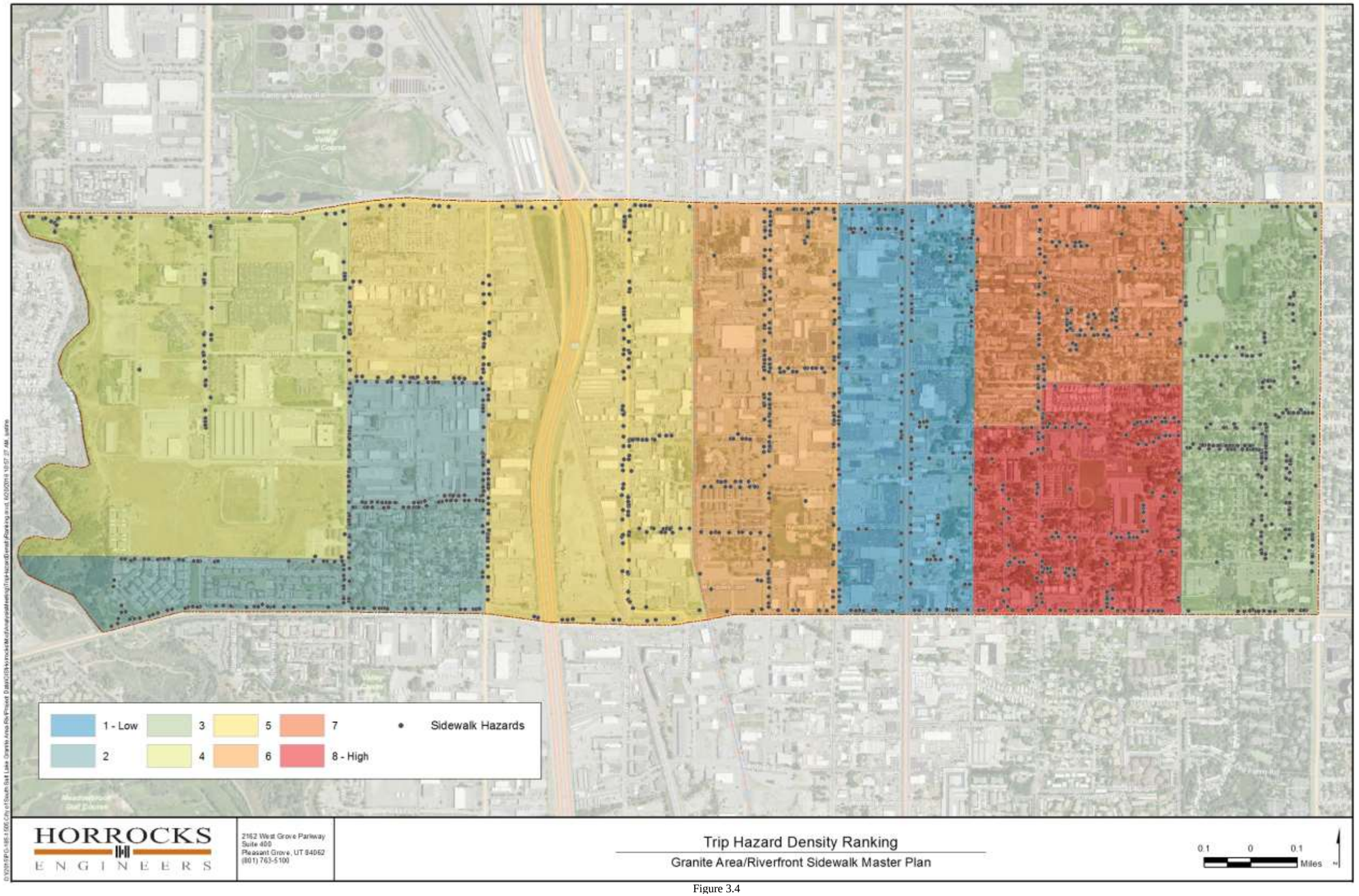

1 - Low
2
3
4
5
6
7
8 - High
Sidewalk Hazards
HORROCKS
ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Trip Hazard Density Ranking
Granite Area/Riverfront Sidewalk Master Plan
0.1 0 0.1
Miles

Figure 3.4

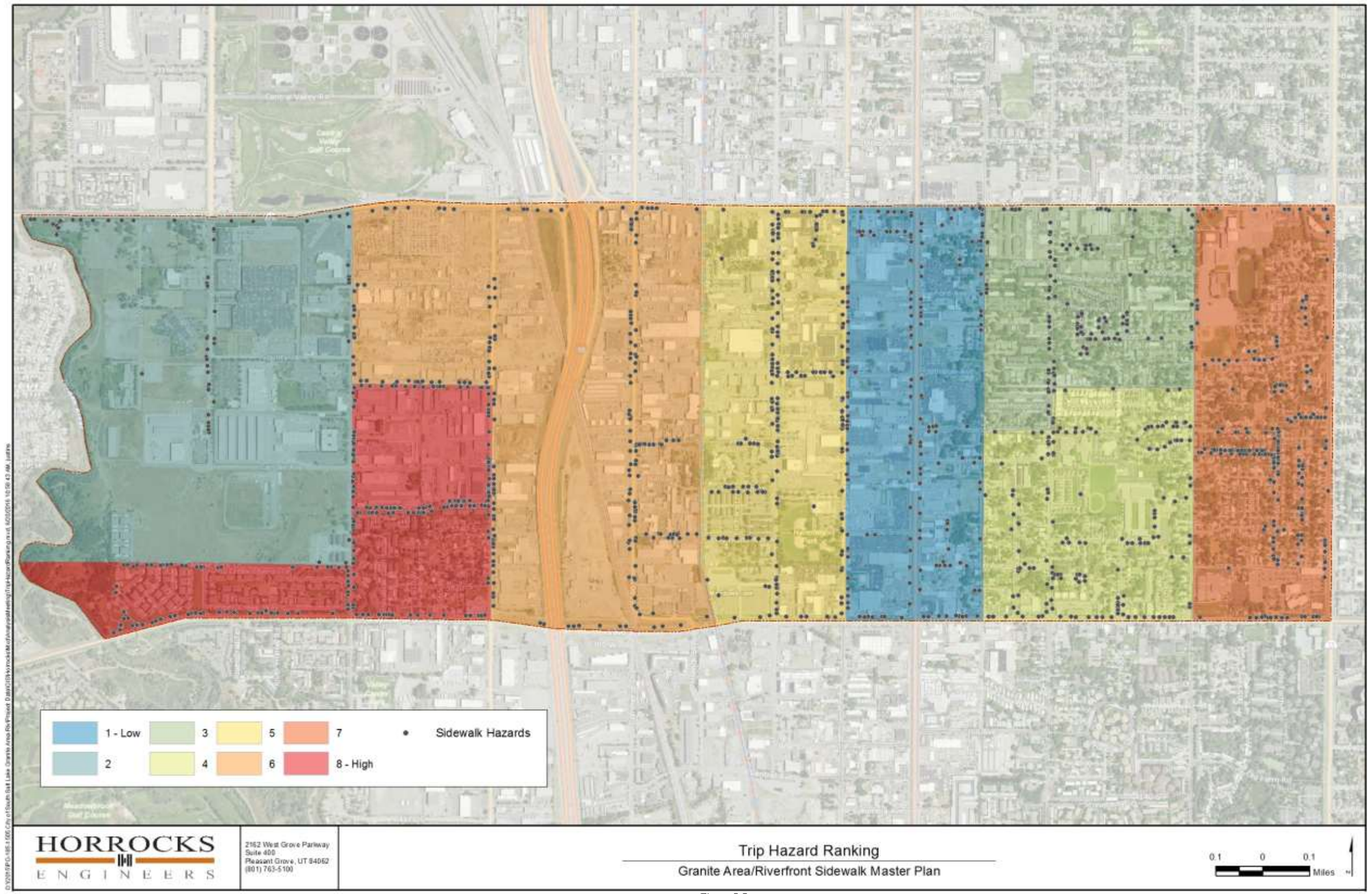

1 - Low
2
3
4
5
6
7
8 - High
Sidewalk Hazards
HORROCKS
ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Trip Hazard Ranking
Granite Area/Riverfront Sidewalk Master Plan
0.1
0
0.1
Miles

Figure 3.5

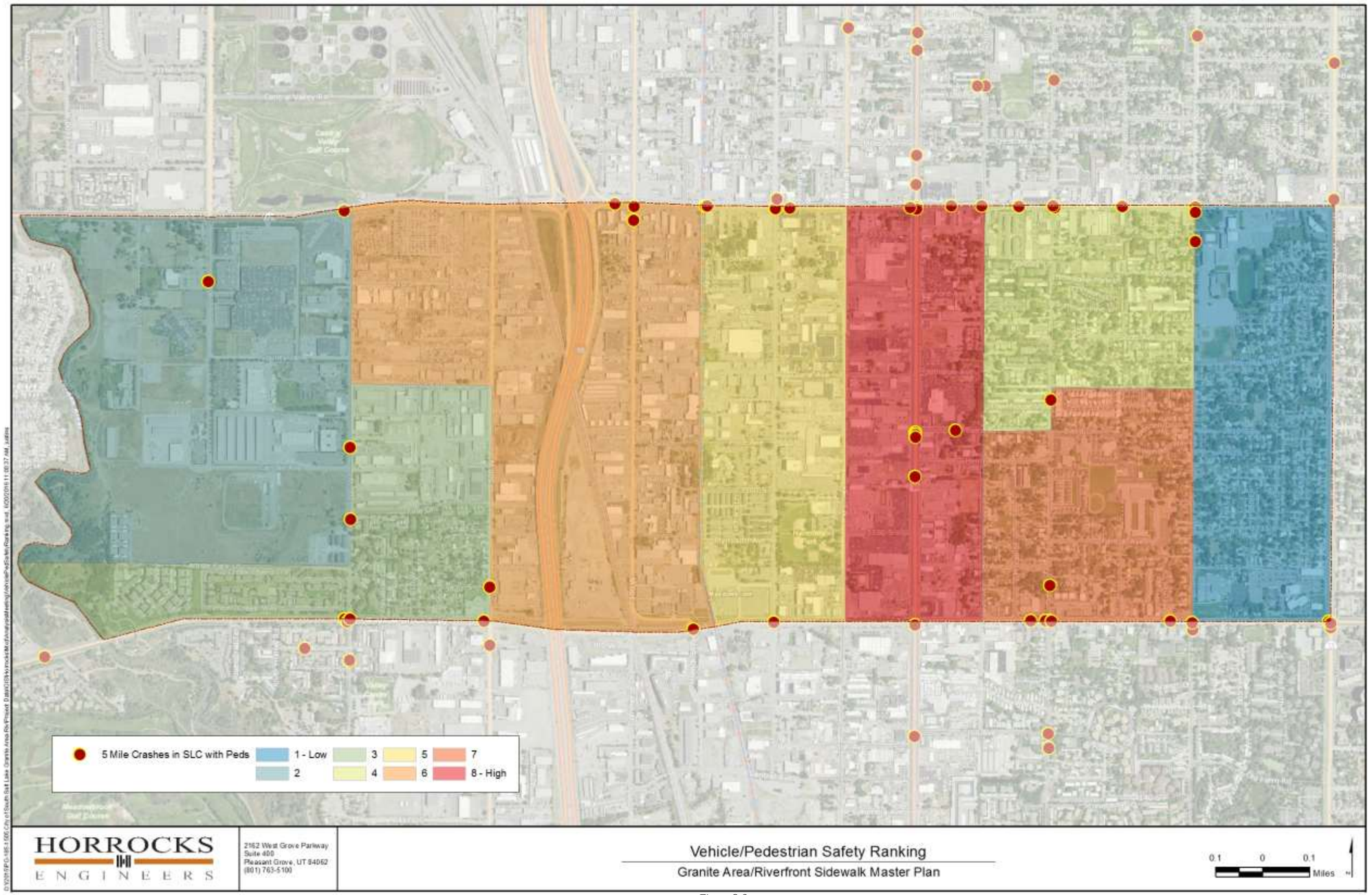

5 Mile Crashes in SLC with Peds
1 - Low
2
3
4
5
6
7
8 - High
HORROCKS
ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Vehicle/Pedestrian Safety Ranking
Granite Area/Riverfront Sidewalk Master Plan
0.1
0
0.1
Miles

Figure 3.6

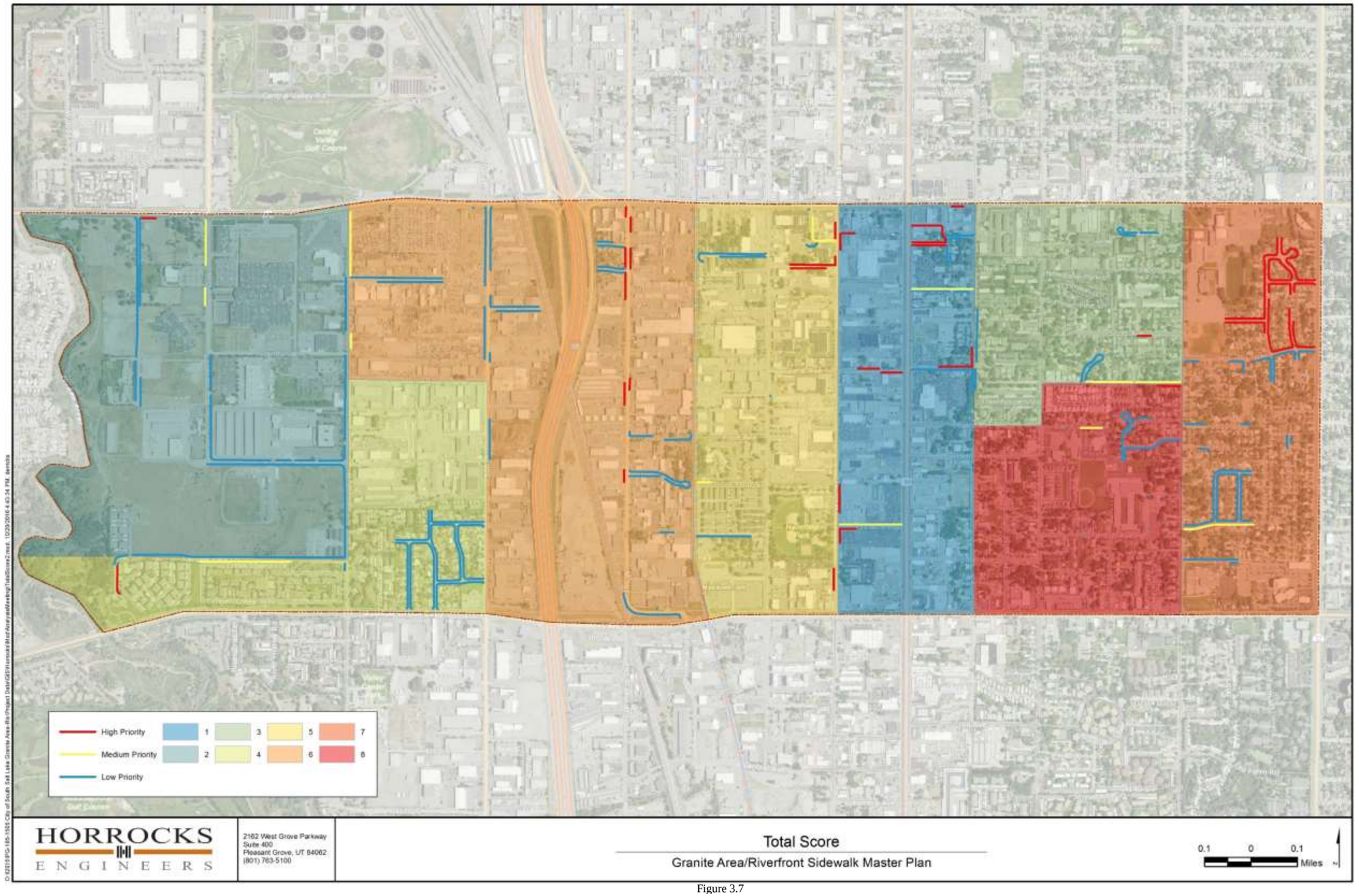

High Priority
Medium Priority
Low Priority
1
2
3
4
5
6
7
8
HORROCKS
ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
Total Score
Granite Area/Riverfront Sidewalk Master Plan
0.1
0
0.1
Miles

Figure 3.7

3.2 ADA Compliance

Title II regulations under the Americans with Disabilities Act (ADA) requires the City to apply specific access design standards developed by the United States Access Board when constructing or altering pedestrian facilities. The Americans with Disabilities Act Accessibility Guidelines (ADAAG) contains the requirements for accessible facilities. The US Access Board has also developed a draft guideline, Public Right-of-Way Accessibility Guidelines (PROWAG) that addresses the unique challenges of accessibility for sidewalks, street crossings, and other elements of public right-of-way. All new and reconstructed pedestrian access ramp installations must comply with these current guidelines.

The edges of curbs can provide a cue to people with vision impairments. Since curb ramps remove this detectable drop-off, ADAAG requires a distinctive dome patterning for the surface of curb ramps detectable by canes or by foot so that people with vision impairments can detect the transition from pedestrian area to street. The requirements for detectable warnings at curb ramps and other areas are a part of ADAAG and the enforceable standards.

The Department of Transportation is committed to providing the highest degree of accessibility. As such, the Department standards are aligned with the ADA guidelines (ADAAG). Within the study of area of South Salt Lake there are 374 curb ramps. There are 240 of these that are ADA compliant according to the Federal Highway Administration standards. In the study area there are 6 that don't comply with the national standards and will need to be addressed. There are 129 ramps that are missing the detectable warnings that will be easily converted to comply with the standard. Alterations to the existing access ramps must meet the design standards and be accessible to the maximum extent feasible. Figure 3.8 shows a map of ADA compliant ramps.

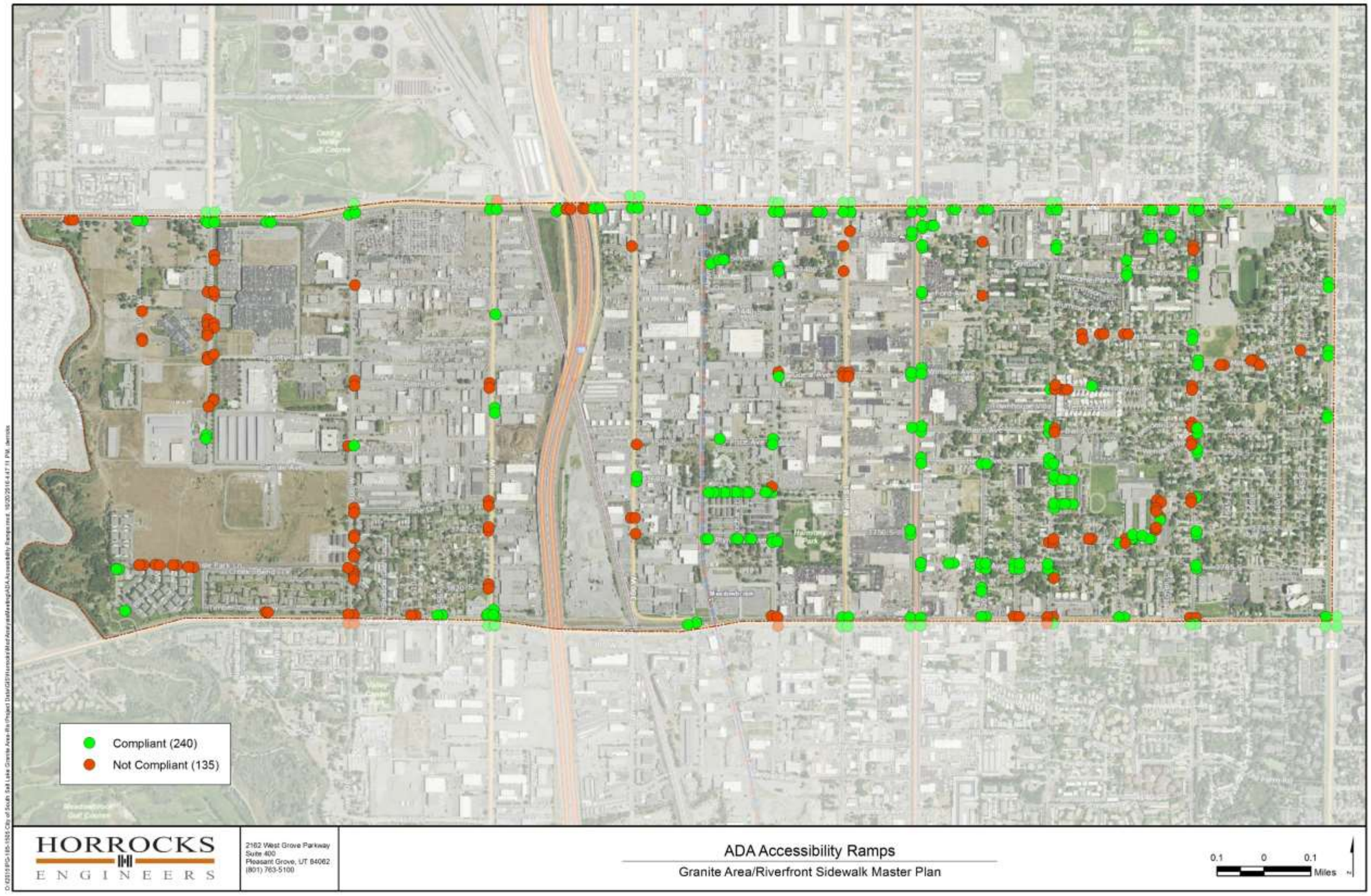

Compliant (240)
Not Compliant (135)
HORROCKS ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
ADA Accessibility Ramps
Granite Area/Riverfront Sidewalk Master Plan
0.1 0 0.1
Miles

Figure 3.8

4 Funding & Cost Estimates

This sections consists of the funding sources, cost estimates for installing new sidewalk in "absent sidewalk" areas, and performing sidewalk maintenance.

4.1 Funding Sources

The city should expand the current sidewalk improvement program. The sidewalk priority system developed as part of this plan should be used to identify and prioritize where sidewalk improvements should be made on an annual basis.

Funding is critical to implementation. It can be the enabler for making infrastructure improvements that increase pedestrian safety. With most state and local governments facing budget constraints, allocating funds to address pedestrian safety issues can be a challenge. There are a number of potential funding sources by which the city could fund a sidewalk improvement program. The following is a list of potential funding sources that could be used:

The following funding strategies can be applied to finance pedestrian safety improvements:

- Routine accommodations in new projects
- Partnerships
- Dedicated funds and set asides
- Federal/State funding
- Annual maintenance budget

Routine accommodations in new projects

Routinely including pedestrian facility improvements with other roadway improvement projects is a cost-effective strategy for increasing pedestrian safety and encouraging more walking. The construction of a good pedestrian infrastructure as part of normal public and private development and the adoption of good traffic management practices are known as "routine accommodations." Examples are pedestrian crossings are built in conjunction with the construction of intersections, pedestrian signals are installed in conjunction with traffic signals, and most sidewalks in residential neighborhoods are built as part of private, residential housing developments. Routine accommodation allows for significant improvements over time, even if there is no special funding available for pedestrian safety improvements.

Partnerships

Both public works and many private development projects provide partnership opportunities for making improvements to increase pedestrian safety in addition to what might be accomplished through routine accommodations.

Dedicated Funds and Set Asides

Some states MPOs (Metropolitan Planning Organizations) and local governments have set aside dedicated funds for pedestrian improvements. Set asides are a percentage of a larger fund such as the Federal Enhancement Fund.

Federal/State Funding

There are a limited number of Federal and State funding programs that could be used for the study area. Most of these programs focus on State Highways only. There are some limited locations; that could be considered under these programs. A full list of these funding sources can be found in Attachment 1.

UDOT Safe Sidewalk Program

UDOT's Safe Sidewalk Program provides funding for construction of new sidewalks adjacent to state routes where sidewalks do not currently exist. The program enables sidewalks to be installed in locations where major construction or reconstruction of a route is not planned for 10 or more years. In addition, it is UDOT policy to consider adding sidewalks on all UDOT projects where pedestrian traffic would be a significant factor.

For a proposed sidewalk location to be considered for the Safe Sidewalk Program, it must meet the following criteria:

- Be in an urban area or in an area that is urban in nature
- Have significant pedestrian traffic
- Local governments must match 25 percent in cash

Surface Transportation Program (STP)

The Surface Transportation Program (STP) provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals. The following is a list of the Eligible Activities.

- Bicycle transportation and pedestrian walkways
- ADA sidewalk modifications
- Carpool projects,
- Fringe and corridor parking facilities and programs, including electric and natural gas vehicle charging infrastructure,

Transportation Alternatives Program (TAP)

This alternative establishes a new program to provide for a variety of alternative transportation projects, including many that were previously eligible activities under separately funded programs. The TAP is funded by contract authority from the Highway Account of the Highway Trust Fund. Funds are subject to the overall Federal-aid obligation limitation. An amount equal

to 2% of the total amount authorized from the Highway Account of the Highway Trust Fund each fiscal year. Funds may be used for projects or activities that are related to surface transportation and described in the definition of "Transportation Alternatives." The following is a list of the Eligible Activities.

- Construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation.
- Construction, planning, and design of infrastructure-related projects and systems that will provide safe routes for non-drivers, including children, older adults, and individuals with disabilities to access daily needs.

The state makes funds available for several sources from highway and bridge construction. Sources include special fuel taxes, vehicle registration fees, and driver's license fees. Seventy percent of these fees are retained by UDOT for construction and maintenance on state highways. The remaining thirty percent are made available to cities and counties for local road use.

Other Funding

Grants are funds provided by an outside agency, typically the federal or state government. They are required to be used for a specific purpose in a specified amount of time. Each grant is different and usually has an underlying purpose. Grants often require the city to compete with other agencies or cities in order to obtain funding. Since grants usually require a local match, additional funding is allocated by the city as a condition of the grant award.

Community Development Block Grants: Community Development Block Grants (CDBG) from Housing and Urban Development (HUD) are granted through the Wasatch Front Regional Council (WFRC) to assist in meeting various needs of residents. One use of block grants is to target the needs of low and moderate income neighborhoods. For those neighborhoods that meet the federal test for income levels (i.e. 51% of the residents are below 80% of the median income for the city), CDBG money could be used for the installation of new sidewalks.

- **New Development**: When new projects are developed, sidewalks are routinely required as part of the development. The sidewalk must be built to city standards and the cost is passed on by the developer to the property owners.
- **Assessment District**: An Assessment District allows a group of property owners to share the cost of large common projects such as street improvements and sanitary and storm sewers. The Assessment District process usually begins when a property owner makes a request to the city for an eligible capital improvement. The city then defines an area for the District. All owners within the district pay for the costs of the improvements and they are apportioned to each property owner in an equitable fashion.
- **Bond**: The City has bonding power to issue a bond as a form of long-term debt used to buy or build capital improvements. Bonding has been used historically to fund large-scale capital investments in urban areas. For example, South Salt Lake City is currently considering bonding for Storm Water Projects within South Salt Lake City. There are two types of bonds a community can use. One is a Revenue Bond and the other a General Obligation (GO)

Bond. A Revenue Bond is a bond which is approved by the City Council. It must have a funding system in place to generate a revenue stream to pay the bond back. A GO Bond requires a vote by the citizens in a general election. The City then imposes additional property taxes to pay the annual interest and principal payments (typically over 20 years). Debt instruments such as bond issues are sometimes called a "pay as you use" form of capital financing because people pay for a long-lived capital assets over its useful life.

Annual maintenance budget

Existing annual maintenance budgets can be used to make small but important pedestrian improvements. For example, limited budgets for painting marked crosswalks can be focused around schools and high crash locations. Crosswalks can be widened or changed to high-visibility markings when they are scheduled to be repainted or small trip hazards can be removed.

4.2 Cost Estimates

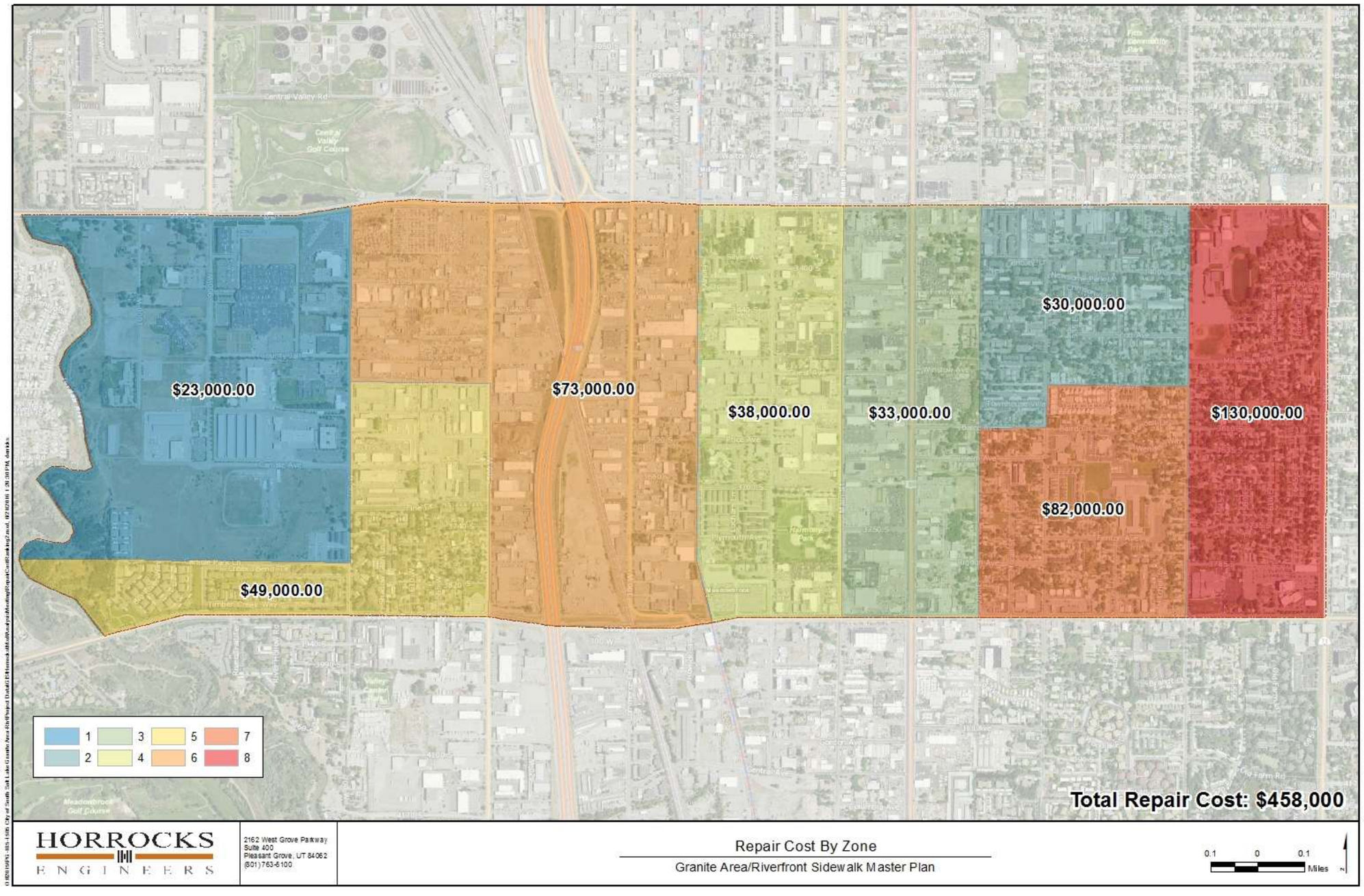
The cost to repair and maintain sidewalks can be significant. This section provides information about cost estimates to repair and install sidewalks in the project area. Costs have been summarized by area, but individual costs per individual hazard or project can be accessed through the GIS data that accompanies this document.

The cost estimates detailed below in Figure 4.1 are construction estimates and do not include preliminary design and engineering work. The table below shows the base costs for sidewalk repair, replacement, and installation. Note that many times sidewalk installation requires upgrades to the existing storm drain system. For that reason storm drain improvement costs are included.

Item	Unit	Unit Price
Remove/Replace Sidewalk	Square Foot	$60
Sidewalk Grinding	Unit	$20
New Sidewalk	Square Yard	$40
*SD Inlets	Each	$3,200
*SD 15" Pipe	Linear Foot	$35
*Connect Manhole or Inlet	Each	$650
*Reconstruct Manhole or Inlet	Each	$1,200
Curb & Gutter	Linear Foot	$17
T-Patch	Square Yard	$37
Waterway	Square Foot	$9
Remove Waterway	Linear Foot	$5
Drive Approach	Square Foot	$7
Contingency: Utilities/ROW	Percentage	15%
Contingency: Engineering/Inspection	Percentage	3%
Contingency: Traffic Control	Percentage	1%
Contingency: Tree Removal	Percentage	10%
Contingency: Unknown	Percentage	10%

* = storm drain system improvement

Figure 4.1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$73,000.00
$38,000.00
$33,000.00
$30,000.00
$130,000.00
$82,000.00
$49,000.00
1
2
3
4
5
6
7
8
Total Repair Cost: $458,000
HORROCKS
ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801)763-6100
Repair Cost By Zone
Granite Area/Riverfront Sidewalk Master Plan
0.1 0 0.1
Miles

Figure 4.2

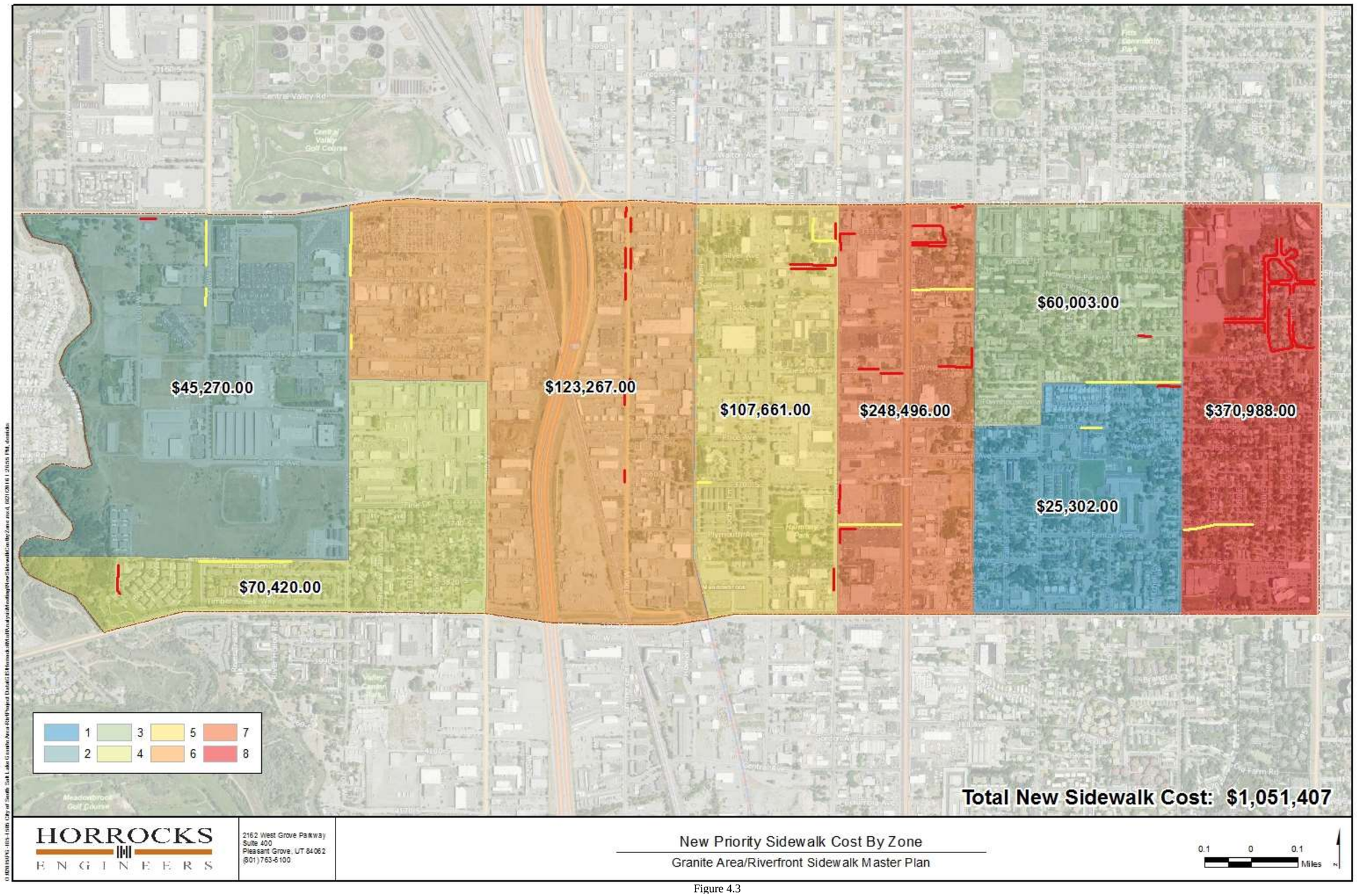
$45,270.00
$123,267.00
$107,661.00
$248,496.00
$60,003.00
$370,988.00
$25,302.00
$70,420.00
1
2
3
4
5
6
7
8
Total New Sidewalk Cost: $1,051,407
HORROCKS ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801)763-6100
New Priority Sidewalk Cost By Zone
Granite Area/Riverfront Sidewalk Master Plan
0.1 0 0.1
Miles

Figure 4.3

Figure 4.2 shows the total cost to repair existing sidewalk in each zone. These costs can be correlated with the composite ranking map in Section 3 to determine funding priorities. Figure 4.3 shows the total cost to install new sidewalk in medium and high priority areas.

The installation of sidewalks in high to medium priority absent sidewalk locations include the addition of storm drain upgrades. To install sidewalk in the medium and high priority absent sidewalk areas will cost approximately $503,000 with an additional $549,000 in storm drain costs as detailed below.

Item	Unit	Quantity	Unit Price	Price
*Inlets	Each	30	$ 3,200	$ 96,000
*15" Pipe	Lineal Foot	1,547	$ 35	$ 54,145
*Connect to manhole or inlet (core and grout)	Each	9	$ 650	$ 5,850
*Reconstruct inlet or manhole	Each	2	$ 1,200	$ 2,400
Curb & Gutter	Lineal Foot	10,828	$ 17	$ 184,076
T-Patch	Square Yard	1,273	$ 37	$ 47,097
Waterway	Square Foot	280	$ 9	$ 2,380
Remove Waterway	Lineal Foot	330	$ 5	$ 1,650
Drive Approach	Square Foot	150	$ 7	$ 1,050
New Sidewalk 4'	Square Yard	9,044	$ 40	$ 361,760
Contingency	Percentage		39%	$ 295,000
Total				**$ 1,051,407**

*= storm drain system improvement

Figure 4.4

Installation of just sidewalk in all absent sidewalk areas in the entire study area will cost approximately $1,700,000. Additional storm drain costs for low priority areas were not estimated.

Attachment 1

FHWA Funding for Pedestrian Safety and Sidewalks

Bicycle and Pedestrian Funding Opportunities
US Department of Transportation, Federal Transit, and Federal Highway Funds

Revised October 1, 2015

This table indicates potential eligibility for pedestrian and bicycle projects under Federal Transit and Federal Highway programs. Specific program requirements must be met, and eligibility must be determined, on a case-by-case basis.

	Bicycle and Pedestrian Funding Opportunities US Department of Transportation, Federal Transit, and Federal Highway Funds												
Activity	**TIGER** see note below	**FTA**	**ATI**	**CMAQ** see note below	**HSIP**	**NHPP NHS**	**STP**	**TAP TE**	**RTP**	**SRTS** until expended	**PLAN** see note below	**402**	**FLTTP**
Access enhancements to public transportation (includes benches, bus pads)	$	$	$	$			$	$					$
ADA/504 Self Evaluation / Transition Plan	$plan						$	$	$		$		$
Bicycle and/or pedestrian plans	$plan	$					$	$			$		$
Bicycle lanes on road	$	$	$	$	$	$	$	$		$			$
Bicycle parking	$*	$	$	$		$	$	$	$	$			$
Bike racks on transit	$	$	$	$			$	$					$
Bicycle share (capital and equipment; not operations)	$	$	$	$		$	$	$					$
Bicycle storage or service centers	$*	$	$	$			$	$					$
Bridges / overcrossings for bicyclists and/or pedestrians	$	$	$	$*	$	$	$	$	$	$			$
Bus shelters and benches	$	$	$	$			$	$					$
Coordinator positions (State or local)				$ Limit 1 per State			$	$ as SRTS		$			
Crosswalks (new or retrofit)	$	$	$	$*	$	$	$	$	$	$			$
Curb cuts and ramps	$	$	$	$*	$	$	$	$	$	$			$
Counting equipment	$plan	$	$		$	$	$	$	$	$	$*		$
Data collection and monitoring for bicyclists and/or pedestrians	$plan	$	$		$	$	$	$	$	$	$*		$
Helmet promotion (for bicyclists)							$	$ as SRTS		$		$	
Historic preservation (bicycle and pedestrian and transit facilities)	$	$	$				$	$					$
Landscaping, streetscaping (bicycle and/or pedestrian route; transit access); related amenities (benches, water fountains)	$*	$	$				$	$					$
Lighting (pedestrian and bicyclist scale associated with pedestrian/bicyclist project)	$	$	$		$	$	$	$	$	$			$
Maps (for bicyclists and/or pedestrians)		$	$	$			$	$		$	$*		
Paved shoulders for bicyclist and/or pedestrian use	$			$*	$	$	$	$		$			$
Police patrols							$ as SRTS	$ as S		$		$	
Recreational trails	$*						$	$	$				$
Safety brochures, books							$ as SRTS	$ as S		$	$*	$	
Safety education positions							$ as SRTS	$ as S		$		$	
Separated bicycle lanes*	$	$	$	$	$	$	$	$		$			$
Shared use paths / transportation trails	$	$	$	$*	$	$	$	$	$	$			$
Sidewalks (new or retrofit)	$	$	$	$	$	$	$	$	$	$			$
Signs / signals / signal improvements	$	$	$	$	$	$	$	$		$			$
Signed bicycle or pedestrian routes	$	$	$	$		$	$	$		$			$
Spot improvement programs	$	$			$		$	$	$	$			$
Stormwater impacts related to pedestrian and bicycle projects	$	$	$		$	$	$	$	$	$			$
Traffic calming	$	$			$	$	$	$		$			$
Trail bridges	$			$*	$	$	$	$	$	$			$
Trail/highway intersections	$			$*	$	$	$	$	$	$			$
Training				$			$	$	$	$	$*	$	
Tunnels / undercrossings for bicyclists and/or pedestrians	$	$	$	$*	$	$	$	$	$	$			$

KEY: $: Funds may be used for this activity.
ADA/504: Americans with Disabilities Act of 1990 / Section 504 of the Rehabilitation Act of 1973
TIGER: Transportation Investment Generating Economic Recovery Discretionary Grant program
FTA: Federal Transit Administration Capital Funds
ATI: Associated Transit Improvement (1% set-aside of FTA)
CMAQ: Congestion Mitigation and Air Quality Improvement Program
HSIP: Highway Safety Improvement Program
NHPP/NHS: National Highway Performance Program/National Highway System
STP: Surface Transportation Program
TAP/TE: Transportation Alternatives Program / Transportation Enhancement Activities
RTP: Recreational Trails Program
SRTS: Safe Routes to School Program
PLAN: Statewide or Metropolitan Planning
402: State and Community Highway Safety Grant Program
FLTTP: Federal Lands and Tribal Transportation Programs (Federal Lands Access Program, Federal Lands Transportation Program, Tribal Transportation Program)

* TIGER: Subject to annual appropriations. $plan = Eligible for TIGER planning funds. $* = Eligible, but not competitive unless part of a larger project.
* CMAQ: See the CMAQ guidance at www.fhwa.dot.gov/environment/air_quality/cmaq/ for a list of projects that may be eligible for CMAQ funds. Several activities may be eligible for CMAQ funds as part of a bicycle and pedestrian-related project, but not as a highway project. CMAQ funds may be used for shared use paths, but may not be used for trails that are primarily for recreational use.
* STP and TAP: Activities marked "as SRTS" means the activity is eligible only as an SRTS project benefiting schools for kindergarten through 8th grade.
* Planning funds must be for planning purposes: Maps: System maps and GIS; Safety brochures, books: As transportation safety planning; Training: bicycle and pedestrian system planning training.
* Separated Bicycle Lanes, also known as protected bike lanes or cycle tracks.