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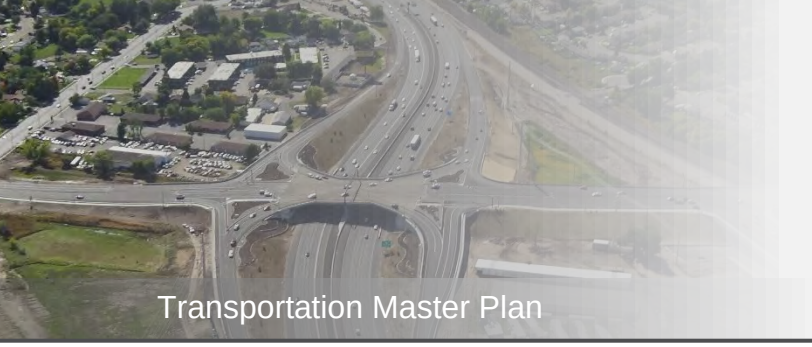
LAYTON CITY TRANSPORTATION MASTER PLAN



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Glossary of Terms

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
BRT	Bus Rapid Transit
CFP	Capital Facilities Plan
FHWA	Federal Highway Administration
GOPB	Governor's Office of Planning and Budget
HCM	Highway Capacity Manual
HOA	Homeowner's Association
IFFP	Impact Fee Facilities Plan
ITE	Institute of Transportation Engineers
LOS	Level of Service
LRTP	Long Range Transportation Plan
MPO	Metropolitan Planning Organization
MUTCD	Manual on Uniform Traffic Control Devices
STIP	Statewide Transportation Improvement Program
STP	Surface Transportation Program
TAZ	Traffic Analysis Zone
TIP	Transportation Improvement Program
TIS	Traffic Impact Study
TMP	Transportation Master Plan
TRAX	Transit Express (light rail)
TRB	Transportation Research Board
UDOT	Utah Department of Transportation
UTA	Utah Transit Authority
WFRC	Wasatch Front Regional Council

Executive Summary

Layton City has experienced significant growth and development in recent years with growth of approximately 30,700 residents since 1990. With Layton City committed to continued growth, it is projected that the population in 2040 will be above 80,000. A Transportation Master Plan (TMP) has been implemented so the transportation system can accommodate the projected growth in the City for the year 2040.

As part of the plan, the current roadway network was assessed using current traffic volumes. Current traffic volumes were projected through the year 2040 using the current roadway network to find the capacity improvements necessary for the roadway network to positively contribute to the economic and community development in Layton City. The following sections are included in the Layton City TMP.

Roadway Network Analysis

A major contribution to a successful transportation system is to have a connected street system. A connected system improves the reduction of traffic congestion, commute times, emergency response times, etc. Roadways share two functions: mobility and land access. These two functions share an inverse relationship, meaning a roadway with high mobility has minimal land access points and a roadway with low mobility has frequent land access points. Roadway classifications are implemented in a connected roadway network to designate the amount of mobility and land access the roadway will have. The following roadway classification is used in Layton City: Freeway, Principal Arterial, Major Arterial, Arterial, Collector, Minor Collector, and Local Street. These classifications range from most mobile and least access points (Freeway) to least mobile with frequent access points (Local Street), creating a hierarchy in the roadway system. Intersections are used in the roadway system to allow for the progression from high mobility to low mobility and frequent land access points. Freeways connect with Arterial Streets, which connect with Collector Streets, which connect with Local Streets. Correct use of all roadway functional classifications within the city allows for a successful, connected roadway system.

To measure the performance of a roadway segment, Level of Service (LOS) is used. LOS is defined by the Federal Highway Administration (FHWA) to determine the level of congestion on a roadway segment or intersection. To measure LOS, a letter grade is assigned a letter grade A through F where A represents free flowing traffic and F represents grid lock. LOS is measured using daily traffic volumes and delay per vehicle for roadway segments and intersections respectively. The LOS of a roadway segment or intersection is used to determine if capacity improvements are necessary. In Layton City, a standard of LOS D or better was adopted as an acceptable LOS.

As part of the TMP, data was collected for the existing roadway network and a LOS was determined for each roadway segment and intersection. The existing traffic volumes were projected to 2040 using the

Wasatch Front Regional Council (WFRC) travel demand model. The WFRC is a collaboration of local government and community members from Salt Lake, Weber, Tooele, Morgan and Box Elder counties in Utah to plan future growth. This model includes the West Davis Corridor. Other adjustments to the WFRC travel demand model were made based on socioeconomic data and Layton City's land use plan. Projected 2040 traffic was first modeled for the no-build scenario. Typically, the no-build scenario acts as a guide for roadway capacity inefficiencies that will need to be improved by 2040. Using the no-build scenario as a base for roadway capacity improvements, the projected 2040 traffic was modeled using the West Davis Corridor WFRC model. The segments with LOS E or worse with the 2040 projected traffic volumes will be recommended to undergo capacity improvements to achieve acceptable LOS.

Capital Facilities Plan

A Capital Facilities Plan outlines all improvements necessary to provide Layton City with an adequate roadway system in 2040 based on the projected 2040 traffic volumes. This plan is updated by the City as project scopes change and development occurs. As part of the TMP, a Transportation Improvement Plan (TIP) is included that outlines all the projects necessary to accommodate future traffic volumes. It is expected that the total cost of necessary roadway improvements for Layton City is approximately **$40,638,000**.

Alternative Modes of Transportation

Included in this TMP are discussions about alternative modes of transportation. Currently, the transit service in Layton City is operated by the Utah Transit Authority (UTA). UTA offers services such as commuter rail, light rail, bus, bus rapid transit (BRT), ski buses, and van share. Currently, transit service in Layton City includes the FrontRunner and bus services. The WFRC long range model calls for enhanced bus service, the introduction of BRT on Main Street as well as improving Frontrunner service.

Various Layton City policies were reviewed to determine their effect on bicycling and walking. A "best practices" review was then conducted in the area of bicycle and pedestrian-related policies to develop appropriate recommendations that the City can modify and/or adopt. Basic descriptions of the recommended changes and additions are given in this TMP along with information about where the City may find more detailed resources (if applicable) about the recommended policies.

Transportation Plan Guidelines

This section is a discussion of the other elements included in the TMP. There is a discussion describing using a Traffic Impact Study (TIS) prior to development. A TIS assesses the impacts to the roadway system due to new development, which helps the City prepare for the impacts to the roadway network caused by the development. Another discussion included in the TMP is Intelligent Transportation Systems (ITS). ITS refers to the increased use of technology and communication methods to improve traffic operations. Specifically, the use of ITS to improve traffic signal performance. The other elements discussed in this section are Access Management, Travel Demand Management, School Zone Planning, Connectivity, Americans with Disabilities Act (ADA), Safety and Corridor Preservation.

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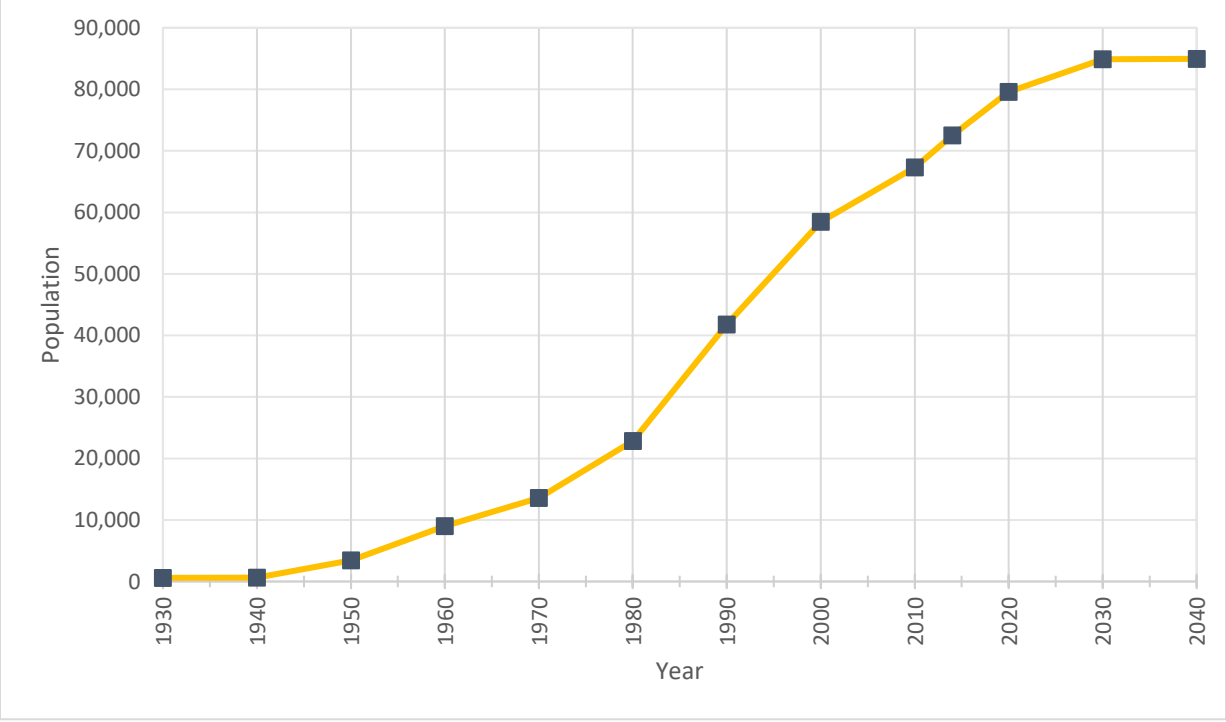
Introduction

Layton City has seen rapid growth in recent years. Located in the northeastern portion of the Davis County, Layton City is bordered to the north by Clearfield, South Weber and Hill Air Force Base; to the south by Kaysville; to the east by the Wasatch Mountain Range and on the west by Syracuse City. Within the city there is a mix of residential, commercial, and industrial development as well undeveloped land, particularly in the western portion of the city. A map of Layton City and the surrounding area is shown in **Figure 2**.

Layton City and the surrounding communities have recently experienced significant growth and development, which is expected to continue in the future, as shown in the **Figure 1**. Layton City's population growth from 2000 to 2010 was 8,837 (15.1%). The current population (2014) is slightly above 72,000 according to the U.S. Census Bureau. By the year 2020 the population is projected to be around 80,000 and up to 85,000 by the year 2040. To keep pace with projected growth, a comprehensive transportation plan must be developed and regularly maintained. This plan must incorporate the goals of Layton City regarding the transportation systems within their jurisdiction as well as those regional facilities maintained by UDOT, UTA, Davis County, and neighboring communities.

Figure 1: Layton City Population



This Transportation Master Plan (TMP) contains an analysis of the existing transportation network and conditions. Any major deficiencies are itemized and possible improvement or mitigation alternatives are discussed. An analysis of the future transportation network is also included for the horizon year 2040. Any major UDOT projects and improvements within the city, such as the West Davis Corridor, are reflected in the future network. Any deficiencies in the future transportation network that are expected to exist and would not be accommodated by projects that are currently planned will be discussed. A list of recommended improvements and projects will then be given to aid Layton City in planning for future transportation projects as well as in working with other agencies such as UDOT or neighboring cities. This Transportation Master Plan is intended to be a useful tool to aid Layton City in taking a proactive effort in planning and maintaining the overall transportation network within their city.

History

The City of Layton was established in 1850 as an agricultural extension to the settlement that was later incorporated as Kaysville, Utah. The original boundaries of what was called Kays Ward extended from Haight's Creek on the south to the Weber County line and the Weber River in the north, and from the Wasatch Mountains on the east to the shores of the Great Salt Lake on the west. Although the settlers of Kays Ward eventually laid out streets and established a typical town plan and city center in 1854, the area that is now Layton remained rural, unorganized and unplanned during this early period.

Because Layton was an outgrowth of Kaysville, the settlers did not build their homes around a city block plan or a central fort. When fort districts were established in 1854 and 1855, for protection, the people living along Kays Creek contributed money and labor to the building of the Kays Ward fort. However, these settlers never lived in the Kays Ward fort area but built their own stockade called "Little Fort". This structure was built on the east side of Kays Creek, south of what is now known as Fort Lane Street.

Following the building of a wagon road between Salt Lake City and Ogden, several mercantile and trade establishments were founded along what is now known as Layton's Main Street. Also, in the late 1860's the Utah Central Railway was built with tracks running parallel to Main Street. As a result, several businessmen opened workshops (blacksmiths, shoemakers, tanners, harness makers, weavers) or became tradesmen (carpenters, rock masons, sawyers). Other settlers built flourmills, made adobe bricks, or became innkeepers. With time, the small business district came to be known as Kays Creek, a suburb of Kaysville three miles to the south.

In 1907, the people living in Layton officially separated from Kaysville and a new town was born. Throughout the 1900's, there have been major developments which have changed the transportation infrastructure, such as the addition of Hill Air Force Base in 1940, I-15 in the 1960's, and Layton Hills Mall in 1980. The transportation infrastructure will continue to adapt to meet the needs as Layton City continues to develop.

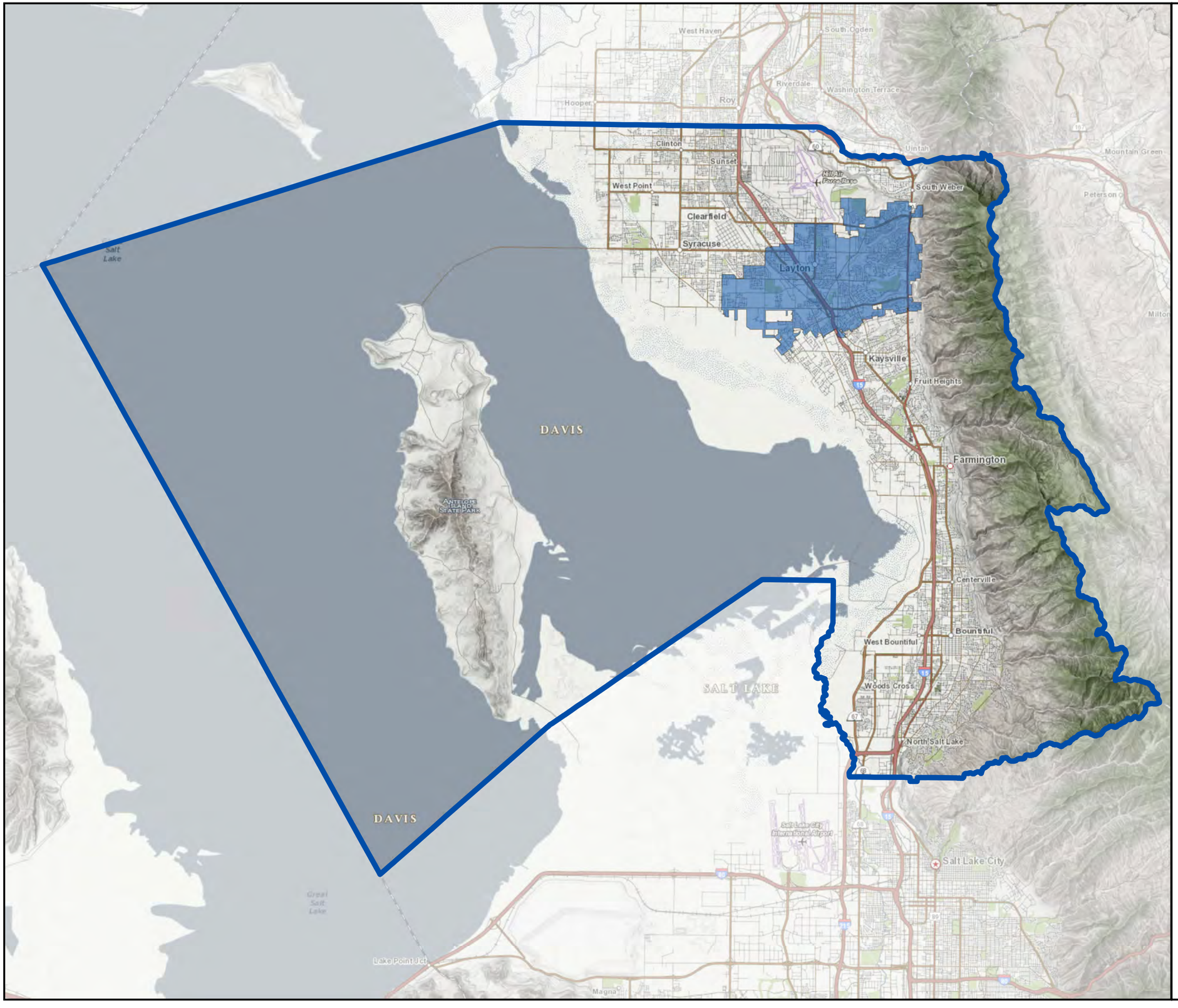


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Figure 02: Layton City Area Map

Legend

- Davis County
- Layton City Boundary

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Roadway Network Analysis

Transportation planning in the region is a cooperative effort of state and local agencies. The WFRC is responsible for coordinating this transportation planning process in the Ogden/Layton and Salt Lake urbanized areas as the designated Metropolitan Planning Organization (MPO). Metropolitan Planning Organizations are agencies responsible for transportation planning in urbanized areas throughout the United States. The Governor designated the Wasatch Front Regional Council (WFRC or Regional Council) as the Metropolitan Planning Organization for the Salt Lake and Ogden Areas in 1973. This section includes a general discussion on the travel demand modeling process used for this TMP, functional classification of streets, and level of service of streets and intersections. Also included are the existing and future conditions for 2026 and 2040.

Traffic Demand Modelling

Traffic Demand Modelling was used to project existing traffic conditions into the future. Layton City's land use plan, socioeconomic data as well as additional data obtained from the City and the Wasatch Front Regional Council (WFRC) serve as valuable input into the travel demand model. The WFRC has a regional travel demand model which was used for this TMP. This section discusses the socioeconomic data, land use, vehicle trip generation as well as the precautions of using the WFRC Travel Demand Model.

Land Use Planning

The majority of the socioeconomic data used in this study is based on the best available statewide data provided by the Governor's Office of Planning and Budget (GOPB). This data was supplemented and verified using the data provided by the City in the form of the current adopted general plan as of October 28, 2013 as shown in **Figure 3** (the most recent version can be found on Layton City's website at *www.laytoncity.org*).

The information is considered to be the best available data for predicting future travel demands. However, land use planning is a dynamic process and the assumptions made in this report should be used as a guide and should not supersede other planning efforts especially when it comes to localized intersections and roadways.

Socioeconomic Conditions

Currently, Layton City's population is estimated to be 72,500 residents which includes 22,356 dwelling units. The median household income in the city is $65,439 and the average family size is 3.59. The median age of Layton City residents is 29.2 years. The 2000 to 2010 decade saw moderate growth in Layton, with an increase in population from 58,474 to 67,311 (15.1 percent). The City has an unemployment rate of 3.10. There are 2,735 licensed businesses in the City and the average travel time to work for the workforce is 24 minutes.

Based on the current land use, zoning, demographics, and growth patterns, Layton City is expected to grow to approximately 85,000 residents by the year 2040. The forecasted growth within Layton City as well the surrounding cities will place increased pressure on the City's infrastructure, including the street network. Layton City is also committed to increasing commercial, office, and retail stores to provide greater opportunity for residents to live, work, and play in the City. This growth will therefore have considerable impact on traffic volumes in the City.

Trip Generation

In order to generate vehicle trips, sections of the city are split into geographical sections called Traffic Analysis Zones (TAZ). Each TAZ contains socioeconomic data including the number of households, employment opportunities, and average income levels. This data is used to generate vehicle trips that originate in the TAZ. All trips generated in the TAZ are assigned to other TAZs based on the data within other zones. Since the WFRC travel demand model predicts regional travel patterns, the TAZ structure was updated to obtain more detailed travel demand data for Layton City. This was completed by splitting larger TAZ's. The new TAZ structure used for this analysis is shown in **Figure 4**.

Travel Demand Model Precautions

Layton City aims to plan for and encourage responsible and sustainable growth in the City. Part of the commitment to provide a sustainable system includes encouraging a reduction in vehicle trips by providing a balance of roads, trails and bikeways, and public transit facilities. Today's transportation system should not only accommodate existing travel demands, but should also have built-in capacity to account for the demand that will be placed on the system in the future. While considering the socioeconomic data used in this report and the anticipated growth in the City, some precautions should be considered. First, the TAZ specific socioeconomic data only approximates the boundary conditions of the City and is based on data provided by WFRC and the City's planning documents. Second, actual values may vary somewhat as a result of the large study area of the regional travel demand model, which includes the unincorporated areas around Layton City. Therefore, the recommendations in this report represent a planning level analysis and should not be used for construction of any project without review and further analysis. This document should also be considered a living document and should be updated regularly as development plans, zoning plans, and traffic patterns and trends change.

Layton City General Plan

This map is an abstract representation of the adopted policies which make up the Layton City General Plan. This genereal representation is without scale and should not be used to determine specific land use on individual parcels, nor should the boundaries shown between land uses be interpreted to be exact.

Legend

General Plan

- Agricultural Holding Zone
- Business\Research Park
- Commercial
- Downtown Mixed Use
- High Density Over 16 Unit
- Hill AFB Easement Area
- Low Density 0-3 Units
- Low Density 2-4 Units
- Low Density 3-6 Units
- MU
- Manufacturing
- Medium Density 6-12 Units/ Acre
- Medium Density 8-16 Units/ Acre
- Mixed Use
- Open Space\Public Fac
- Professional Business
- Layton City Boundary
- Highway/Freeway
- Property
- APZ
- Hill Airforce Base Runway
- Proposed Annexaiton Areas
- Lakes
- Streams
- Rail Lines
- Interstate 15
- West Davis Corridor
- Business Node
- Commercial Node

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Date: 10/28/2013

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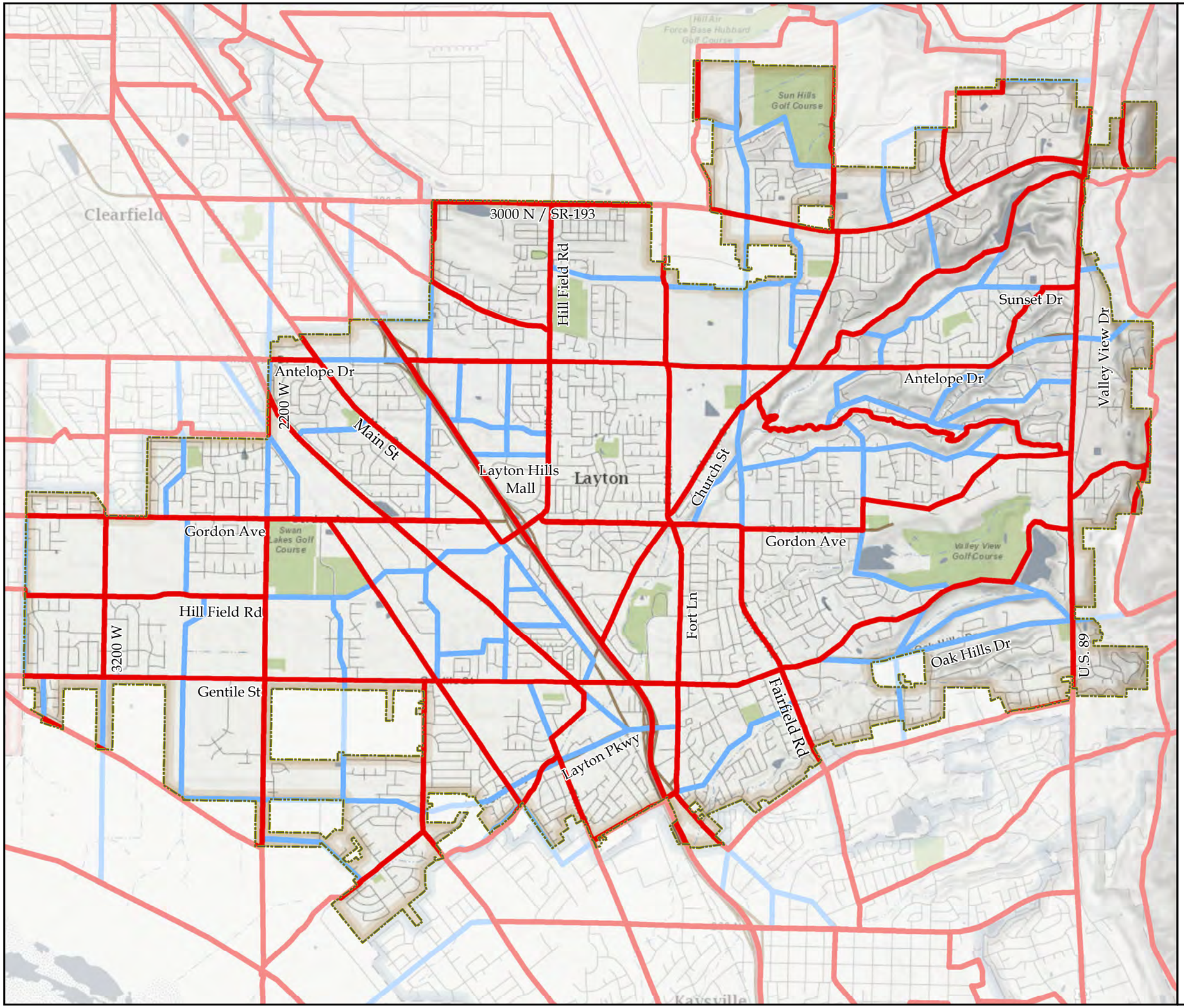
Figure 04: Traffic Analysis Zones



Legend

- WFRC Traffic Analysis Zones
- New Traffic Analysis Zone
- Layton City Boundary

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Functional Classification

All trips include two distinct functions: mobility and land access. Mobility and land access share an inverse relationship, meaning as mobility increases land access decreases. Street facilities are classified by the relative amounts of through and land-access service they provide. There are four primary classifications: Freeway/Expressway, Arterial, Collector and Local Streets. Each classification is explained in further detail in the following paragraphs and is also represented in **Figure 5**.

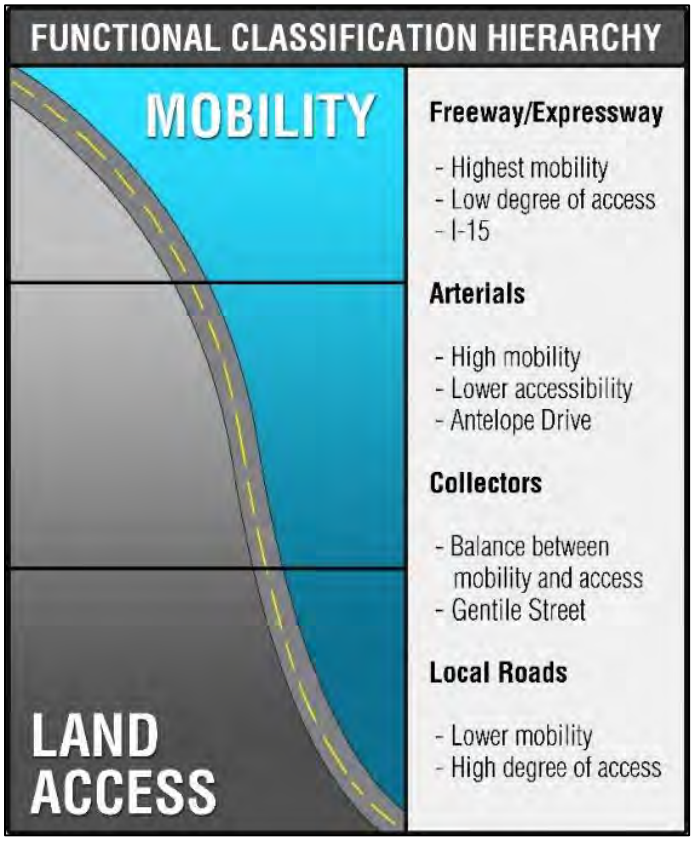
Freeways and Expressways – *Freeway and expressway facilities provide service for long distance trips between cities and states. No land access is provided by these facilities.*

Arterials – *Arterial facilities provide service primarily through-traffic movements. All traffic controls and the facility design are intended to provide efficient through movement. There are limited access points to these facilities.*

Collectors – *Collector facilities are intended to serve both through and land-access functions in relatively equal proportions. They are frequently used for shorter through movements associated with the distribution and collection portion of trips*.

Local Streets – *Local street facilities primarily serve land-access functions. The design and control facilitates the movement of vehicles onto and off of the street system from land parcels.*

Figure 5: Mobility vs. Access Chart



Each of the major classifications described above can be further subdivided. Currently in Layton City, arterials and collectors are divided into major and minor classifications. For each classification, major movements have higher carrying capacity and provide more through movements than the minor movements. For this TMP, the major and minor designations are determined based on the number of lanes on the roadway facility. **Table 1** shows the number of lanes and the right of way for each functional class. This designation helps in identifying the appropriate cross-section as well as the carrying capacity of the roadway.

Table 1: Typical Cross-Sections

Functional Classification	Number of Lanes	Right of Way Width (ft.)
Minor Street/Residential	2	50/58
Minor Collector	2	60
Collector	3	66
Minor Arterial	3	84
Arterial	5	100
Principal Arterial	7	124

For this TMP, each functional classification is color coded based on the number of lanes on each street. Many of the city streets were constructed prior to the adoption of the typical street sections and therefore do not comply with these standards. As such, designating the streets as arterials and collectors in the existing conditions analysis may be misleading.

Private streets are rare in the City and should be used where public streets are not possible. However, if private streets are allowed they should meet the minimum cross-section design shown in this chapter. A more detailed description of the characteristics of the four primary functional classifications of streets are found in **Table 2**.

All information on design and development in Layton City can be found in the Standard Drawings for the *Layton City Development Guidelines and Design Standards* adopted in April, 2015. The most current version can be found online at *http://www.laytoncity.org*.

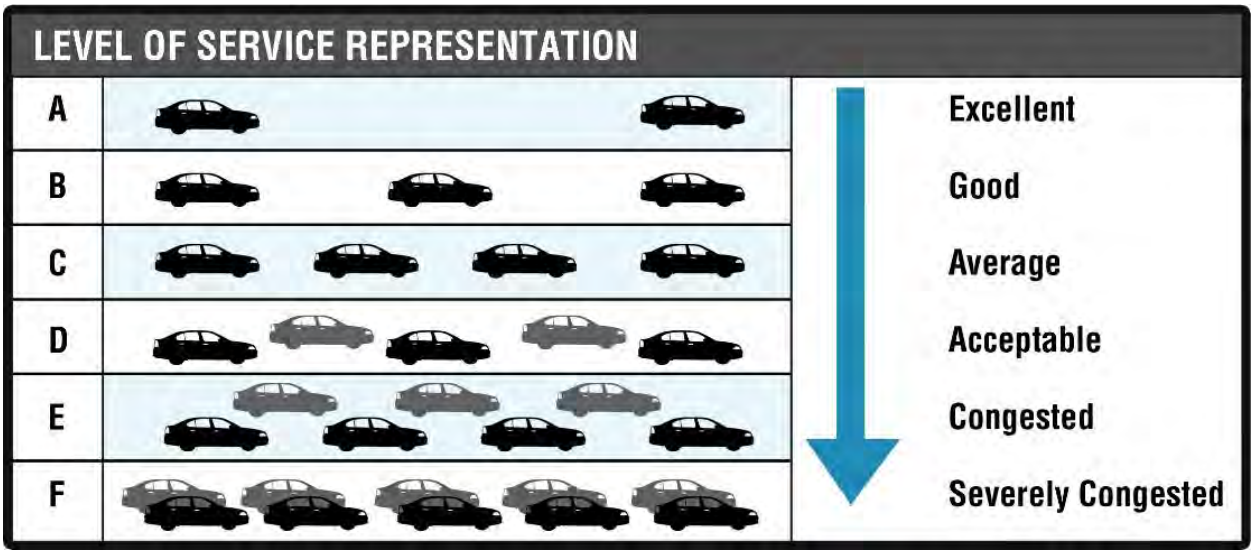
Table 2 Street Functional Classification

Characteristic	Functional Classification			
	Freeway and Expressway	Arterial	Collector	Local Street
Function	Traffic movement	Traffic movement, land access	Collect and distribute traffic between streets and arterials, land access	Land access
Typical % of Surface Street System Mileage	Not applicable	5-10%	10-20%	60-80 %
Continuity	Continuous	Continuous	Continuous	None
Spacing	4 miles	1-2 miles	½-1 mile	As needed
Typical % of Surface Street System Vehicle-Miles Carried	Not applicable	40-65%	10-20%	10-25 %
Direct Land Access	None	Limited: major generators only	Restricted: some movements prohibited; number and spacing of driveways controlled	Safety controls access
Minimum Roadway Intersection Spacing	1 mile	½ mile	300 feet-¼ mile	300 feet
Speed Limit	55-75 mph	40-50 mph in fully developed areas	30-40 mph	25 mph
Parking	Prohibited	Discouraged	Limited	Permitted
Comments	Supplements capacity of arterial street system & provides high-speed mobility	Backbone of street system		Through traffic should be discouraged

Level of Service

The adequacy of an existing street system can be quantified by assigning Levels of Service (LOS) to major roadways and intersections. As defined in the *Highway Capacity Manual (HCM),* a document published by the Transportation Research Board (TRB), LOS serves as the traditional form of measurement of a roadway's functionality. The TRB identifies LOS by reviewing elements, such as the number of lanes assigned to a roadway, the amount of traffic using the roadway and the time of delay per vehicle traveling on the roadway and at intersections. Levels of service range from A (free flow where users are virtually unimpeded by other traffic on the roadway) to F (traffic exceeds the operating capacity of the roadway) as shown in **Figure 6**.

Figure 6: Level of Service Representation



Roadway Level of Service

Roadway LOS is used as a planning tool to quantitatively represent the ability of a particular roadway to accommodate the travel demand. **Table 3** and **Table 4** show LOS traffic volume thresholds for each of the major roadways in the City. These values are based on HCM principles and regional experience. Roadway segment LOS can be mitigated with geometry improvements, additional lanes, two-way-left turn lanes, and access management.

Table 3 Suburban Freeway LOS Capacity Criteria in Vehicles per Day

Lanes	LOS D	LOS E
4	70,000	89,000
6	110,000	140,000

Table 4 Suburban Arterial and Collector LOS Capacity Criteria in Vehicles per Day

Lanes	Arterial		Collector	
	LOS D	LOS E	LOS D	LOS E
2	11,500	15,000	10,500	13,500
3	13,000	16,500	11,500	15,000
5	30,500	39,000	25,000	31,500
7	46,000	59,000	NA	NA

LOS D is approximately 80 percent of a roadway's capacity and is a common goal for urban streets during peak hours. A standard of LOS D for system streets (collectors and arterials) is acceptable for future planning. Attaining LOS C or better on these streets would be potentially cost prohibitive and may present societal impacts, such as the need for additional lanes and wider street cross-sections. LOS D suggests that for most times of the day, the roadways will be operating well below capacity. The peak times of the day will likely experience moderate congestion characterized by a higher vehicle density and slower than free flow speeds.

For two-lane Arterials and Collectors, the City may modify the LOS at their discretion for added safety and livability on a case by case basis.

Intersection Level of Service

Whereas roadway LOS considers an overall picture of a roadway to estimate operating conditions, intersection LOS looks at each individual movement at an intersection and provides a much more precise method for quantifying operations. Since intersections are typically a source of bottlenecks in the transportation network, a detailed look into vehicle delay at each intersection should be performed on a regular basis. The methodology for calculating delay at an intersection is outlined in the *H*ighway Capacity Manual (HCM) and the resulting criteria for assigning LOS to signalized and un-signalized intersections are outlined in **Table 5**. LOS D is considered the industry standard for intersections in an urbanized area. LOS D at an intersection corresponds to an average control delay of 35-55 seconds per vehicle for a signalized intersection and 25-35 seconds per vehicle for an un-signalized intersection.

At a signalized intersection under LOS D conditions, the average vehicle will be stopped for less than 55 seconds. This is considered an acceptable amount of delay during the times of the day when roadways are most congested. As a general rule, traffic signal cycle lengths (the length of time it takes for a traffic signal to cycle through each movement in turn) should be below 90 seconds. An average delay of less than 55 seconds suggests that in most cases, no vehicles will have to wait more than one cycle before proceeding through an intersection.

Un-signalized intersections are generally stop-controlled. These intersections allow major streets to flow freely, and minor intersecting streets to stop prior to entering the intersection. In cases where traffic volumes are more evenly distributed or where sight distances may be limited, four-way stop-controlled intersections are common. LOS for an un-signalized intersection is assigned based on the average control of the worst approach (always a stop approach) at the intersection. An un-signalized intersection operating at LOS D means the average vehicle waiting at one of the stop-controlled approaches will wait

no longer than 35 seconds before proceeding through the intersection. This delay may be caused by large volumes of traffic on the major street resulting in fewer gaps in traffic for a vehicle to turn, or for queued vehicles waiting at the stop sign. Roundabout LOS is also measured using the stopped controlled LOS parameters.

Table 5: Intersection Level of Service

LOS*	Signalized Intersection (sec)	Stop-Controlled/ Roundabout (sec)
A	≤10	≤10
B	>10-20	>10-15
C	>20-35	>15-25
D	>35-55	>25-35
E	>55-80	>35-50
F	≥80	≥50

*LOS F when traffic volumes exceed capacity

Intersection and roadway segment LOS problems must be solved independently of each other, as the treatment required to mitigate the congestion is different in each case. Intersection problems may be mitigated by adding turn lanes, improving signal timing, and improving corridor signal coordination.

Existing Roadway Network Conditions

Travel Demand Model Calibration

As with the TAZ structure, the WFRC Travel Demand Model was calibrated to fit existing traffic conditions in Layton City. The method used to calibrate the model was to use traffic counts throughout the City. Traffic counts were collected from UDOT and include annual average daily traffic (AADT) volumes as defined in *Traffic on Utah Highways.* On City owned roadways, traffic counts were either provided by Layton City or were manually counted as part of this TMP. **Figure 7** shows the count locations throughout the City used for model calibration.

Existing Functional Classification and Level of Service

The existing functional classification used in the WFRC Travel Demand Model is shown in **Figure 8**. The LOS was calculated for each roadway and intersection according to the guidelines explained in the Level of Service section and a LOS map is included in **Figure 9**. Avenue Consultants was hired to complete the intersection Level of Service analysis. The intersection LOS is not represented on the map, but the results of their analysis are found in **Appendix A: Intersection Analysis**.

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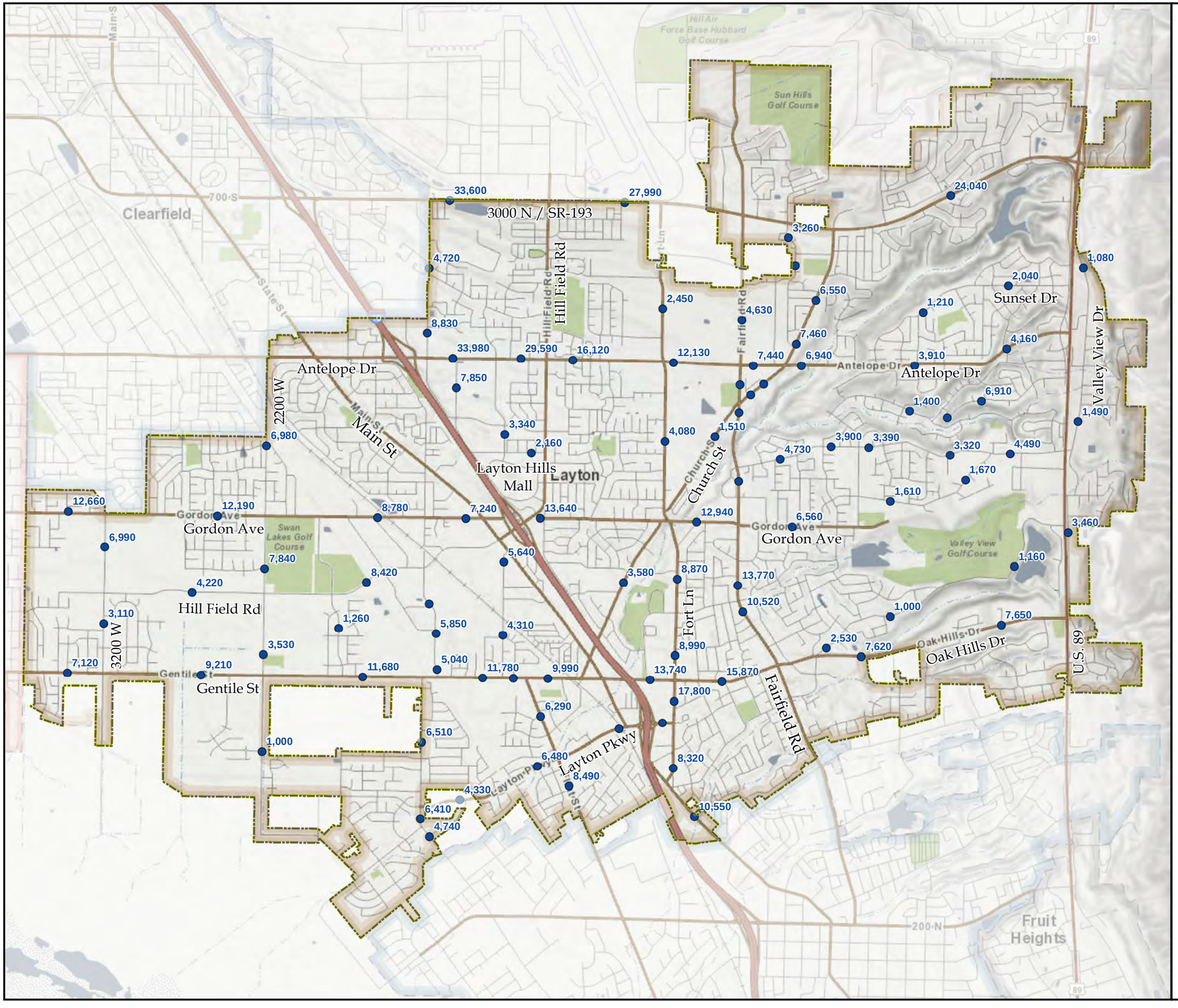
Figure 07: Existing Daily Traffic Volumes



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- Daily Traffic Count
- Layton City Boundary

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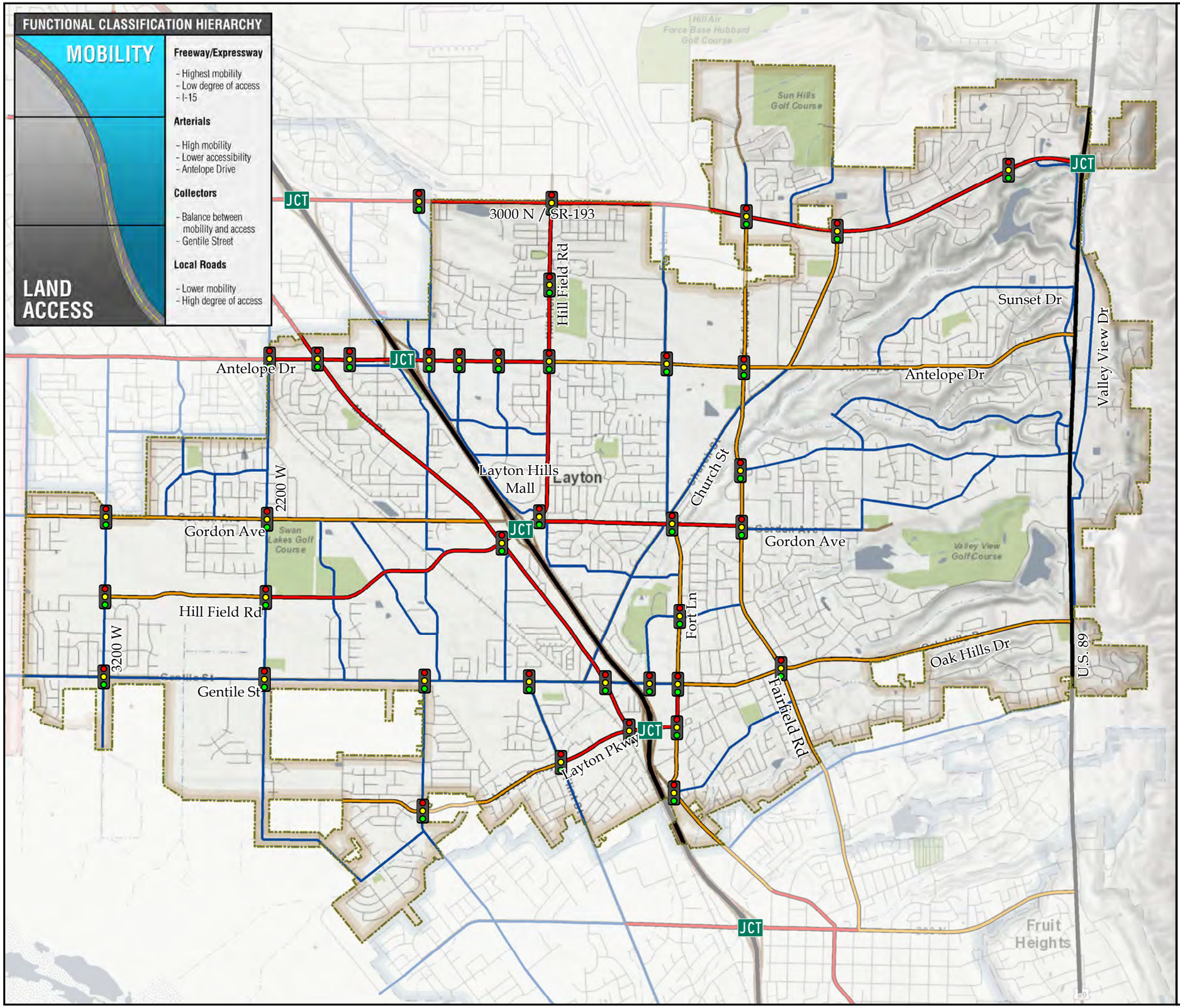

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Figure 08: Existing Roadway Network

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Existing Roadway Network

- Freeway/Expressway
- Major Arterial 4/5 Lanes
- Minor Arterial 2/3 Lanes
- Collector 2/3 Lanes
- JCT Existing Interchange
- Existing Traffic Signal
- Layton City Boundary

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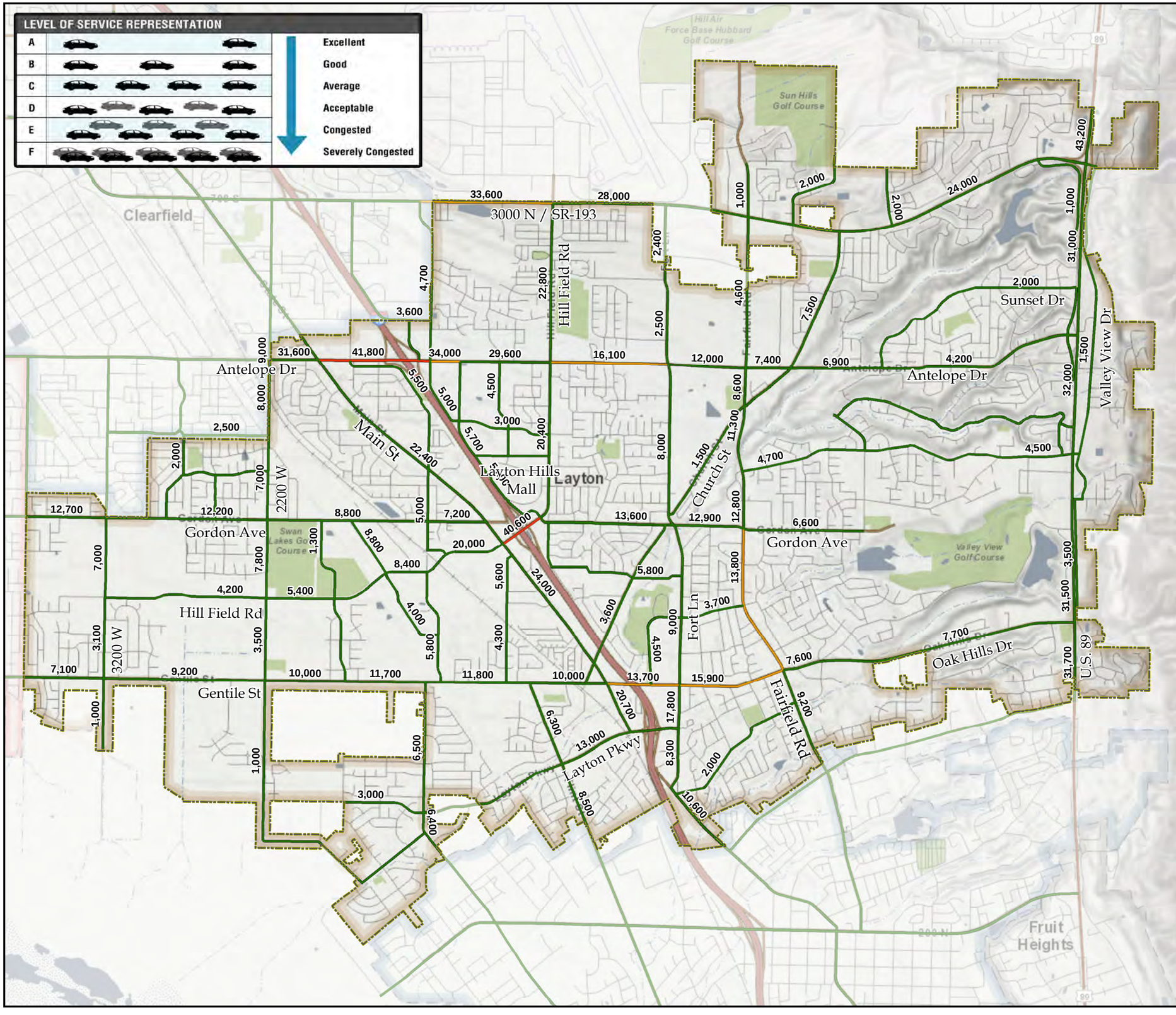

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Figure 09: Existing Level of Service

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- Acceptable (LOS D or Better)
- Unacceptable (LOS E)
- Unacceptable (LOS F)
- Layton City Boundary

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Mitigations to Existing Capacity Deficiencies

Using LOS D as the threshold for roadway improvements in **Figure 9** (Indicated by red lines), the following shows the roadways and intersections (from **Appendix A: Intersection Analysis**) that have existing capacity deficiencies:

Roadway Segments at or below LOS E:

- **Antelope Drive**: Hill Field Road to Fort Lane and University Park Blvd. to 1000 West
- **3000 North (SR 193):** University Park Blvd to Hill Field Road
- **Fairfield Road:** Gordon Avenue to Gentile Street
- **Gentile Street:** Main Street to Fairfield Road
- **Antelope Drive:** University Park Blvd. to Main Street
- **Hill Field Road:** Junction with I-15

Intersections at or below LOS E

- **Weaver Lane and Angel Street**

In most cases, roadway capacity improvements are achieved by adding travel lanes. In some cases additional capacity can be gained by striping additional lanes where the existing pavement width will accommodate it. This can be accomplished by eliminating on street parking, creating narrower travel lanes, and adding two-way left turn lanes where they don't currently exist. For all roadway capacity improvements, it is recommended to investigate other mitigation methods before widening the roadway.

At signalized intersections, methods to improve intersection LOS include additional left and right turning lanes and signal timing improvements. The only intersection below LOS D is at Weaver Lane and Angel Street. The solution for this intersection would be to install a traffic signal with an exclusive northbound left turn lane.

Future Roadway Network Conditions

By calibrating the WFRC Travel Demand Model to fit the existing traffic conditions in Layton City, the model is prepared to project traffic volumes into the future. There are two future models used for this TMP. The first model used was to identify potential capacity deficiencies, called the 2040 No Build Model. The other model used was the 2040 Master Plan Solution Model, which includes all future projects to improve the deficiencies in the 2040 No Build Model.

No Build Level of Service

A no-build scenario is intended to show what the roadway network would be like in the future if no action is taken to improve the City roadway network. The travel demand model was again used to predict this condition by applying the future growth and travel demand to the existing roadway network. As shown in **Figure 10**, the following roadways would perform at LOS E or worse if no action were taken to improve the roadway network:

- **Antelope Drive** (Fairfield Road to Western Border)
- **3000 North** (Fairfield Road to Western Border)
- **Gentile Street** (2200 West to 3200 West; Flint Street to Sugar Street; Fairfield Road to Main Street)

- **Gordon Avenue** (2200 West to Western Border)
- **US 89** (Northern Border to Southern Border)
- **Fairfield Road** (Antelope Drive to Gentile Street)
- **Hill Field Road** (Junction with I-15)
- **2200 West** (Antelope Drive to Hill Field Road)
- **Flint Street** (Layton Parkway to Southern Border)

Intersections at or below LOS E

- **Antelope Drive and Robins Way**
- **Antelope Drive and Hill Field Road**
- **Antelope Drive and Church Street**
- **Fairfield Road and Church Street**
- **Angel Street and Gentile Street**
- **Wasatch Drive and Gentile Street**
- **Fort Lane and Gentile Street**
- **Fairfield Road and gentile Street**
- **Oak Hills Drive and Gentile Street**
- **2700 West and Layton Parkway**

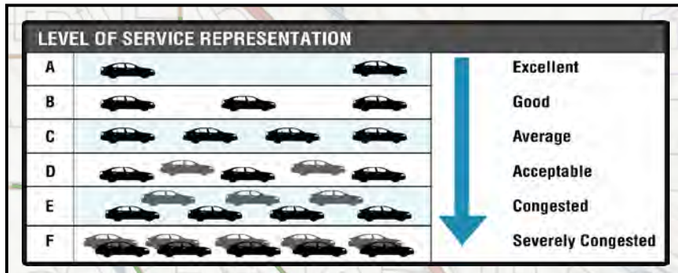

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Figure 10: 2040 No Build Level of Service

Legend

- Acceptable (LOS D or Better)
- Unacceptable (LOS E)
- Unacceptable (LOS F)
- Layton City Boundary

N

HORROCKS

0 0.5 1 2 Miles

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2040 Roadway Network Conditions

Improvements will need to be made as growth occurs in order to preserve the quality of life for Layton City residents and to maintain an acceptable LOS on city streets and intersections. These improvements will also provide a sound street system that will support the City's growing economic base.

The No Build Level of Service as well as the WFRC long range plan form the basis for improving the Layton City roadway network for 2040. The WFRC long range plan is included in this TMP as **Figure 11**. The 2040 network was developed through a series of iterations with input from City staff, planning commission and the city council. The final recommended roadway network seeks to balance accommodating demand through the year 2040 with fiscal responsibility, while also considering the planning efforts of neighboring cities. Many of the neighboring cities and other jurisdictional stake holders including Kaysville City, Syracuse City, Fruit Heights City, Clearfield City, and UDOT were consulted and their input welcomed and considered during the planning process. The culmination of this analysis, as well as the efforts of the planning commission and city council, are shown as a recommended 2040 roadway network in **Figure 12**. The following paragraphs outline some of the highlights of the proposed street network.

Roadway Improvements

- **3000 North (SR-193)** (Hill Field Road to I-15): Widen to 7 lanes from Hill Field Road to I-15
- **Antelope Drive** (University Park Blvd to Main Street): Widen to 7 Lanes
- **Hill Field Road** (Gordon Avenue to Main Street): Widen to 7 Lanes
- **Gordon Avenue** (Fairfield Road to US-89): New 3 lane arterial connecting Fairfield Road to US-89 (Widen existing roadway portions)
- **Gentile Street** (Fairfield Rd to Main Street): Widen to 5 Lanes
- **2700 West** (West Davis Corridor to Hill Field Road): Widen/New Roadway to 5 Lanes
- **Fairfield Road** (Cherry Lane to Gentile Street): Widen to 5 Lanes
- **US-89** (Northern Border to Southern Border): Convert Expressway to Freeway. Add frontage roadways along the corridor
- **Layton Parkway** (End of Existing to 2700 West): New 3 Lane Arterial
- **West Davis Corridor:** New Freeway along southwest border of Layton City with an interchange at 2200 W./2700 W.
- **Oak Hills Drive** (Fairfield Drive to US-89): Widen to 5 Lanes

Intersection Improvements

- **Antelope Drive and Robins Way:** Add dual southbound lanes
- **Antelope Drive and Hill Field Road:** Add dual eastbound and westbound turning lane; add exclusive westbound right turn lane; add exclusive northbound right turn lane with turn arrow on signal
- **Antelope Drive and Church Street:** Add roundabout with a channelized right on westbound leg
- **Fairfield Road and Church Street:** Install traffic signal to improve safety
- **Angel Street and Gentile Street:** Consider realignment of Sugar Street and Angel Street
- **Wasatch Drive and Gentile Street:** Add dual eastbound and westbound through lanes; add a northbound left arrow

- **Fort Lane and Gentile Street:** Add dual eastbound and westbound through lanes; add a northbound right arrow
- **Fairfield Road and Gentile Street:** Add dual eastbound and westbound through lanes; add left turn arrows on all legs
- **Oak Hills Drive and Gentile Street:** Add a roundabout
- **2700 West and Layton Parkway:** Add a new intersection

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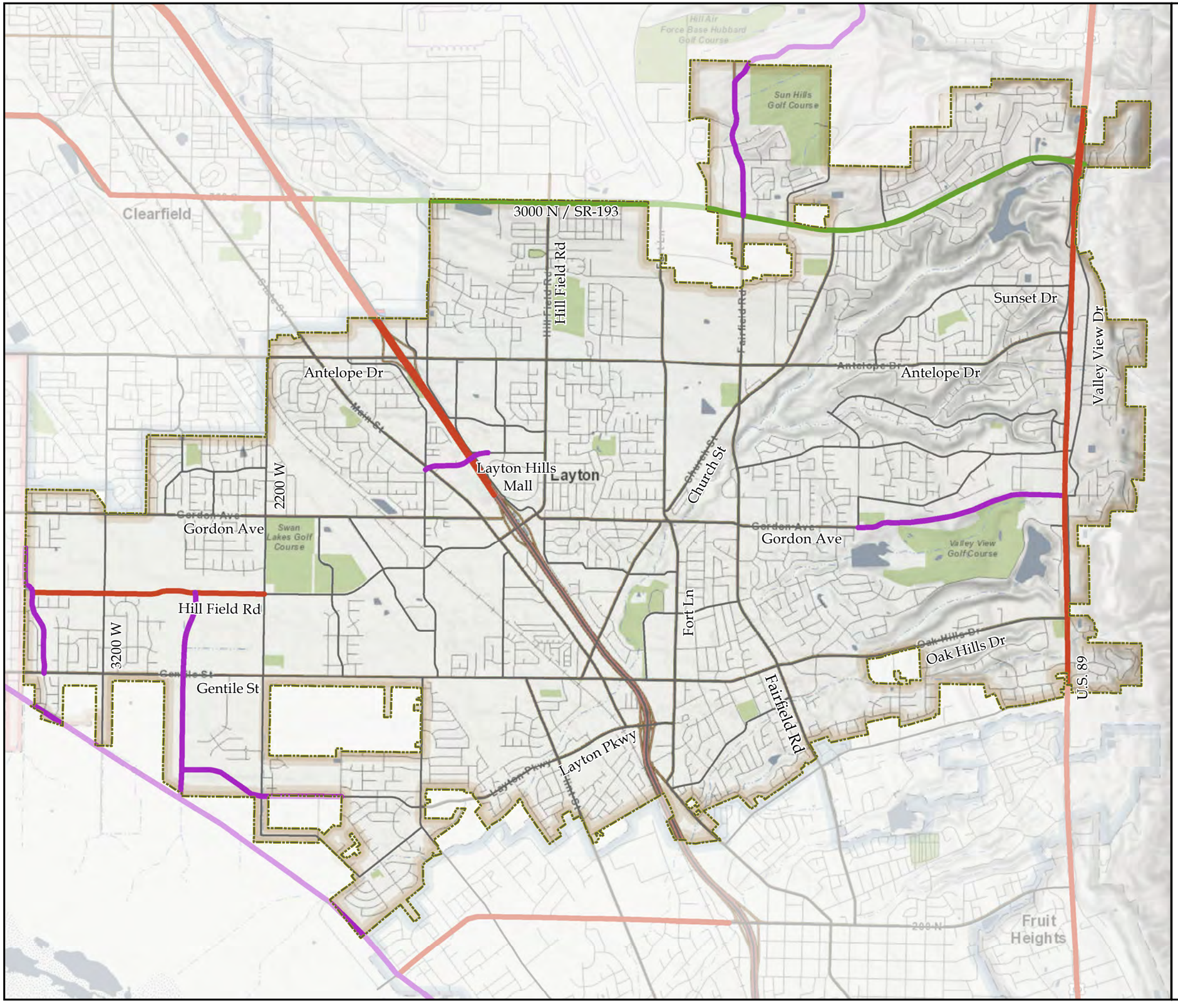
Figure 11: WFRC Long Range Transportation Plan



Legend

WFRC 2015-2040 RTP

- New Construction
- Operational
- Widening
- Layton City Boundary

N

HORROCKS

0 0.5 1 2 Miles

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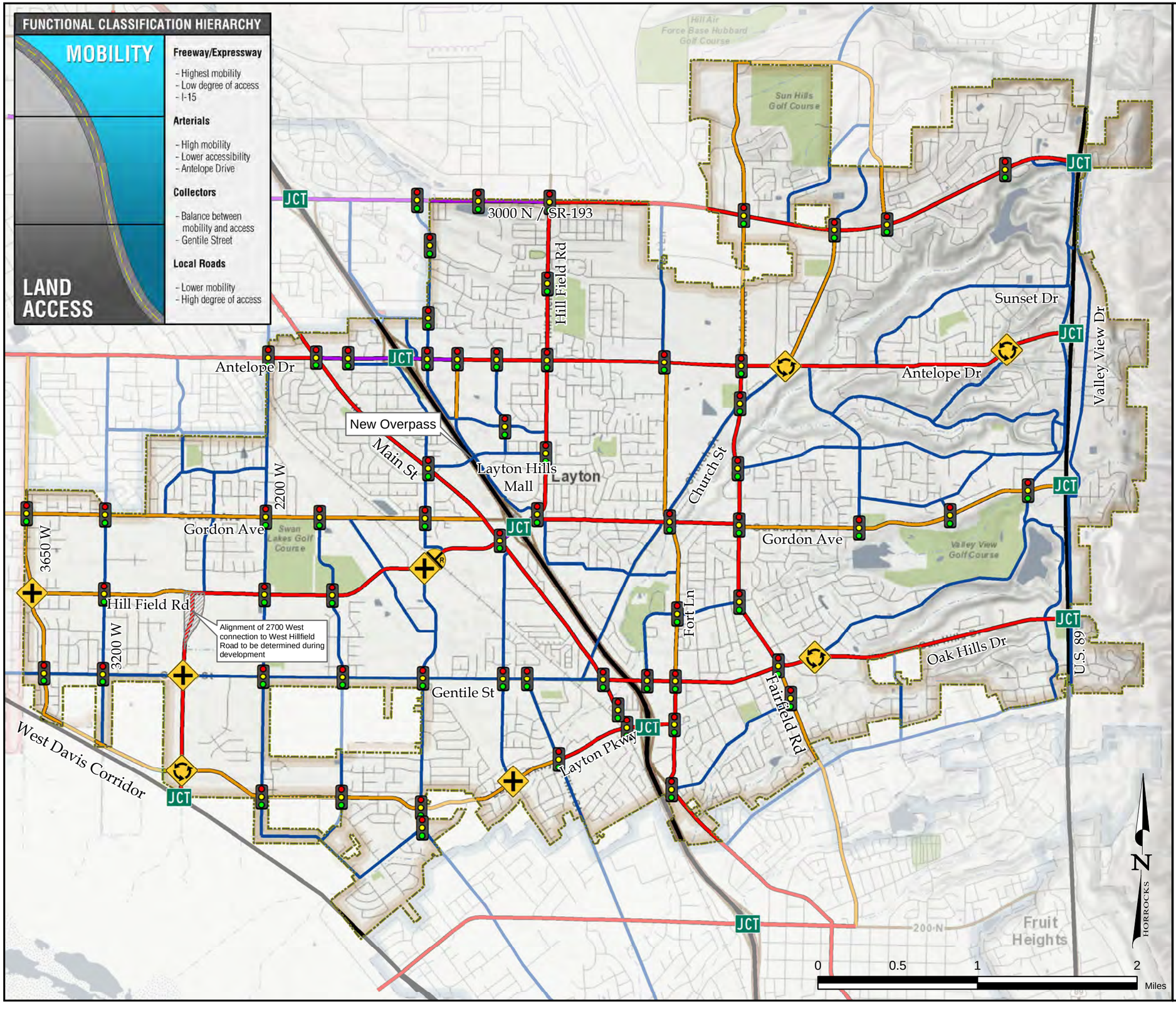

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Figure 12: 2040 Master Plan Solution

Legend

2040 Roadway Network

- Freeway
- Principal Arterial 6/7 Lanes
- Major Arterial 4/5 Lanes
- Minor Arterial 2/3 Lanes
- Collector 2/3 Lanes
- JCT Freeway Interchange
- Traffic Signal
- Roundabout
- Intersection Treatment
- Railroad Overpass
- Layton City Boundary
- Potential Alignment Area

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It is expected that the roadway network recommended in this document will perform at an acceptable LOS through the planning year of 2040 as shown in **Figure 13**. This will help in preserving the quality of life and economic vitality of the City. The specific details of the recommended roadway network are discussed more extensively in subsequent sections.

As part of this TMP, all intersections in Layton City were analyzed. Using the existing intersection LOS (see **Figure 9**) as well as volume projections to 2040, the proposed intersection improvements are shown in **Table 6**. Although **Table 6** indicates the predicted intersection improvements for 2040, LOS for signals is very difficult to predict in the distant future. It is recommended that the signalized intersections in the City be regularly monitored and signal timings adjusted as needed to maintain acceptable operating conditions. Additionally, care should be taken to regularly monitor the non-signalized intersections in the City and, where appropriate, signal warrant studies should be performed to assess whether a traffic signal is warranted. Funding sources for signals should be explored and may include general funds, impact fees where appropriate and/or a special transportation improvement funds.

Table 6: Intersection Improvements for 2040

Intersection	Existing LOS	2040 No Build LOS	Recommended Improvement	Improved LOS
Antelope Drive & Robins Way	54s – D	49s – D	Dual SBL	29s – C
Antelope Drive & Hill Field Road	42s – D	76s – E	Dual EBL & WBL turn lanes; Exclusive WBR turn lane; Exclusing NBR turn lane w/ turn arrow	52s – D
Antelope Drive & Church Street	14s – B	84s – F	Roundabout with channelized WBR	33s – D
Fairfield Road & Church Street	20s – C	32s – D	Install traffic signal to improve safety	15s – B
Angel Street & Gentile Street	25s – C	20s – B	Consider aligning Sugar St w/ Angel St	20s – B
Wasatch Drive & Gentile Street	12s – B	18s – B	Dual EB & WB through lanes; install EB left turn arrow	9s – A
Fort Lane & Gentile Street	42s – D	112s – F	Dual EB & WB through lanes; add NB right turn arrow	36s – C
Fairfield Road & Gentile Street	20s – B	69s – E	Dual EB & WB through lanes; left turn arrows on all legs	32s – C
Oak Hills Drive & Gentile Street	30s – D	>180s – F	Concept Design – Roundabout	NA
2700 W & Layton Pkwy	NA	NA	New Intersection (see interchange concept)	13s – B
Weaver Lane & Angel Street	46s – E	>180s – F	Install traffic signal and an exclusive NB left turn lane	10s – B

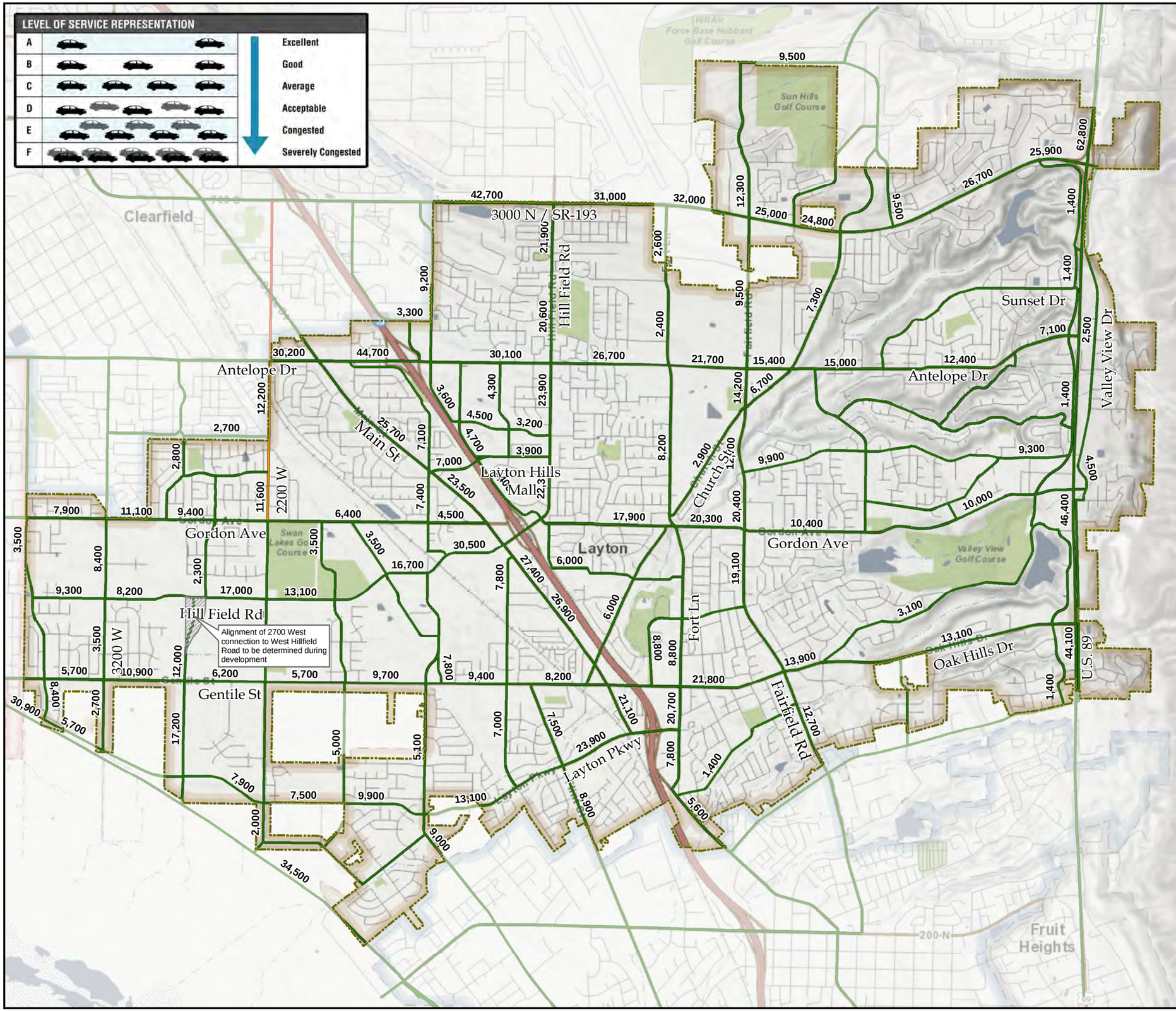

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Figure 13: 2040 Master Plan Level of Service

Legend

- Acceptable (LOS D or Better)
- Unacceptable (LOS E)
- Unacceptable (LOS F)
- Layton City Boundary
- Potential Alignment Area

N

HORROCKS

0 0.5 1 2 Miles

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Capital Facilities Plan

As growth continues in Layton City, the roadway network will need to be improved by constructing new roads, widening existing transportation corridors, and making intersection improvements to provide future residents of the city with an adequate transportation system. A concept plan for future growth between the planning years of 2017-2040 is provided in **Figure 12**.

Transportation Needs as a Result of New Development

The specific roadway network needs resulting from future growth throughout Layton City are identified in **Figure 14**. Updating **Figure 14** is necessary since project scopes change and development occurs throughout the City. All projects necessary to improve the roadway network were identified and compiled into tables to produce a Transportation Improvement Plan (TIP). All projects under Layton City's and UDOT's jurisdictions are found in **Table 7** and **Table 8** respectively.

Many of the identified projects are for UDOT roads or roads which would be eligible for WFRC funding. Where a planned project occurs on a UDOT road, it is assumed that the City would not participate in funding that project. In the case of WFRC eligible roadways, the City would be responsible for an approximate 8% match of the total project cost. This 8% would be need to be funded by the City with a mechanism such as impact fees.

In cases where UDOT and WFRC would not participate in funding a particular project, Layton City may share the cost of the roadway with the development community in cases where those projects are the result of new growth. The cost of a roadway widening would be 100% the responsibility of the City but may be funded using impact fees. Where new roads are planned, adjacent developers would be responsible for the construction costs of a local street section (the minimum requirement to access their individual development). The City would be required to fund any improvements beyond that of a local street section, for example a collector or arterial street section where planned. The City portion of the cost for new roads will be funded by impact fees at 100%. See **Appendix B: Cost Estimates** for more details.

The cost estimates shown, in cooperation with City officials, represent the costs of construction, right-of-way, and engineering. All costs represent 2017 costs. Project timing should be determined by development and transportation needs. It is expected that the total cost of roadway improvements funded by Layton City for 2040 will be approximately **$41,318,000**.

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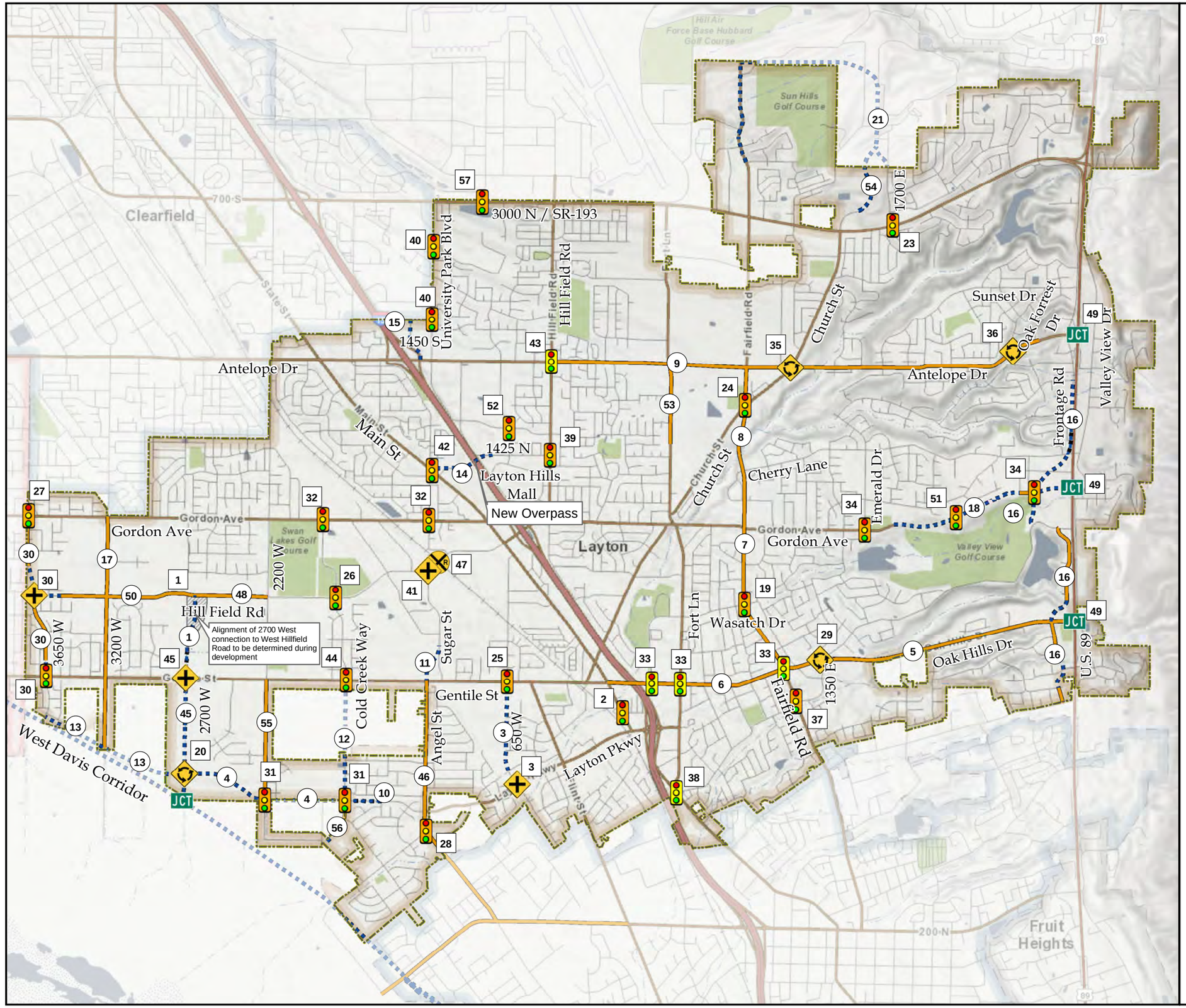
Figure 14: Proposed Roadway Projects



Legend

Proposed Roadway Projects

- New Roadway
- Capacity Improvement
- JCT Proposed Interchange
- Proposed Signal
- Proposed Signal Modification
- Intersection Treatment
- Roundabout
- Railroad Overpass
- Layton City Boundary
- Potential Alignment Area

16 Roadway Project Number

49 Intersection Project Number

N

HORROCKS

0 0.5 1 2 Miles

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Table 7: Capital Facilities Plan - Layton City Responsibility

Capital Facilities Plan – Layton City Responsibility						
No.	**Location**	**Total Price**	**Funding Source**	**Range (Yr)**	**Layton City %**	**Layton City Total**
1	2700 West: West Hillfield Road to Gentile Street	$4,001,000	Layton	2026	29%	$1,158,000
2	Traffic Signal: 200 South and Main Street	$340,000	Layton	2040	100%	$340,000
3	650 West: Weaver Lane to Gentile St	$3,647,000	Layton	2040	15%	$541,000
4	Layton Parkway: 1700 West to 2700 West	$3,591,000	Layton	2026	29%	$1,039,000
7	Fairfield Road: Gentile Street to Cherry Lane	$274,000	Layton	2040	100%	$274,000
8	Fairfield Road: Cherry Lane to Antelope Drive	$2,439,000	Layton	2040	100%	$2,439,000
9	Antelope Drive: Hill Field Rd. to Oak Forest	$248,000	Layton	2040	100%	$248,000
11	Angel Street and Sugar Street Connection	$1,125,000	Layton	2026	100%	$1,125,000
12	1700 West: 300 South to Weaver Lane	$4,500,000	Layton	2040	15%	$667,000
13	Layton Parkway: 2700 West to Bluff Ridge Blvd	$6,700,000	Layton	2040	29%	$1,939,000
17	3200 West: West Hillfield Road to Northern Boundary	$2,114,000	Layton	2026	100%	$2,114,000
18	Gordon Ave: 1800 East to Highway 89	$8,010,000	Layton	2026	100%	$8,010,000
19	Signal: Wasatch Drive and Fairfield Road	$272,000	Layton	2026	100%	$272,000
20	Roundabout: 2700 West and Layton Parkway	$650,000	Layton	2026	100%	$650,000
21	Eastridge Business Loop: Fairfield Rd (End of Existing) to Church St	$5,863,000	Layton	2040	15%	$869,000
24	Signal: Fairfield Road and Church Street	$272,000	Layton	2026	100%	$272,000
25	Signal: Gentile Street and 650 West	$272,000	Layton	2026	100%	$272,000
26	Signal: Hill Field Road and Cold Creek Way	$272,000	Layton	2026	100%	$272,000
27	Signal: Gordon Avenue and 3700 West	$272,000	Layton	2040	100%	$272,000

Capital Facilities Plan – Layton City Responsibility						
No.	**Location**	**Total Price**	**Funding Source**	**Range (Yr)**	**Layton City %**	**Layton City Total**
28	Signal: Weaver Lane and Angel Street	$272,000	Layton	2026	100%	$272,000
29	Roundabout: Oak Hills Drive and Gentile Street	$378,000	Layton	2026	100%	$378,000
30	3650 West: Gordon Ave to Gentile Street	$2,877,000	Layton	2026	29%	$835,000
31	Signals: Layton Pkwy at 1700 West & 2200 West	$544,000	Layton	2026	100%	$544,000
32	Signals: Gordon Ave at 1200 West (Angel St) and Cold Creek Way	$544,000	Layton	2026	100%	$544,000
33	Signal Modifications: Gentile Street at Wasach Drive, Fort Lane and Fairfield Road	$816,000	Layton	2026	21%	$174,000
34	Signals: Gordon Ave at Emerald Drive and 2600 East	$544,000	Layton	2026	100%	$544,000
35	Roundabout: Antelope Drive and Church Street	$680,000	Layton	2040	100%	$680,000
37	Signal: Fairfield Road and Rosewood Lane	$272,000	Layton	2040	100%	$272,000
38	Signal: Main Street and Fort Lane	$272,000	Layton	2040	100%	$272,000
40	Signals: University Park Blvd and 2600 North	$272,000	Layton	2040	100%	$272,000
41	Signal: West Hillfield and Sugar Street	$272,000	Layton	2026	100%	$272,000
44	Signal: Gentile and Cold Creek Way	$272,000	Layton	2040	100%	$272,000
45	2700 West: Gentile Street to West Davis Corridor	$7,869,000	Layton	2026	29%	$2,277,000
46	Angel Street: Gentile Street to Kaysville Border	$1,742,000	Layton	2026	100%	$1,742,000
47	Hill Field Road: Railroad Crossing	$1,742,000	Layton/WFRC	2040	8%	$2,356,000
48	Hill Field Road: 2200 West to 2700 West	$2,720,000	Layton	2026	42%	$1,133,000
50	West Hillfield Road: 2700 West to 3650 West	$4,365,000	Layton	2040	29%	$1,263,000
51	Signal: 2100 East and Gordon Avenue	$272,000	Layton	2026	100%	$272,000

Capital Facilities Plan – Layton City Responsibility						
No.	**Location**	**Total Price**	**Funding Source**	**Range (Yr)**	**Layton City %**	**Layton City Total**
52	Signal: Herritage Park and Layton Hills Parkway	$272,000	Layton	2026	100%	$272,000
53	Fort Lane: 1500 North to Antelope Drive	$1,200,000	Layton	2040	100%	$1,200,000
54	Church Street: 3100 North to 3300 North	$1,688,000	Layton	2026	100%	$1,688,000
55	2200 West: Gentile Street to 1000 South	$810,000	Layton	2026	100%	$810,000
56	1700 West: Layton Parkway to Westside Drive	$1,350,000	Layton	2026	15%	$201,000
	Total	**$76,907,000**				**$41,318,000**

Table 8: Capital Facilities Plan - UDOT Responsibility

Capital Facilities Plan – UDOT Responsibility						
No.	**Location**	**Total Price**	**Funding Source**	**Range (Yr)**	**Layton City %**	**Layton City Total**
5	Oaks Hill Drive: US-89 to Fairfield Rd.	$8,933,000	UDOT	2040	0%	$0
6	Gentile St.: Main Street (SR-126) to Fairfield Rd	$13,888,000	UDOT	2026	0%	$0
14	Midtown Crossing (1425 North: Main Street to Hillfield Road)	$20,000,000	UDOT	2026	0%	$0
16	Frontage Road to US-89: Mutton Hollow Road to 1000 North (West Side)	$3,005,000	UDOT	2026	0%	$0
23	Signal: SR-193 and 1700 East	$272,000	UDOT	2026	0%	$0
39	Signal: Hill Field Road and 1425 North	$272,000	UDOT	2026	0%	$0
42	Signal: Main Street and 1425 Bridge Overpass	$272,000	UDOT	2026	0%	$0
49	US-89 Interchanges	$275,000,000	UDOT	2026	0%	$0
57	Signal: SR-193 and Weber State University Campus Connection	$272,000	UDOT	2040	0%	$0
	Total	**$321,914,000**				**$0**

Proposed Means to Meet Demands of New Development

All possible revenue sources have been considered as a means of financing transportation capital improvements needed as a result of new growth. This section discusses the potential revenue sources that could be used to fund transportation needs as a result of new development.

Transportation routes often span multiple jurisdictions and provide regional significance to the transportation network. As a result, other government jurisdictions or agencies often help pay for such regional benefits. Those jurisdictions and agencies could include the Federal Government, the State Government or UDOT, or WFRC. The City will need to continue to partner and work with these other jurisdictions to ensure the adequate funds are available for the specific improvements necessary to maintain an acceptable LOS. The City will also need to partner with adjacent communities to ensure corridor continuity across jurisdictional boundaries (i.e., arterials connect with arterials; collectors connect with collectors, etc.).

Funding sources for transportation are essential if Layton City recommended improvements are to be built. The following paragraphs further describe the various transportation funding sources available to the City.

Federal Funding

Federal monies are available to cities and counties through the federal-aid program. UDOT administers the funds. In order to be eligible, a project must be listed on the five-year Statewide Transportation Improvement Program (STIP).

The Surface Transportation Program (STP) funds projects for any roadway with a functional classification of a collector street or higher as established on the Functional Classification Map. STP funds can be used for both rehabilitation and new construction. The Joint Highway Committee programs a portion of the STP funds for projects around the state in urban areas. Another portion of the STP funds can be used for projects in any area of the state at the discretion of the State Transportation Commission. Transportation Enhancement funds are allocated based on a competitive application process. The Transportation Enhancement Committee reviews the applications and then a portion of the application is passed to the State Transportation Commission. Transportation enhancements include 12 categories ranging from historic preservation, bicycle and pedestrian facilities and water runoff mitigation. Other federal and state trail funds are available from the Utah State Parks and Recreation Program.

WFRC accepts applications for federal funds through local and regional government jurisdictions. The WFRC Technical Advisory and Regional Planning committees select projects for funding annually. The selected projects form the Transportation Improvement Program (TIP). In order to receive funding, projects should include one or more of the following aspects:

- **Congestion Relief** – spot improvement projects intended to improve Levels of Service and/or reduce average delay along those corridors identified in the Regional Transportation Plan as high congestion areas
- **Mode Choice** – projects improving the diversity and/or usefulness of travel modes other than single occupant vehicles

- **Air Quality Improvements** – projects showing demonstrable air quality benefits
- **Safety** – improvements to vehicular, pedestrian, and bicyclist safety

State/County Funding

The distribution of State Class B and C Program monies is established by State Legislation and is administered by the State Department of Transportation. Revenues for the program are derived from State fuel taxes, registration fees, driver license fees, inspection fees, and transportation permits. Seventy-five percent of these funds are kept by UDOT for their construction and maintenance programs. The rest is made available to counties and cities. As many of the roads in Layton fall under UDOT jurisdiction, it is in the interests of the City that staff is aware of the procedures used by UDOT to allocate those funds and to be active in requesting the funds be made available for UDOT owned roadways in the City.

Class B and C funds are allocated to each city and county by a formula based on population, centerline miles, and land area. Class B funds are given to counties, and Class C funds are given to cities and towns. Class B and C funds can be used for maintenance and construction projects; however, thirty percent of those funds must be used for construction or maintenance projects that exceed $40,000. The remainder of these funds can be used for matching federal funds or to pay the principal, interest, premiums, and reserves for issued bonds.

In 2005 the state senate passed a bill providing for the advance acquisition of right-of-way for highways of regional significance. This bill would enable cities in the county to better plan for future transportation needs by acquiring property to be used as future right-of-way before it is fully developed and becomes extremely difficult to acquire. UDOT holds on account the revenue generated by the local corridor preservation fund but the county is responsible to program and control monies. In order to qualify for preservation funds, the City must comply with the Corridor Preservation Process found at the flowing link *www.udot.utah.gov/public/ucon* and also provided in **Appendix C: Corridor Preservation Process**. Currently, Layton City uses Class C funding for their transportation projects.

City Funding

Some cities utilize general fund revenues for their transportation programs. Another option for transportation funding is the creation of special improvement districts. These districts are organized for the purpose of funding a single specific project that benefits an identifiable group of properties. Another source of funding used by cities includes revenue bonding for projects intended to benefit the entire community.

Private interests often provide resources for transportation improvements. Developers construct the local streets within subdivisions and often dedicate right-of-way and participate in the construction of collector/arterial streets adjacent to their developments. Developers can also be considered a possible source of funds for projects through the use of impact fees. These fees are assessed as a result of the impacts a particular development will have on the surrounding roadway system, such as the need for traffic signals or street widening.

General fund revenues are typically reserved for operation and maintenance purposes as they relate to transportation. However, general funds could be used if available to fund the expansion or introduction

of specific services. The City of Layton currently uses Class C funding for their transportation improvements. Providing a line item in the City budgeted general funds to address roadway improvements, which are not impact fee eligible is a recommended practice to fund transportation projects should other funding options fall short of the needed amount.

General obligation bonds are debt paid for or backed by the City's taxing power. In general, facilities paid for through this revenue stream are in high demand amongst the community. Typically, general obligation bonds are not used to fund facilities that are needed as a result of new growth because existing residents would be paying for the impacts of new growth. As a result, general obligation bonds are not considered a fair means of financing future facilities needed as a result of new growth.

Certain areas might require different needs or methods of funding other than traditional revenue sources. A Special Assessment Area (SAA) can be created for infrastructure needs that benefit or encompass specific areas of the City. Creation of the SAA may be initiated by the municipality by a resolution declaring the public health, convenience, and necessity requiring the creation of a SAA. The boundaries and services provided by the district must be specified and a public hearing held prior to creation of the SAA. Once the SAA is created, funding can be obtained from tax levies, bonds, and fees when approved by the majority of the qualified electors of the SAA. These funding mechanisms allow the costs to be spread out over time. Through the SAA, tax levies and bonding can apply to specific areas in the City needing to benefit from the improvements.

Interfund Loans

Since infrastructure must generally built ahead of growth, it must sometimes be funded before expected impact fees are collected. Bonds are the solution to this problem in some cases. In other cases, funds from existing user rate revenue will be loaned to the impact fee fund to complete initial construction of the project. As impact fees are received, they will be reimbursed. Consideration of these loans will be included in the impact fee analysis and should be considered in subsequent accounting of impact fee expenditures.

Developer Dedications and Exactions

Developer dedications and exactions can both be credited against the developer's impact fee analysis. If the value of the developer dedications and/or extractions are less than the developer's impact fee liability, the developer will owe the balance of the liability to the city. If the dedications and/or extractions of the developer are greater than the impact fee liability, the city must reimburse the developer the difference.

Developer Impact Fees

Impact fees are a way for a community to obtain funds to assist in the construction of infrastructure improvements resulting from and needed to serve new growth. The premise behind impact fees is that if no new development occurred, the existing infrastructure would be adequate. Therefore, new developments should pay for the portion of required improvements that result from new growth. Impact fees are assessed for many types of infrastructures and facilities that are provided by a community, such as roadway facilities. According to state law, impact fees can only be used to fund growth related system improvements.

Alternative Modes of Transportation

Accommodating alternative modes of transportation is a vital consideration when planning a livable and sustainable community. As a vibrant and growing city, it is important for Layton City to continue to plan for improved transit, trails, and pedestrian facilities. These facilities will improve the overall quality of life of the residents while aiding in congestion relief and increasing the lifespan of the City's roadway network.

Non-Motorized Traffic

Pedestrian and bicycle safety is an important feature of any transportation master plan. People will be more inclined to walk or ride their bicycle when the experience is pleasant, they feel safe, and distances are reasonable. High-density housing near high-traffic generators or main street type areas encourages people to use alternative travel options from the automobile. In order to create a more connected and complete trail system, each of the roads that appear on both the Transportation Master Plan and the Preliminary Bicycle and Pedestrian Recommendations Map (shown in **Figure 15**) will include bicycle facilities. The design guidelines set forth in the Trails Master Plan should be followed when planning and constructing additional trails.

The following descriptions of bicycle-related terms are provided to assist readers who are unfamiliar with bicycle terminology. The terms bicycle and bike are used interchangeably.

- **Bikeway** - A thoroughfare suitable for bicycles - it may either exist within the right-of-way of other modes of transportation, such as highways, or along a separate and independent corridor.
- **Bicycle Facilities** - A general term denoting improvements and provisions to accommodate or encourage bicycling, including parking facilities, maps, all bikeways, and shared roadways.
- **Bicycle or Multi-use Path (Bike Path or Class 1)** - A bikeway physically separated from motorized vehicular traffic and either within the highway right-of-way or within an independent right-of-way. Bike path facilities are often excellent recreational routes and can be developed where right-of-way is available. Typically, bike paths are a minimum of 10 feet to 12 feet wide, with an additional graded area maintained on each side of the path.
- **Bicycle Lane (Bike Lane or Class 2)** - A portion of a roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists. Bike lanes are ideal for minor thoroughfares or collectors. Under certain conditions, bike lanes may be beneficial on streets with significant traffic volumes and/or speeds. Under ideal conditions, minimum bike lane width is four feet.
- **Signed Bike Route (Class 3)** - A segment of a system of bikeways designated by appropriate directional and/or informational signs. In this plan, a Class 3 signed bike route may be a local or residential street, Bicycle Boulevard, an arterial with wide outside lanes, or a roadway with a paved shoulder.

- **Paved Shoulder** - The part of the highway that is adjacent to the regularly traveled portion of the highway, is on the same level as the highway, and when paved can serve as a bikeway. Paved shoulders should be at least four feet wide, and additional width is desirable in areas where speeds are high and/or a large percentage of trucks use the roadway.
- **Wide Outside Lane** - An outside (curb) lane on a roadway that does not have a striped bike lane, but is of sufficient width for a bicyclist and motorist to share the lane with a degree of separation. A width of 14 feet is recommended to safely accommodate both motor vehicles and bicycles.
- **Bicycle Boulevard** - A residential street that has been modified for bicyclist safety and access.

Bicycle and pedestrian crossings are an important part of the transportation network. An analysis containing existing and future bike lanes and trails as well as pedestrian and bike crossings is included in this TMP. The trails map shown in **Figure 15** identifies areas of the city where trails and bike facilities are recommended. Wherever these facilities intersect a roadway, a safe and convenient crossing should be installed. These crossings can come in the form of standard pedestrian crossings at intersections, midblock HAWK signal crossings, grade separated bridges and tunnels, or standard pedestrian midblock crossings. Each crossing location must be treated individually and should follow the guidelines set forth in the MUTCD. The MUTCD also provides a specific set of criteria for when a pedestrian crossing is warranted based on vehicular and pedestrian traffic, proximity to high pedestrian generators such as schools, and safety considerations. In each case an engineering study should be performed before an at-grade pedestrian crossing is installed.

As part of this TMP, the bicycle and pedestrian policy as well as the cross sections and design guidelines were updated. The findings are included in this sections and detailed reports are found in **Appendix D: Biking and Walking Elements** and **Appendix E: Cross Section and Design Guidelines**.

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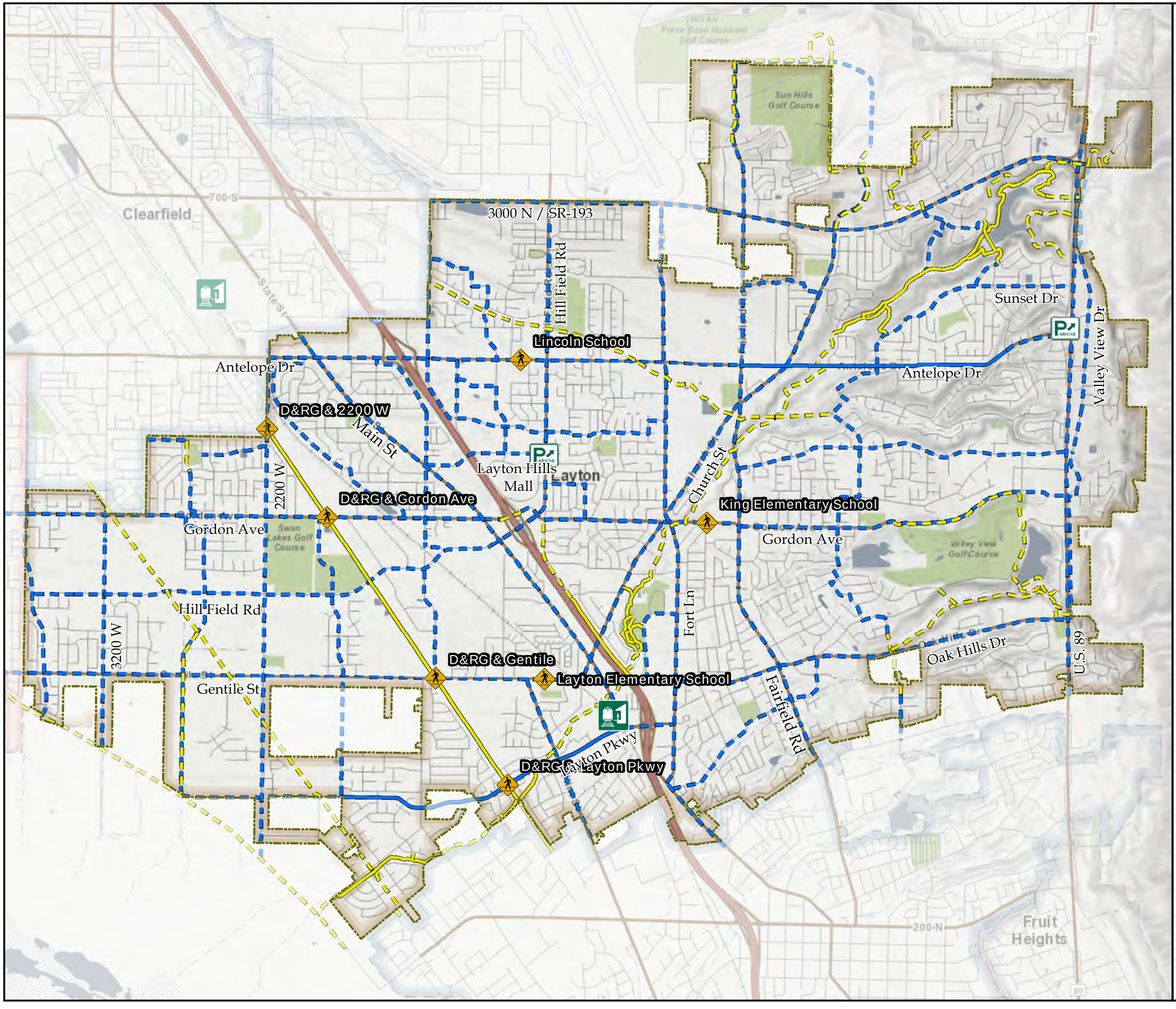
Figure 15: Bicycle and Pedestrian Paths



Legend

- Frontrunner Station
- Park and Ride Location
- Pedestrian Crossing
- Existing On-Street
- Existing Off-Street
- Recommended On-Street
- Recommended Off-Street
- Layton City Boundary

* For more information, please refer to the Layton City Parks, Recreation, Trails, Open Space, & Culteral Facilities Master Plan

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Layton Bicycle and Pedestrian Policy Review

Various Layton City policies were reviewed to determine their effect on bicycling and walking. A "best practices" review was then conducted in the area of bicycle and pedestrian-related policies to develop appropriate recommendations that the City can modify and/or adopt. Basic descriptions of the recommended changes and additions are given in this memo along with information about where the City may find more detailed resources (if applicable) about the recommended policies.

As part of this plan, the following was reviewed:

- **City of Layton General Plan**
- **City of Layton Municipal Code**

The full policy and regulatory review is provided in the attached policy matrix included in **Appendix D: Biking and Walking Elements**.

Key Findings

Layton City has a number of very positive policies, codes, ordinances, and regulations that support walkable and bikeable environments. However, it is also evident that the City could significantly strengthen many areas of policy and code regarding facility definitions and standards, general support of pedestrian and bicyclist safety, walkable neighborhoods, access to schools, required bicycle parking, bicycle and pedestrian facility requirements, and enhancements within the context of development ordinances. Policies and standards geared toward making Layton safer and more welcoming for bicycling and walking are recommended and discussed within the attached policy matrix found in **Appendix D: Biking and Walking Elements**. The section below describes key strengths identified within the existing ordinances and policies of the City, as well as priority areas for improvement.

Cross Sections and Design Guidelines

These treatments and design guidelines are important because they represent the tools for creating a bicycle and pedestrian-friendly, safe, accessible community. The guidelines are not, however, a substitute for a more thorough evaluation by a landscape architect or engineer upon implementation of facility improvements. Some improvements may also require cooperation with the Utah DOT for specific design solutions. The following standards and guidelines are referred to in this guide. Please refer to **Appendix D: Biking and Walking Elements** for more information.

The Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD) is the primary source for guidance on lane striping requirements, signal warrants, and recommended signage and pavement markings.

American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, updated in June 2012 provides guidance on dimensions, use, and layout of specific bicycle facilities.

Offering similar guidance for pedestrian design, the 2004 AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities provides comprehensive guidance on planning and designing for people on foot.

The National Association of City Transportation Officials' (NACTO) 2012 **Urban Bikeway Design Guide** is the newest publication of nationally recognized bikeway design standards, and offers guidance on the current state of the practice designs.

Meeting the requirements of the Americans with Disabilities Act (ADA) is an important part of any bicycle facility project. The United States Access Board's proposed **Public Rights-of-Way Accessibility Guidelines** (PROWAG) and the **2010 ADA Standards for Accessible Design** (2010 Standards) contain standards and guidance for the construction of accessible facilities.

Should the national standards be revised in the future and result in discrepancies with this chapter, the national standards should prevail for all design decisions.

Strengths

- **General ordinance supporting pedestrian and bicycle safety**
- **Maximum block sizes in residential and agricultural zones**
- **Pedestrian accommodations in parking lots in mixed use zones**
- **Good ordinance language requiring property owner participation in sidewalk maintenance**
- **Good language prohibiting obstructions to sidewalks**
- **Good language requiring overhangs and shelters to protect pedestrians in mixed use zones**

Priority Areas for Improvement

- **Develop a comprehensive Complete Streets Ordinance**
- **Require pedestrian improvements with new development and redevelopment** (sidewalks, lighting, street trees, etc.)
- **Develop citywide bicycle parking requirements**
- **Update suburban, auto-oriented development standards to be more context-based and pedestrian-friendly**
- **Develop policy and ordinances for required width and installation of sidewalks**
- **Expand the walking and bicycling-friendly requirements that exist in mixed use zones to all non-residential and non-agricultural zones in the City**

Conclusions

It is clear that adapting best practices from across the country into the existing code would serve as an efficient approach to improving existing conditions while facilitating new walkable and bikeable development. The City's development standards are primarily oriented towards automobile access. Walkability begins with access to destinations through the minimization of out of direction travel, compact distances, and a pleasant overall aesthetic. To the extent politically feasible, the City and its partners in the County and State agencies should promote development that is proximate to existing infrastructure, residential development, and existing destinations for education, employment, commerce, and civic activities. This begins with allowing and promoting a mixture of land uses and at a density that supports

walking and bicycle access. Walkable land use patterns are critical to quality of life Layton residents and visitors

Promoting "complete" infrastructure and transportation linkages between land uses will help ensure that destinations within Layton that are proximate in distance are indeed comfortable and safe to walk or bike to and from. Pedestrian and bicycle access should be considered in every applicable requirement and ordinance, like the development of sidewalks, provision of bicycle parking and street trees, and pedestrian-scaled lighting. Standards should also consider whether or not building and lots are oriented for pedestrian and bicycle access.

The comments and recommendations in the attached policy matrix outline many opportunities for making local development standards more pedestrian and bicycle friendly. This plan suggests that City staff and appropriate appointed committees develop proposed text amendments they consider easy to accomplish in the short term. For more structural changes, staff, committees, and the Plan committee members should incorporate changes into the upcoming comprehensive audit and rewrite of development standards over the next 12-18 months. The outcome of such an effort will be development standards that are predictable and sustainable for investors and developers, but that also promote active living, aging in place, quality of life, the local character of Layton, and transportation and recreation choices.

The Layton City Parks and Recreation Department is currently updating their *City Parks, Recreation, Trails, Open Space & Cultural Facilities Master Plan*. The latest draft can be found through the Parks and Recreation webpage at *www.laytoncity.org*.

Transit Service

The Utah Transit Authority (UTA) is the provider of public transportation throughout the Wasatch Front. UTA operates fixed route buses, express buses, bus rapid transit (BRT), ski buses, light rail, and commuter rail. In this capacity, UTA is responsible for the operation of the transit network in Layton City. It is the responsibility of both Layton City and UTA to cooperate to provide transit planning to accommodate alternative transportation options to residents as demand increases. The following are existing transit routes and days of service that are in operation in Layton City and is also included in **Figure 16** (UTA maintains up-to-date route information at *www.rideuta.com*):

- **Bus Route 455:** Monday – Friday (No Weekend Service)
- **Bus Route 456:** Monday – Friday (No Weekend Service)
- **Bus Route 470:** Monday – Sunday
- **Bus Route 472:** Monday – Friday (No Weekend Service)
- **Bus Route 473:** Monday – Friday (No Weekend Service)
- **Bus Route 477:** Monday – Friday (No Weekend Service)
- **Bus Route 626:** Monday – Friday (No Weekend Service)
- **Bus Route 627:** Monday – Friday (No Weekend Service)
- **Bus Route 640:** Monday – Saturday (No Sunday Service)
- **FrontRunner 750:** Monday – Saturday (No Sunday Service)

The combined efforts of the Utah Transit Authority (UTA), UDOT, WFRC, and Layton City will largely dictate the nature of a future expanded transit system. Included in this TMP is the WFRC long range transit plan

as shown in **Figure 17**. Included in this plan is to enhance bus service, the introduction of BRT on Main Street as well as improving Frontrunner service.

Layton City should be actively involved in supporting transit as a viable and attractive alternative transportation mode in the city. These planning and lobbying efforts will assist in procuring the necessary funding and support to develop, implement, and maintain a sustainable transit system. The UTA bus system is versatile as routes and stops can be adjusted as the demand and other factors require it.

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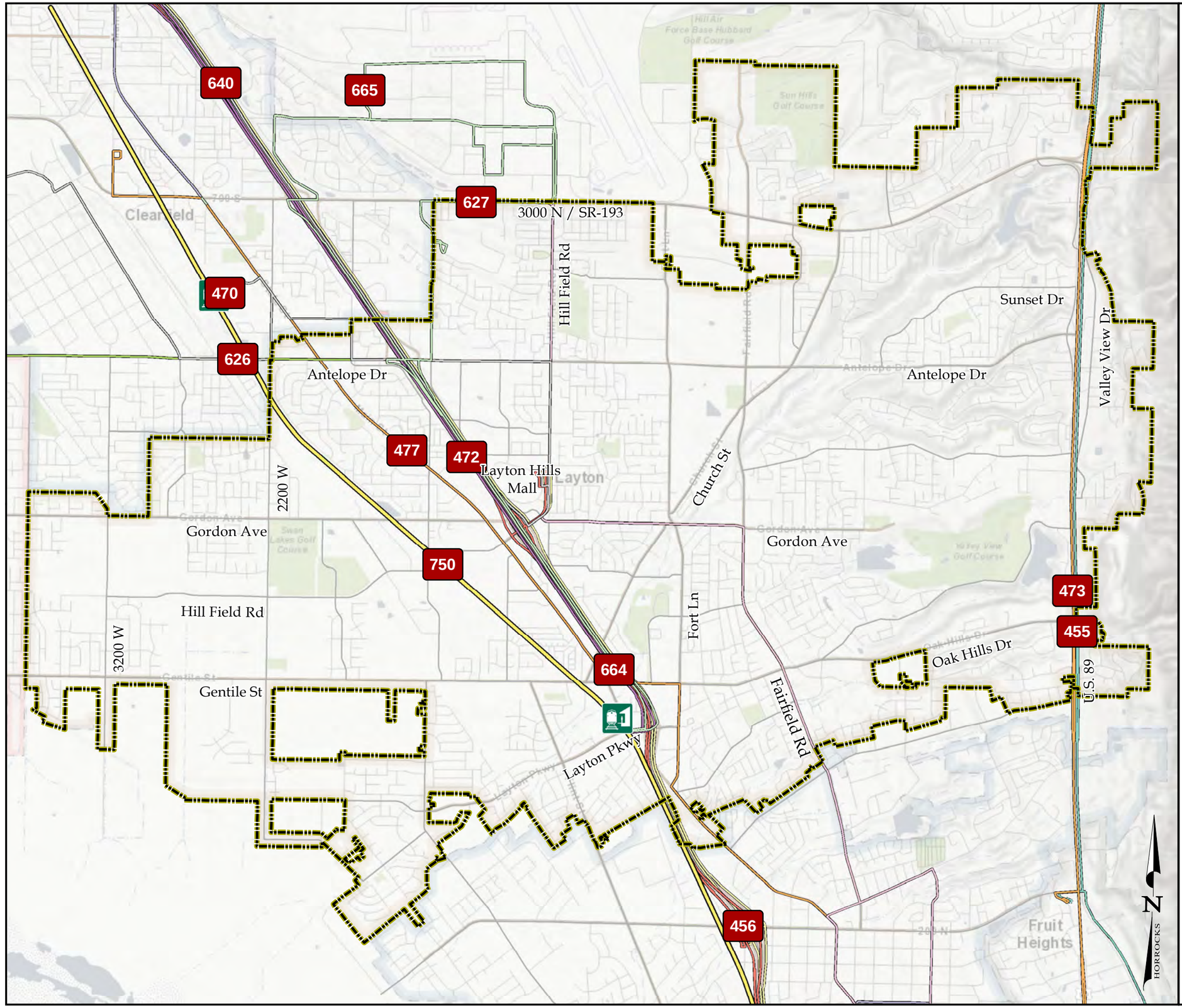
Figure 16: UTA Transit Routes



Legend

UTA Routes

- 664
- 455
- 456
- 470
- 472
- 473
- 477
- 626
- 627
- 640
- 665
- Frontrunner (750)
- Frontrunner Station
- Roadway Network
- Layton City Boundary

0 0.5 1 2 Miles

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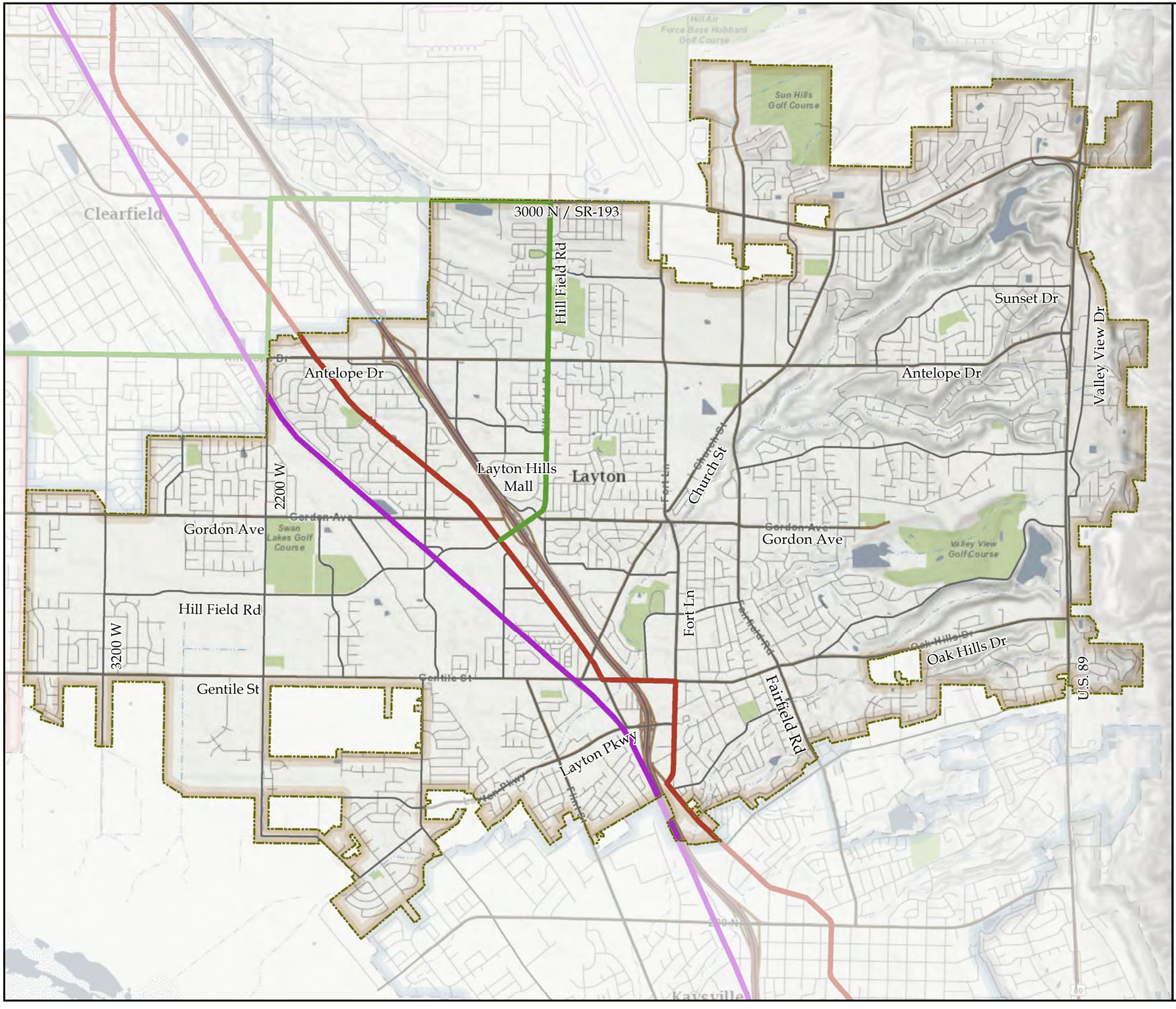
Figure 17: WFRC Long Range Transit Plan



Legend

- Layton City Boundary

WFRC 2015-2040 RTP - Transit

- Bus Rapid Transit (BRT 3)
- Commuter Rail
- Enhanced Bus (BRT 1)

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0 0.5 1 2 Miles

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Transportation Plan Guidelines

School Zone Planning

There are many children using all modes of transportation modes to travel to and from school. Without proper planning, students have a higher risk of injury during their commute. All guidelines for traffic control in school zones are found in Chapter 7 of the Utah MUTCD, which is found online at *http://mutcd.fhwa.dot.gov*. Included in this chapter are guidelines to creating SNAP plans as well as the process for school crossing control criteria, such as signage, pavement markings, and crossing supervision. Also included in **Appendix F: Utah MUTCD Warrant Flowchart**, are flow charts for schools to use when warranting school crosswalk zones, reduced speed school zone, an overhead school speed limit assembly, crossing guards, and narrow school routes. It is recommended that Layton City use Chapter 7 of the Utah MUTCD to assure that all school zones are up to code to provide the safest environment for students travelling to school.

Access Management

Access management is a term that refers to providing and managing access to land development while maintaining traffic flow and being attentive to safety issues. It includes elements such as driveway spacing, signal spacing, and corner clearance. Access management is a key element in transportation planning, helping to make transportation corridors operate more efficiently and carry more traffic without costly road widening projects. Access management offers local governments a systematic approach to decision-making applying principles uniformly, equitably, and consistently throughout the jurisdiction.

An access management program must address the balance between access and mobility. While the functional classification of roads implies the priority of access versus mobility, access management does much the same thing. Freeways move vehicles over long distances at high speeds with very controlled access and great mobility. Conversely, residential streets offer high levels of access but at low speeds and with little mobility. Access management standards must account for these different functions of various facilities. The access management standards followed by the city are based on the FHWA access guide and are outlined in detail in the Layton City Road and Bridge Standards.

Principles of Access Management

Constantly growing traffic congestion, concerns over traffic safety, and the ever increasing cost of upgrading roads have generated interest in managing the access to not only the highway system, but to surface streets as well. Access management is the process that provides access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity, and speed. Access management attempts to balance the need to provide good mobility for through traffic with the requirements for reasonable access to adjacent land uses.

Arguably the most important concept in understanding the need for access management is to insure the movement of traffic and access to property is mutually exclusive (See **Figure 5: Mobility vs. Access Chart**). No facility can move traffic very well and provide unlimited access at the same time. The extreme examples of this concept are the freeways and the cul-de-sac. The freeway moves traffic very well with few opportunities for access, while the cul-de-sac has unlimited opportunities for access, but doesn't move traffic very well. In many cases, accidents and congestion are the result of streets trying to serve both mobility and access at the same time.

A good access management program will accomplish the following:

- **Limit the number of conflict points at driveway locations**
- **Separate conflict areas**
- **Reduce the interference of through traffic**
- **Provide sufficient spacing for at-grade, signalized intersections**
- **Provide adequate on-site circulation and storage**

Access management attempts to put an end to the seemingly endless cycle of road improvements followed by increased access, increased congestion, and the need for more road improvements.

Poor planning and inadequate control of access can quickly lead to an unnecessarily high number of direct accesses along roadways. The movements that occur on and off roadways at driveway locations, when those driveways are too closely spaced, can make it very difficult for through traffic to flow smoothly at desired speeds and levels of safety. The American Association of State Highway and Transportation Officials (AASHTO) states, "the number of accidents is disproportionately higher at driveways than at other intersections…thus their design and location merits special consideration." Studies have shown that anywhere between 50 and 70 percent of all crashes that occur on the urban street system are access related.

Fewer direct access, greater separation of driveways, and better driveway design and location are the basic elements of access management. There is less occasion for through traffic to brake and change lanes in order to avoid turning traffic when these techniques are implemented uniformly and comprehensively.

Consequently, with good access management, the flow of traffic will be smoother and average travel speeds higher. There will definitely be less potential for accidents. According to the Federal Highway Administration (FHWA), before and after analyses show that routes with well managed access can experience 50 percent fewer accidents than comparable facilities with no access controls.

Intelligent Transportation Systems

Intelligent Transportation Systems (ITS) refers to the increased use of technology and communication methods to improve traffic operations. Pavement detectors, traffic cameras and weather sensors are used to gather constant information about traffic flow conditions along corridors or at intersections. This information may be relayed to a traffic control center where operators can change traffic signal timing plans or post messages on variable message signs. All of the traffic signals located on Arterial streets in

Layton City are connected to the UDOT and Davis County Traffic Operations Center by the use of fiber optic cable or radio antennas.

Traffic Signal Coordination

Traffic signal coordination is another ITS method that is used to improve traffic operations and efficiency. Traffic signal timing and phasing improvements generally improve all traffic flow but can also be used to favor high-occupancy vehicles or buses. Some ways in which signal timing can be used to favor transit include transit pre-emption and priority. Transit pre-emption means that as a transit vehicle approaches an intersection the signal timing is interrupted to accommodate the transit vehicle. This interrupts the signal coordination of a corridor or network and as such is generally not recommended. Transit priority allows traffic signals to adjust their phasing to give priority to transit vehicles without interrupting the overall traffic signal timing plan.

Connectivity

Layton City desires a connected street system for all new developments, minimizing the use of cul-de-sacs. Infill parcels will be required to provide future street stubs to adjacent parcels with the potential for development. Retail and office development must provide cross access easements to create circulation patterns to adjacent properties, to eliminate multiple access points to the major street system. Consequently, this will reduce travel time and congestion by allowing drivers to make shorter and more direct trips. In addition, connectivity will allow the option of walking or bicycling, due to shorter routes to schools, parks and businesses. Emergency vehicles including police, fire trucks, and ambulances will similarly benefit from connectivity, by use of alternate routes if one is blocked. Overall fuel consumption and pollution will also result by shortening trips through connectivity.

Safety

One of the main goals of the Transportation Element of the General Plan and long term transportation planning in general is to estimate traffic growth and provide for adequate facilities as the need arises. The safe traffic operations of these future facilities are of equal importance. As a result, all of these facilities should be constructed and maintained to applicable design and engineering standards such as those set forth in Layton City ordinances, AASHTO “Policy on Geometric Design of Highways and Streets,” and the Manual on Uniform Traffic Control Devices (MUTCD). This includes implementing applicable Americans with Disabilities Act (ADA) standards and school zone treatments.

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act of 1990 prohibits discrimination and ensures equal opportunity and access for persons with disabilities.

ADA standards govern the construction and alteration of places of public accommodation, commercial facilities, and state and local government facilities. The Department of Justice (DOJ) maintains ADA standards that apply to all ADA facilities except transit facilities, which are subject to similar standards issued by the Department of Transportation (DOT). The DOJ published revised regulations for Titles II and III of the American with Disabilities Act of 1990 in the Federal Register on September 15, 2010, which are

available online at http://www.ada.gov/2010ADAstandards_index.htm. In the DOJ, Chapter 4: Accessible Routes of the 2010 ADA Standards for Titles II and II Facilities governs the design of accessible routes.

The ADA standards should be regularly reviewed to ensure that City standards and specifications are in compliance with Federal ADA regulations. All areas of newly designed and newly constructed buildings and facilities and altered portions of existing buildings and facilities shall comply with the ADA requirements as published. Although only new and altered facilities must be in compliance with ADA standards, in order to improve the quality of life for Layton City residents with disabilities, a thorough review of all public right-of-ways and facilities should be conducted over the next few years, as far as is economically viable.

The City Public Works Department will budget funds for survey, inventory and reconstruction of existing facilities to identify areas of non-compliance. Layton City intends to inventory the City facilities that are eligible for ADA compliance over the next two years. These facilities will be stored within a Geographic Information Systems (GIS) database and areas of ADA deficiency will be cataloged. Once a database has been established, a plan will be set in motion to budget for improving facilities that may be readily approved in compliance with the 2010 ADA standards. Priority will be given to sensitive facilities such as the senior center, schools, senior care centers and medical centers. In addition, the City will prioritize public facilities over private or residential areas. Some areas where compliance issues will be addressed through priority include ramps at pedestrian crossings, missing sidewalks and deficient sidewalk widths.

Corridor Preservation

Corridor preservation is an important transportation planning tool that agencies should use and apply to all future transportation corridors. There are several new transportation facilities that have been identified in the Transportation Master Plan. In planning for these future facilities, corridor preservation techniques should be employed. The main purposes of corridor preservation are to:

- **Preserve the viability of future options**
- **Reduce the cost of these options**
- **Minimize environmental and socio-economic impacts of future implementation**

Corridor preservation seeks to preserve the right-of-way needed for future transportation facilities and prevent development that might be incompatible with these facilities. This is primarily accomplished by the community's ability to apply land use controls, such as zoning and approval of developments. Adoption of the Transportation Master Plan by Layton City is a commitment to citizens and future leaders in the community that the identified future corridors will be the ultimate location for transportation facilities.

Perhaps the most important elements of corridor preservation are ensuring that the corridors are preserved in the correct location and that they meet the applicable design and right-of-way standards for the type of facility being preserved. As the master plan does not define the exact alignment of each future corridor, it becomes the responsibility of the City to make sure the corridors are correctly preserved. This will have to be accomplished through the engineering and planning reviews done within the City as

development and annexation requests are approved that involve properties within or adjacent to the future corridors.

Corridor Preservation Techniques

Some examples of specific corridor preservation techniques that may be most beneficial and easily implemented include the following:

- **Developer Incentives and Agreements** – Public agencies can offer incentives in the form of tax abatements, density credits, or timely site plan approvals to developers who maintain property within proposed transportation corridors in an undeveloped state.
- **Exactions** – As development proposals are submitted to the city for review, efforts should be made to exact land identified within the future corridors.
- **Fee Simple Acquisitions** – A voluntary transaction full ownership of a land parcel, including the underlying title, transferred from the owner to the City via either purchase or donation.
- **Transfer of Development Rights and Density Transfers** – Government entities can provide incentives for developers and landowners to participate in corridor preservation programs using the transfer of development rights and density transfers. This is a powerful tool in that there seldom is any capital cost to local governments.
- **Land Use Controls** – This method allows government entities to use its policing power to regulate intensity and types of land use. Zoning ordinances are the primary controls over land use and the most important land use tools available for use in corridor preservation programs.
- **Purchase of Options and Easements** – Options and easements allow government agencies to purchase interests in property that lies within highway corridors without obtaining full title of the land.
- **Annexation** – The City of Layton has adopted the policy of requiring the right-of-way for roadways to be dedicated to the City during the annexation process. This becomes part of the annexation agreement and is an effective and efficient way to procure needed right-of-way for future expansion.

Traffic Impact Studies

As growth occurs throughout the City, the City will evaluate the impacts of proposed developments on the surrounding transportation networks prior to giving approval to build. This will be accomplished by requiring that a Traffic Impact Study (TIS) be performed for any development in the City based on city staff recommendations. A TIS will allow the City to determine the site specific impacts of a development including internal site circulation, access issues, and adjacent roadway and intersection impacts. In addition, a TIS will assist in defining possible impacts to the overall transportation system in the vicinity of the development. The area and items to be evaluated in a TIS include key intersections and roads as determined by the City Traffic Engineer on a case by case basis.

Each TIS will be conducted by a qualified Traffic Engineer chosen by the developer at their cost and approved by the City. A scope meeting will be required by the developer/Traffic Engineer with the City

Engineer to determine the scope of each TIS. Layton Traffic Impact Study Requirements are included in **Appendix G: Traffic Impact Study Requirements** of this report.

Appendix A: Intersection Analysis

Layton Intersection Analysis Summary

Intersection	Existing LOS	2040 No Build LOS	Recommended Improvement	Improved LOS
Antelope Drive & Robins Way	54s – D	49s – D	Dual SBL	29s – C
Antelope Drive & 700 W	19s – B	14s – B	None	14s – B
Antelope Drive & Hill Field Road	42s – D	76s – E	Dual EBL & WBL turn lanes; exclusive WBR turn lane; exclusive NBR turn lane w/ turn arrow	52s – D
Antelope Drive & Church Street	14s – B	84s – F	Roundabout with channelized WBR	33s – D
Fairfield Road & Church Street	20s – C	32s – D	Install traffic signal to improve safety	15s – B
Church Street & Gordon Avenue	15s – B	35s – D	None	35s – D
Fort Lane & Gordon Avenue	16s – B	18s – B	None	18s – B
Church Street & Fort Lane	16s – B	13s – B	None	13s – B
Main Street & Church Street	30s – D	25s – C	None	25s – C
Angel Street & Gentile Street	25s – C	20s – B	Consider aligning Sugar St w/ Angel St	20s – B
Wasatch Drive & Gentile Street	12s – B	18s – B	Dual EB & WB through lanes; install EB left turn arrow	9s – A
Fort Lane & Gentile Street	42s – D	112s – F	Dual EB & WB through lanes; add NB right turn arrow	36s – C
Fairfield Road & Gentile Street	20s – B	69s – E	Dual EB & WB through lanes; left turn arrows on all legs	32s – C
Oak Hills Drive & Gentile Street	30s – D	>180s – F	Channelize intersection per city's conceptual layout	>180s[1] – F
2700 W & Layton Pkwy	NA	NA	New Intersection (see interchange concept)	13s – B
Weaver Lane & Angel Street	46s – E	>180s – F	Install traffic signal and an exclusive NB left turn lane	10s – B

[1]*Delay for NB & SB left and through movements (approx. 55 vehicles in 2040 PM peak hour)*

Appendix B: Cost Estimates

Project Summary (All Projects - Full Funding)						
Project	Location	Total Price	Funding Source	Range (Yr)	Layton City %	Layton City Total
1	2700 West: West Hillfield Road to Gentile Street	$4,001,000	Layton	2025	29%	$1,158,000
2	Traffic Signal: 200 South and Main Street	$340,000	Layton	2040	100%	$340,000
3	650 West: Weaver Lane to Gentile St	$3,647,000	Layton	2040	15%	$541,000
4	Layton Parkway: 1700 West to 2700 West	$3,591,000	Layton	2025	29%	$1,039,000
5	Oaks Hill Drive: US-89 to Fairfield Rd.	$8,933,000	UDOT	2040	0%	$0
6	Gentile St.: Main Street (SR-126) to Fairfield Rd	$13,888,000	UDOT	2025	0%	$0
7	Fairfield Road: Gentile Street to Cherry Lane	$274,000	Layton	2040	100%	$274,000
8	Fairfield Road: Cherry Lane to Antelope Drive	$2,439,000	Layton	2040	100%	$2,439,000
9	Antelope Drive: Hill Field Rd. to Oak Forest	$248,000	Layton	2040	100%	$248,000
11	Angel Street and Sugar Street Connection	$1,125,000	Layton	2025	100%	$1,125,000
12	1700 West: 300 South to Weaver Lane	$4,500,000	Layton	2040	15%	$667,000
13	Layton Parkway: 2700 West to Bluff Ridge Blvd	$6,700,000	Layton	2040	29%	$1,939,000
14	Midtown Crossing (1425 North: Main Street to Hillfield Road)	$20,000,000	UDOT	2025	0%	$0
16	Frontage Road to US-89: Mutton Hollow Road to 1000 North (West Side)	$3,005,000	UDOT	2025	0%	$0
17	3200 West: West Hillfield Road to Northern Boundary	$2,114,000	Layton	2025	100%	$2,114,000
18	Gordon Ave: 1800 East to Highway 89	$8,010,000	Layton	2025	100%	$8,010,000
19	Signal: Wasatch Drive and Fairfield Road	$272,000	Layton	2025	100%	$272,000
20	Roundabout: 2700 West and Layton Parkway	$650,000	Layton	2025	100%	$650,000
21	Eastridge Business Loop: Fairfield Rd (End of Existing) to Church St	$5,863,000	Layton	2040	15%	$869,000
23	Signal: SR-193 and 1700 East	$272,000	UDOT	2025	0%	$0
24	Signal: Fairfield Road and Church Street	$272,000	Layton	2025	100%	$272,000
25	Signal: Gentile Street and 650 West	$272,000	Layton	2025	100%	$272,000
26	Signal: Hill Field Road and Cold Creek Way	$272,000	Layton	2025	100%	$272,000
27	Signal: Gordon Avenue and 3700 West	$272,000	Layton	2040	100%	$272,000
28	Signal: Weaver Lane and Angel Street	$272,000	Layton	2025	100%	$272,000
29	Roundabout: Oak Hills Drive and Gentile Street	$378,000	Layton	2025	100%	$378,000
30	3650 West: Gordon Ave to Gentile Street	$2,877,000	Layton	2025	29%	$835,000
31	Signals: Layton Pkwy at 1700 West & 2200 West	$544,000	Layton	2025	100%	$544,000
32	Signals: Gordon Ave at 1200 West (Angel St) and Cold Creek Way	$544,000	Layton	2025	100%	$544,000
33	Signal Modifications: Gentile Street at Wasach Drive, Fort Lane and Fairfield Road	$816,000	Layton	2025	21%	$174,000
34	Signals: Gordon Ave at Emerald Drive and 2600 East	$544,000	Layton	2025	100%	$544,000
35	Roundabout: Antelope Drive and Church Street	$680,000	Layton	2040	100%	$680,000
37	Signal: Fairfield Road and Rosewood Lane	$272,000	Layton	2040	100%	$272,000
38	Signal: Main Street and Fort Lane	$272,000	Layton	2040	100%	$272,000
39	Signal: Hill Field Road and 1425 North	$272,000	UDOT	2025	0%	$0
40	Signals: University Park Blvd and 2600 North	$272,000	Layton	2040	100%	$272,000
41	Signal: West Hillfield and Sugar Street	$272,000	Layton	2025	100%	$272,000
42	Signal: Main Street and 1425 Bridge Overpass	$272,000	UDOT	2025	0%	$0
44	Signal: Gentile and Cold Creek Way	$272,000	Layton	2040	100%	$272,000
45	2700 West: Gentile Street to West Davis Corridor	$7,869,000	Layton	2025	29%	$2,277,000
46	Angel Street: Gentile Street to Kaysville Border	$1,742,000	Layton	2025	100%	$1,742,000
47	Hill Field Road: Railroad Crossing	$1,742,000	Layton/WFRC	2040	8%	$2,356,000
48	Hill Field Road: 2200 West to 2700 West	$2,720,000	Layton	2025	42%	$1,133,000
49	US-89 Interchanges	$275,000,000	UDOT	2025	0%	$0
50	West Hillfield Road: 2700 West to 3650 West	$4,365,000	Layton	2040	29%	$1,263,000
51	Signal: 2100 East and Gordon Avenue	$272,000	Layton	2025	100%	$272,000
52	Signal: Herritage Park and Layton Hills Parkway	$272,000	Layton	2025	100%	$272,000
53	Fort Lane: 1500 North to Antelope Drive	$1,200,000	Layton	2040	100%	$1,200,000
54	Church Street: 3100 North to 3300 North	$1,688,000	Layton	2025	100%	$1,688,000
55	2200 West: Gentile Street to 1000 South	$810,000	Layton	2025	100%	$810,000
56	1700 West: Layton Parkway to Westside Drive	$1,350,000	Layton	2025	15%	$201,000
57	Signal: SR-193 and Weber State University Campus Connection	$272,000	UDOT	2040	0%	$0
	Total	**$398,821,000**				**$41,318,000**

Layton City
Transportation Improvement Program (TIP)

Unit Costs

Item	Unit	Unit Cost
Parkstrip	S.F.	$10.00
Removal of Existing Asphalt	S.Y.	$4.00
Clearing and Grubbing	Acre	$2,000
Roadway Excavation	C.Y.	$10.50
HMA Concrete	Ton	$85.00
Untreated Base Course	C.Y.	$15.00
Granular Borrow	C.Y.	$40.00
Curb and Gutter (2.5' width)	L.F.	$22.50
Sidewalk (4' width)	L.F.	$25.00
Drainage	L.F.	$45.00
Right of Way	S.F.	$4.00
Signage Striping	L.F.	$1.00
Bridge/Culvert	S.F.	$225.00
Traffic Signal	Each	$180,000

Contingency	25%

Mobilization	10%

Preconstruction Engineering	8%
Construction Engineering	8%

Layton City TMP

Developer's Responsibility vs. City's Responsibility

Item	Unit	Unit Cost	100' Length of Minor Street (50' Cross-Section)		100' Length of Minor Collector (60' Cross-Section)		100' Length of Collector (66' Cross-Section)		100' Length of Minor Arterial (84' Cross-Section)		100' Length of Arterial (100' Cross-Section)		100' Length of Principal Arterial (124' Cross-Section)	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Parkstrip	S.F.	$10	900	$9,000	900	$9,000	900	$9,000	900	$9,000	900	$9,000	900	$9,000
Removal of Existing Asphalt	S.Y.	$4	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
Clearing and Grubbing	Acre	$2,000	0.11	$230	0.14	$275	0.15	$303	0.19	$386	0.23	$459	0.28	$569
Roadway Excavation	C.Y.	$11	112	$1,176	139	$1,462	160	$1,676	481	$5,056	650	$6,826	843	$8,849
HMA Concrete	Ton	$85	64	$5,435	79	$6,752	121	$10,320	168	$14,273	314	$26,679	407	$34,584
Untreated Base Course	C.Y.	$15	81	$1,222	101	$1,519	116	$1,741	160	$2,407	200	$3,000	259	$3,889
Granular Borrow	C.Y.	$40	0	$0	0	$0	174	$6,963	241	$9,630	300	$12,000	389	$15,556
Curb and Gutter (2.5' width)	L.F.	$23	200	$4,500	200	$4,500	200	$4,500	200	$4,500	200	$4,500	200	$4,500
Sidewalk (4' width)	L.F.	$25	800	$20,000	1000	$25,000	1000	$25,000	1000	$25,000	1000	$25,000	1000	$25,000
Drainage	L.F.	$45	100	$4,500	100	$4,500	100	$4,500	100	$4,500	100	$4,500	100	$4,500
Right of Way	S.F.	$4	5000	$20,000	6000	$24,000	6600	$26,400	8400	$33,600	10000	$40,000	12400	$49,600
Signage Striping	L.F.	$1	-	-	-	-	-	-	-	-	-	-	-	-
Bridge/Culvert	S.F.	$225	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
Traffic Signal	Each	$180,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
		Subtotal		$66,063		$77,008		$90,403		$108,351		$131,965		$156,047
		Contingency	25%	$16,516		$19,252		$22,601		$27,088		$32,991		$39,012
		Mobilization	10%	$6,606		$7,701		$9,040		$10,835		$13,196		$15,605
		Preconstruction Engineering	8%	$5,285		$6,161		$7,232		$8,668		$10,557		$12,484
		Construction Engineering	8%	$5,285		$6,161		$7,232		$8,668		$10,557		$12,484
		Total Project Cost		$99,755		$116,282		$136,508		$163,610		$199,266		$235,631
		Developers Responsibility	100%	$99,755	100%	$116,282	85%	$116,282	71%	$116,282	58%	$116,282	49%	$116,282
		Layton City's Responsibility	0%	$0	0%	$0	15%	$20,226	29%	$47,328	42%	$82,985	51%	$119,349
											$35,656	18%		
Overall Assumptions:														
HMA Pavement Density (pcf) =				155		155		155		155		155		155
HMA Thickness (in) =				3		3		4		4		6		6
Untreated Base Course Thickness (in) =				8		8		8		8		8		8
Granual Borrow Thickness (in) =				0		0		12		12		12		12
Roadway Excavation Depth (ft) =				0.9167		0.9167		2		2		2.167		2.167
Number of Sidewalks (No.) =				2		2		2		2		2		2

Layton City
Transportation Master Plan

Oaks Hill Drive: US-89 to Fairfield Rd.

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	87,300	$873,000
Removal of Existing Asphalt	S.Y.	$4	51,733	$206,933
Clearing and Grubbing	Acre	$2,000	8	$16,033
Roadway Excavation	C.Y.	$11	21,798	$228,883
HMA Concrete	Ton	$85	10,525	$894,583
Untreated Base Course	C.Y.	$15	6,706	$100,593
Granular Borrow	C.Y.	$40	10,059	$402,370
Curb and Gutter (2.5' width)	L.F.	$23	19,400	$436,500
Sidewalk (4' width)	L.F.	$25	19,400	$485,000
Drainage	L.F.	$45	19,400	$873,000
Right of Way	S.F.	$4	349,200	$1,396,800
Signage Striping	L.F.	$1	2,005	$2,005
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$5,915,700**

Contingency	25%	$1,478,925
Mobilization	10%	$591,570
Preconstruction Engineering	8%	$473,256
Construction Engineering	8%	$473,256
Total Project Costs		**$8,933,000**

Layton City's Responsibility	**0%**
	$0

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**5**
Funding:	**UDOT**
Type:	**New**

Layton City
Transportation Master Plan

Gentile St.: Main Street (SR-126) to Fairfield Rd

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	53,100	$531,000
Removal of Existing Asphalt	S.Y.	$4	31,467	$125,867
Clearing and Grubbing	Acre	$2,000	5	$9,752
Roadway Excavation	C.Y.	$11	13,259	$139,218
HMA Concrete	Ton	$85	6,402	$544,128
Untreated Base Course	C.Y.	$15	4,079	$61,185
Granular Borrow	C.Y.	$40	6,119	$244,741
Curb and Gutter (2.5' width)	L.F.	$23	11,800	$265,500
Sidewalk (4' width)	L.F.	$25	11,800	$295,000
Drainage	L.F.	$45	11,800	$531,000
Right of Way	S.F.	$4	212,400	$849,600
Homes	Each	$200,000	28	$5,600,000
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$9,196,990**

Contingency	25%	$2,299,247
Mobilization	10%	$919,699
Preconstruction Engineering	8%	$735,759
Construction Engineering	8%	$735,759
Total Project Costs		**$13,888,000**

Layton City's Responsibility	**0%**
	$0

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**6**
Funding:	UDOT
Type:	**Widen**

Layton City
Transportation Master Plan

Midtown Crossing (1425 North: Main Street to Hillfield Road)

Minor Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	359,398	$3,593,977
Removal of Existing Asphalt	S.Y.	$4	159,732	$638,929
Clearing and Grubbing	Acre	$2,000	9	$18,335
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	79,866	$1,796,989
Sidewalk (4' width)	L.F.	$25	79,866	$1,996,654
Drainage	L.F.	$45	79,866	$3,593,977
Right of Way	S.F.	$4	399,331	$1,597,323
Signage Striping	L.F.	$1	8,253	$8,253
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$13,244,437**

Contingency	25%	$3,311,109
Mobilization	10%	$1,324,444
Preconstruction Engineering	8%	$1,059,555
Construction Engineering	8%	$1,059,555
Total Project Costs		**$20,000,000**

Layton City's Responsibility	**0%**
	$0

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	3
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	0
Roadway Excavation Depth (ft) =	0.9167
Number of Sidewalks (No.) =	2

Project No.	**14**
Funding:	**UDOT**
Type:	**New**

Layton City
Transportation Master Plan

Frontage Road to US-89: Mutton Hollow Road to 1000 North (West Side)

Minor Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	54,000	$540,000
Removal of Existing Asphalt	S.Y.	$4	24,000	$96,000
Clearing and Grubbing	Acre	$2,000	1	$2,755
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	12,000	$270,000
Sidewalk (4' width)	L.F.	$25	12,000	$300,000
Drainage	L.F.	$45	12,000	$540,000
Right of Way	S.F.	$4	60,000	$240,000
Signage Striping	L.F.	$1	1,240	$1,240
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$1,989,995**

Contingency	25%	$497,499
Mobilization	10%	$198,999
Preconstruction Engineering	8%	$159,200
Construction Engineering	8%	$159,200
Total Project Costs		**$3,005,000**

Layton City's Responsibility	**0%**
	$0

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	3
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	0
Roadway Excavation Depth (ft) =	0.9167
Number of Sidewalks (No.) =	2

Project No.	**16**
Funding:	**UDOT**
Type:	**New**

Layton City
Transportation Master Plan

Frontage to US-89: 1000 North to 1925 North (East Side)

Minor Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	45,000	$450,000
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	7	$13,774
Roadway Excavation	C.Y.	$11	6,111	$64,169
HMA Concrete	Ton	$85	3,488	$296,438
Untreated Base Course	C.Y.	$15	4,444	$66,667
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	10,000	$225,000
Sidewalk (4' width)	L.F.	$25	10,000	$250,000
Drainage	L.F.	$45	10,000	$450,000
Right of Way	S.F.	$4	300,000	$1,200,000
Signage Striping	L.F.	$1	1,033	$1,033
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$3,017,081**

Contingency	25%	$754,270
Mobilization	10%	$301,708
Preconstruction Engineering	8%	$241,366
Construction Engineering	8%	$241,366
Total Project Costs		**$4,556,000**

Layton City's Responsibility	**0%**
	$0

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	3
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	0
Roadway Excavation Depth (ft) =	0.9167
Number of Sidewalks (No.) =	2

Project No.	**22**
Funding:	**UDOT**
Type:	**New**

Layton City
Transportation Master Plan

Signal: SR-193 and 1700 East

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**0%**
	$0

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**23**
Funding:	**UDOT**
Type:	**Signal**

Layton City
Transportation Master Plan

Signal: Hill Field Road and 1425 North

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**0%**
	$0

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**39**
Funding:	**UDOT**
Type:	**Signal**

Layton City
Transportation Master Plan

Signal: Main Street and 1425 Bridge Overpass

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**0%**
	$0

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**42**
Funding:	**UDOT**
Type:	**Signal**

Layton City
Transportation Master Plan

US-89 Interchanges

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	21	$21
Bridge/Culvert	S.F.	$225	809,418	$182,119,145
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$182,119,166**

Contingency	25%	$45,529,792
Mobilization	10%	$18,211,917
Preconstruction Engineering	8%	$14,569,533
Construction Engineering	8%	$14,569,533
Total Project Costs		**$275,000,000**

Layton City's Responsibility	**0%**
	$0

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**49**
Funding:	**UDOT**
Type:	**Interchange**

Layton City
Transportation Master Plan

2700 West: West Hillfield Road to Gentile Street

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	24,300	$243,000
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	5	$10,413
Roadway Excavation	C.Y.	$11	12,000	$126,000
HMA Concrete	Ton	$85	4,185	$355,725
Untreated Base Course	C.Y.	$15	4,000	$60,000
Granular Borrow	C.Y.	$40	6,000	$240,000
Curb and Gutter (2.5' width)	L.F.	$23	5,400	$121,500
Sidewalk (4' width)	L.F.	$30	5,400	$162,000
Drainage	L.F.	$45	5,400	$243,000
Right of Way	S.F.	$4	226,800	$907,200
Signage Striping	L.F.	$1	558	$558
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$2,649,396**

Contingency	25%	$662,349
Mobilization	10%	$264,940
Preconstruction Engineering	8%	$211,952
Construction Engineering	8%	$211,952
Total Project Costs		**$4,001,000**

Layton City's Responsibility	**29%**
	$1,158,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**1**
Funding:	**Layton**
Type:	**New**

Layton City
Transportation Master Plan

Traffic Signal: 200 South and Main Street

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$30	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Actual Construction	LS	$340,000	1	$340,000
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$340,000**

Contingency	0%	$0
Mobilization	0%	$0
Preconstruction Engineering	0%	$0
Construction Engineering	0%	$0
Total Project Costs		**$340,000**

Layton City's Responsibility	**100%**
	$340,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**2**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

650 West: Weaver Lane to Gentile St

Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	27,000	$270,000
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	5	$9,091
Roadway Excavation	C.Y.	$11	9,333	$98,000
HMA Concrete	Ton	$85	3,255	$276,675
Untreated Base Course	C.Y.	$15	3,111	$46,667
Granular Borrow	C.Y.	$40	4,667	$186,667
Curb and Gutter (2.5' width)	L.F.	$23	6,000	$135,000
Sidewalk (4' width)	L.F.	$25	6,000	$150,000
Drainage	L.F.	$45	6,000	$270,000
Right of Way	S.F.	$4	198,000	$792,000
Signage Striping	L.F.	$1	620	$620
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$2,414,719**

Contingency	25%	$603,680
Mobilization	10%	$241,472
Preconstruction Engineering	8%	$193,178
Construction Engineering	8%	$193,178
Total Project Costs		**$3,647,000**

Layton City's Responsibility	**15%**
	$541,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**3**
Funding:	**Layton**
Type:	**Widen**

Layton City
Transportation Master Plan

Layton Parkway: 1700 West to 2700 West

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	23,400	$234,000
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	5	$10,028
Roadway Excavation	C.Y.	$11	11,556	$121,333
HMA Concrete	Ton	$85	4,030	$342,550
Untreated Base Course	C.Y.	$15	3,852	$57,778
Granular Borrow	C.Y.	$40	5,778	$231,111
Curb and Gutter (2.5' width)	L.F.	$23	5,200	$117,000
Sidewalk (4' width)	L.F.	$30	5,200	$156,000
Drainage	L.F.	$45	5,200	$234,000
Right of Way	S.F.	$4	218,400	$873,600
Signage Striping	L.F.	$1	537	$537
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$2,377,937**

Contingency	25%	$594,484
Mobilization	10%	$237,794
Preconstruction Engineering	8%	$190,235
Construction Engineering	8%	$190,235
Total Project Costs		**$3,591,000**

Layton City's Responsibility	**29%**
	$1,039,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**4**
Funding:	**Layton**
Type:	**New**

Layton City
Transportation Master Plan

Fairfield Road: Gentile Street to Cherry Lane

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10		
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	1,447	$1,447
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$181,447**

Contingency	25%	$45,362
Mobilization	10%	$18,145
Preconstruction Engineering	8%	$14,516
Construction Engineering	8%	$14,516
Total Project Costs		**$274,000**

Layton City's Responsibility	**100%**
	$274,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**7**
Funding:	**Layton**
Type:	**Widen**

Layton City
Transportation Master Plan

Fairfield Road: Cherry Lane to Antelope Drive

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	9,000	$90,000
Removal of Existing Asphalt	S.Y.	$4	4,000	$16,000
Clearing and Grubbing	Acre	$2,000	0	$826
Roadway Excavation	C.Y.	$11	1,778	$18,667
HMA Concrete	Ton	$85	620	$52,700
Untreated Base Course	C.Y.	$15	593	$8,889
Granular Borrow	C.Y.	$40	889	$35,556
Curb and Gutter (2.5' width)	L.F.	$23	2,000	$45,000
Sidewalk (4' width)	L.F.	$30	2,000	$60,000
Drainage	L.F.	$45	2,000	$90,000
Right of Way	S.F.	$4	18,000	$72,000
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	5,000	$1,125,000
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$1,614,638**

Contingency	25%	$403,659
Mobilization	10%	$161,464
Preconstruction Engineering	8%	$129,171
Construction Engineering	8%	$129,171
Total Project Costs		**$2,439,000**

Layton City's Responsibility	**100%**
	$2,439,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**8**
Funding:	**Layton**
Type:	**Widen**

Layton City
Transportation Master Plan

Antelope Drive: Hill Field Rd. to Oak Forest

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$10	16,400	$164,000
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$164,000**

Contingency	25%	$41,000
Mobilization	10%	$16,400
Preconstruction Engineering	8%	$13,120
Construction Engineering	8%	$13,120
Total Project Costs		**$248,000**

Layton City's Responsibility	**100%**
	$248,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**9**
Funding:	**Layton**
Type:	**Widen**

Layton City
Transportation Master Plan

Layton Parkway: Angel (1200 West) to 1700 West

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	24,300	$243,000
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	5	$10,413
Roadway Excavation	C.Y.	$11	12,000	$126,000
HMA Concrete	Ton	$85	4,185	$355,725
Untreated Base Course	C.Y.	$15	4,000	$60,000
Granular Borrow	C.Y.	$40	6,000	$240,000
Curb and Gutter (2.5' width)	L.F.	$23	5,400	$121,500
Sidewalk (4' width)	L.F.	$30	5,400	$162,000
Drainage	L.F.	$45	5,400	$243,000
Right of Way	S.F.	$4	226,800	$907,200
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$2,468,838**

Contingency	25%	$617,210
Mobilization	10%	$246,884
Preconstruction Engineering	8%	$197,507
Construction Engineering	8%	$197,507
Total Project Costs		**$3,728,000**

Layton City's Responsibility	**29%**
	$1,079,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**10**
Funding:	**Layton**
Type:	**New**

Layton City
Transportation Master Plan

Angel Street and Sugar Street Connection

Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	9,000	$90,000
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	2	$3,030
Roadway Excavation	C.Y.	$11	3,111	$32,667
HMA Concrete	Ton	$85	1,085	$92,225
Untreated Base Course	C.Y.	$15	1,037	$15,556
Granular Borrow	C.Y.	$40	1,556	$62,222
Curb and Gutter (2.5' width)	L.F.	$23	2,000	$45,000
Sidewalk (4' width)	L.F.	$25	2,000	$50,000
Drainage	L.F.	$45	2,000	$90,000
Right of Way	S.F.	$4	66,000	$264,000
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$744,700**

Contingency	25%	$186,175
Mobilization	10%	$74,470
Preconstruction Engineering	8%	$59,576
Construction Engineering	8%	$59,576
Total Project Costs		**$1,125,000**

Layton City's Responsibility	**100%**
	$1,125,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**11**
Funding:	**Layton**
Type:	**New**

Layton City
Transportation Master Plan

1700 West: 300 South to Weaver Lane

Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	36,000	$360,000
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	6	$12,121
Roadway Excavation	C.Y.	$11	12,444	$130,667
HMA Concrete	Ton	$85	4,340	$368,900
Untreated Base Course	C.Y.	$15	4,148	$62,222
Granular Borrow	C.Y.	$40	6,222	$248,889
Curb and Gutter (2.5' width)	L.F.	$23	8,000	$180,000
Sidewalk (4' width)	L.F.	$25	8,000	$200,000
Drainage	L.F.	$45	8,000	$360,000
Right of Way	S.F.	$4	264,000	$1,056,000
Signage Striping	L.F.	$1	827	$827
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$2,979,626**

Contingency	25%	$744,906
Mobilization	10%	$297,963
Preconstruction Engineering	8%	$238,370
Construction Engineering	8%	$238,370
Total Project Costs		**$4,500,000**

Layton City's Responsibility	**15%**
	$667,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**12**
Funding:	**Layton**
Type:	**New**

Layton City
Transportation Master Plan

Layton Parkway: 2700 West to Bluff Ridge Blvd

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	72,000	$720,000
Removal of Existing Asphalt	S.Y.	$4	32,000	$128,000
Clearing and Grubbing	Acre	$2,000	6	$12,489
Roadway Excavation	C.Y.	$11	14,222	$149,333
HMA Concrete	Ton	$85	4,960	$421,600
Untreated Base Course	C.Y.	$15	4,741	$71,111
Granular Borrow	C.Y.	$40	7,111	$284,444
Curb and Gutter (2.5' width)	L.F.	$23	16,000	$360,000
Sidewalk (4' width)	L.F.	$30	16,000	$480,000
Drainage	L.F.	$45	16,000	$720,000
Right of Way	S.F.	$4	272,000	$1,088,000
Signage Striping	L.F.	$1	1,653	$1,653
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$4,436,631**

Contingency	25%	$1,109,158
Mobilization	10%	$443,663
Preconstruction Engineering	8%	$354,930
Construction Engineering	8%	$354,930
Total Project Costs		**$6,700,000**

Layton City's Responsibility	**29%**
	$1,939,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**13**
Funding:	**Layton**
Type:	**New**

Layton City
Transportation Master Plan

3200 West: West Hillfield Road to Northern Boundary

Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	28,800	$288,000
Removal of Existing Asphalt	S.Y.	$4	8,533	$34,133
Clearing and Grubbing	Acre	$2,000	1	$2,351
Roadway Excavation	C.Y.	$11	4,267	$44,800
HMA Concrete	Ton	$85	1,488	$126,480
Untreated Base Course	C.Y.	$15	1,422	$21,333
Granular Borrow	C.Y.	$40	2,133	$85,333
Curb and Gutter (2.5' width)	L.F.	$23	6,400	$144,000
Sidewalk (4' width)	L.F.	$25	6,400	$160,000
Drainage	L.F.	$45	6,400	$288,000
Right of Way	S.F.	$4	51,200	$204,800
Signage Striping	L.F.	$1	661	$661
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$1,399,892**

Contingency	25%	$349,973
Mobilization	10%	$139,989
Preconstruction Engineering	8%	$111,991
Construction Engineering	8%	$111,991
Total Project Costs		**$2,114,000**

Layton City's Responsibility	**100%**
	$2,114,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**17**
Funding:	**Layton**
Type:	**Widen**

Layton City
Transportation Master Plan

Gordon Ave: 1800 East to Highway 89

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	52,200	$522,000
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	11	$22,369
Roadway Excavation	C.Y.	$11	25,778	$270,667
HMA Concrete	Ton	$85	8,990	$764,150
Untreated Base Course	C.Y.	$15	8,593	$128,889
Granular Borrow	C.Y.	$40	12,889	$515,556
Curb and Gutter (2.5' width)	L.F.	$23	11,600	$261,000
Sidewalk (4' width)	L.F.	$30	11,600	$348,000
Drainage	L.F.	$45	11,600	$522,000
Right of Way	S.F.	$4	487,200	$1,948,800
Signage Striping	L.F.	$1	1,199	$1,199
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$5,304,629**

Contingency	25%	$1,326,157
Mobilization	10%	$530,463
Preconstruction Engineering	8%	$424,370
Construction Engineering	8%	$424,370
Total Project Costs		**$8,010,000**

Layton City's Responsibility	**100%**
	$8,010,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**18**
Funding:	**Layton**
Type:	**New**

Layton City
Transportation Master Plan

Signal: Wasatch Drive and Fairfield Road

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$30	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**100%**
	$272,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**19**
Funding:	**Layton**
Type:	**New**

Layton City
Transportation Master Plan

Roundabout: 2700 West and Layton Parkway

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Rounabout	Each	$250,000	1	$250,000
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$430,000**

Contingency	25%	$107,500
Mobilization	10%	$43,000
Preconstruction Engineering	8%	$34,400
Construction Engineering	8%	$34,400
Total Project Costs		**$650,000**

Layton City's Responsibility	**100%**
	$650,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**20**
Funding:	**Layton**
Type:	**New**

Layton City
Transportation Master Plan

Eastridge Business Loop: Fairfield Rd (End of Existing) to Church St

Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	90,000	$900,000
Removal of Existing Asphalt	S.Y.	$4	28,889	$115,556
Clearing and Grubbing	Acre	$2,000	1	$2,755
Roadway Excavation	C.Y.	$11	11,852	$124,444
HMA Concrete	Ton	$85	4,133	$351,333
Untreated Base Course	C.Y.	$15	3,951	$59,259
Granular Borrow	C.Y.	$40	5,926	$237,037
Curb and Gutter (2.5' width)	L.F.	$23	20,000	$450,000
Sidewalk (4' width)	L.F.	$25	20,000	$500,000
Drainage	L.F.	$45	20,000	$900,000
Right of Way	S.F.	$4	60,000	$240,000
Signage Striping	L.F.	$1	2,067	$2,067
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$3,882,451**

Contingency	25%	$970,613
Mobilization	10%	$388,245
Preconstruction Engineering	8%	$310,596
Construction Engineering	8%	$310,596
Total Project Costs		**$5,863,000**

Layton City's Responsibility	**15%**
	$869,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**21**
Funding:	**Layton**
Type:	**New**

Layton City
Transportation Master Plan

Signal: Fairfield Road and Church Street

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$30	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**100%**
	$272,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**24**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Signal: Gentile Street and 650 West

Minor Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10		
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**100%**
	$272,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	3
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	0
Roadway Excavation Depth (ft) =	0.9167
Number of Sidewalks (No.) =	2

Project No.	**25**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Signal: Hill Field Road and Cold Creek Way

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**100%**
	$272,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**26**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Signal: Gordon Avenue and 3700 West

Minor Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10		
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**100%**
	$272,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	3
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	0
Roadway Excavation Depth (ft) =	0.9167
Number of Sidewalks (No.) =	2

Project No.	**27**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Signal: Weaver Lane and Angel Street

Minor Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10		
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**100%**
	$272,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	3
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	0
Roadway Excavation Depth (ft) =	0.9167
Number of Sidewalks (No.) =	2

Project No.	**28**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Roundabout: Oak Hills Drive and Gentile Street

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$250,000	1	$250,000
			Subtotal	**$250,000**

Contingency	25%	$62,500
Mobilization	10%	$25,000
Preconstruction Engineering	8%	$20,000
Construction Engineering	8%	$20,000
Total Project Costs		**$378,000**

Layton City's Responsibility	**100%**
	$378,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**29**
Funding:	**Layton**
Type:	**Roundabout**

Layton City
Transportation Master Plan

3650 West: Gordon Ave to Gentile Street

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	20,700	$207,000
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	1	$2,534
Roadway Excavation	C.Y.	$11	10,222	$107,333
HMA Concrete	Ton	$85	3,565	$303,025
Untreated Base Course	C.Y.	$15	3,407	$51,111
Granular Borrow	C.Y.	$40	5,111	$204,444
Curb and Gutter (2.5' width)	L.F.	$23	4,600	$103,500
Sidewalk (4' width)	L.F.	$30	4,600	$138,000
Drainage	L.F.	$45	4,600	$207,000
Right of Way	S.F.	$4	55,200	$220,800
Signage Striping	L.F.	$1	475	$475
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	2	$360,000
			Subtotal	**$1,905,224**

Contingency	25%	$476,306
Mobilization	10%	$190,522
Preconstruction Engineering	8%	$152,418
Construction Engineering	8%	$152,418
Total Project Costs		**$2,877,000**

Layton City's Responsibility	**29%**
	$835,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**30**
Funding:	**Layton**
Type:	**New**

Layton City
Transportation Master Plan

Signals: Layton Pkwy at 1700 West & 2200 West

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	2	$360,000
			Subtotal	**$360,000**

Contingency	25%	$90,000
Mobilization	10%	$36,000
Preconstruction Engineering	8%	$28,800
Construction Engineering	8%	$28,800
Total Project Costs		**$544,000**

Layton City's Responsibility	**100%**
	$544,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**31**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Signals: Gordon Ave at 1200 West (Angel St) and Cold Creek Way

Minor Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10		
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	2	$360,000
			Subtotal	**$360,000**

Contingency	25%	$90,000
Mobilization	10%	$36,000
Preconstruction Engineering	8%	$28,800
Construction Engineering	8%	$28,800
Total Project Costs		**$544,000**

Layton City's Responsibility	**100%**
	$544,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	3
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	0
Roadway Excavation Depth (ft) =	0.9167
Number of Sidewalks (No.) =	2

Project No.	**32**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Signal Modifications: Gentile Street at Wasach Drive, Fort Lane and Fairfield Road

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	3	$540,000
			Subtotal	**$540,000**

Contingency	25%	$135,000
Mobilization	10%	$54,000
Preconstruction Engineering	8%	$43,200
Construction Engineering	8%	$43,200
Total Project Costs		**$816,000**

Layton City's Responsibility	**21%**
	$174,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**33**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Signals: Gordon Ave at Emerald Drive and 2600 East

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$30	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	2	$360,000
			Subtotal	**$360,000**

Contingency	25%	$90,000
Mobilization	10%	$36,000
Preconstruction Engineering	8%	$28,800
Construction Engineering	8%	$28,800
Total Project Costs		**$544,000**

Layton City's Responsibility	**100%**
	$544,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**34**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Roundabout: Antelope Drive and Church Street

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Roundabout	Each	$250,000	1	$450,000
			Subtotal	**$450,000**

Contingency	25%	$112,500
Mobilization	10%	$45,000
Preconstruction Engineering	8%	$36,000
Construction Engineering	8%	$36,000
Total Project Costs		**$680,000**

Layton City's Responsibility	**100%**
	$680,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**35**
Funding:	**Layton**
Type:	**Roundabout**

Layton City
Transportation Master Plan

Signal: Fairfield Road and Rosewood Lane

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$30	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**100%**
	$272,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**37**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Signal: Main Street and Fort Lane

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**100%**
	$272,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**38**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Signals: University Park Blvd and 2600 North

Minor Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10		
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**100%**
	$272,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	3
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	0
Roadway Excavation Depth (ft) =	0.9167
Number of Sidewalks (No.) =	2

Project No.	**40**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Signal: West Hillfield and Sugar Street

Minor Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10		
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**100%**
	$272,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	3
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	0
Roadway Excavation Depth (ft) =	0.9167
Number of Sidewalks (No.) =	2

Project No.	**41**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Signal: Gentile and Cold Creek Way

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10		
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Property Takes	Unit	$200,000	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**100%**
	$272,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**44**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

2700 West: Gentile Street to West Davis Corridor

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	36,000	$360,000
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	8	$15,427
Roadway Excavation	C.Y.	$11	17,778	$186,667
HMA Concrete	Ton	$85	6,200	$527,000
Untreated Base Course	C.Y.	$15	5,926	$88,889
Granular Borrow	C.Y.	$40	8,889	$355,556
Curb and Gutter (2.5' width)	L.F.	$23	8,000	$180,000
Sidewalk (4' width)	L.F.	$30	8,000	$240,000
Drainage	L.F.	$45	8,000	$360,000
Right of Way	S.F.	$4	624,215	$2,716,859
Signage Striping	L.F.	$1	827	$827
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$5,211,224**

Contingency	25%	$1,302,806
Mobilization	10%	$521,122
Preconstruction Engineering	8%	$416,898
Construction Engineering	8%	$416,898
Total Project Costs		**$7,869,000**

Layton City's Responsibility	**29%**
	$2,277,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**45**
Funding:	**Layton**
Type:	**New**

Layton City
Transportation Master Plan

Angel Street: Gentile Street to Kaysville Border

Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10		
Removal of Existing Asphalt	S.Y.	$4	8,800	$35,200
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	4,400	$46,200
HMA Concrete	Ton	$85	1,535	$130,433
Untreated Base Course	C.Y.	$15	1,467	$22,000
Granular Borrow	C.Y.	$40	2,200	$88,000
Curb and Gutter (2.5' width)	L.F.	$23	6,600	$148,500
Sidewalk (4' width)	L.F.	$25	6,600	$165,000
Drainage	L.F.	$45	6,600	$297,000
Right of Way	S.F.	$4	0	$220,000
Signage Striping	L.F.	$1	682	$682
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$1,153,015**

Contingency	25%	$288,254
Mobilization	10%	$115,301
Preconstruction Engineering	8%	$92,241
Construction Engineering	8%	$92,241
Total Project Costs		**$1,742,000**

Layton City's Responsibility	**100%**
	$1,742,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**46**
Funding:	**Layton**
Type:	**Widen**

Layton City
Transportation Master Plan

Hill Field Road: Railroad Crossing

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	Unit	$19,500,000	1	$19,500,000
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$19,500,000**

Contingency	25%	$4,875,000
Mobilization	10%	$1,950,000
Preconstruction Engineering	8%	$1,560,000
Construction Engineering	8%	$1,560,000
Total Project Costs		**$29,445,000**

Layton City's Responsibility	**8%**
	$2,356,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**47**
Funding:	**Layton/WFRC**
Type:	**New**

Layton City
Transportation Master Plan

Hill Field Road: 2200 West to 2700 West

Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	23,400	$234,000
Removal of Existing Asphalt	S.Y.	$4	10,400	$41,600
Clearing and Grubbing	Acre	$2,000	2	$4,775
Roadway Excavation	C.Y.	$11	8,347	$87,643
HMA Concrete	Ton	$85	4,030	$342,550
Untreated Base Course	C.Y.	$15	2,568	$38,519
Granular Borrow	C.Y.	$40	3,852	$154,074
Curb and Gutter (2.5' width)	L.F.	$23	5,200	$117,000
Sidewalk (4' width)	L.F.	$25	5,200	$130,000
Drainage	L.F.	$45	5,200	$234,000
Right of Way	S.F.	$4	104,000	$416,000
Signage Striping	L.F.	$1	537	$537
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$1,800,698**

Contingency	25%	$450,175
Mobilization	10%	$180,070
Preconstruction Engineering	8%	$144,056
Construction Engineering	8%	$144,056
Total Project Costs		**$2,720,000**

Layton City's Responsibility	**42%**
	$1,133,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	6
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.167
Number of Sidewalks (No.) =	2

Project No.	**48**
Funding:	**Layton**
Type:	**Widen**

Layton City
Transportation Master Plan

West Hillfield Road: 2700 West to 3650 West

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	45,900	$459,000
Removal of Existing Asphalt	S.Y.	$4	13,600	$54,400
Clearing and Grubbing	Acre	$2,000	3	$5,620
Roadway Excavation	C.Y.	$11	13,600	$142,800
HMA Concrete	Ton	$85	4,743	$403,155
Untreated Base Course	C.Y.	$15	4,533	$68,000
Granular Borrow	C.Y.	$40	6,800	$272,000
Curb and Gutter (2.5' width)	L.F.	$23	10,200	$229,500
Sidewalk (4' width)	L.F.	$30	10,200	$306,000
Drainage	L.F.	$45	10,200	$459,000
Right of Way	S.F.	$4	122,400	$489,600
Signage Striping	L.F.	$1	1,054	$1,054
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$2,890,129**

Contingency	25%	$722,532
Mobilization	10%	$289,013
Preconstruction Engineering	8%	$231,210
Construction Engineering	8%	$231,210
Total Project Costs		**$4,365,000**

Layton City's Responsibility	**29%**
	$1,263,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**50**
Funding:	**Layton**
Type:	**Widen**

Layton City
Transportation Master Plan

Signal: 2100 East and Gordon Avenue

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$30	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**100%**
	$272,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2
Number of Sidewalks (No.) =	2

Project No.	**51**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Signal: Herritage Park and Layton Hills Parkway

Minor Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10		
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$25	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**100%**
	$272,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	3
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	0
Roadway Excavation Depth (ft) =	0.92
Number of Sidewalks (No.) =	2

Project No.	**52**
Funding:	**Layton**
Type:	**Signal**

Layton City
Transportation Master Plan

Fort Lane: 1500 North to Antelope Drive

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	14,400	$144,000
Removal of Existing Asphalt	S.Y.	$4	7,111	$28,444
Clearing and Grubbing	Acre	$2,000	1	$1,763
Roadway Excavation	C.Y.	$11	2,370	$24,889
HMA Concrete	Ton	$85	827	$70,267
Untreated Base Course	C.Y.	$15	790	$11,852
Granular Borrow	C.Y.	$40	1,185	$47,407
Curb and Gutter (2.5' width)	L.F.	$23	3,200	$72,000
Sidewalk (4' width)	L.F.	$30	3,200	$96,000
Drainage	L.F.	$45	3,200	$144,000
Right of Way	S.F.	$4	38,400	$153,600
Signage Striping	L.F.	$1	331	$331
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$794,553**

Contingency	25%	$198,638
Mobilization	10%	$79,455
Preconstruction Engineering	8%	$63,564
Construction Engineering	8%	$63,564
Total Project Costs		**$1,200,000**

Layton City's Responsibility	**100%**
	$1,200,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.00
Number of Sidewalks (No.) =	2

Project No.	**53**
Funding:	**Layton**
Type:	**Widen**

Layton City
Transportation Master Plan

Church Street: 3100 North to 3300 North

Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	13,500	$135,000
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	2	$4,545
Roadway Excavation	C.Y.	$11	4,667	$49,000
HMA Concrete	Ton	$85	1,628	$138,338
Untreated Base Course	C.Y.	$15	1,556	$23,333
Granular Borrow	C.Y.	$40	2,333	$93,333
Curb and Gutter (2.5' width)	L.F.	$23	3,000	$67,500
Sidewalk (4' width)	L.F.	$25	3,000	$75,000
Drainage	L.F.	$45	3,000	$135,000
Right of Way	S.F.	$4	99,000	$396,000
Signage Striping	L.F.	$1	310	$310
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$1,117,360**

Contingency	25%	$279,340
Mobilization	10%	$111,736
Preconstruction Engineering	8%	$89,389
Construction Engineering	8%	$89,389
Total Project Costs		**$1,688,000**

Layton City's Responsibility	**100%**
	$1,688,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.00
Number of Sidewalks (No.) =	2

Project No.	**54**
Funding:	**Layton**
Type:	**New**

Layton City
Transportation Master Plan

2200 West: Gentile Street to 1000 South

Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	13,500	$135,000
Removal of Existing Asphalt	S.Y.	$4	5,500	$22,000
Clearing and Grubbing	Acre	$2,000	0	$413
Roadway Excavation	C.Y.	$11	1,000	$10,500
HMA Concrete	Ton	$85	349	$29,644
Untreated Base Course	C.Y.	$15	333	$5,000
Granular Borrow	C.Y.	$40	500	$20,000
Curb and Gutter (2.5' width)	L.F.	$23	3,000	$67,500
Sidewalk (4' width)	L.F.	$25	3,000	$75,000
Drainage	L.F.	$45	3,000	$135,000
Right of Way	S.F.	$4	9,000	$36,000
Signage Striping	L.F.	$1	310	$310
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$536,367**

Contingency	25%	$134,092
Mobilization	10%	$53,637
Preconstruction Engineering	8%	$42,909
Construction Engineering	8%	$42,909
Total Project Costs		**$810,000**

Layton City's Responsibility	**100%**
	$810,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.00
Number of Sidewalks (No.) =	2

Project No.	**55**
Funding:	**Layton**
Type:	**Widen**

Layton City
Transportation Master Plan

1700 West: Layton Parkway to Westside Drive

Collector

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	10,800	$108,000
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	2	$3,636
Roadway Excavation	C.Y.	$11	3,733	$39,200
HMA Concrete	Ton	$85	1,302	$110,670
Untreated Base Course	C.Y.	$15	1,244	$18,667
Granular Borrow	C.Y.	$40	1,867	$74,667
Curb and Gutter (2.5' width)	L.F.	$23	2,400	$54,000
Sidewalk (4' width)	L.F.	$25	2,400	$60,000
Drainage	L.F.	$45	2,400	$108,000
Right of Way	S.F.	$4	79,200	$316,800
Signage Striping	L.F.	$1	248	$248
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	0	$0
			Subtotal	**$893,888**

Contingency	25%	$223,472
Mobilization	10%	$89,389
Preconstruction Engineering	8%	$71,511
Construction Engineering	8%	$71,511
Total Project Costs		**$1,350,000**

Layton City's Responsibility	**15%**
	$201,000

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.00
Number of Sidewalks (No.) =	2

Project No.	**56**
Funding:	**Layton**
Type:	**New**

Layton City
Transportation Master Plan

Signal: SR-193 and Weber State University Campus Connection

Minor Arterial

Costs

Item	Unit	Unit Cost	Quantity	Cost
Parkstrip	S.F.	$10	0	$0
Removal of Existing Asphalt	S.Y.	$4	0	$0
Clearing and Grubbing	Acre	$2,000	0	$0
Roadway Excavation	C.Y.	$11	0	$0
HMA Concrete	Ton	$85	0	$0
Untreated Base Course	C.Y.	$15	0	$0
Granular Borrow	C.Y.	$40	0	$0
Curb and Gutter (2.5' width)	L.F.	$23	0	$0
Sidewalk (4' width)	L.F.	$30	0	$0
Drainage	L.F.	$45	0	$0
Right of Way	S.F.	$4	0	$0
Signage Striping	L.F.	$1	0	$0
Bridge/Culvert	S.F.	$225	0	$0
Traffic Signal	Each	$180,000	1	$180,000
			Subtotal	**$180,000**

Contingency	25%	$45,000
Mobilization	10%	$18,000
Preconstruction Engineering	8%	$14,400
Construction Engineering	8%	$14,400
Total Project Costs		**$272,000**

Layton City's Responsibility	**0%**
	$0

Overall Assumptions:

HMA Pavement Density (pcf) =	155
HMA Thickness (in) =	4
Untreated Base Course Thickness (in) =	8
Granual Borrow Thickness (in) =	12
Roadway Excavation Depth (ft) =	2.00
Number of Sidewalks (No.) =	2

Project No.	**57**
Funding:	**UDOT**
Type:	**Signal**

Layton

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Appendix C: Corridor Preservation Process

The Utah Department of Transportation
Corridor Preservation Process

The Intermodal Surface Transportation Efficiency Act of 1991 formally introduced the concept of corridor preservation, requiring states to consider "preservation of rights of way for construction of future transportation projects…and identify those corridors for which action is most needed to prevent destruction or loss."

While strongly promoted at the federal level, it has been left to the individual states to develop techniques and programs for corridor preservation. The Utah Department of Transportation (UDOT) has developed a program that enables the state and local municipalities to preserve future transportation corridors by acquiring rights of way that meet certain eligibility requirements.

If you are interested in selling your property to the state for corridor preservation purposes, you must meet the following requirements to be eligible:

Bare Ground and/or Imminent Development

- Your land must be vacant (without constructed improvements), and soon to be developed.

- Your land is in a corridor that UDOT or the local municipality has identified for preservation.

Hardship

Health and Safety Considerations:

- Advanced age – needs care or assistance from others.
- Ambulatory defects or diseases – where present facilities are inadequate or cannot be maintained by the owner.
- Major disabilities or equivalent disabilities.
- Doctor's recommendation to change climate or physical environments.
- Non-decent, safe, and sanitary housing such as overcrowded living conditions if the occupancy level did not exceed decent, safe, and sanitary standards at the time the owner originally bought the property.

Financial Considerations:

- Probate or other litigation.
- Loss of employment.
- Retirement causing financial inability to maintain current residence, or purchase of retirement home.
- Pending mortgage foreclosure.
- Job transfer that creates a need to move.

- Financial Distress involving personal or business circumstances.
- Substantial Burden such as maintenance, taxes, and/or rehabilitation costs.
- Monetary Loss – Income or vacant properties. Eligible when the proposed project is the immediate cause of a monetary loss. The owner must demonstrate that the project creates an adverse impact upon business profitability or upon property. Non-transportation issues to be considered are:
    - Inability to obtain financing
    - Inherent risk of ownership associated with this type of property.
    - Other outside factors affecting the profitability of the business operation or property ownership.
    - Local governmental regulations affecting development or rehabilitation, such as requiring the owner to set aside right of way from development, without the requirement for dedication.

Application Process

If you believe you may qualify for advanced acquisition, you must apply for a Hardship Acquisition. Please follow the steps below in order to be considered for advanced acquisition using the Corridor Preservation Funds:

1. Completely fill out the Hardship Acquisition Questionnaire and attach all necessary documentation.

2. If needed, a letter may accompany the Questionnaire if further information is needed to describe your hardship.

3. The letter or questionnaire must include the property owner's name, address of the property and a telephone number.

4. In the documentation, please state the reason you believe you qualify for advanced acquisition, the estimated market value of the property and what steps, if any, you have taken to sell the property on the open market.

5. Please submit the information packet to:

    Utah Dept of Transportation
    P. O. Box 148420-8420
    Salt Lake City, UT 84114
    Attn: Dian McGuire

    Re: Corridor Preservation Fund

6. Upon receipt of your letter, you will be contacted by a UDOT representative that will explain the process to you.

7. An appraisal will be ordered by UDOT at no cost to you. The appraiser will be a qualified appraiser and will contact you directly. You have the right to accompany the appraiser during their site visit. This could take approximately 30 days.

8. A review appraiser will be hired to go over the appraisal report. The reviewer will review the report and validate the integrity of the report and help determine market value. This process may take 7 to 10 days.

9. Once UDOT has received the reports from both appraisers, your completed application packet will be evaluated at the next monthly Advisory Council meeting. The Advisory Council is a group of representatives from each of the Metropolitan Planning Organizations (MPOs), UDOT, and appointed members from the Transportation Commission.

10. If the Advisory Council recommends approval, your application will then be considered by the Transportation Commission for acquisition approval. The Transportation Commission meets monthly and may review your application the same month as the Advisory Council.

11. If the Transportation Commission approves your application, a UDOT representative will contact you with an explanation of the acquisition process. In the event of denial, you will receive a letter explaining your rights of appeal.

12. Please note that the advanced acquisition program using Corridor Preservation Funds is a voluntary process. Should you and the Department of Transportation be unable to reach an agreement on the terms of sale, the Department may withdraw their offer without any further obligation.

If you have additional questions concerning this process, please contact Dian McGuire at 801-633-6370 or dmcguire@utah.gov

Layton

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Appendix D: Biking and Walking Elements

Policy Review Memorandum

To: Steven Lord, Horrocks Engineers

From: Tom Millar, Planner
Travis Jensen, Associate and Project Manager
Joe Gilpin, Principal
Alta Planning + Design

Date: August 26, 2014

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1 Introduction

Various Layton City policies were reviewed to determine their effect on bicycling and walking. A "best practices" review was then conducted in the area of bicycle and pedestrian-related policies to develop appropriate recommendations that the City can modify and/or adopt. Basic descriptions of the recommended changes and additions are given in this memo along with information about where the City may find more detailed resources (if applicable) about the recommended policies.

As part of this plan, the consultant team reviewed:

- City of Layton General Plan
- City of Layton Municipal Code

The full policy and regulatory review is provided in the attached policy matrix.

2 Key Findings

Layton City has a number of very positive policies, codes, ordinances, and regulations that support walkable and bikeable environments. However, it is also evident that the City could significantly strengthen many areas of policy and code regarding facility definitions and standards, general support of pedestrian and bicyclist safety, traffic calming, walkable neighborhoods, access to schools, required bicycle parking, bicycle and pedestrian facility requirements, and enhancements within the context of development ordinances. Policies and standards geared toward making Layton safer and more welcoming for bicycling and walking are recommended and discussed within the attached policy matrix. Error! Reference source not found. below describes key strengths identified within the existing ordinances and policies of the City, as well as priority areas for improvement.

Strengths

- General ordinance supporting pedestrian and bicycle safety
- Maximum block sizes in residential and agricultural zones
- Pedestrian accommodations in parking lots in mixed use zones
- Good ordinance language requiring property owner participation in sidewalk maintenance
- Good language prohibiting obstructions to sidewalks
- Good language requiring overhangs and shelters to protect pedestrians in mixed use zones

Priority Areas for Improvement

- Develop a comprehensive Complete Streets Ordinance
- Require pedestrian improvements with new development and redevelopment (sidewalks, lighting, street trees, etc.)
- Develop citywide bicycle parking requirements
- Update suburban, auto-oriented development standards to be more context-based and pedestrian-friendly
- Develop policy and ordinances for required width and installation of sidewalks
- Expand the walking and bicycling-friendly requirements that exist in mixed use zones to all non-residential and non-agricultural zones in the City

3 Conclusion

It is clear that adapting best practices from across the country into the existing code would serve as an efficient approach to improving existing conditions while facilitating new walkable and bikeable development. The City's development standards are primarily oriented towards automobile access. Walkability begins with access to destinations through the minimization of out of direction travel, compact distances, and a pleasant overall aesthetic. To the extent politically feasible, the City and its partners in the County and State agencies should promote development that is proximate to existing infrastructure, residential development, and existing destinations for education, employment, commerce, and civic activities. This begins with allowing and promoting a mixture of land uses and at a density that supports walking and bicycle access. Walkable land use patterns are critical to quality of life Layton residents and visitors

Promoting "complete" infrastructure and transportation linkages between land uses will help ensure that destinations within Layton that are proximate in distance are indeed comfortable and safe to walk or bike to and from. Pedestrian and bicycle access should be considered in every applicable requirement and ordinance, like the development of sidewalks, provision of bicycle parking and street trees, and pedestrian-scaled lighting. Standards should also consider whether or not building and lots are oriented for pedestrian and bicycle access.

The comments and recommendations in the attached policy matrix outline many opportunities for making local development standards more pedestrian and bicycle friendly. This plan suggests that City

staff and appropriate appointed committees develop proposed text amendments they consider easy to accomplish in the short term. For more structural changes, staff, committees, and the Plan committee members should incorporate changes into the upcoming comprehensive audit and rewrite of development standards over the next 12-18 months. The outcome of such an effort will be development standards that are predictable and sustainable for investors and developers, but that also promote active living, aging in place, quality of life, the local character of Layton, and transportation and recreation choices.

Layton Master Transportation Plan – Bicycling and Walking Elements

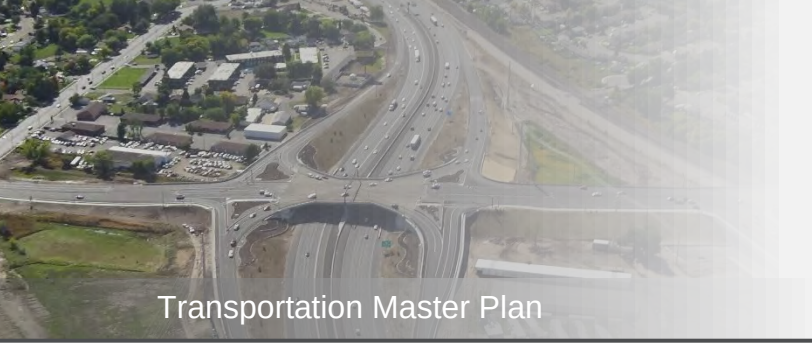
Topic	Review	
	City of Layton Municipal Code ("Code"), Other Regulations, or Policies	Comments/Suggestions
1. DEFINITIONS and SUPPORTING ORDINANCES		
1.1 Does "Street" definition include pedestrian, cyclist, and transit reference?	No definition listed.	Consider adding language to the Code to reflect the City's intent to include and safely accommodate pedestrians, cyclists, transit users, etc.: Example: *The term "street" includes avenues, boulevards, highways, roads, alleys, lanes, viaducts, bridges and the approaches thereto and all other public thoroughfares in the city, and means the entire width thereof between opposed abutting property lines. It shall be construed to include a sidewalk or footpath and accommodations for bicyclists, transit riders, and persons of all abilities as deemed contextually appropriate unless the contrary is expressed or unless such construction would be inconsistent with the manifest intent of the city council.*
1.2 Definition of right of way	The Code states that public right of way widths are measured from lot line to lot line. Because the Code does not specify or require a minimum number of motor vehicle traffic lanes, each roadway classification type's right of way width can be dedicated to other uses like street trees, wider sidewalks, bike lanes, paths, and center medians or pedestrian refuge islands.	Define and prioritize non-motorized roadway elements within the right of way.
1.3 Definition of vehicle	No definition listed.	Some cities' and states' definition of 'vehicle' includes the bicycle. Include an express definition of vehicle, including bicycles. Doing so will add validity to bicyclists' presence on the roadway and to planning and designing for and accommodating bicyclists.
1.4 Definition of sidewalk	No definition listed.	Add a definition of sidewalk that defines it as part of the public right of way.
1.5 Definition of bicycle	No definition listed.	MUTCD Definition: *A pedal-powered vehicle upon which the human operator sits.*
1.6 Types and definition of facilities specified or allowed	None found.	Define different types of bicycle facilities and establish a hierarchy.
1.7 Definition of greenway or shared use path	No definition of greenway or shared use path listed.	Potential definition: *A linear open space established along or adjacent to a manmade corridor, like a street, or a natural corridor, such as a river, stream, ridgeline, rail-trail, canal, or other route for conservation, recreation, and shared-use alternative transportation purposes such as pedestrians and cyclists.*
1.8 General ordinances supporting pedestrian and bicycle safety	Needs improvement. The Municipal Code and General Plan Land Use Element include several policies and regulations that are supportive of pedestrian and bicyclist safety and comfort including: - Prohibition on opening doors into traffic - Prohibition on parking on sidewalk or curb - Prohibition of bicyclists and pedestrians on limited access highways - Authorizing Play Streets - Definition of speed limits for motor vehicles (De facto: 25 mph) - Definition of and directives on the installation of control devices - New elementary schools recommended to be located near the center of residential areas and not on edges and/or on arterial streets - Prohibition of operation of motor vehicle on public property that is not a highway or street (i.e. motor vehicles on shared use paths, trails, sidewalks, or other facility designed for bicyclists and pedestrians) - Requirements for prompt snow removal from sidewalks (within 12 hours), especially on sidewalks where children walk to and from schools or parks. Exempt sidewalks: along agriculture frontage or where children would not walk to and from schools or parks.	The regulations and policies listed at left are some of the most helpful the documents reviewed. The authorization of play streets, requirement for prompt snow removal on sidewalks, and the prohibition on opening doors into traffic (which helps to protect bicyclists in the roadway and pedestrians on narrow sidewalks) are especially commendable for supporting pedestrian and bicycle comfort and safety. Changes and additions to consider include: - Disallowing driving, parking, or blocking designated bikeways, including bike lanes - Other allowances for and restrictions on bicycle travel such as prohibitions on wrong-way riding, riding without lights, riding with headphones - Other protections for bicyclists and pedestrians including: anti-harassment ordinances, safe passing of cyclists requirements (if a requirement stricter than the state's 3' passing rule is desired by the City), etc. See the following documents for comprehensive recommendations for policy and regulatory tools to support walking and bicycling and transit access: - *Making Neighborhoods More Walkable and Bikeable*, ChangeLab Solutions: http://changelabsolutions.org/sites/default/files/MoveThisWay_FINAL-20130905.pdf - *Getting the Wheels Rolling: A Guide to Using Policy to Create Bicycle Friendly Communities,* ChangeLab Solutions *http://changelabsolutions.org/bike-policies*

Topic	Review	
	City of Layton Municipal Code ("Code"), Other Regulations, or Policies	Comments/Suggestions
1.9 School property regulations on vehicular traffic	Per State Code, cities can adopt rules and regulations for the control of vehicular traffic and parking on school property. Layton's City Council has stated that the City's traffic code is applicable and enforceable on school property within city limits and that the places where vehicles operate on school property are considered public streets, roads, or highways. Special rules or exceptions can be made for particular schools.	None.
2. STREET ELEMENTS AND CONFIGURATION		
2.1.1 Pedestrian and bicycle accommodations required during new development or redevelopment 2.1.2 New sidewalks, bike lanes, greenways, etc. - connect to existing facilities, general connectivity requirements	No requirements for accommodations or connectivity found.	Include access to transit in the list of priority destinations for sidewalk provisions. Consider adding requirements, typical sections, elements, and similar suggested language for bike lanes, other dedicated bicycle infrastructure, and greenways, including reservation, dedication, or provision in new developments where a greenway or trail is shown on an adopted plan or where a property connects to an existing or proposed greenway. Establish guidelines and requirements so that bicycle and pedestrian accommodation and access is maintained during development and construction.
2.2 Cross-access between adjacent land parcels in subdivisions	No requirements of design guidelines found.	Add section in subdivision regulations to require cross-access between adjacent parcels to facilitate non-motorized (pedestrian and bicycle) access. Requiring cross-access between adjacent parcels of land is a great tool for reducing the amount of traffic on major roads while increasing connectivity for pedestrians, bicycles, and cars.
2.3 Block size	Needs improvement to promote walking, biking and transit access. In Layton, maximum block lengths are only specified for three of the 18 total zoning district types in City limits: - Agriculture – No maximum - Residential suburban – 1,000' - Single family residential (10) – 800' - Single family residential (8) – 700' - Single family residential (6) – 600' If a block is over 800' in length, which is possible only in an agriculture zone, the Planning Commission may require a dedicated walkway not less than 10' wide through the block approximately at its center. The Code states that the length, width, and shape of blocks in the City shall provide convenient and safe circulation and access for pedestrians and vehicles.	Long block lengths can make walking less attractive and more difficult. Shorter blocks (and therefore more blocks and streets) create more opportunities for street-fronting commerce, more access and mobility for walking and bicycling, can calm vehicle speeds, and therefore reduce the impact of collisions. Small block size is also important to intersection density and interconnectivity which serve to enhance walking, bicycling, and transit-access opportunities. Ideally, block size should not exceed 1000'-1200' for low density residential development (which Layton's Code does well). Where blocks exceed this length, a mid-block crosswalk should be required. In higher density areas like MU and MU-TOD zones, blocks can be as narrow as 200-400' wide. Block length should be tied to density of development.
2.4 Dead end streets	Needs improvement. The Code states that streets terminating in cul-de-sacs shall be no longer than 500' to the end of the turn-around.	Street interconnectivity is critical to successful bicycle/pedestrian networks. Furthermore, long dead-end streets create challenges for pedestrians, cyclists, and effective transit and other public services. Consider amending this section of the code with the following: *Cul-de-sacs may be permitted only where topographic conditions and/or exterior lot line configurations offer no practical alternatives for connection or through traffic. Cul-de-sacs shall have pedestrian and bicycle neighborhood access trails at the ends to connect to adjacent streets. Where possible, a close is preferred over a cul-de-sac.*
2.5 Setback maximums in highway corridor commercial districts	Needs improvement. According to the General Plan land use policies, the maximum lot depth off of each arterial street should be established based on existing man-made and natural boundaries, along with the consideration of adjacent uses. Where no such boundaries exist, a maximum depth of 200' to 400' from the street should be the general rule.	Setbacks of 200' to 400', even in highway corridor commercial districts where cars are very dominant, impede pedestrian ease of use, accessibility, and safety. Deep setbacks create more open corridors where traffic speeds are high and pedestrian safety and comfort are generally low. In order to promote walking and bicycling, the City should create reasonable yet strict setback minimum and maximum requirements in order to promote and require human-scaled development in all commercial and non-residential or agricultural zones.

Topic	Review	
	City of Layton Municipal Code ("Code"), Other Regulations, or Policies	Comments/Suggestions
2.6 Multi-family and mobile home land use policies	In Layton's General Plan, several policies regarding multi-family and mobile home land uses require these uses to be located on and provide access to abutting arterial streets. Because of the inherent risk of having children living in homes within these land uses adjacent to high volume and high speed roads, the General Plan requires these uses to include adequate safety provisions (fencing along the street). In mobile home developments, it states that access should only be to and from arterial streets. Access to local streets should be for emergency purposes only.	Consider amending the requirements and policies regarding multi-family and mobile home land uses by encouraging pedestrian connections external to the development. This is important to create inviting pedestrian and bicycle links to quieter local streets, particularly where parks, shopping and schools are proximate.
3. PEDESTRIAN FRIENDLY BUILDINGS AND SITE DESIGN STANDARDS		
3.1 Off-street motorized vehicle parking is behind or to side of buildings	No information found.	Consider requiring motorized vehicle parking that is behind or to the side of buildings in pedestrian-oriented zoning districts (like, but not limited to, MU and MU-TOD) to improve the pedestrian-orientation of buildings and to minimize the need for pedestrians to walk through parking lots to access buildings.
3.2 Automobile parking requirements defined	Minimum off-street parking requirements are required for all uses and the amount of parking is defined by each land use type. Maximum distance from off-premise parking to the building site cannot be more than 500' along the shortest pedestrian route. Access to parking spaces in private parking lots must be made from private roadways and not from public streets. When two dissimilar uses are adjacent to each other and the demand for parking at those uses do not conflict, the Board of Adjustment can authorize changing the maximum number of spaces to the requirement for the larger use.	The City should consider additional ways in which it can share or pool parking in order to maximize usable land and create pedestrian-scale places. Moreover, by including principles from 'Topic 3.4 – Bicycle parking requirements', the City can allow a reduction incentive to property and land owners for minimum automobile parking spaces. Creating maximums for automobile parking spaces will require applicants to satisfy the demand at their location with supply of bike parking and other amenities that can accommodate those who do not drive a car.
3.3 Pedestrian walkways in parking lots	Good. Broader application is recommended. In mixed use (MU) and mixed use transit-oriented development (MU-TOD) zones, where feasible, pedestrian walkways are required in parking lots of any size. Those with more than 100 spaces must be divided by landscaped areas that include a 10' (minimum width) walkway. Overall, the Code requires and recommends that these district types have many of the elements of a walkable and bikeable area.	Expand the requirement for pedestrian walkways in parking lots of any size to all zones in the City, not just mixed use development.
3.4 Bicycle parking requirements	Space for public seating and bicycle parking near entrances to buildings of groups of buildings in mixed use zones is required. The Code states that the design standards of the zone should create pedestrian and bicycle friendly areas. Except in mixed use zones, bicycle parking is not required per the Code.	Incorporate bicycle parking requirements throughout the section describing on- and off-street parking. Even though bicycle parking is required near entrances in mixed use zones, construction specifications, spacing, amount, and cost-sharing or installation of bicycle parking are not outlined. References for best practices in bicycle parking requirements: • Bicycle Parking Model Ordinance, Change Lab Solutions: http://changelabsolutions.org/publications/bike-parking • *Bicycle Parking Guidelines, 2nd Edition – by the Association of Pedestrian and Bicycle Professionals (APBP; available for purchase)* • The Model Bicycle Parking Ordinance developed by the Public Health Law & Policy group provides excellent model language for bicycle parking requirements and related amenities, including showers and changing areas: http://www.atpolicy.org/sites/default/files/Model%20Bike%20Parking%20Ordinance%20with%20Annotations%20-%20Public%20Health%20Law%20and%20Policy.pdf
3.5 Site amenities for cyclists and others (showers, changing areas, etc.)	No guidelines or requirements found.	Consider requiring or providing incentives to encourage the installation of site amenities such as showers, storage lockers, and changing areas for bicyclists and others for commercial and educational sites. Minimum requirements can be determined by number of employees, tenants, or students. The Model Bicycle Parking Ordinance developed by the Public Health Law & Policy group provides excellent model language for bicycle parking requirements and related amenities, including showers and changing areas: http://www.atpolicy.org/sites/default/files/Model%20Bike%20Parking%20Ordinance%20with%20Annotations%20-%20Public%20Health%20Law%20and%20Policy.pdf
3.6 Other place-supportive parking regulations (On-street parking, shared parking, pricing, employer incentives/programs, etc.)	No guidelines or requirements found.	Require or incentivize shared parking and parking reductions in pedestrian-oriented districts, especially where pedestrians are potentially present.

Topic	Review	
	City of Layton Municipal Code ("Code"), Other Regulations, or Policies	Comments/Suggestions
3.7 Pedestrian-scale lighting (< 15' tall) required along sidewalks, paths and in parking areas	No guidelines or requirements found.	Incorporate appropriate-scale lighting (<15' tall) considerations for bicyclists and pedestrians where appropriate.
3.8 Pedestrian-protective overhangs and shelters	In mixed use zones, roofs, alcoves, porticos, and other overhangs shall be incorporated into building design to protect pedestrians from the elements. Buildings within 30' of the street shall have an attractive and functional pedestrian entrance facing the street.	Expand this requirement to all commercial or other mixed use zones, or any zones where buildings that are accessed by the public exist.
4. PEDESTRIAN FACILITY DESIGN		
4.1 Minimum sidewalk width by context	No guidelines found for non-mixed use zones. Only the MU and MU-TOD zones have sidewalk width requirement (8' minimum).	The best standards would require or provide sidewalks on both sides of all collector and arterial streets and on *at least* one side of local streets where warranted by density and/or system connectivity. 5' wide sidewalks along local streets and 6' wide sidewalks along collectors and arterials are preferred minimum widths. 5' is the minimum width required for two adults to walk side-by-side. The land use context and density of development necessitates a greater level of requirement for sidewalk specifications. In areas such as downtown with buildings at the back of the sidewalk and ground level retail, sidewalks should be as wide as 10-18' wide.
4.2 Street trees	Needs improvement. Not required between sidewalk and the curb or in any non-mixed use zones. In mixed use zones in Layton, for example, street trees are required on all street frontages at a spacing of 20' (minimum) to 30' (maximum) on center.	In addition to their value for improving the air quality, water quality, and beauty of a community, street trees can help slow traffic and improve comfort for pedestrians. Trees add visual interest to streets and narrow the street's visual corridor, which may cause drivers to slow down. When planted in a planting strip between the sidewalk and the curb, street trees also provide a buffer between the pedestrian zone and the street. Expand the requirement for the presence, location, and spacing of street trees to all non-agricultural zones within the City.
5. BICYCLE FACILITY DESIGN		
5.1 Bicycle facility design guidelines, plan, or manual	None found.	Incorporate bicycle facility design best practices into the Code and other appropriate City design requirements. The Design Guidelines developed for this Plan, as well as resources in this memo, will provide specific design guidelines and reference to national design guidelines. The City should also consider adopting the NACTO Urban Bikeway Design Guide as an official set of design guidelines for bikeway design, definitions, and construction.
6. COMPLETE STREETS SUPPORTING POLICIES AND MANUALS		
6.1 Complete Streets Ordinance	Layton has not adopted a Complete Streets ordinance.	Consider adopting a Complete Streets ordinance. The ordinance would require that all city owned transportation facilities in the public right of way on which bicyclists and pedestrians are permitted by law, including, but not limited to, streets, bridges, and all other connecting pathways, be designed, constructed, operated, and maintained so that users, including people with disabilities, can travel safely and independently. Salt Lake City adopted a Complete Streets ordinance in 2010 and has tremendously improved bikeability and walkability since that time. http://www.bikeslc.com/GetInvolved/MasterPlansandPolicies/PDF/CompleteStreetsOrdinance.pdf
6.2 Traffic calming programs, policies, and/or manuals	None found.	Consider adopting traffic calming programs, especially near schools and in commercial, mixed use, Downtown, or Village Center districts.
6.3 Consideration of pedestrian and bicycle concerns and Level of Service (LOS) in Traffic Impact Analyses and other required engineering studies	None found.	In September 2013, the State of California did away with the Level of Service requirement in their environmental review process. Previously, a law required every roadway project (including transit, bicycling, or walking projects) to include a Level of Service analysis in the project's environmental review process. Previously, if a project adversely affected vehicular level of service, it would not receive environmental clearance or funding. Consider adopting a multi-modal level of service standard for future projects. For example, the MMLOS can be used to determine the best way to accommodate multi-modal traffic in new developments where active transportation and transit use are expected to be high. Consideration of bicycle and pedestrian levels of service can lend credibility to providing or improving adequate facilities for bicyclists and pedestrians.

Topic	Review	
	City of Layton Municipal Code ("Code"), Other Regulations, or Policies	Comments/Suggestions
6.4 Access management program or policy	None found.	Consider adding language across all types of development pertaining to non-motorized vehicle and pedestrian access management; this could broadly be incorporated into zoning districts requirements or street design standards.
6.5 Sidewalk retrofit/infill program or policy	None found.	The communities should consider developing sidewalk infill and maintenance program where City staff periodically inventory the street network to identify sidewalk gaps, and develop strategies, project prioritization criteria and funding for completing these gaps. Potential project prioritization criteria include filling gaps along key pedestrian routes, near major pedestrian trip generators like schools, transit routes, and along streets with high vehicle volumes.
6.6 Sidewalk maintenance requirements and obstructions	Sidewalks, curb, and gutter must be kept in good repair and otherwise safe conditions by the abutting or fronting property owners.	Enforcement of the obstructions language is critical and could provide a basis for removal of all kinds of temporary (e.g., trash cans) and more fixed obstructions in pedestrian ways (e.g., utility poles, sign poles). A systematic code enforcement program, public comment channel, and/or division could help Layton City enforce the municipal code (especially if several new requirements recommended in this policy review are adopted). Large and small cities like Los Angeles, CA; Virginia Beach, VA; Bryan, TX; and Watsonville, CA (which has a similar city profile where agricultural and suburban interests compete), have adopted and implemented code enforcement programs, public comment channels, and/or divisions to this end. • Los Angeles, CA: http://lahd.lacity.org/lahdinternet/CodeEnforcement/tabid/327/language/en-US/Default.aspx • Virginia Beach, VA: http://www.vbgov.com/government/departments/housing-neighborhood-preservation/code-enforcement/Pages/default.aspx • Bryan, TX: http://www.bryantx.gov/planning-and-development-services/code-enforcement/ • Watsonville, CA: http://cityofwatsonville.org/permits-plans/building-division/code-enforcement-complaints
7. ITEMS REVIEWED		
7.1 Names of Resources	GUIDELINES AND REGULATIONS: 1. City of Layton, Utah Municipal Code ("Code"): http://www.laytoncity.org/public/depts/legal/MunicipalCode.aspx ADDITIONAL POLICIES AND ORDINANCES: 1. City of Layton, Utah General Plan Land Use Element Policies: https://www.laytoncity.org/downloads/CD/Planning/GeneralPlan/GeneralPlanLandUseElement.pdf	REFERENCES AND HELPFUL RESOURCES 1. *Making Neighborhoods More Walkable and Bikeable*, ChangeLab Solutions: http://changelabsolutions.org/sites/default/files/MoveThisWay_FINAL-20130905.pdf 2. *Getting the Wheels Rolling: A Guide to Using Policy to Create Bicycle Friendly Communities,* ChangeLab Solutions *http://changelabsolutions.org/bike-policies* 3. *Bicycle Parking Guidelines, 2nd Edition* – by the Association of Pedestrian and Bicycle Professionals (APBP) 4. *Complete Streets Local Policy Workbook* – by the National Complete Streets Coalition and Smart Growth America 5. *NACTO Urban Bikeway Design Guide* – by the National Association of City Transportation Officials (NACTO) 6. 2010 ADA Standards for Accessible Design - http://www.ada.gov/2010ADAstandards_index.htm



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Appendix E: Cross Section and Design Guidelines

Cross Sections and Design Guidelines Memorandum

To: Steven Lord, Horrocks Engineers

From: Tom Millar and Travis Jensen, Alta Planning + Design

Date: May 16, 2014

Alta Planning + Design has been tasked with creating graphics showing different types of bikeway facility cross sections and design guidelines, showing general recommended characteristics (e.g. width, relationship to parking) for each of the following facility types:

- Signed shared roadway
- Marked shared roadway
- Bicycle boulevard
- Bike lane
- Buffered bike lane
- Protected bike lane (i.e. cycle track)
- Shared use path

Attached are the draft cross section and design guidelines cut sheets. Please review and return comments to Alta Planning + Design. Comments and changes will be incorporated and a final document will be produced.

Bicycle Facility Classification

Description

Consistent with bicycle facility classifications throughout the nation, these Facility Design Guidelines identify the following classes of facilities by degree of separation from motor vehicle traffic.

Signed Shared Roadways are bikeways where bicyclists and cars operate within the same travel lane, either side by side or in single file depending on roadway configuration. The most basic type of bikeway is a signed shared roadway. This facility provides continuity with other bicycle facilities (usually bike lanes), or designates preferred routes through high-demand corridors.

Marked Shared Roadways may be designated by pavement markings, signage and other treatments. Shared roadways with low vehicle volumes and speeds either as existing or through interventions are known as bicycle boulevards.

Bicycle Boulevards are applicable on low traffic, low speed streets, and may be supplemented with wayfinding signage, traffic calming and diversion, in addition to incorporating many of the elements of shared roadways.

Bike Lanes use signage and striping to delineate the right-of-way assigned to bicyclists and motorists. Bike lanes encourage predictable movements by both bicyclists and motorists.

Buffered Bike Lanes are similar to bike lanes, but have an added striping buffer between the bike lane and parking, the bike lane and travel lane, or both.

Protected Bike Lanes (i.e. Cycle Tracks) are exclusive bike facilities that combine the user experience of a separated path with the on-street infrastructure of conventional bike lanes. The hallmark of protected bike lanes is physical separation from moving traffic. This separation can come in the form of parked cars, curb barriers, planters, or other types of barrier.

Shared Use Paths are facilities separated from roadways for use by bicyclists, pedestrians, and other non-motorized users.

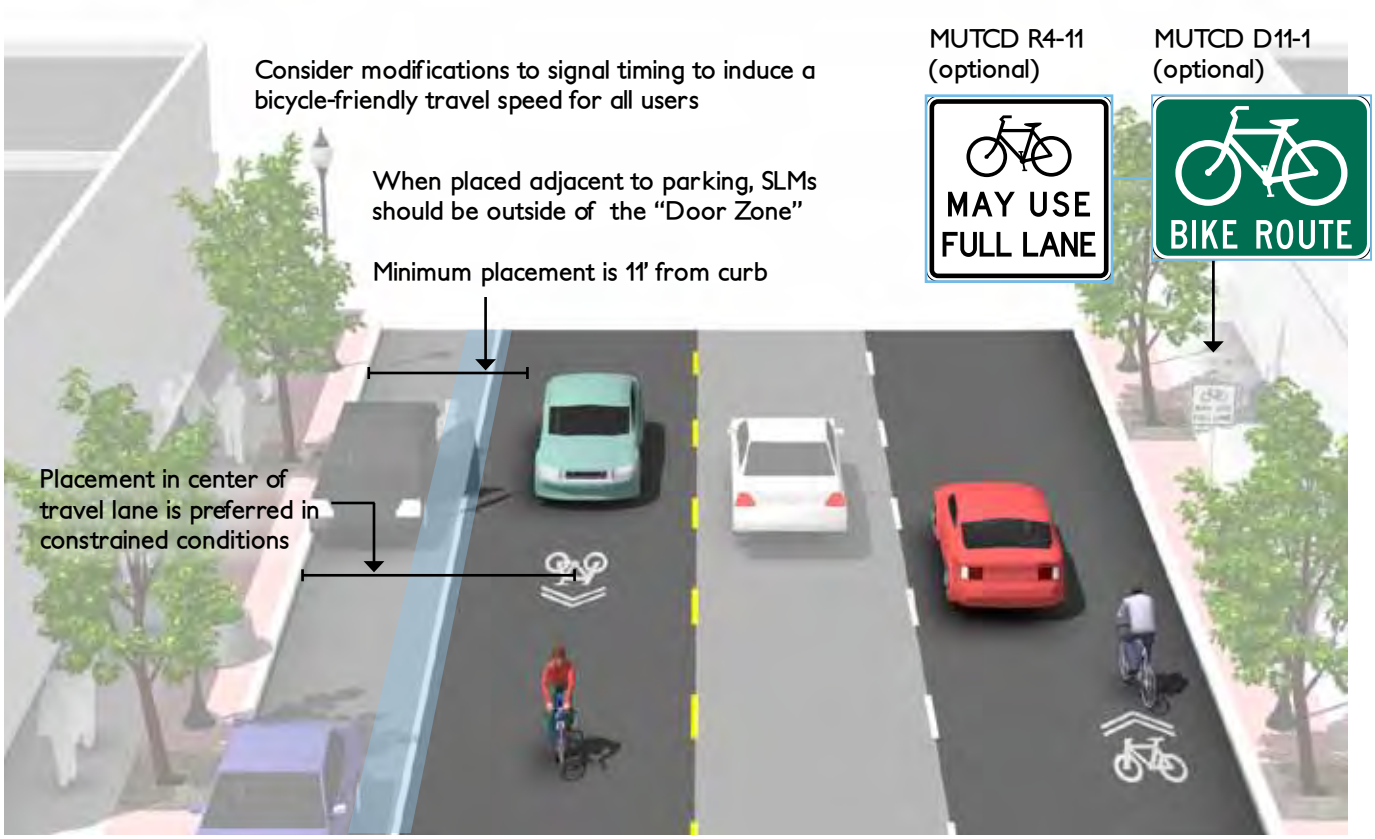
Marked Shared Roadway

Description

A marked shared roadway is a general purpose travel lane marked with shared lane markings (SLM) used to encourage bicycle travel and proper positioning within the lane.
In constrained conditions, the SLMs are placed in the middle of the lane to discourage unsafe passing by motor vehicles. On a wide outside lane, the SLMs can be used to promote bicycle travel to the right of motor vehicles.
In all conditions, SLMs should be placed outside of the door zone of parked cars.

Guidance

- Do not use on roads with speed limits higher than 35 mph.
- In constrained conditions, preferred placement is in the center of the travel lane to minimize wear and promote single file travel.
- Minimum placement of SLM marking centerline is 11 feet from edge of curb where on-street parking is present, 4 feet from edge of curb with no parking. If parking lane is wider than 7.5 feet, the SLM should be moved further out accordingly.



Discussion

Bike Lanes should be considered on roadways with outside travel lanes wider than 15 feet, or where other lane narrowing or removal strategies may provide adequate road space. SLMs shall not be used on shoulders, in designated bike lanes, or to designate bicycle detection at signalized intersections. (MUTCD 9C.07)

This configuration differs from a bicycle boulevard due to a lack of traffic calming, wayfinding, and other enhancements designed to provide a higher level of comfort for a broad spectrum of users.

Additional References and Guidelines

AASHTO. Guide for the Development of Bicycle Facilities. 2012.
FHWA. Manual on Uniform Traffic Control Devices. 2009.
NACTO. Urban Bikeway Design Guide. 2012.

Materials and Maintenance

Placing SLMs between vehicle tire tracks will increase the life of the markings and minimize the long-term cost of the treatment.

Signed Shared Roadway

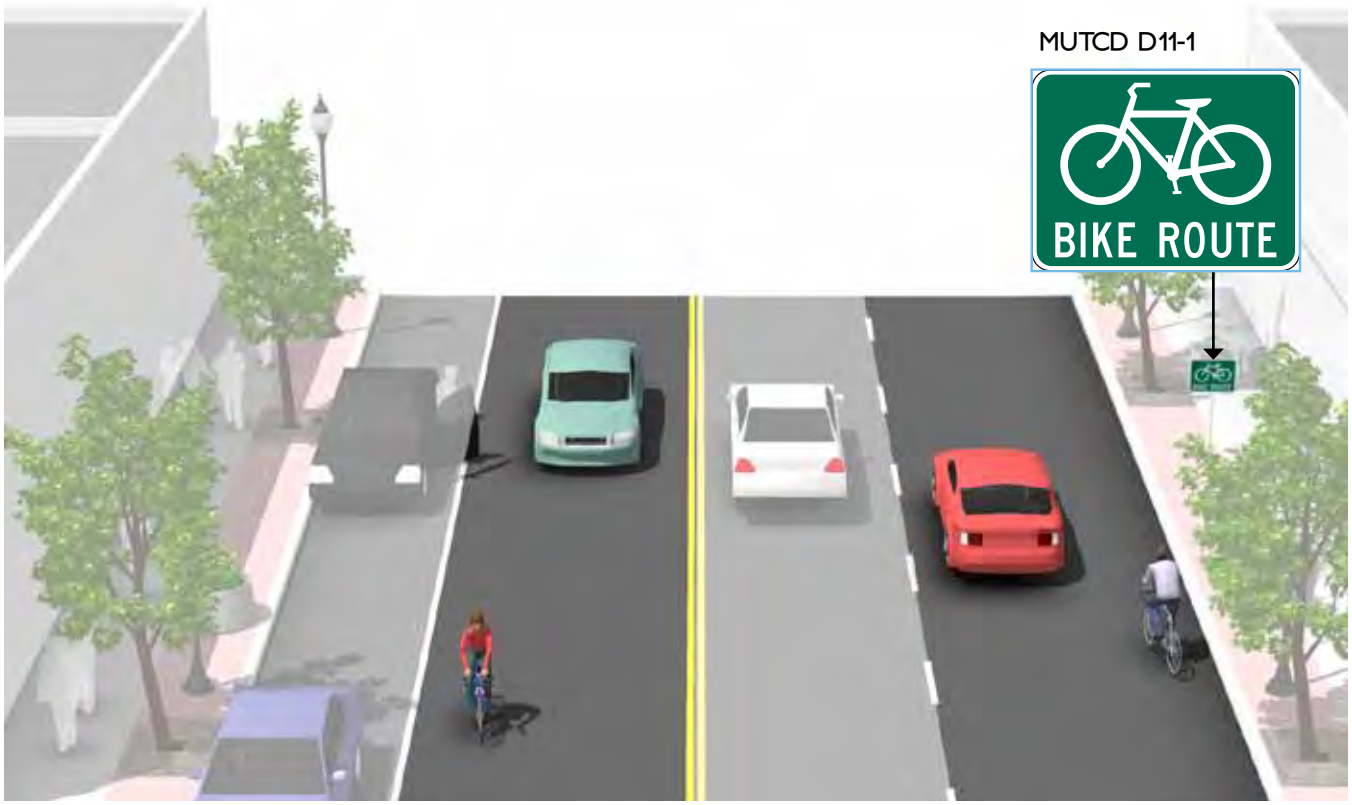
Description

Signed Shared Roadways are facilities shared with motor vehicles. They are typically used on roads with low speeds and traffic volumes, however can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

Guidance

Lane width varies depending on roadway configuration. Bicycle Route signage (D11-1) should be applied at intervals frequent enough to keep bicyclists informed of changes in route direction and to remind motorists of the presence of bicyclists. Commonly, this includes placement at:

- Beginning or end of Bicycle Route.
- At major changes in direction or at intersections with other bicycle routes.
- At intervals along bicycle routes not to exceed ½ mile.



Discussion

Signed shared roadways are often used to designate preferred routes through high-demand corridors. If used to provide continuity with other bicycle facilities (such as bike lanes), consider marking the route with shared lane markings to increase legibility for users.

This configuration differs from a bicycle boulevard due to a lack of traffic calming, wayfinding, pavement markings designed to provide a higher level of comfort for a broad spectrum of users.

Additional References and Guidelines

AASHTO. Guide for the Development of Bicycle Facilities. 2012.
FHWA. Manual on Uniform Traffic Control Devices. 2009.

Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs, and will need periodic replacement due to wear.

Bicycle Boulevard

Description

Bicycle boulevards are low-volume, low-speed streets that enhance bicyclist comfort by using treatments such as signage, pavement markings, traffic calming and/or traffic reduction, and intersection modifications. These treatments allow through movements of bicyclists while discouraging similar through-trips by non-local motorized traffic. Many streets will meet speed and volume targets without interventions.

Guidance

- Signs and pavement markings are the minimum treatments necessary to designate a street as a bicycle boulevard.
- Bicycle boulevards should have a maximum posted speed of 25 mph. Use traffic calming to maintain an 85th percentile speed below 22 mph.
- Implement volume control treatments based on the context of the bicycle boulevard, using engineering judgment. Target motor vehicle volumes range from 1,000 to 3,000 vehicles per day.
- Intersection crossings should be designed to enhance safety and minimize delay for bicyclists.

Discussion

Bicycle boulevard retrofits to local streets are typically located on streets without existing signalized accommodation at crossings of collector and arterial roadways. Without treatments for bicyclists, these intersections can become major barriers along the bicycle boulevard and compromise safety.

Traffic calming can deter motorists from driving on a street. Anticipate and monitor vehicle volumes on adjacent streets to determine whether traffic calming results in inappropriate volumes. Traffic calming can be implemented on a trial basis.

Additional References and Guidelines

NACTO. Urban Bikeway Design Guide. 2012.
Ewing, Reid. Traffic Calming: State of the Practice. 1999.
Ewing, Reid and Brown, Steven. U.S. Traffic Calming Manual. 2009.

Materials and Maintenance

Vegetation should be regularly trimmed to maintain visibility and attractiveness.

Bike Lane

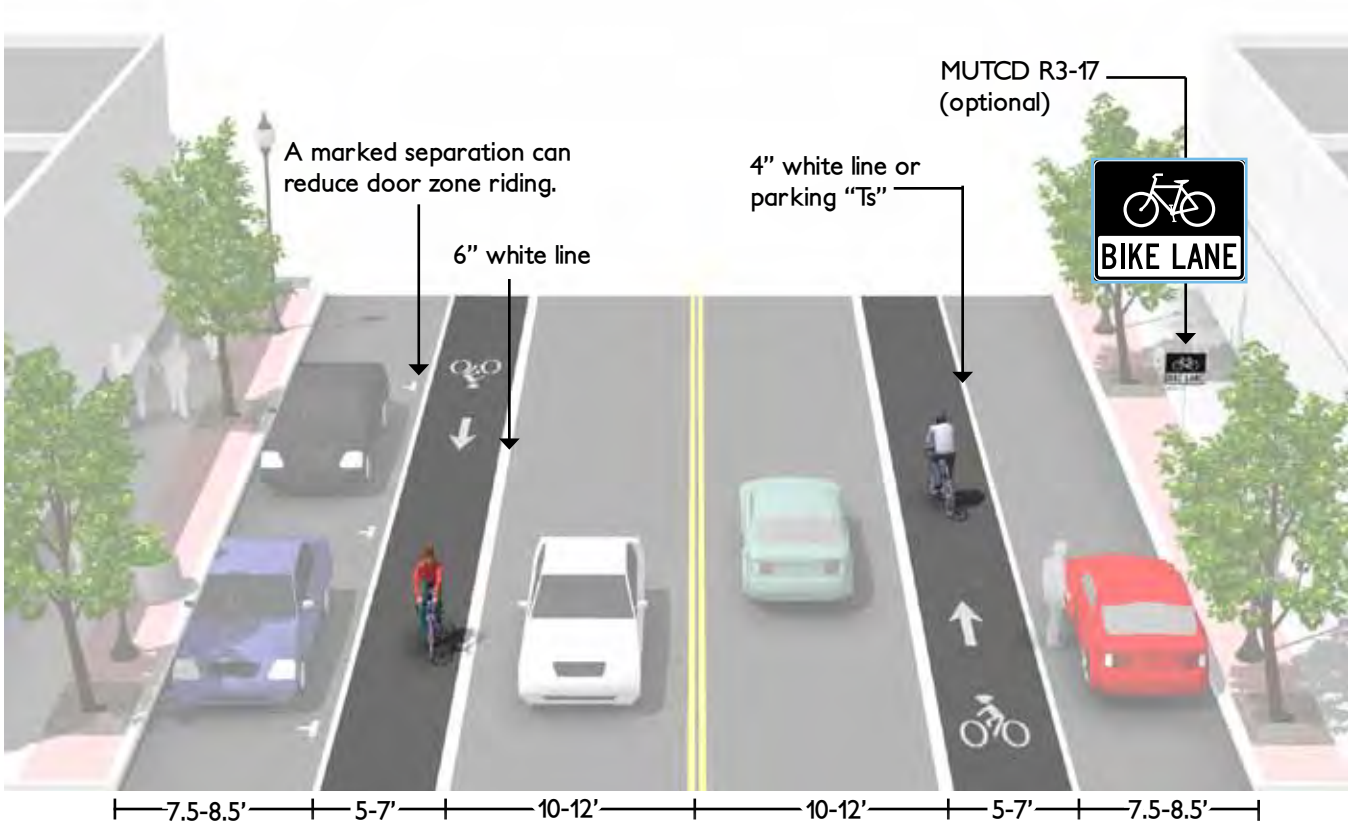
Description

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is located adjacent to motor vehicle travel lanes and is used in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge or parking lane.

Many bicyclists, particularly less experienced riders, are more comfortable riding on a busy street if it has a striped and signed bikeway than if they are expected to share a lane with vehicles.

Guidance

- Bike lanes may range from 4-6' wide if they are placed adjacent to the curb and parking is not allowed.
- 7 foot maximum for marked width of bike lane. Greater widths may encourage vehicle loading in bike lane. Consider buffered bicycle lanes when a wider facility is desired.
- Consider a buffered bike lane in areas with high parking turnover.



Discussion

Bike lanes adjacent to on-street parallel parking require special treatment in order to avoid crashes caused by an open vehicle door. The bike lane should have sufficient width to allow bicyclists to stay out of the door zone while not encroaching into the adjacent vehicular lane. Parking stall markings, such as parking "Ts" and double white lines create a parking side buffer that encourages bicyclists to ride farther away from the door zone.

Additional References and Guidelines

AASHTO. Guide for the Development of Bicycle Facilities. 2012.
FHWA. Manual on Uniform Traffic Control Devices. 2009.
NACTO. Urban Bikeway Design Guide. 2012.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

Buffered Bike Lane

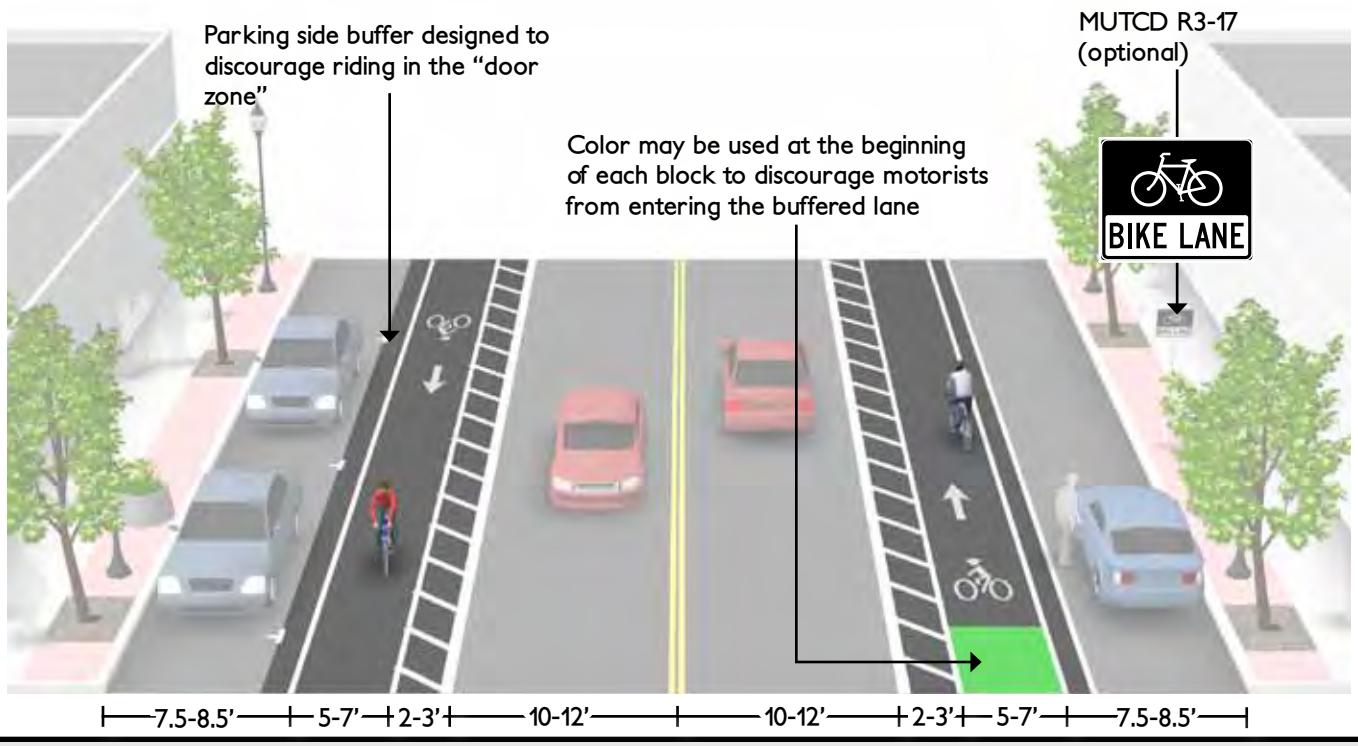
Description

Buffered bike lanes are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. Buffered bike lanes follow MUTCD guidelines for buffered preferential lanes (section 3D-01).

Buffered bike lanes are designed to increase the space between the bike lane and the travel lane or parked cars. This treatment is appropriate for bike lanes on roadways with high motor vehicle traffic volumes and speed, adjacent to parking lanes, or a high volume of truck or oversized vehicle traffic.

Guidance

- Where bicyclist volumes are high or where bicyclist speed differentials are significant, the desired bicycle travel area width is 7 feet.
- Buffers should be at least 2 feet wide. If 3 feet or wider, mark with diagonal or chevron hatching. For clarity at driveways or minor street crossings, consider a dotted line for the inside buffer boundary where cars are expected to cross.
- Diagonal hatching should be striped at intervals of 10 to 40 feet. Increased striping frequency may increase motorist compliance.



Discussion

Frequency of right turns by motor vehicles at major intersections should determine whether continuous or truncated buffer striping should be used approaching the intersection.

Parking side buffers are helpful in areas with high turnover parking to reduce the risk of dooring.

Additional References and Guidelines

AASHTO. Guide for the Development of Bicycle Facilities. 2012.
FHWA. Manual on Uniform Traffic Control Devices. 2009. (3D-01)
NACTO. Urban Bikeway Design Guide. 2012.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

Protected Bike Lanes (i.e. Cycle Tracks)

Description

A cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk. Cycle tracks have different forms but all share common elements—they provide space that is intended to be exclusively or primarily used by bicycles, and are separated from motor vehicle travel lanes, parking lanes, and sidewalks.

Raised cycle tracks may be at the level of the adjacent sidewalk or set at an intermediate level between the roadway and sidewalk to separate the cycle track from the pedestrian area.

Guidance

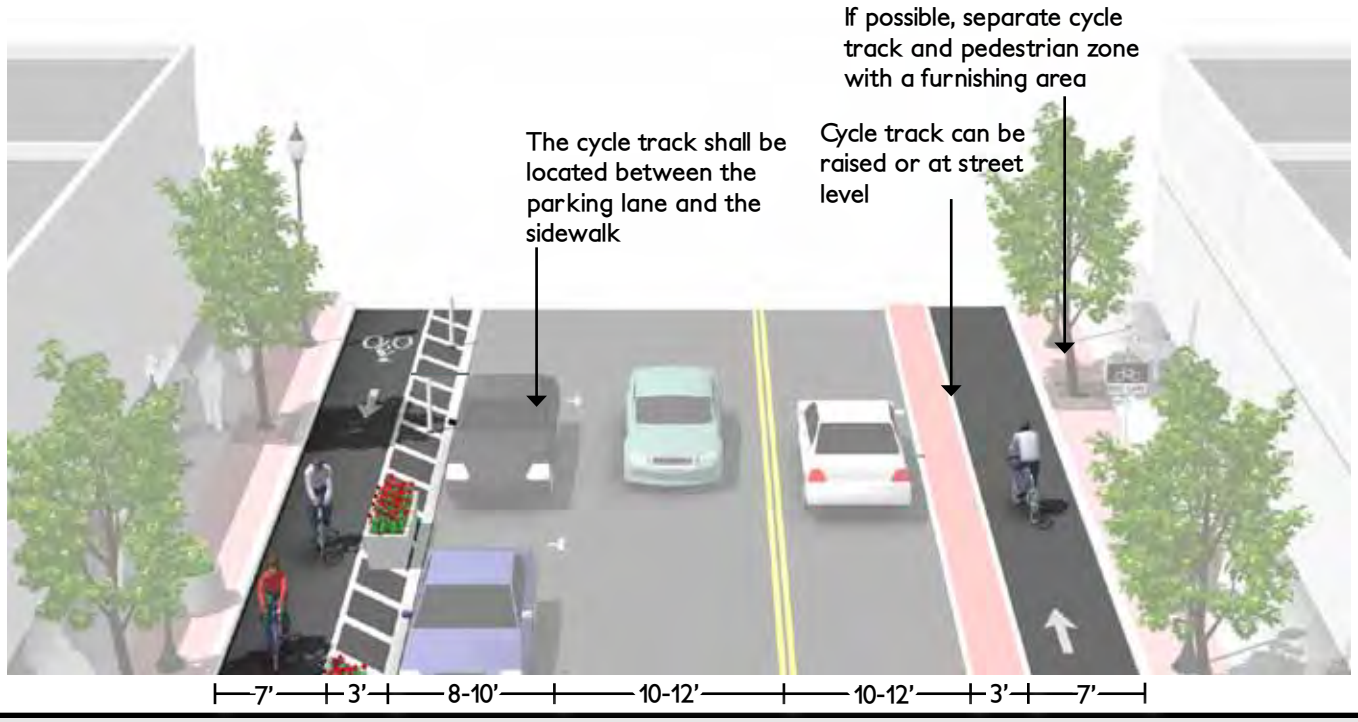
Cycle tracks should ideally be placed along streets with long blocks and few driveways or mid-block access points for motor vehicles.

One-Way Cycle Tracks

- 7 foot recommended minimum to allow passing. 5 foot minimum in constrained locations.

Two-Way Cycle Tracks

- Cycle tracks located on one-way streets have fewer potential conflict areas than those on two-way streets.
- 12 foot recommended minimum for two-way facility. 8 foot minimum in constrained locations



Discussion

Special consideration should be given at transit stops to manage bicycle and pedestrian interactions. Driveways and minor street crossings are unique challenges to cycle track design. Parking should be prohibited within 30 feet of the intersection to improve visibility. Color, yield markings and "Yield to Bikes" signage should be used to identify the conflict area and make it clear that the cycle track has priority over entering and exiting traffic. If configured as a raised cycle track, the crossing should be raised so that the sidewalk and cycle track maintain their elevation through the crossing.

Additional References and Guidelines

NACTO. Urban Bikeway Design Guide. 2012.

Materials and Maintenance

In cities with winter climates, barrier separated and raised cycle tracks may require special equipment for snow removal.

Shared Use Paths

Description

Shared use paths can provide a desirable facility, particularly for recreation, and users of all skill levels preferring separation from traffic. Paths should generally provide directional travel opportunities not provided by existing roadways.

Guidance

Width

- 8 feet is the minimum allowed for a two-way path and is only recommended for low traffic situations. 10 feet is recommended in most situations and will be adequate for moderate to heavy use.

- 12 feet is recommended for heavy use situations with high concentrations of multiple users. A separate track (5 foot minimum) can be provided for pedestrian use.

Lateral Clearance

- A 2 foot or greater shoulder on both sides of the path should be provided. An additional foot of lateral clearance (total of 3 feet) is required by the MUTCD for the installation of signage or other furnishings.

- If bollards are used at intersections and access points, they should be colored brightly and/or supplemented with reflective materials to be visible at night.

Overhead Clearance

- Clearance to overhead obstructions should be 8 feet minimum, with 10 feet recommended.

Striping

When striping is desired, use a 4 inch dashed yellow centerline stripe with 4 inch solid white edge lines. Solid centerlines can be provided on tight or blind corners, and on the approaches to roadway crossings.

Terminate the path where it is easily accessible to and from the street system, preferably at a controlled intersection or at the beginning of a dead-end street.

8-12' depending on usage

Discussion

The AASHTO Guide for the Development of Bicycle Facilities generally recommends against the development of shared use paths along roadways unless they are limited-access roads (such as freeways or other expressways). Also known as "sidepaths", these facilities create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding when either entering or exiting the path.

Additional References and Guidelines

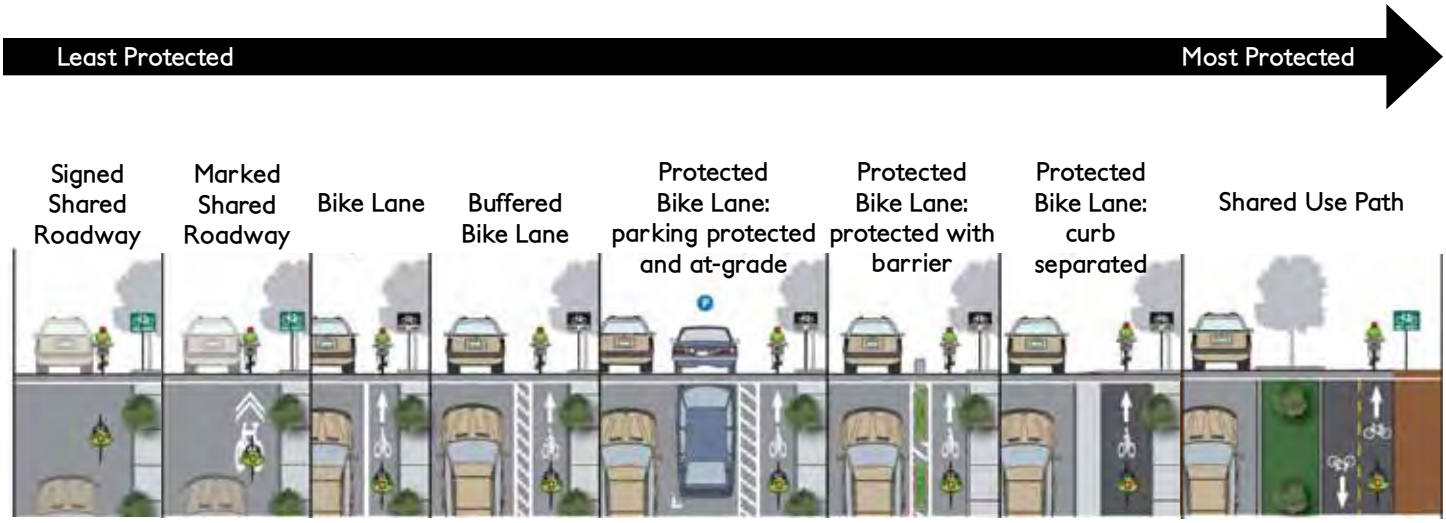
AASHTO. Guide for the Development of Bicycle Facilities. 2012.
FHWA. Manual on Uniform Traffic Control Devices. 2009.
Flink, C. Greenways: A Guide To Planning Design And Development. 1993.

Materials and Maintenance

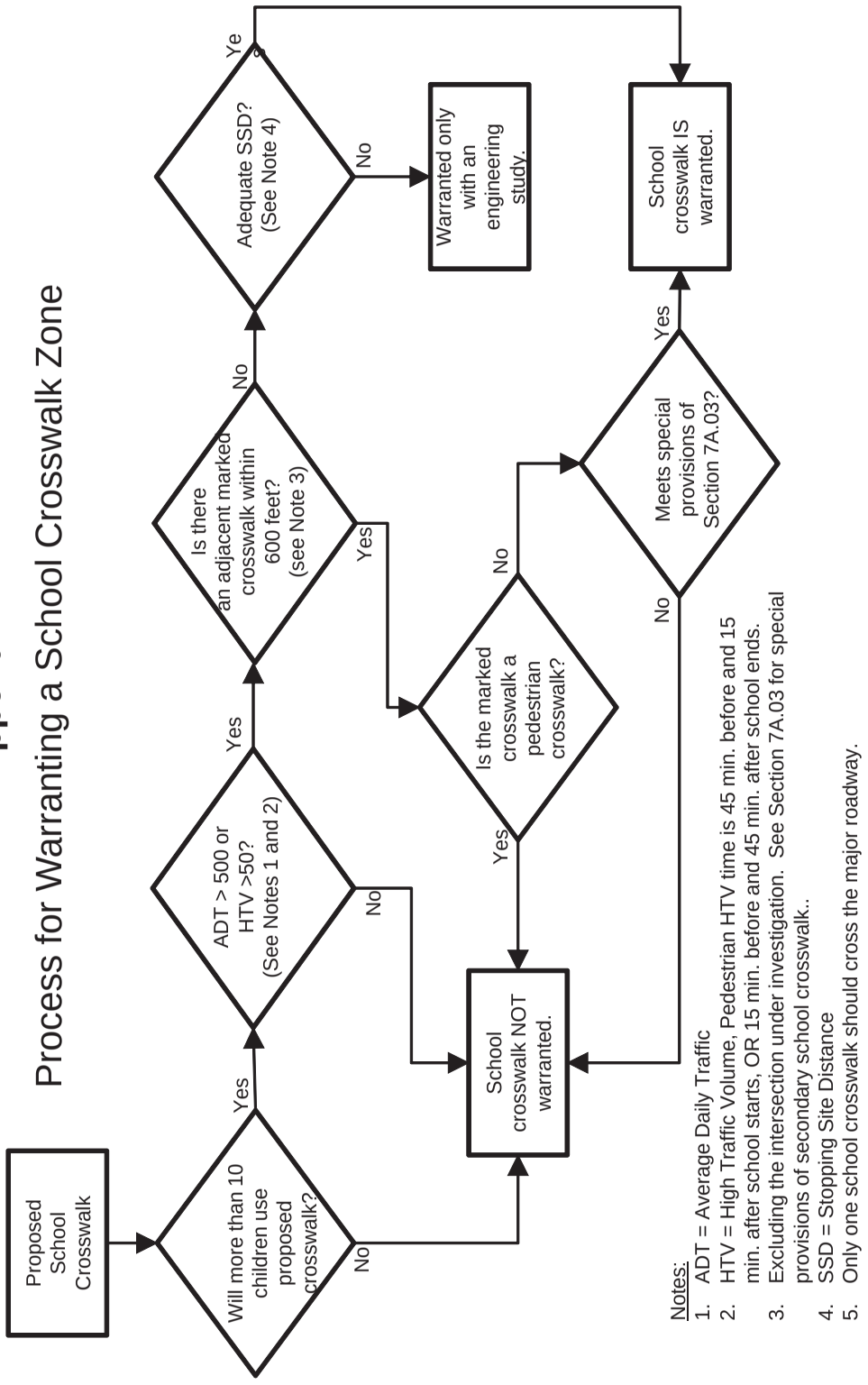
Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Bicycle Facility Continua

The following continua illustrate the range of bicycle facilities applicable to various roadway environments, based on the roadway type and desired degree of separation. Engineering judgment, traffic studies, previous municipal planning efforts, community input and local context should be used to refine criteria when developing bicycle facility recommendations for a particular street. In some corridors, it may be desirable to construct facilities to a higher level of treatment than those recommended in relevant planning documents in order to enhance user safety and comfort. In other cases, existing and/or future motor vehicle speeds and volumes may not justify the recommended level of separation, and a less intensive treatment may be acceptable.



Appendix F: Utah MUTCD Warrant Flowchart


Appendix B1
Process for Warranting a School Crosswalk Zone
Proposed School Crosswalk
Will more than 10 children use proposed crosswalk?
Yes
No
ADT > 500 or HTV >50? (See Notes 1 and 2)
Yes
No
Is there an adjacent marked crosswalk within 600 feet? (see Note 3)
No
Yes
Adequate SSD? (See Note 4)
Ye
No
Warranted only with an engineering study.
Is the marked crosswalk a pedestrian crosswalk?
No
Yes
Meets special provisions of Section 7A.03?
Yes
No
School crosswalk IS warranted.
School crosswalk NOT warranted.
Notes:
1. ADT = Average Daily Traffic
2. HTV = High Traffic Volume, Pedestrian HTV time is 45 min. before and 15 min. after school starts, OR 15 min. before and 45 min. after school ends.
3. Excluding the intersection under investigation. See Section 7A.03 for special provisions of secondary school crosswalk..
4. SSD = Stopping Site Distance
5. Only one school crosswalk should cross the major roadway.

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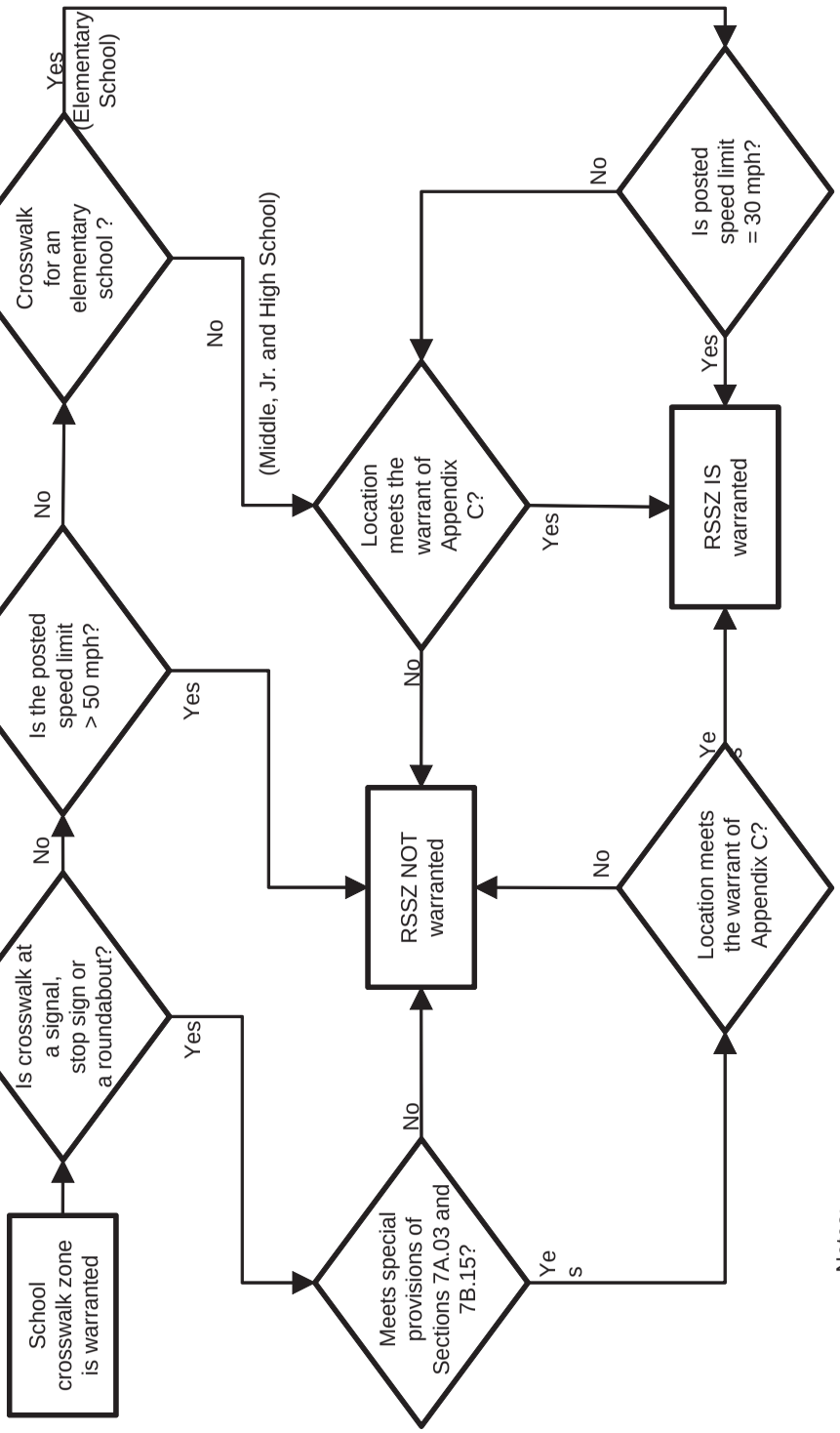
UTAH MUTCD

Appendix B2

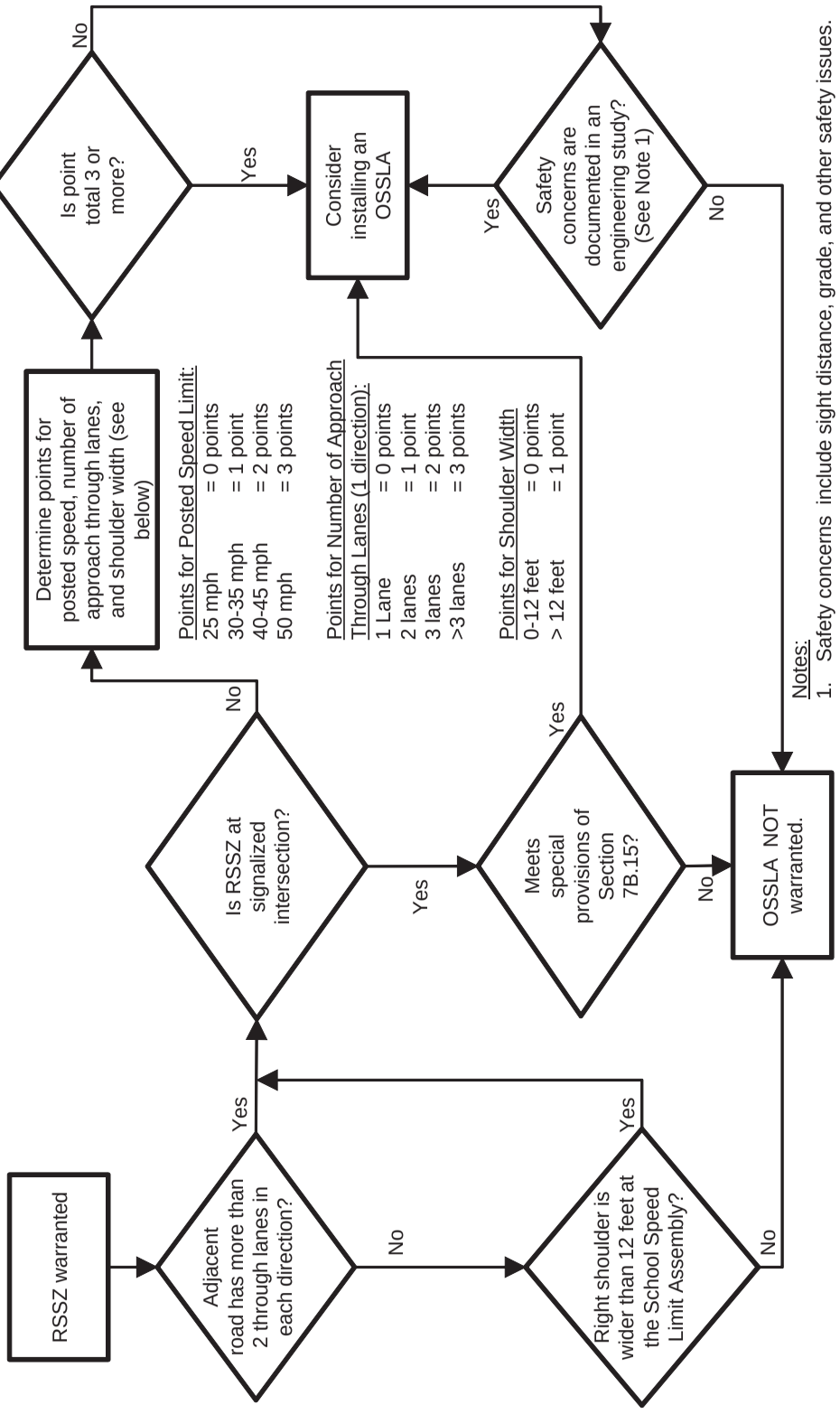
Process for Warranting a Reduced Speed School Zone (RSSZ)



Notes:
1. See Appendix B4 for crossing guard requirements.

Appendix B3

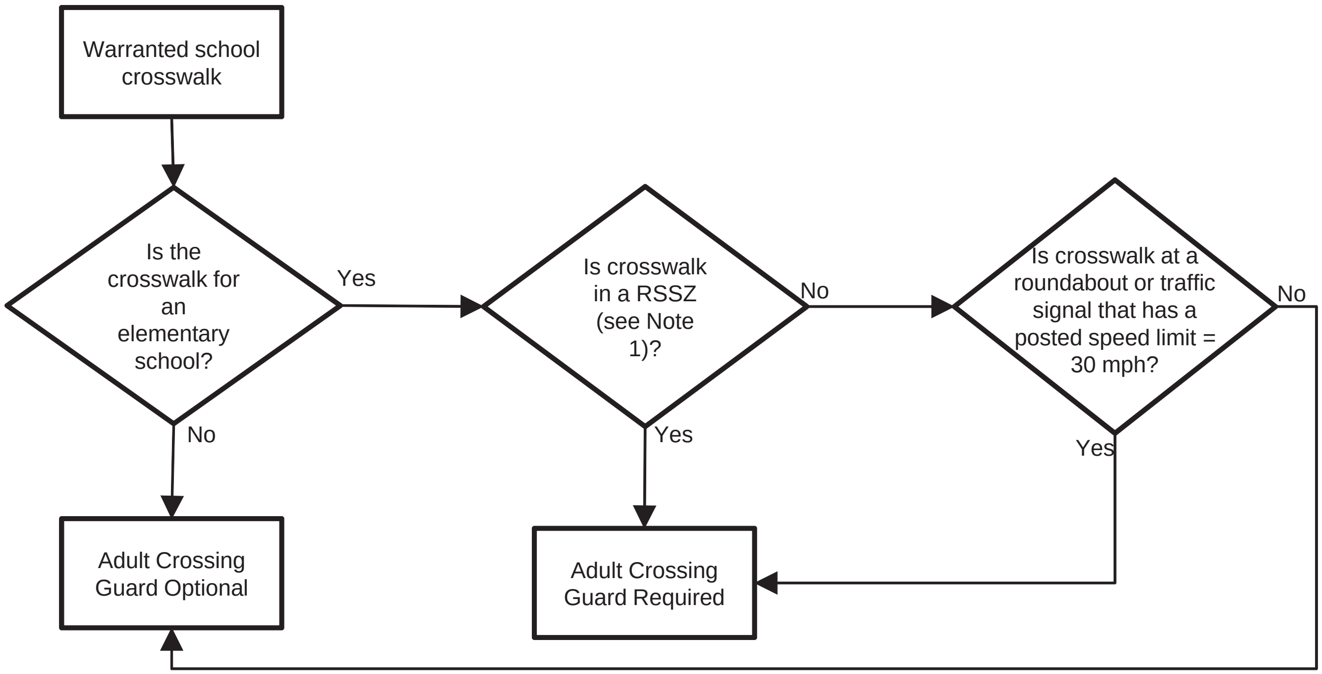
Requirements for Consideration of Overhead School Speed Limit Assembly (OSSLA) in a Reduced Speed School Zone (RSSZ)



UTAH MUTCD

Appendix B4

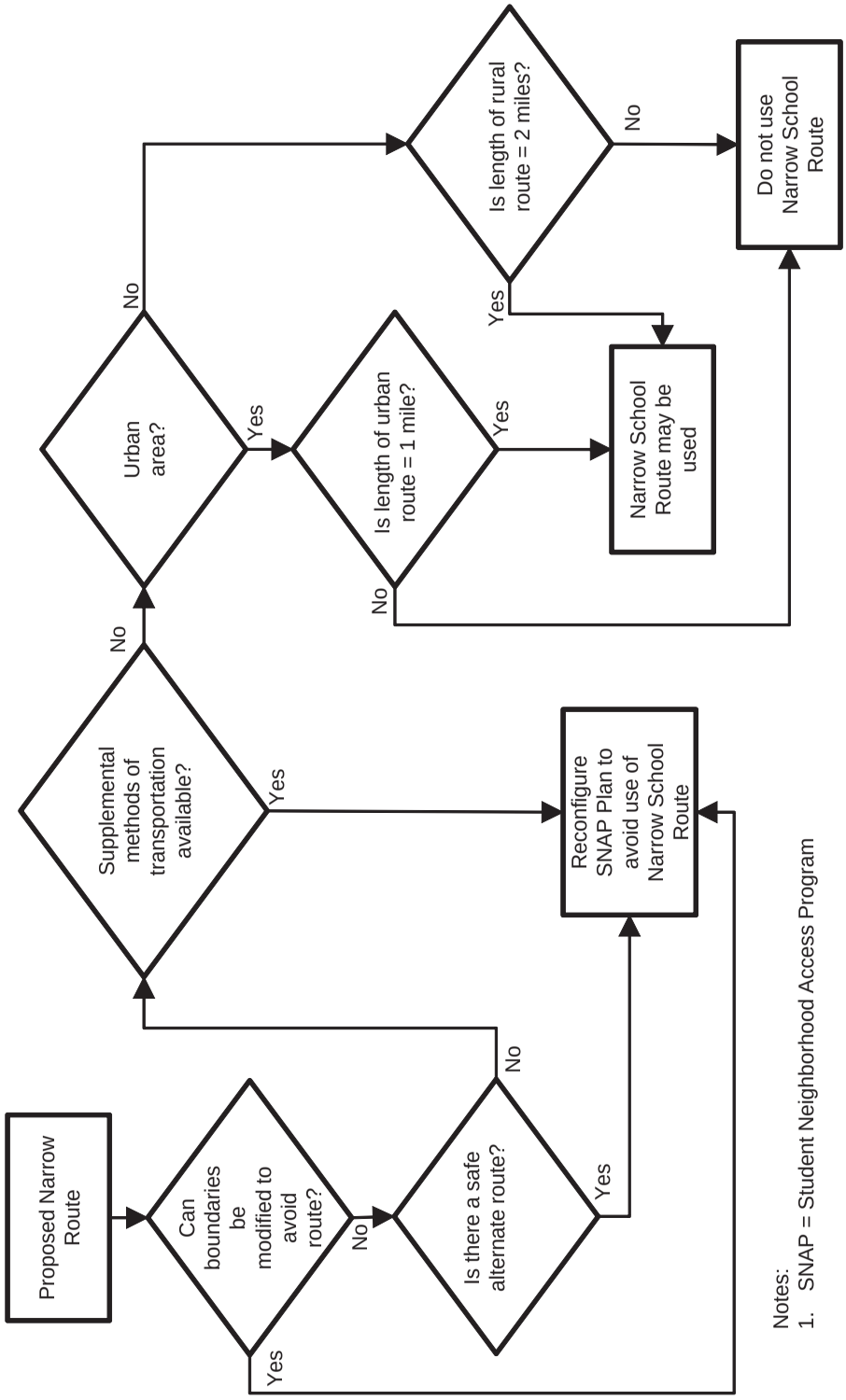
Requirements for Adult Crossing Guards at School Crosswalks



<u>Note:</u>
1. RSSZ = Reduced Speed School Zone

Appendix B5

Process for Evaluating the Use of a Narrow School Route



Notes:
1. SNAP = Student Neighborhood Access Program

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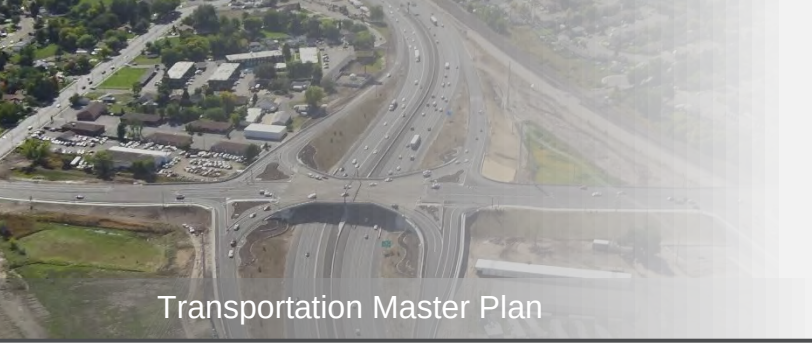

Layton

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Appendix G: Traffic Impact Study Requirements

Traffic Impact Study Requirements

When a Traffic Impact Study is required the study must be prepared according to the appropriate TIS level as shown below. The traffic study shall, at a minimum, incorporate Layton City principles and standards and national practices. Additional requirements and investigation may be imposed upon the applicant as necessary.

Traffic Study level I
Project ADT < 100 trips

No proposed modifications to traffic signals or roadway elements or geometry.

1. Study Area.

The study area, depending on the size and intensity of the development and surrounding development, may be identified by parcel boundary, area of immediate influence or reasonable travel time boundary.

The study area may be limited to or include property frontage and include neighboring and adjacent parcels. Identify site, cross, and next adjacent up and down stream access points within access category distance of property boundaries.

2. Design year.
Opening day of project

3. Analysis Conditions and Period
Identify site traffic volumes and characteristics.
Identify adjacent street(s) traffic volume and characteristics.

4. Identify right-of-way, geometric boundaries and physical conflicts.
Investigate existence of federal or state, no access or limited access control line.

5. Generate access point capacity analysis as necessary.
Analyze site and adjacent road traffic for the following time periods: weekday A.M. and P.M. peak hours including Saturday peak hours if required by the City Engineer. Identify special event peak hour as necessary (per roadway peak and site peak).

6. Design and Mitigation.
Identify operational concerns and mitigation measures to ensure safe and efficient operation pursuant to appropriate state highway access category.

Traffic Study Level II
Project ADT 100 to 500 trips

1. Study Area.

The study area, depending on the size and intensity of the development and surrounding development, may be identified by parcel boundary, area of immediate influence or reasonable travel time boundary. Intersection of site access drives with state highways and any signalized and unsignalized intersection within access category distance of property line. Include any identified queuing distance at site and study intersections

2. Design Year

Opening day of project

3. Analysis Period

Identify site and adjacent road traffic for weekday A.M. and P.M. peak hours (Saturdays if required by the City Engineer).

4. Data Collection

Identify site and adjacent street roadway and intersection geometries.
Identify adjacent street(s) traffic volume and characteristics.

5. Conflict / Capacity Analysis

Diagram flow of traffic at access point(s) for site and adjacent development.
Perform capacity analysis as determined by the City Engineer.

6. Right-of-Way Access

Identify right-of-way, geometric boundaries and physical conflicts.
Investigate existence of federal or state, no access or limited access control line.

7. Design and Mitigation

Determine and document safe and efficient operational design needs based on site and study area data. Identify operational concerns and mitigation measures to ensure safe and efficient operation pursuant to appropriate state highway access category.

Project ADT 500 to 3,000 trips or peak hour < 500 trips.

1. Study Area

The study area, depending on the size and intensity of the development and surrounding development, may be identified by parcel boundary, area of immediate influence or reasonable travel time boundary. An acceptable traffic study boundary is 1/4-1/2 mile on each side of the project site per the City Engineer.

Intersection of site access drives with state highways and any signalized and unsignalized intersection within access category distance of property line. Include any identified queuing distance at site and study intersections.

2. Design Year

Opening day of project and five year after project completion.
Document and include all phases of development (includes out pad parcels).

3. Analysis Period

Analyze site and adjacent road traffic for weekday A.M. and P.M. peak hours including Saturday peak hours if identified as a high Saturday use.. Identify special event peak hour as necessary (adjacent roadway peak and site peak).

4. Data Collection

a. Daily and Turning Movement counts.
b. Identify site and adjacent street roadway and intersection geometries.
c. Traffic control devices including traffic signals and regulatory signs.
d. Traffic accident data

5. Trip Generation

Use equations or rates available in latest edition of ITE Trip Generation. Where developed equations are unavailable for intended land use, perform trip rate study and estimation following ITE procedures or develop justified trip rate agreed to by the Department.

6. Trip Distribution and Assignment

Document distribution and assignment of existing, site, background, and future traffic volumes on surrounding network of study area.

7. Conflict / Capacity Analysis

Diagram flow of traffic at access point(s) for site and adjacent development.
Perform capacity analysis for daily and peak hour volumes

8. Traffic Signal Impacts

For modified and proposed traffic signals:
a. Traffic Signal Warrants as identified.
b. Traffic Signal drawings as identified.
c. Queuing Analysis

9. Design and Mitigation.

Determine and document safe and efficient operational design needs based on site and study area data. Identify operational concerns and mitigation measures to ensure safe and efficient operation pursuant to appropriate state highway access category.

Traffic Study Level III

Project ADT 3,000 to10,000 trips or peak hour traffic 500 to 1,200 trips.

1. Study Area

The study area, depending on the size and intensity of the development and surrounding development, may be identified by parcel boundary, area of immediate influence or reasonable travel time boundary.

An acceptable traffic study boundary should be based on travel time or by market area influence. Intersection of site access drives with state highways and any intersection within 1/2 mile of property line on each side of project site.

2. Design Year

Opening day of project, five years and twenty years after opening.
Document and include all phases of development (includes out pad parcels).

3. Analysis period

For each design year analyze site and adjacent road traffic for weekday A.M. and P.M. peak hours including Saturday peak hours if identified as needed per the City Engineer. Identify special event peak hour as necessary (adjacent roadway peak and site peak).

4. Data Collection

a. Daily and Turning movement counts.
b. Identify site and adjacent street roadway and intersection geometries.
c. Traffic control devices including traffic signals and regulatory signs.
d. Automatic continuous traffic counts for at least 48 hours.
e. Traffic accident data.

5. Trip Generation

Use equations or rates available in latest edition of ITE Trip Generation. Where developed equations are unavailable for intended land use, perform trip rate study and estimation following ITE procedures or develop justified trip rate agreed to by the Department.

6. Trip Distributions and Assignment

Document distribution and assignment of existing, site, background, and future traffic volumes on surrounding network of study area.

7. Capacity Analysis

a. Level of Service (LOS) for all intersections.
b. LOS for existing conditions, design year without project, design year with project.

8. Traffic Signal Impacts. For proposed Traffic Signals:

a. Traffic Signal Warrants as identified.
b. Traffic Signal drawings as identified.
c. Queuing Analysis.
d. Traffic Systems Analysis. Includes acceleration, deceleration and weaving.
e. Traffic Coordination Analysis

10. Accident and Traffic Safety Analysis

Existing vs. as proposed development.

11. Design and Mitigation

Determine and document safe and efficient operational design needs based on site and study area data. Identify operational concerns and mitigation measures to ensure safe and efficient operation pursuant to appropriate state highway access category.

Traffic Study Level IV

Project ADT greater than 10,000 trips or peak hour traffic > 1,200 vehicles per hour.

1. Study Area

The study area, depending on the size and intensity of the development, will include the surrounding roadways ½ mile from the parcel boundary or reasonable travel time boundary.

2. Design Year

Opening day of project, five years and twenty years after opening.
Document and include all phases of development (includes out pad parcels).

3. Analysis period

For each design year analyze site and adjacent road traffic for weekday A.M. and P.M. peak hours including Saturday peak hours as needed per the City Engineer. Identify special event peak hour as necessary (adjacent roadway peak and site peak).

4. Data Collection

a. Daily and Turning movement counts.
b. Identify site and adjacent street roadway and intersection geometries.
c. Traffic control devices including traffic signals and regulatory signs.
d. Automatic continuous traffic counts for at least 24 hours or obtain ADT from local or state agencies
e. Traffic accident data.

5. Trip Generation

Use equations or rates available in latest edition of ITE Trip Generation. Where developed equations are unavailable for intended land use, perform trip rate study and estimation following ITE procedures or develop justified trip rate agreed to by the Department.

6. Trip Distributions and Assignment

Document distribution and assignment of existing, site, background, and future traffic volumes on surrounding network of study area.

7. Capacity Analysis

a. Level of Service (LOS) for all intersections.
b. LOS for existing conditions, design year without project, design year with project.

8. Traffic Signal Impacts. For proposed traffic signals:

a. Traffic Signal Warrants as identified.
b. Traffic Signal drawings as identified.
c. Queuing Analysis.
d. Traffic Systems Analysis. Includes acceleration, deceleration and weaving.
e. Traffic Coordination Analysis.

9. Accident and Traffic Safety Analysis. Existing vs. as proposed develop

10. Design and Mitigation

Determine and document safe and efficient operational design needs based on site and study area data. Identify operational concerns and mitigation measures to ensure safe and efficient operation pursuant to appropriate state highway access category.

HORROCKS ENGINEERS

2162 West Grove Parkway, Ste 400
Pleasant Grove, Utah 84062
801-763-5100
www.horrocks.com

To: **Alan McKean, P.E.**
Assistant City Engineer
Layton City

From: **Kevin Croshaw, P.E.**
Project Engineer
Horrocks Engineers

Date: April 23, 2019 **Memorandum**

Subject: **Layton City Transportation Master Plan Clarification**

This memorandum addresses clarifications for Level of Service (LOS) on 2-Lane Arterial and Collector streets included in the Layton City Transportation Master Plan (TMP) adopted in 2017. The following items have been clarified in the TMP Document, which is attached to this memorandum:

Level of Service Thresholds

Table 4 on page 12 of the TMP document includes thresholds for LOS D and LOS E for each Collector and Arterial roadway. The values for 2-Lane Arterials and Collectors have been clarified to reflect the correct values for LOS D and LOS E, as shown below.

Table 4 Suburban Arterial and Collector LOS Capacity Criteria in Vehicles per Day

Lanes	Arterial		Collector	
	LOS D	LOS E	LOS D	LOS E
2	11,500	15,000	10,500	13,500
3	13,000	16,500	11,500	15,000
5	30,500	39,000	25,000	31,500
7	46,000	59,000	NA	NA

Modification of 2-Lane Arterial and Collector Level of Service

The original intent in using lower LOS values is to allow modification of LOS for 2-Lane Arterial and Collector roadways at the City's discretion improve safety, traffic flow, and livability. To address this, the following text has been added to Page 12 of the TMP document:

"*For two-lane Arterials and Collectors, the City may modify the LOS at their discretion for added safety and livability on a case by case basis.*"

HORROCKS
ENGINEERS

2162 West Grove Parkway, Ste 400
Pleasant Grove, Utah 84062
801-763-5100
www.horrocks.com

Attached to this memorandum is the Utah/Wasatch Front Specific Maximum Daily Traffic Capacity Estimate and Pages 12-13 of the TMP document with the stated changes to insert into the TMP document.

Thank you.

Sincerely,

Kevin Croshaw, P.E.

Attached: Utah/Wasatch Front Specific Maximum Daily Traffic Capacity Estimate & Page 12 – Page 13 Insert

HORROCKS ENGINEERS

Utah/Wasatch Front Specific
Maximum Daily Traffic Capacity Estimate

Suburban			
2 Lane			
	Freeway	Arterial	Collector
LOS A	NA	5,500	5,000
LOS B	NA	7,500	7,000
LOS C	NA	10,000	9,000
LOS D	NA	11,500	10,500
LOS E	NA	15,000	13,500

Rural			
2 Lane			
	Freeway	Arterial	Collector
LOS A	NA	5,000	3,500
LOS B	NA	8,500	5,500
LOS C	NA	12,000	7,500
LOS D	NA	15,500	9,500
LOS E	NA	19,500	12,000

Urban/CBD			
2 Lane			
	Freeway	Arterial	Collector
LOS A	NA	6,500	5,500
LOS B	NA	7,500	6,500
LOS C	NA	8,500	7,500
LOS D	NA	10,000	9,000
LOS E	NA	10,500	9,500

3 Lane			
	Freeway	Arterial	Collector
LOS A	NA	7,000	5,500
LOS B	NA	9,000	7,500
LOS C	NA	11,500	10,000
LOS D	NA	13,000	11,500
LOS E	NA	16,500	15,000

3 Lane			
	Freeway	Arterial	Collector
LOS A	NA	5,500	4,000
LOS B	NA	9,000	6,000
LOS C	NA	13,000	8,500
LOS D	NA	16,500	10,500
LOS E	NA	21,000	13,500

3 Lane			
	Freeway	Arterial	Collector
LOS A	NA	7,500	6,500
LOS B	NA	9,500	8,500
LOS C	NA	12,000	10,500
LOS D	NA	14,000	12,500
LOS E	NA	17,000	15,000

4 Lane			
	Freeway	Arterial	Collector
LOS A	31,500	14,000	10,000
LOS B	45,500	19,500	14,500
LOS C	60,000	25,000	19,000
LOS D	70,000	29,000	22,500
LOS E	89,000	36,500	28,500

4 Lane			
	Freeway	Arterial	Collector
LOS A	20,500	8,500	7,000
LOS B	35,000	14,500	11,500
LOS C	50,000	20,500	16,000
LOS D	63,000	26,000	20,500
LOS E	80,000	33,000	25,500

4 Lane			
	Freeway	Arterial	Collector
LOS A	36,500	13,000	9,500
LOS B	49,500	17,500	12,500
LOS C	63,000	22,000	16,000
LOS D	73,000	26,000	19,000
LOS E	90,000	31,500	23,000

5 Lane			
	Freeway	Arterial	Collector
LOS A	NA	14,500	12,000
LOS B	NA	20,500	16,500
LOS C	NA	26,500	21,500
LOS D	NA	30,500	25,000
LOS E	NA	39,000	31,500

5 Lane			
	Freeway	Arterial	Collector
LOS A	NA	9,500	8,000
LOS B	NA	15,500	13,000
LOS C	NA	22,000	18,000
LOS D	NA	28,000	22,500
LOS E	NA	35,000	28,500

5 Lane			
	Freeway	Arterial	Collector
LOS A	NA	17,000	13,500
LOS B	NA	22,500	18,000
LOS C	NA	28,000	22,500
LOS D	NA	32,500	26,000
LOS E	NA	39,500	32,000

6 Lane			
	Freeway	Arterial	Collector
LOS A	51,000	18,500	NA
LOS B	72,500	26,500	NA
LOS C	95,000	35,000	NA
LOS D	110,000	40,500	NA
LOS E	140,000	52,000	NA

6 Lane			
	Freeway	Arterial	Collector
LOS A	29,500	12,500	NA
LOS B	50,500	21,500	NA
LOS C	72,000	30,500	NA
LOS D	91,000	39,000	NA
LOS E	115,000	49,000	NA

6 Lane			
	Freeway	Arterial	Collector
LOS A	58,500	20,500	NA
LOS B	79,000	27,500	NA
LOS C	100,000	35,000	NA
LOS D	116,000	40,500	NA
LOS E	142,000	50,000	NA

7 Lane			
	Freeway	Arterial	Collector
LOS A	NA	21,500	NA
LOS B	NA	30,500	NA
LOS C	NA	40,000	NA
LOS D	NA	46,000	NA
LOS E	NA	59,000	NA

7 Lane			
	Freeway	Arterial	Collector
LOS A	NA	13,500	NA
LOS B	NA	23,000	NA
LOS C	NA	33,000	NA
LOS D	NA	42,000	NA
LOS E	NA	53,000	NA

7 Lane			
	Freeway	Arterial	Collector
LOS A	NA	25,000	NA
LOS B	NA	33,500	NA
LOS C	NA	42,000	NA
LOS D	NA	49,000	NA
LOS E	NA	59,500	NA

8 Lane			
	Freeway	Arterial	Collector
LOS A	66,500	NA	NA
LOS B	95,500	NA	NA
LOS C	126,000	NA	NA
LOS D	146,000	NA	NA
LOS E	187,000	NA	NA

8 Lane			
	Freeway	Arterial	Collector
LOS A	NA	NA	NA
LOS B	NA	NA	NA
LOS C	NA	NA	NA
LOS D	NA	NA	NA
LOS E	NA	NA	NA

8 Lane			
	Freeway	Arterial	Collector
LOS A	78,000	NA	NA
LOS B	105,000	NA	NA
LOS C	133,000	NA	NA
LOS D	154,000	NA	NA
LOS E	189,000	NA	NA

Assumes phf between 8%and 12%, higher for better LOS and less urban conditions;
Right turn lanes will increase capacity approximately 5% to 10 %;
Use with caution based on signal spacing, access management and other issues.