SOUTH SALT LAKE CITY ON THE MOVE

CITY COUNCIL

SHARLA BEVERLY
RYAN GOLD
IRVIN JONES
KEVIN D. RAPP
MIKE RUTTER
DEBBIE SNOW
ROY TURNER

220 E MORRIS AVE
SUITE 200
SOUTH SALT LAKE CITY
UTAH
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P 801.483.6027
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South Salt Lake City Council
REGULAR MEETING AGENDA

Public notice is hereby given that the **South Salt Lake City Council** will hold a Regular Meeting on **Wednesday, July 9, 2014** in the City Council Chambers, 220 East Morris Avenue, commencing at **7:00 p.m.**, or as soon thereafter as possible.

Conducting: Ryan Gold, District 1
Council Chair: Irvin H. Jones, Jr.
Sergeant at Arms: Ryan Cram

Opening Ceremonies

1. Welcome/Introductions — Ryan Gold
2. Serious Moment of Reflection/Pledge of Allegiance — LeRoy Turner

Approval of Minutes

June 11, 2014 Regular Meeting
June 18, 2014 Regular Meeting

No Action Comments

1. Scheduling — City Recorder
2. Citizen Comments/Questions
   a. Response to Comments/Questions (at discretion of conducting council member)
3. Mayor Comments
4. City Attorney Comments
5. City Council Comments
6. Information
   a. 2700 South Road Diet and Bike Lane — Dennis Pay

Action Items

Appointments by the Mayor

Unfinished Council Business

1. Discussion to Start Developing a Request for Qualifications (RFQ) for Fire Contract Services — Irvin Jones
2. Reconsideration to Change the Land Use District Designation from Commercial General (CG) to Residential Multiple (RM) and Planned Unit Development Overlay which was, on the date of Approval July 31, 2013, 3824 S. 700 W., Parcel Number 15-35-200-027 — Mike Florence

New Council Business

1. Public Assets Department — Mayor Wood
2. A Resolution Approving and Authorizing the Execution of an Interlocal Agreement with Salt Lake County Regarding a Grant for Trail and Bike Route Improvements — Dennis Pay
3. Drinking Water Master Plan — Dennis Pay

Motion for Closed Meeting

See Page Two for Continuation of Agenda

CHERIE WOOD
MAYOR

220 E MORRIS AVE
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SOUTH SALT LAKE CITY
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In accordance with State Statute and Council Policy, one or more Council Members may be connected via speakerphone.

Those needing auxiliary communicative aids or other services for this meeting should contact Craig Burton at 801 483-6027, giving at least 24 hours' notice.

Each of the Deseret News and Salt Lake Tribune was advised of the Agenda of the Regular Meeting of the City Council to be held Wednesday, July 9, 2014, by fax transmittal of the foregoing agenda on Thursday, July 3, 2014.

Craig D. Burton, City Recorder
Dated this 3rd day of July, 2014

Craig D. Burton, City Recorder

Citizen Comments/Question Policy

Time is made available for anyone in the audience to address the Council and/or Mayor concerning matters pertaining to City business. When a member of the audience addresses the Council and/or Mayor, he or she will come to the podium and state his or her name and address. Citizens will be asked to limit their remarks/questions to five (5) minutes each. The conducting Councilmember shall have discretion as to who will respond to a comment/question. In all cases the criteria for response will be that comments/questions must be pertinent to City business, that there are no argumentative questions and no personal attacks. Some comments/questions may have to wait for a response until the next regular council meeting. The conducting Councilmember will inform a citizen when he or she has used the allotted time. Grievances by City employees must be processed in accordance with adopted personnel rules.

CERTIFICATE OF COMPLIANCE WITH OPEN MEETING LAW

The undersigned, duly qualified and acting City Recorder of the City of South Salt Lake, does hereby certify that on the 3rd day of July, 2014, pursuant to Utah Code Annotated Section 52-4-202 (1953), as amended, there was posted (at least 24 hours prior to the meeting time) at the regular meeting place of the City Council of the City of South Salt, written notice of the Agenda or the Regular Meeting of the Council, a copy of which is attached and incorporated herein as Exhibit "A". The undersigned does further certify that there was mailed or delivered to all persons shown on Exhibit "B", Notice of Agenda of the above mentioned regular meeting, a copy of which is attached hereto and incorporated herein.

Name: CRAIG D. BURTON
Title: CITY RECORDER

Signature: _____

Witnessed the 3rd day of July, 2014 by
Name: SHERI MILLER

Signature: _____

CITY OF SOUTH SALT LAKE
CITY COUNCIL MEETING

COUNCIL MEETING	Wednesday, July 9, 2014 7:00 p.m.
CITY OFFICES	220 East Morris Avenue – Suite 200 South Salt Lake, Utah 84115
PRESIDING	Council Chair Irvin H. Jones, Jr.
CONDUCTING	Council Member Ryan Gold
SERIOUS MOMENT OF REFLECTION/ PLEDGE OF ALLEGIANCE	Council Member LeRoy Turner
SERGEANT AT ARMS	None

COUNCIL MEMBERS PRESENT:
Sharla Beverly, Ryan Gold, Irvin H. Jones Jr., Kevin Rapp, LeRoy Turner
Michael Rutter and Debbie Snow

STAFF PRESENT:
Mayor Cherie Wood
Charee Peck, Chief of Staff
Lyn Creswell, City Attorney
Paul Roberts, Deputy City Attorney
Ron Morris, Fire Chief
Jack Carruth, Police Chief
Dennis Pay, Public Works Director
Randy Sant, Economic Development Consultant
Mike Florence, Community Development Director
Glenn Smith, Urban Livability Director
Aaron Wiet, Parks and Recreation Director
Mont Roosendaal, Fleet Manager
Kristin Reardon, Court Administrator
Sharen Hauri, Urban Design Director
Kari Cutler, Promise South Salt Lake Director
Myrna Clark, Deputy Parks and Recreation Director
Pam Juliano, Human Resources Director
Craig Burton, City Recorder
Paula Melgar, Deputy City Recorder

OTHERS PRESENT:
See attached list

APPROVAL OF MINUTES

June 11, 2014 Regular Meeting. Council Member Snow moved to approve these minutes.

MOTION:	Debbie Snow
SECOND:	LeRoy Turner
Voice Vote:	
Beverly	Aye
Gold	Aye
Jones	Aye
Rapp	Aye
Rutter	Aye
Snow	Aye
Turner	Aye

June 18, 2014 Regular Meeting. Council Member Turner moved to approve these minutes.

MOTION:	LeRoy Turner
SECOND:	Sharla Beverly
Voice Vote:	
Beverly	Aye
Gold	Aye
Jones	Aye
Rapp	Aye
Rutter	Aye
Snow	Aye
Turner	Aye

NO ACTION COMMENTS

1. **SCHEDULING.** The City Recorder informed those at the meeting of upcoming events, meetings, activities, etc.

2. **CITIZEN COMMENTS/QUESTIONS. Ed Winter, 2992 South 600 East.** He is not on the Good Landlord Program and asked if he was paying the disproportionate fee.

Deputy City Attorney, Paul Roberts, advised him that he is not.

Mr. Winter also expressed his support for the South Salt Lake Fire Department and asked that the City do something to keep it.

Renee Watts, 525 East Garden Avenue. She also expressed her support for the Fire Department and asked that the Council find the answers to keep them.

Chris Wood, South Salt Lake Fire Department Captain. He wants to know that he has the security of a job. The RFQ brings information to the Council to make an educated

decision about the Fire Department. He encouraged the Council to continue with the RFQ, get the numbers and study them. He is grateful for the raise this year. Can they continue to give them in upcoming years? Do they have to give up more to get something? He asked what the Council's commitment is to the employees of the City. He wants to be able to retire with full benefits. He hopes the City can do that but if they can't, what does it hurt to look at a potential problem? He asked that the Council get the data and look at it.

Ian Nelson, South Salt Lake Fire Department. He seconded what Captain Wood had to say. The RFQ doesn't hurt anybody. They just want to know that every option is looked at fairly and that they don't take an individual's opinion on what should be done. The Fire Department is very dedicated to the City.

3. MAYOR COMMENTS. Mayor Wood thanked all the employees involved in the Fourth of July celebration.

She stated that the citizens love having local control of their police and fire departments. She is in support of that. She is concerned about losing the taxing authority and losing the ability to regulate it. The conversation of the RFQ has been very disruptive and wounded morale in both the Fire and Police Departments. She does not support the RFQ.

4. CITY ATTORNEY COMMENTS. Economic Development Director, Randy Sant, advised the Council that the RDA has agreed to assume a contract for purchase of property on 2310-12 State Street.

5. CITY COUNCIL COMMENTS. Council Member Beverly thanked volunteers and staff for their efforts for the Fourth of July celebration.

Council Member Snow thanked all who helped with the Fourth of July celebration as well.

Council Chair Jones thanked all who help with the celebration on behalf of the parade chairman. He added his thanks also.

Council Member Rapp thanked everyone for their effort on the Freedom Fest as well. He also thanked the Police Department for their help on an issue in his neighborhood. They are doing a great job.

Council Member Rutter thanked everyone for the great Fourth of July event. He encouraged others to participate in the events.

Council Member Gold feels the RFQ will put to rest anyone's concerns who may feel they don't have the best service. He thinks the RFQ will calm the questions of whether they are doing the best thing for the people and prove that they are. They are just gathering information.

He thanked everyone who helped in the Freedom Fest.

6. INFORMATION.

a. **2700 South Road Diet and Bike Lane.** Public Works Director, Dennis Pay, summarized the study. A copy is attached to these minutes and incorporated by this reference. The reason for the study is they have had several requests from cyclists for bicycle lanes on 2700 South. If they undertook this plan it would reduce the road to one lane in each direction with a center turn lane down the middle and the shoulders would accommodate bikes.

Council Member Rutter asked if the traffic signals would be changed. He has received a lot of comments from citizens asking that they go to flashing four way stops during non-peak hours. He asked if that was something that could be done.

Mr. Pay explained that the signals are old and in the next couple of years they will be replacing several of them. Right now they have a split phase. It does create delay but it is safer and has reduced accidents significantly. If they did the bike lanes they would change the phasing to the normal east-west, north-south phasing.

The Council then moved to Unfinished Business on the agenda.

UNFINISHED COUNCIL BUSINESS

1. **Discussion to start developing a request for qualifications (RFQ) for Fire contract services.** Council Chair Jones advised that the purpose of the RFQ is they have had requests from the Fire Department representative that the Department hasn't been treated fairly, that personnel were not being treated as well as some other agencies. Also, in the last four years the Country has suffered the worst economic downturn since the great depression. The Council and Mayor have been focused on making the pie larger instead of fighting over which economic piece of the pie each department gets. They are going to take the RFQ process slow and deliberate to insure it is done right and that all the stake holders have input into it. With discussions with the administration, the Council Chair and Vice-Chair, and Chief Morris, they propose that they proceed as follows:

   Chief Morris will develop an advisory group of firemen professionals for suggestions and recommendations that they think would provide a better fire department. Administration will begin a search for consultants to develop an RFQ, preferably outside of Salt Lake County, to perhaps make it more independent. Council Members will be asked to develop their individual priorities, what is important to them, what they would like to see, in the Fire Department. Beginning in August they will start having work meetings and start discussing this among the Council. Then they will have a report and discussion by the three groups in September, perhaps towards the end of December, in work meeting discussions so they can do this.

The main interest and the main concern of the Mayor and Council is that the firemen are treated fairly and equitably. They realize they put their life on the line and during these hard times with the budgets they appreciate their patience. Neither the Mayor, nor any of the Council, has contacted any other fire agency for any information or proposals. They are beginning the process now and so all those rumors and things that have been heard, all the gossip, take if from the Council and from the Mayor to ignore them. They're interest is in the firemen and their best interests and the Police Department as well, and the employees. The Council and the administration are truly grateful for the employees, the public works, and the public safety people that they have. Going forward this is how they will proceed with the RFQ. This is not a done deal. They are not getting rid of the Fire Department but having said that, if the best way to take care of the Fire Department is to go with another agency, then they will look at that as well with the combined efforts and discussion of these three groups, the fire professionals, the administration, and the Council.

Council Member Turner moved to put this on a future Council meeting when it's needed.

MOTION:	LeRoyTurner
SECOND:	Michael Rutter
Voice Vote:	
Beverly	Aye
Gold	Aye
Jones	Aye
Rapp	Aye
Rutter	Aye
Snow	Aye
Turner	Aye

Council Member Snow said she thought they were going to discuss the timeline but it looks like all the dates have already been decided and they've just made an announcement. She asked when they could expect to get the RFQ back.

Council Chair Jones said it would be months away. The timeline is very flexible and these are approximate dates. He's thinking they will receive an RFQ back in November or December and then the Council will start discussing the results.

Council Member Snow clarified that they will expect the results back at about the end of the year.

Council Member Turner felt it was more important that they have a good process and cover all the bases rather than adhere to a ridged time frame.

Council Member Rutter thinks all the Council and the Mayor are concerned about the Fire Department. As they do all their research, they need to consider how this will affect the citizens as well as the Fire Department. They are concerned about the people who live here.

Mr. Creswell advised that the Mayor does not support the RFQ process yet the process that's been defined has the Mayor and her staff working collaboratively with the Council. So, between now and the next meeting the Council needs to come up with a resolution stating whether this is a Council exclusively driven process or whether it is going to be a joint process between the administration and the Council. That will affect how this goes forward. The Council has the ability to do this on their own but if they want, and expect, the cooperation of the Mayor and the Fire Chief something needs to be worked out to make sure the two branches of government collaborate on this. Before they approach this next time they need to work those details out.

Council Member Gold asked if they could have something together for the next meeting.

Council Chair Jones said they will hold some staff meetings together...

Council Member Snow felt that was a little ominous. She asked if she heard that the Mayor and staff won't participate in the RFQ process and they need to do it on their own.

Mr. Creswell said he just raised the question. The Mayor suggested tonight she doesn't support this process. He doesn't know if that means she ultimately won't participate, but he thinks the discussion needs to go on and be brought back before the next meeting.

Council Member Snow asked Mayor Wood what it means for the Council.

Mayor Wood feels they need to have additional meetings to understand. She doesn't think that the Council understands the ramifications that this is causing at an everyday work level at the City. She would like to sit down and have those conversations with the Council Chair.

Council Member Snow would like to be a part of those conversations. She feels the public deserves to have some of this information. It sounds like they are just going to go to the Council Chair, Mayor and staff, and obscure some of the details to the rest of them. She would like to know what the factors are and what they're talking about.

Council Member Rapp felt the entire Council should be involved and not just the Council Chair.

Mayor Wood said she is fine with that.

Mr. Creswell advised that they have a work meeting on July 30. There could be some preliminary discussions before that and this could be a discussion item for the 30th work meeting.

Council Snow suggested they schedule it for an earlier date as Mr. Creswell suggested. It sounds like there are some issues that can't wait. They need to get the details now on how is will proceed.

Mr. Creswell advised that an RFQ is a formal process. If the intent of the Council is to merely do some exploratory, comparative evaluation, it seems they could do that without establishing a formal RFQ process. Once they go formal with an RFQ a lot of other things are going to come in. They shouldn't feel that the RFQ is the only process they can use. Maybe there is another less formal process that nets them the same kind of comparative information that they may want to be looking for. Once that comparative information comes in then they can make a more formal decision.

Council Member Snow said she respects the presence of the Fire Department here tonight and the individuals that stepped forward and spoke and asked the Council to get the information so they can make an informed decision once and for all. She supports the RFQ process. She has never been one to stick her head in the sand and say they don't want to know the information and don't want the data. She views this as a duty they have to get the information on behalf of the firemen, the citizens, the City, and the budget issues.

Mayor Wood said she has a concern. She has met with three to four firefighters a week since this issue has come up and the majority of them do not support the two firefighters that stood up and spoke. So she would say the RFQ is a little formal and she thinks there may be ways to gather the information without the formal process of an RFQ.

Council Member Gold said that when the Council brought this up in a previous meeting Mr. Creswell stated that the process would take six months.

Mr. Creswell advised the formal process would take six months. He doesn't see anything quicker than that. If they do something less formal they could probably abbreviate both the data collection and analysis. The thing with an RFQ is they do an advertisement, it's a relatively closed process, and it doesn't involve a lot of public input and all the advisory stuff that the Council Chair was talking about. There is a selection committee that can represent both the Council and administration. They work with the bidders, or the individuals who are going to present information. They do an analytical process and then they report it out at some point. It is not as interactive as he thinks the Council wants to be. It is a great process but it has its limitations on the kind of things he's hearing the Council wants to accomplish. If at the end of the day the Council wants to contract out, they will have to have an RFQ but if they don't know if they want to contract out. Maybe they come up with a different process that is less structured, less formal, that gives them enough early information to decide whether they want to move in that direction or not. When he briefed the Council before, that was the number one concern he had. He doesn't know why they want to do this. Before anyone does anything, each council member has to say, "This is important to me because... one, two, three." He thinks once they get their policy framework it

allows those advising the Council, including the administration, to say, "Given those policy parameters this is an approach you can use to gather the information and do an analysis." Some of the Council said this is for the firefighter's best interest, if that's the policy direction, that has a different feel to him than if they say they want to reduce the budget of the department.

Council Member Gold feels a lot of things weigh in here. There is the best interest of the firefighters, the City, and the citizens who pay the taxes. There's a lot that weighs in. It sounds like the Fire Department is split, based on what Mayor said. He feels they should gathering information, not be probing.

Mr. Creswell advised they are really talking about scoping this out. He is uncomfortable now of even drafting, or helping draft, an RFQ because he doesn't know what the Council wants so they need to scope the activity and what they are trying to achieve.

Council Member Gold said it seems that everything is different from what the Council Chair just told them was going to happen. There's a big line drawn and they just found it out.

Council Member Beverly said there is obviously a lot of background to this that she is just starting to hear and recognize. When she campaigned she felt they should have local control over Fire and Police. She is a teacher, a public servant, a member of the teacher's union. She believes in the power of negotiating and bargaining. She values Police and Fire and puts it as one of her highest priorities for the budget. She would prefer to do a less formal process and work together to make sure they prioritize the raises. She knows Fire is underpaid. They are not in the middle right now and she would like to see them there. She commits to put that as a priority in the budget. She would rather do a less formal process.

Council Member Snow said she is truly worried about what they can commit considering in two years they have a $2.7 million dollar revenue loss that they are staring at. Of course she would love to commit to keep everyone on schedule and to take care of the employees. When they talked about it last time she thinks Mr. Creswell's words were, "It's a no brainer" in that it could really solve some of the 2016 problem.

Mr. Creswell advised that if the Council's issue was budget driven, yes. But there are a lot of other moving factors. He mentioned the employees and several other things but if the Council's priority is budget, then yes, it kind of drives the rest of the process but, as the Mayor and others have said here, there are a lot of other priorities or issues at stake than just the budget. That's where the Council has to decide where they want to move.

Council Member Rapp feels the Council has the responsibility to look at everyone involved. This includes the citizens as well, and that includes the budget. He agrees that the firefighter should be paid a decent salary and a livable wage but, unfortunately, that's not the only thing here with that shortfall that is coming up.

One of the pledges made by the Mayor in her campaigned was to do something about the ambulance service, which nothing was done about. That shortfall still exists. They need to do something to seriously look at this issue and he would prefer the RFQ.

Council Member Gold said they have heard from citizens about how strongly they like the City's Fire Department. If this RFQ comes back and it shows that the service they provide costs a little bit more then they need to have that information to present to the citizens to get feedback from them on whether or not they want to pay for that service that they so want. If they do nothing then all they hear is about other fire agencies getting paid more and receiving their steps. They don't know; it's just a bunch of talk to him. He hasn't seen any numbers at all. If there's a way to get the numbers without an RFQ then he's for that but he can't make an uninformed decision at all and he represents a big portion of the City and they deserve to know why he votes the way he does.

Mayor Wood said in her campaigned she did include that if the ambulance did self-fund, (they were working on legislation this last year where they thought they might be able to recuperate about $200,000), didn't mean doing away with the ambulance. It was on the list of potential costs savings and she learned the same night the Council did that the fire and ambulance service are pretty intertwined.

Council Member Snowed moved to place this item on the work meeting on July 30, 2014.

MOTION:	Debbie Snow
SECOND:	Kevin Rapp
Voice Vote:	
Beverly	Aye
Gold	Aye
Jones	Aye
Rapp	Aye
Rutter	Nay
Snow	Aye
Turner	Aye

2. **Reconsideration to change the land use district designation from Commercial General (CG) to Residential Multiple (RM) and Planned Unit Development Overlay which was, on the date of approval July 31, 2013, 3824 South 700 West, Parcel Number 15-35-200-027.** Community Development Director, Mike Florence, explained that this is a reconsideration of a map amendment that the Council approved in July of 2013. The ordinance should have read that they were changing the zoning to an (RM) base district and a Planned Unit Development Overlay but the ordinance just said it was to change the zoning to (RM). He asked the Council to reconsider the ordinance so it can be corrected.

   Council Chair Jones moved to reconsider the ordinance.

MOTION: Irvin Jones
SECOND: Michael Rutter
Voice Vote:
Beverly Aye
Gold Aye
Jones Aye
Rapp Aye
Rutter Aye
Snow Aye
Turner Aye

NEW COUNCIL BUSINESS

1. **Public Assets Department.** Mayor Wood reminded the Council that in their budget retreat they had discussed the need for a better system to maintain City assets that would help the budget process in funding capital improvements. There was money in the new budget to do this. Mont Roosendaal is able to maintain all of the assets in his software system. Then there could be a director accountable for all the assets in the City.

   She handed out an organization chart to the Council for this department. A copy is attached and incorporated by this reference.

   Under this new department the Parks Supervisor and the Facilities Supervisor will now report to the Public Assets Director.

   Council Member Turner moved that this item be placed on Unfinished Business on the July 30, 2014 Council meeting.

MOTION: LeRoyTurner
SECOND: Sharla Beverly
Voice Vote:
Beverly Aye
Gold Aye
Jones Aye
Rapp Aye
Rutter Aye
Snow Aye
Turner Aye

The Council moved to Appointments by the Mayor on the agenda.

APPOINTMENTS BY THE MAYOR. Mayor Wood asked for advise and consent from the Council to appoint Mont Roosendaal as the Director of Public Assets.

Council Member Rutter moved to approve the appointment effective July 30, 2014.

MOTION: Michael Rutter
SECOND: LeRoy Turner
Roll Call Vote:

Beverly	Aye
Gold	Aye
Jones	Aye
Rapp	Aye
Rutter	Aye
Snow	Aye
Turner	Aye

The Council then moved back to item number two on New Business on the agenda.

NEW BUSINESS

2. **A resolution approving and authorizing the execution of an interlocal agreement with Salt Lake County regarding a grant for trail and bike route improvements.** Mr. Pay advised that this for the Parley's Trail. The further west the trail goes the harder it becomes to find an open corridor. The crossing of 300 West is a challenge. On a site visit while trying to determine how to continue the trail and the costs that will be incurred, Salt Lake County Active Transportation said they had money to help with the costs but the money had to come from the City. This resolution says the City will accept $135,000 from Salt Lake County Active Transportation and will then turn it over to Salt Lake County Parks for construction of the trail.

   Council Member Rutter moved to suspend the rules.

MOTION: Michael Rutter
SECOND: LeRoy Turner
Voice Vote:

Beverly	Aye
Gold	Nay
Jones	Aye
Rapp	Aye
Rutter	Aye
Snow	Aye
Turner	Aye

   Council Member Beverly moved to approve the resolution.

MOTION: Sharla Beverly
SECOND: Michael Rutter

Roll Call Vote:

Beverly	Aye
Gold	Aye
Jones	Aye
Rapp	Aye
Rutter	Aye
Snow	Aye
Turner	Aye

3. **Drinking Water Master Plan.** Mr. Pay advised the Council one of the steps to implementing a drinking water impact fee is that the Council has to formally adopt the Drinking Water Master Plan. In the Master Plan they looked at what the current system looks like, what the deficiencies are, and then they considered future development at Central Pointe and some other areas, and tried to predict the future a little bit and have a plan for what they do with the water system. They looked out about 40 years. Because things change frequently, they do revise the plan periodically. It is recommended it be looked at every five to ten years.

   Council Member Snow moved to place this item on Unfinished Business on the July 30, 2014 Council meeting.

MOTION: Debbie Snow
SECOND: Kevin Rapp

Voice Vote:

Beverly	Aye
Gold	Aye
Jones	Aye
Rapp	Aye
Rutter	Aye
Snow	Aye
Turner	Aye

The Council then moved back to Item #2 on Unfinished Business.

UNFINISHED BUSINESS

Reconsideration to change the land use district designation from Commercial General (CG) to Residential Multiple (RM) and Planned Unit Development Overlay which was, on the date of approval July 31, 2013, 3824 South 700 West, Parcel Number 15-35-200-027.

Council Member Snow moved to approve this resolution.

MOTION: Debbie Snow
SECOND: Sharla Bevely

Roll Call Vote:

Beverly	Aye
Gold	Aye
Jones	Aye
Rapp	Aye
Rutter	Aye
Snow	Aye
Turner	Aye

Council Member Turner moved to adjourn.

MOTION:	LeRoy Turner
SECOND:	Kevin Rapp

Voice Vote:

Beverly	Aye
Gold	Aye
Jones	Aye
Rapp	Aye
Rutter	Aye
Snow	Aye
Turner	Aye

The meeting adjourned at 8:32 p.m.

~~Irvin H. Jones, Jr., Council Chair~~
LEROY R. TURNER, COUNCIL VICE-CHAIR

Craig D. Burton, City Recorder

July 9, 2014

CITY COUNCIL - REGULAR MEETING
LIST OF ATTENDEES

NAME	ADDRESS	REPRESENTING
Charee Peck	220 E Morris Ave	Mayor's offc.
Pamela Juliano	220 E Morris Ave	HRIS
Mont Roosendaal	220 E. Morris Ave	Public Assets
Stephanie Roosendaal		visitor
Dennis Pay	195 W. Oakland Ave	PW
Renee Watts	525 E Garden Ave - Self -	
Glenn Smith	220 E Morris Ave	ULD
Mike Florence	220 E. Morris Ave	Community Development Dept.
DAVID LARSEN	2600 So MAIN STREET	So SLFE LOCAL 4080
Ron Morris	2600 So. Main	FIRE
Diane Keay	788 E Woodoak Ln Murray	SLCo HD
Carson & Natalee Needham	2600 . So Main	FIRE
Chris Becki Wood	2600 S main	Fire.
LAYNE SCHOENFELD	2600 SO. MAIN	So. SALT LAKE FIRE DEPT.
ROB HIXSON	2600 S MAIN ST.	SSLFD
Brian Gard	2600 S. Main St	SSLFD
Eric Stanton	2000 S. MAIN St	SSLFD
Allan Connor	638 E Hamen Ave	Fire/ Private
Brandon Helbron	2600 S Main St	SSLFD
JUSTIN LEAVITT	2600 S Main St.	SSLFD
Ryan Kosuta	2600 S MAIN	SSLFD
JUSTIN LAMARR	2600 S. MAIN ST	SSLFD
Ian Nelson	2600 S. Main ST	SSLFD

July 9, 2014

CITY COUNCIL - REGULAR MEETING
LIST OF ATTENDEES

NAME	ADDRESS	REPRESENTING
Guy Wilson	450 E. Burton Ave	Visitor
Ann Wilson	450 E. Burton ave	Citizen
Myrna Clark	2531 So 400 East	Recreation Dept
Aaron Wiet	2531 So. 400 E.	Parks & Rec.
Mark Bross	2600, Main	Fire Dept
Nick Hansen		Fire Dept.
Andy Maurer	2600 S. Main	Fire
Jessica Maurer	2600 S. Main	Fire
Jared Christensen	2600 S main	Fire
Ed Winston	9992 So 600 E.	Self
Brent Strong	2600 S Main	Fire
Ed Godwick	8	
Terry Addison	2600 S. Main St.	Fire
Kevin Bowman	2600 so Main	Fire Dept.
Jack Carruth	Police Dept	
Paul Roberts	220 E. Morris	City Atty office

Feasibility Study for

2700 SOUTH ROAD DIET

Prepared by: FEHR & PEERS

2180 South 800 East, Suite 220
Salt Lake City, Utah 84106
801.463.7600

August 2012

EXECUTIVE SUMMARY

The South Salt Lake City's General Plan identifies 2700 South as a future bicycle facility. Specifically, the Plan calls for the consideration of converting 2700 South to a "Complete Street" and including provisions for bicycle lanes along its length. In addition, the General Plan outlines a number of goals to improve the bicycling environment of the City. To these ends, the City has proposed a road diet along 2700 South to change the configuration of the roadway from the current two lanes in each direction to one lane in each direction with a center turn lane and bike lanes. In general, road diets are used to give right of way to sidewalks, bicycle lanes, and/or parking by reducing the width of lanes or removing lanes completely. Road diets are a good traffic calming and safety tool that require no right of way purchase and, in many cases, can be as simple as restriping.

Travel times between the existing roadway configuration and the road diet are estimated to increase by roughly ten seconds between 300 West and 500 East for the westbound and eastbound AM directions. The eastbound PM direction travel time is estimated to increase by one minute and thirty seconds.

The results of this analysis show that implementing a road diet on 2700 South between 300 West and 500 East would still operate at acceptable levels of service (LOS) during both the AM and PM peak hours with the existing traffic volumes and would not significantly increase travel times.

For bicyclists, the road diet has significant improvements, increasing LOS from Bs and Cs in the existing conditions to As in the road diet conditions. This indicates the proposed bicycle lane would improve bicyclists' comfort level.

As shown in the subsequent Chapter IV, it is likely that if 2700 South were reduced to three-lanes, one could expect a reduction in crash frequency, slower speeds, a reduction to no change in average daily traffic (ADT), and a more livable and multi-modal street.

The results of this study indicate a road diet along 2700 South would have minimal to no significant impact on 2700 South to automobile traffic. The road diet increases bicycle comfort and would be a good first step towards a city-wide bicycle network.

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I. INTRODUCTION

A. Purpose

The South Salt Lake City's General Plan identifies 2700 South as a future bicycle facility. Specifically, the Plan calls for the consideration of converting 2700 South to a "Complete Street" and including provisions for bicycle lanes along its length. In addition, the General Plan outlines a number of goals to improve the bicycling environment of the City. To these ends, the City has proposed a road diet along 2700 South to change the configuration of the roadway from the current two lanes in each direction to one lane in each direction with a center turn lane and bike lanes. In general, road diets are used to give right of way to sidewalks, bicycle lanes, and/or parking by reducing the width of lanes or removing lanes completely. Road diets are a good traffic calming and safety tool that require no right of way purchase and, in many cases, can be as simple as restriping. The existing and proposed configurations are shown in Figure 1.

The purpose of this study is to provide a summary of the transportation-related impacts from a proposed road diet on 2700 South between 300 West and 500 East (see Figure 2 for a project location map). This study analyzes the traffic operations and impacts for existing (2012) conditions at key intersections in the vicinity of the site. Two analysis scenarios were performed for the existing condition: "background" and "road diet."

B. Scope

This study analyzes the traffic impacts of the road diet in conjunction with adjacent intersections. Impacts are specifically addressed at the following study intersections:

- 300 West / 2700 South
- West Temple / 2700 South
- Main Street / 2700 South
- State Street / 2700 South
- 300 East / 2700 South
- 500 East / 2700 South

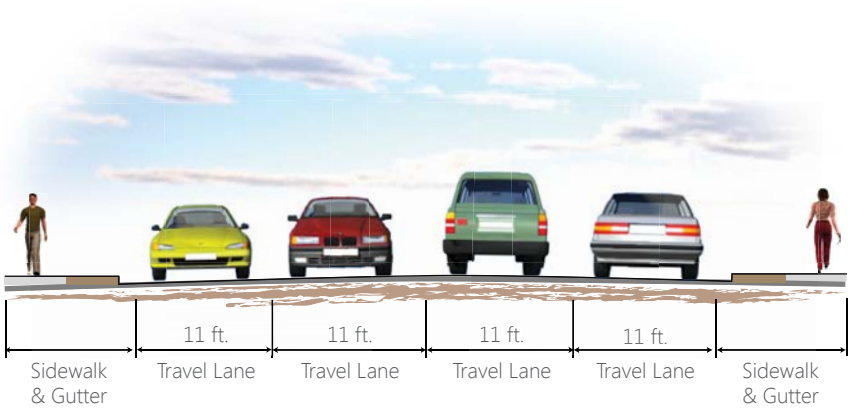
Both AM and PM peak hour analyses were conducted.

C. Analysis Methodology

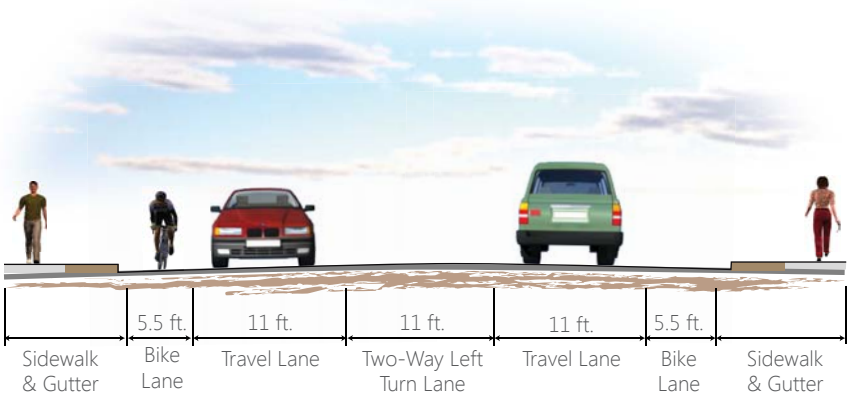
For this study, auto and bike level of service (LOS) were calculated. Bicycle LOS was calculated to determine the improvement in bicycling conditions with the proposed road diet. LOS is a term that describes the operating performance of an intersection or roadway. LOS is measured quantitatively and reported on a scale from A to F, with A representing the best performance and F the worst.

For automobiles, the Highway Capacity Manual 2010 (HCM 2010) methodology was used in this study to remain consistent with "state-of-the-practice" professional standards. For signalized intersections, the LOS is provided for the overall intersection (weighted average of all approach delays).

Existing Conditions
44' Pavement Width



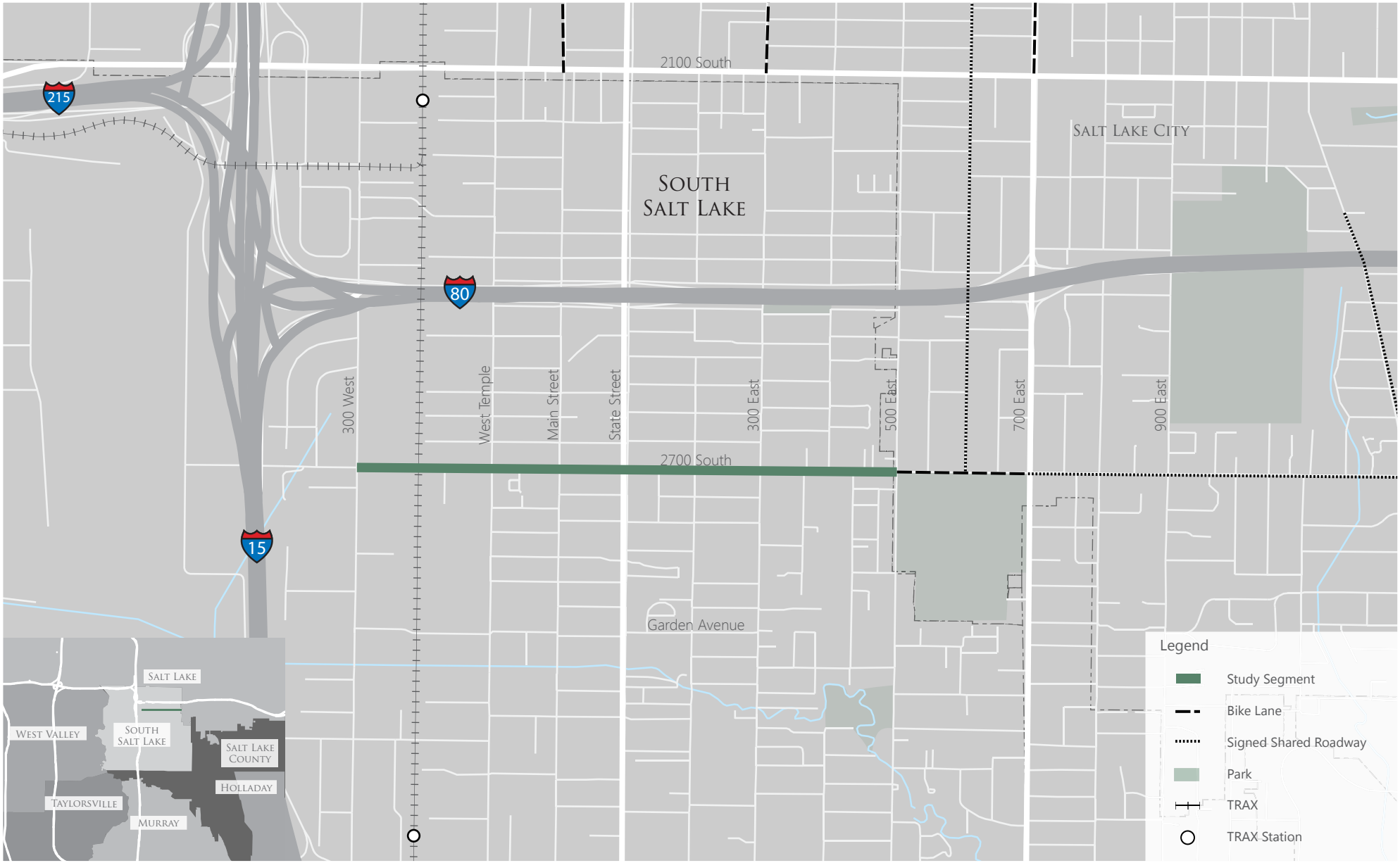
Proposed Conditions
44' Pavement Width



FEHR PEERS

PROPOSED ROAD DIET CONFIGURATION

FIGURE 1



Not to Scale

FEHR PEERS

STUDY AREA

FIGURE 2

Table 1 provides a brief description of each LOS letter designation and an accompanying average delay per vehicle for both signalized and unsignalized intersections.

For bicyclists, the multi-modal level of service analysis tool LOS+ was used. LOS+ is a quick-response tool developed by the Fehr & Peers. LOS+ is a hybrid tool that implements two different multi-modal level of service (MMLOS) methodologies. The bike LOS component is consistent with the methodologies incorporated in the Highway Capacity Manual 2010. The analysis tool was developed as a link-based evaluation tool, which only analyzes the MMLOS along the roadway segment and not the intersection. This approach offers the advantage of being less data intensive than the full methodology and produces results that are generally reflective of pedestrian/bicyclist perceptions of service along the roadway. Bicycle LOS is calculated based on the following criteria:

- lane widths (bicycle and automobile)
- buffer width
- vehicle flow rate
- heavy truck percentage
- percentage of vehicle turning movements
- vehicle speed

D. Automobile Level of Service Standards

For the purposes of this study, a minimum overall intersection performance of automobiles for each of the study intersections was set at LOS D (per Utah Department of Transportation [UDOT] urban standards). However, if LOS E or F for an individual approach at an intersection resulted, explanation and/or mitigation measures are presented where feasible and realistic. A LOS D threshold is consistent with "state-of-the-practice" traffic engineering principles for suburban and non-Central Business District (CBD) urbanized intersections.

TABLE 1
AUTOMOBILE LEVEL OF SERVICE DESCRIPTIONS

LOS	Description of Traffic Conditions	Signalized Intersections	Unsignalized Intersections
		Avg. Delay[1] (sec/veh)	Delay[2] (sec/veh)
A	*Free Flow / Insignificant Delay* Extremely favorable progression.Individual users are virtually unaffected by others in the traffic stream.	0 to 10	0 to 10
B	*Stable Operations / Minimum Delays* Good progression. The presence of other users in the traffic stream becomes noticeable.	> 10 to 20	> 10 to 15
C	*Stable Operations / Acceptable Delays* Fair progression. The operation of individual users is affected by interactions with others in the traffic stream.	> 20 to 35	> 15 to 25
D	*Approaching Unstable Flows / Tolerable Delays* Marginal progression.Operating conditions are noticeably more constrained.	> 35 to 55	> 25 to 35
E	*Unstable Operations / Significant Delays Can Occur* Poor progression. Operating conditions are at or near capacity.	> 55 to 80	> 35 to 50
F	*Forced, Unpredictable Flows / Excessive Delays* Unacceptable progression with forced or breakdown of operating conditions.	> 80	> 50

1.Overall intersection LOS and average delay (seconds/vehicle) for all approaches.
2.Worst approach LOS and delay (seconds/vehicle) only.
3.Volume to capacity (v/c) ratio, average values.
Source: Fehr & Peers Descriptions, based on *Highway Capacity Manual,* 2010 Methodology (Transportation Research Board).

II. EXISTING (2012) CONDITIONS

A. Purpose

The purpose of the 2012 existing conditions analysis is to study the pertinent intersections during the peak travel periods of the day under existing traffic and geometric conditions. Through this analysis, existing traffic operational deficiencies can be identified.

B. Roadway System

The primary roadway for this study is 2700 South. 2700 South is considered a minor arterial. It has four lanes in each direction with no median, bike lanes, or on-street parking. The speed limit is 30 mph. 2700 South is one of four roads continuous between the eastern City border and I-15.

The cross streets of West Temple, Main Street, 300 East, and 500 East are considered Minor Arterials. They are all one lane in each direction. 300 West is considered a Major Arterial and is three lanes in each direction. State Street is a Principal Arterial and is three lanes in each direction. All cross streets are continuous throughout the City.

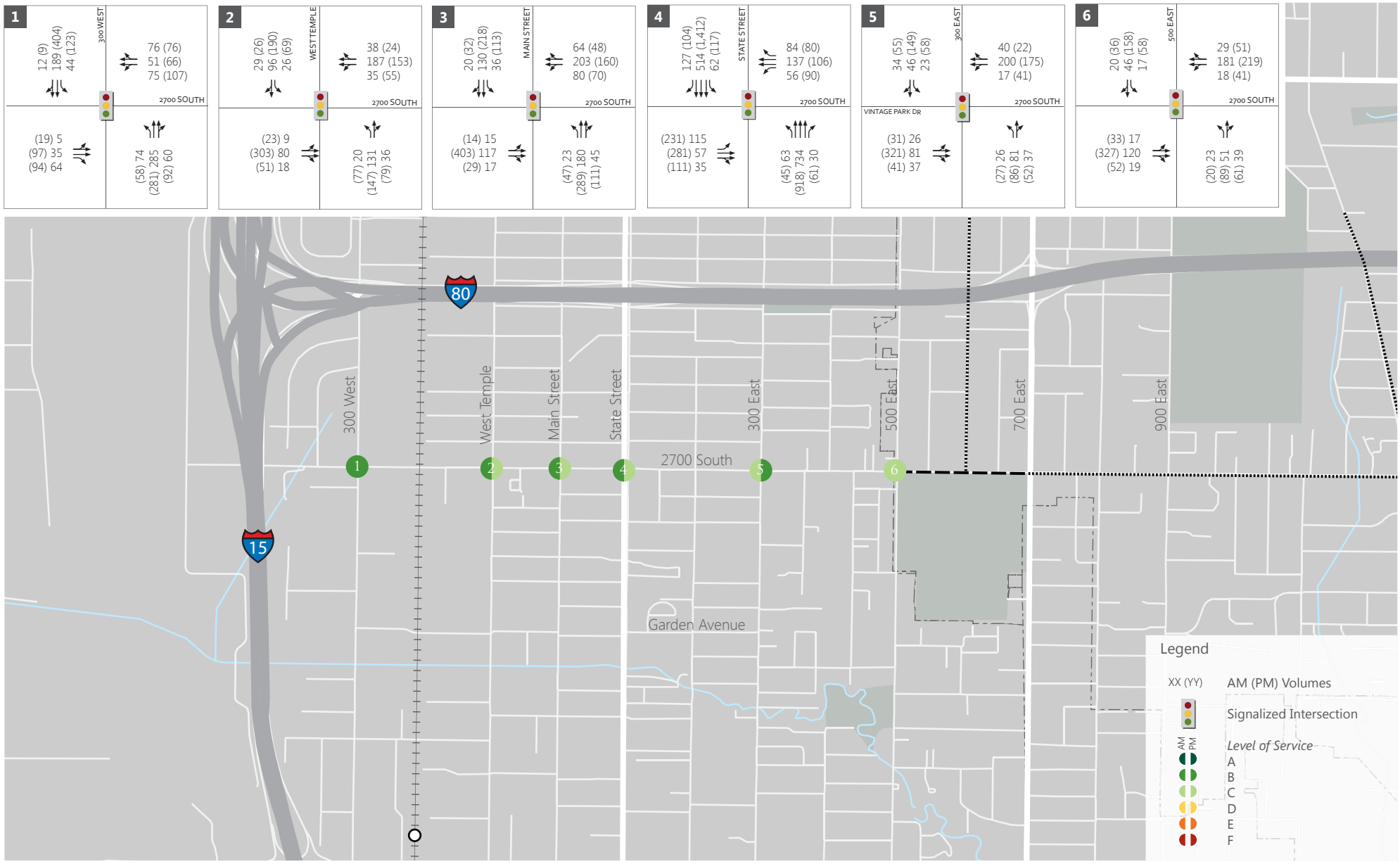
C. Traffic Volumes

Fehr & Peers recorded peak period traffic counts for 2700 South from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM on Tuesday, July 10, 2012. These hours were chosen because the highest traffic volumes are present during those hours, and therefore represent the 'worst case' scenario for the analysis. The following intersections were recorded:

- 300 West / 2700 South
- West Temple / 2700 South
- Main Street / 2700 South
- State Street / 2700 South
- 300 East / 2700 South
- 500 East / 2700 South

The traffic volumes counted in July represent an average day of the year; therefore, no monthly or daily adjustment factors were applied to the July counts. Global Positioning System (GPS) travel time runs were performed on the same day of the traffic counts. The travel time runs were then used to calibrate the SimTraffic model for the level of service analysis and determine the baseline travel time for the corridor without the proposed road diet. SimTraffic is a micro-simulation traffic modeling tool that is used to perform traffic analysis. By using SimTraffic, we are able to capture the interaction between the study intersections, calibrate to existing conditions, and analyze the effects of queue spillback.

The existing (2012) weekday PM peak hour traffic volumes are shown in Figure 3.



Not to Scale

FEHR PEERS

EXISTING (2012) AM & PM PEAK HOUR CONDITIONS

FIGURE 3

D. Automobile Level of Service Analysis

Using SimTraffic modeling software and the HCM 2010 delay thresholds introduced in Chapter I, the existing background weekday AM and PM peak hour LOS were computed for each study intersection. The results of this analysis are reported in Tables 2 and 3 (see Appendix for the detailed LOS report). These results serve as a base for the analysis of the impacts of the proposed road diet.

TABLE 2
EXISTING (2012) AM PEAK HOUR LEVEL OF SERVICE

Intersection			Worst Movement[1]			Overall Intersection	
ID	Location	Control	Movement	Delay (Sec/Veh)	LOS	Avg. Delay (Sec/Veh)[2]	LOS
1	300 West / 2700 South	Signal	N/A	N/A	N/A	11.1	B
2	West Temple / 2700 South	Signal	N/A	N/A	N/A	15.8	B
3	Main Street / 2700 South	Signal	N/A	N/A	N/A	16.9	B
4	State Street / 2700 South	Signal	N/A	N/A	N/A	17.2	B
5	300 East / 2700 South	Signal	N/A	N/A	N/A	26.4	C
6	500 East / 2700 South	Signal	N/A	N/A	N/A	28.7	C

1. This represents the worst movement LOS and delay (seconds/vehicle) and is only reported for unsignalized intersections.
2. This represents the overall intersection LOS and delay (seconds/vehicle).

Source: Fehr & Peers, July 2012.

TABLE 3
EXISTING (2012) PM PEAK HOUR LEVEL OF SERVICE

Intersection			Worst Movement[1]			Overall Intersection	
ID	Location	Control	Movement	Delay (Sec/Veh)	LOS	Avg. Delay (Sec/Veh)[2]	LOS
1	300 West / 2700 South	Signal	N/A	N/A	N/A	16.8	B
2	West Temple / 2700 South	Signal	N/A	N/A	N/A	20.9	C
3	Main Street / 2700 South	Signal	N/A	N/A	N/A	23.1	C
4	State Street / 2700 South	Signal	N/A	N/A	N/A	25.1	C
5	300 East / 2700 South	Signal	N/A	N/A	N/A	18.4	B
6	500 East / 2700 South	Signal	N/A	N/A	N/A	30.8	C

1. This represents the worst movement LOS and delay (seconds/vehicle) and is only reported for unsignalized intersections.
2. This represents the overall intersection LOS and delay (seconds/vehicle).

Source: Fehr & Peers, July 2012.

As shown in Tables 2 and 3, all study intersections operate at LOS C or better during the AM and PM peak hours for the existing (2012) conditions.

E. Automobile Travel Times

Corridor-long GPS travel time runs were performed for the existing condition and serve as a metric for assessing the impact of the proposed road diet. Table 4 shows the AM and PM travel times for both the west- and eastbound directions.

TABLE 4
EXISTING (2012) AM AND PM PEAK HOUR TRAVEL TIMES

Eastbound		Westbound	
AM	**PM**	**AM**	**PM**
5:12[1]	4:49	5:19	5:01

1. Travel time represented in minutes:seconds.
Source: Fehr & Peers, July 2012.

F. Bicycle Level of Service

Bicycle LOS was calculated using the methods described in Chapter I. Bicycle LOS is segment-based and calculated separately for each direction. The results, as shown in Table 5, indicate bicycle travel along 2700 is not optimal and could be improved. Currently, bicyclists have very little to no shoulder to ride. The shoulder that is available can have drainage grates and uneven pavement around sewer manholes.

TABLE 5
EXISTING (2012) AM AND PM PEAK HOUR BICYCLE LEVEL OF SERVICE

Segment		Eastbound		Westbound	
ID	**Location**	**AM**	**PM**	**AM**	**PM**
1	300 West to West Temple	B	C	C	C
2	West Temple to Main Street	B	C	C	C
3	Main Street to State Street	C	C	C	C
4	State Street to 300 East	B	C	C	C
5	300 East to 500 East	B	C	C	C

Source: Fehr & Peers, July 2012.

III. EXISTING (2012) ROAD DIET CONDITIONS

A. Purpose

The purpose of the existing (2012) road diet conditions analysis is to evaluate the impact of the road diet on the 2700 South and its intersections. The road diet in this case consists of converting the existing four-lane (two travel lanes in each direction) cross section to a three-lane (one travel lane in each direction, a center two-way left-turn lane, and bicycle lanes in each direction) cross section. In order to analyze this impact, the existing volumes were applied to the proposed roadway configurations. Intersection LOS analyses were then performed and compared to the results of the existing (2012) background analysis. This comparison shows the impact of the proposed road diet.

B. Level of Service Analysis

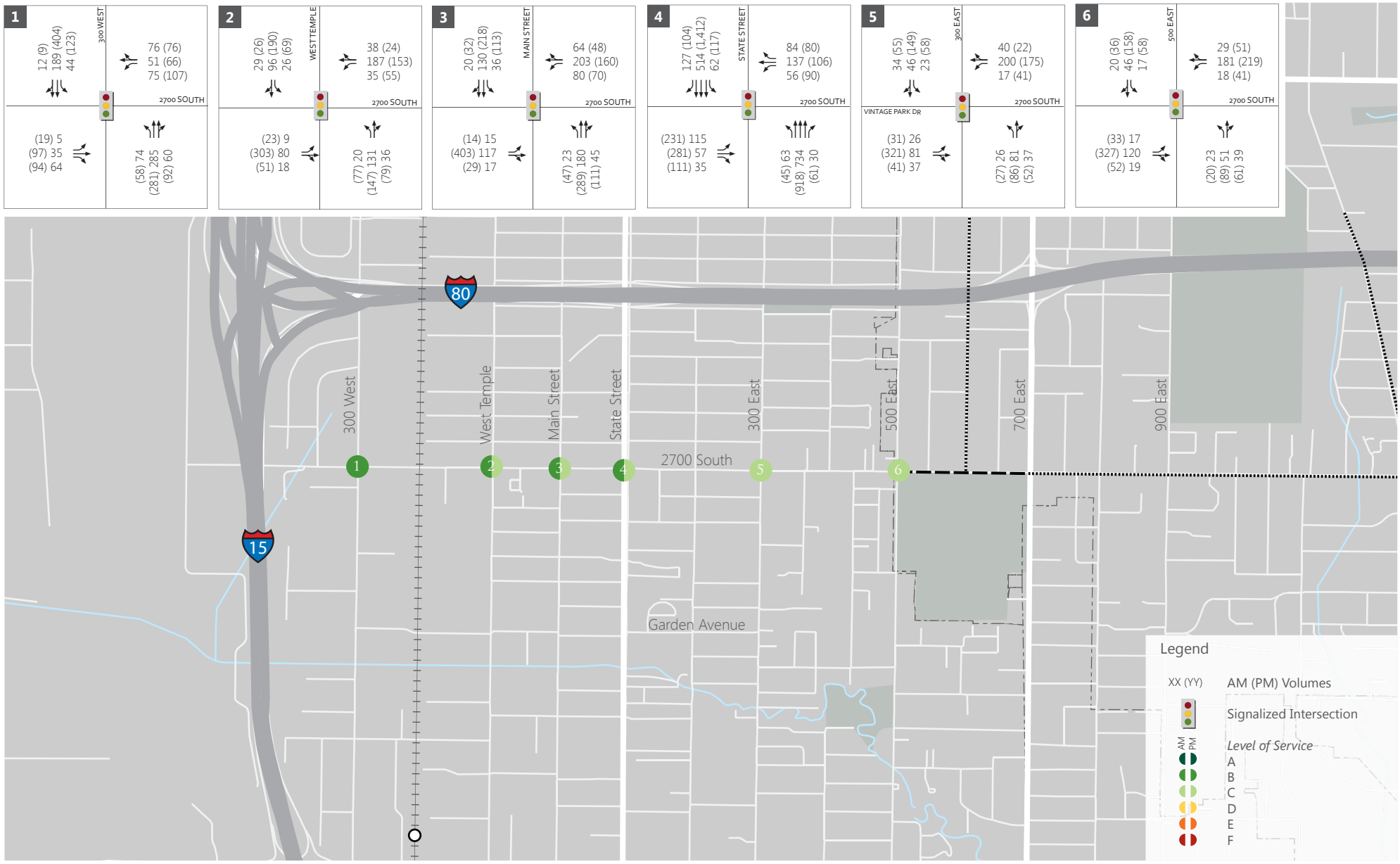
Using SimTraffic modeling software and the HCM 2010 delay thresholds introduced in Chapter I, the existing (2012) road diet weekday AM and PM peak hour LOS were computed for each study intersection. In this scenario, signal timings remain the same as existing. Section E describes a scenario where signal timings are revised for the new road diet configuration. The results of this analysis are reported in Tables 6 and 7 (see Appendix for the detailed LOS report). These results are shown in Figure 4.

TABLE 6
EXISTING (2012) ROAD DIET AM PEAK HOUR LEVEL OF SERVICE

Intersection			Worst Movement[1]			Overall Intersection	
ID	Location	Control	Movement	Delay (Sec/Veh)	LOS	Avg. Delay (Sec/Veh)[2]	LOS
1	300 West / 2700 South	Signal	N/A	N/A	N/A	11.4	B
2	West Temple / 2700 South	Signal	N/A	N/A	N/A	17.4	B
3	Main Street / 2700 South	Signal	N/A	N/A	N/A	18.6	B
4	State Street / 2700 South	Signal	N/A	N/A	N/A	17.5	B
5	300 East / 2700 South	Signal	N/A	N/A	N/A	28.2	C
6	500 East / 2700 South	Signal	N/A	N/A	N/A	29.3	C

1. This represents the worst movement LOS and delay (seconds/vehicle) and is only reported for unsignalized intersections.
2. This represents the overall intersection LOS and delay (seconds/vehicle).
Source: Fehr & Peers, July 2012.

As shown in Table 6, all study intersections operate at LOS C or better during the AM peak hour for the existing (2012) road diet conditions. Compared to the existing (2012) conditions, the road diet adds 1.8 seconds of delay or less to the study intersections with the existing timing plans.



Not to Scale

FEHR PEERS

2012 AM & PM PEAK HOUR CONDITIONS WITH ROAD DIET

FIGURE 4

TABLE 7
EXISTING (2012) ROAD DIET PM PEAK HOUR LEVEL OF SERVICE

Intersection			Worst Movement[1]			Overall Intersection	
ID	Location	Control	Movement	Delay (Sec/Veh)	LOS	Avg. Delay (Sec/Veh)[2]	LOS
1	300 West / 2700 South	Signal	N/A	N/A	N/A	16.7	B
2	West Temple / 2700 South	Signal	N/A	N/A	N/A	27.7	C
3	Main Street / 2700 South	Signal	N/A	N/A	N/A	34.4	C
4	State Street / 2700 South	Signal	N/A	N/A	N/A	28.3	C
5	300 East / 2700 South	Signal	N/A	N/A	N/A	22.0	C
6	500 East / 2700 South	Signal	N/A	N/A	N/A	34.6	C

1. This represents the worst movement LOS and delay (seconds/vehicle) and is only reported for unsignalized intersections.
2. This represents the overall intersection LOS and delay (seconds/vehicle).

Source: Fehr & Peers, July 2012.

As shown in Table 7, all study intersections operate at LOS C or better during the PM peak hour for the existing (2012) road diet conditions. Compared to the existing (2012) conditions, the road diet adds 11.3 seconds of delay or less to the study intersections with the existing timing plans.

C. Automobile Travel Times

Corridor-long GPS travel time runs were performed for the existing condition and serve as a metric for assessing the impact of the proposed road diet. Table 8 shows the AM and PM travel times for both the west- and eastbound directions. Travel times between the existing roadway configuration and the road diet are estimated to increase by roughly ten seconds between 300 West and 500 East for the westbound and eastbound AM directions. The eastbound PM direction travel time is estimated to increase by one minute and thirty seconds.

TABLE 8
EXISTING (2012) ROAD DIET AM AND PM PEAK HOUR TRAVEL TIMES

Eastbound		Westbound	
AM	PM	AM	PM
5:23[1]	6:17	5:28	5:20

1. Travel time represented in minutes:seconds.

Source: Fehr & Peers, July 2012.

D. Bicycle Level of Service

Bicycle LOS was calculated using the methods described in Chapter I. For the road diet conditions, the analysis was altered to reflect the change in roadway cross-section. As shown in Table 9, all roadway

segments operate at LOS A. These LOS show an improvement over the existing conditions and indicate the presence of a bike lane greatly increases bicycle comfort level.

TABLE 9
EXISTING (2012) ROAD DIET AM AND PM PEAK HOUR BICYCLE LEVEL OF SERVICE

Segment		Eastbound		Westbound	
ID	Location	AM	PM	AM	PM
1	300 West to West Temple	A	A	A	A
2	West Temple to Main Street	A	A	A	A
3	Main Street to State Street	A	A	A	A
4	State Street to 300 East	A	A	A	A
5	300 East to 500 East	A	A	A	A

1. This represents the worst movement LOS and delay (seconds/vehicle) and is only reported for unsignalized intersections.
2. This represents the overall intersection LOS and delay (seconds/vehicle).

Source: Fehr & Peers, July 2012.

E. Revised Signal Timings

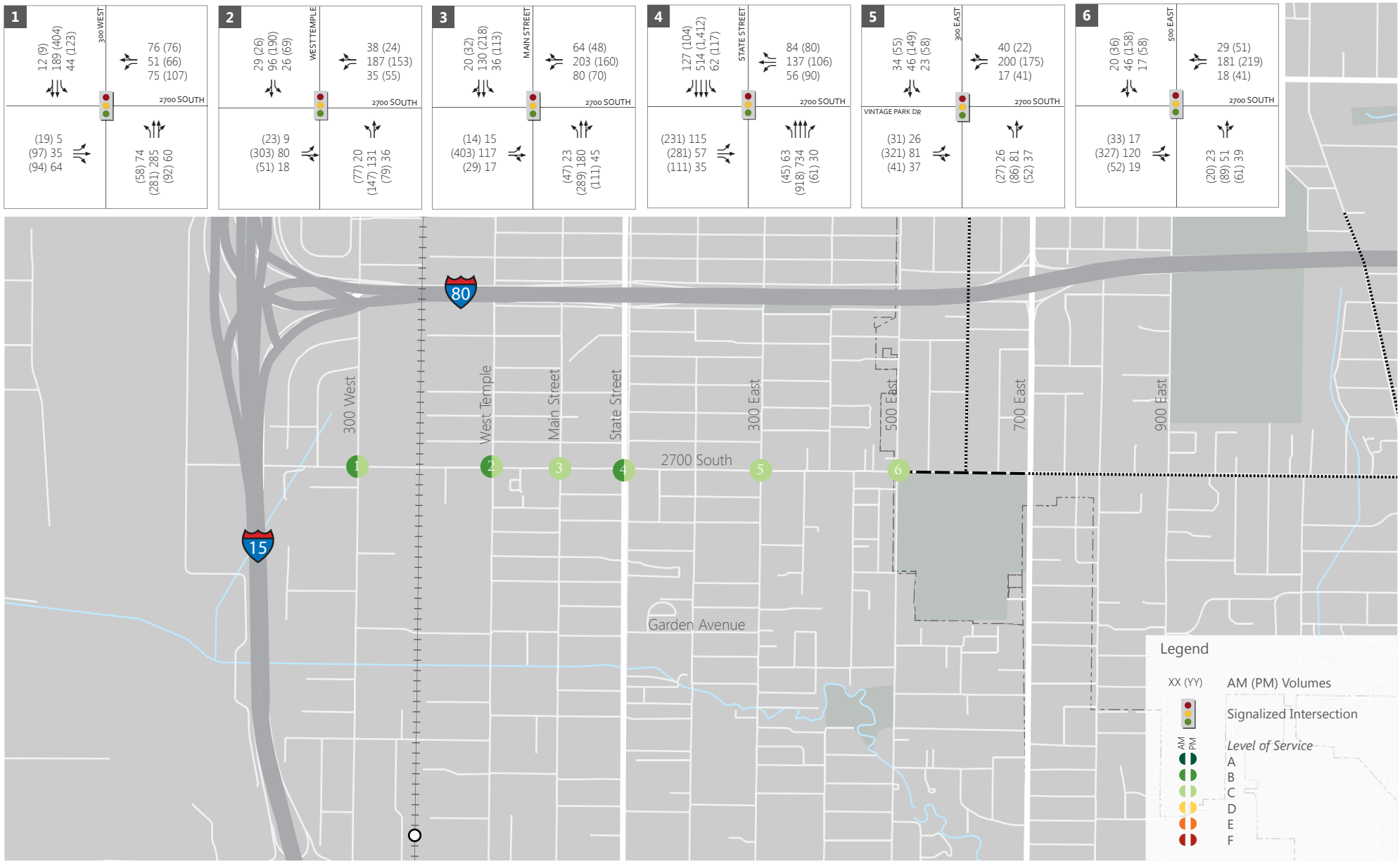
The corridor was analyzed with revised signal timings. Signal timings were optimized for the proposed roadway configuration, which resulted in non-split phase signal timings. In the revised timings, left turns were given a protected phase. AM and PM peak hour LOS were computed for each study intersection with the updated signal timings. The results of this analysis are reported in Tables 10 and 11 (see Appendix for the detailed LOS report). These results are shown in Figure 5.

TABLE 10
EXISTING (2012) ROAD DIET AM PEAK HOUR LEVEL OF SERVICE - REVISED SIGNAL TIMINGS

Intersection			Worst Movement[1]			Overall Intersection	
ID	Location	Control	Movement	Delay (Sec/Veh)	LOS	Avg. Delay (Sec/Veh)[2]	LOS
1	300 West / 2700 South	Signal	N/A	N/A	N/A	16.5	B
2	West Temple / 2700 South	Signal	N/A	N/A	N/A	19.1	B
3	Main Street / 2700 South	Signal	N/A	N/A	N/A	25.7	C
4	State Street / 2700 South	Signal	N/A	N/A	N/A	19.4	B
5	300 East / 2700 South	Signal	N/A	N/A	N/A	25.7	C
6	500 East / 2700 South	Signal	N/A	N/A	N/A	28.8	C

1. This represents the worst movement LOS and delay (seconds/vehicle) and is only reported for unsignalized intersections.
2. This represents the overall intersection LOS and delay (seconds/vehicle).

Source: Fehr & Peers, July 2012.



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2012 AM & PM PEAK HOUR CONDITIONS WITH ROAD DIET - REVISED SIGNAL TIMINGS

FIGURE 4

FEHR PEERS

As shown in Table 10, all study intersections operate at LOS C or better for the existing (2012) road diet conditions with updated signal timings. The new optimized timing plans with protected left turns add 8.8 seconds of delay or less to the study intersections during the AM peak hour.

TABLE 11
EXISTING (2012) ROAD DIET PM PEAK HOUR LEVEL OF SERVICE- REVISED SIGNAL TIMINGS

Intersection			Worst Movement[1]			Overall Intersection	
ID	Location	Control	Movement	Delay (Sec/Veh)	LOS	Avg. Delay (Sec/Veh)[2]	LOS
1	300 West / 2700 South	Signal	N/A	N/A	N/A	21.1	C
2	West Temple / 2700 South	Signal	N/A	N/A	N/A	29.7	C
3	Main Street / 2700 South	Signal	N/A	N/A	N/A	24.8	C
4	State Street / 2700 South	Signal	N/A	N/A	N/A	25.3	C
5	300 East / 2700 South	Signal	N/A	N/A	N/A	28.8	C
6	500 East / 2700 South	Signal	N/A	N/A	N/A	29.2	C

1. This represents the worst movement LOS and delay (seconds/vehicle) and is only reported for unsignalized intersections.
2. This represents the overall intersection LOS and delay (seconds/vehicle).

Source: Fehr & Peers, July 2012.

As shown in Table 10, all study intersections operate at LOS C during the PM peak hour for the existing (2012) road diet conditions with updated signal timings. The new optimized timing plans with protected left turns add 10.4 seconds of delay or less to the study intersections.

Table 12 shows the AM and PM travel times for both the west- and eastbound directions. Travel times between the existing roadway configuration and the road diet with revised signal timings are estimated to increase by roughly thirty to sixty seconds between 300 West and 500 East.

TABLE 12
EXISTING (2012) ROAD DIET AM AND PM PEAK HOUR TRAVEL TIMES – REVISED SIGNAL TIMINGS

Eastbound		Westbound	
AM	PM	AM	PM
6:16 [1]	5:23	6:05	5:41

1. Travel time represented in minutes:seconds.

Source: Fehr & Peers, July 2012.

IV. ROAD DIET COMPARISON

Road diets are not a new concept in the Salt Lake Metro Area; in fact, several road diets have successfully been implemented in Salt Lake City. National studies have been conducted to compare the "before" and "after" effects of road diets. The comparison studies have shown that road diets (converting a four-lane road to a three-lane road) generally result in slower speeds, lower traffic volumes, and lower crash frequency. A study comparing the safety benefits of road diets was performed by Herman F. Huang (*Evaluation of Lane Reduction "Road Diet" Measures on Crashes and Injuries*). Table 13 shows the crash and injury "before" and "after" comparison results summary from case studies of similar road diets.

TABLE 13
CASE STUDY ROAD DIET CRASH AND INJURY COMPARISON SUMMARY

Analysis Category	Comparison			
	Road Diets Before vs. After	**Comparison Sites Before vs. After**	**"Before" Period Road Diets vs. Comparison Sites**	**"After" Period Road Diets vs. Comparison Sites**
Crash Frequency	Reduction in "After" Period	No Change	No Difference	Road Diets Lower
Crash Rates	No Change	No Change	Road Diets Lower	Road Diets Lower
Crash Severity	No Change	No Change	No Difference	No Difference
Crash Type	No Change	No Change	Difference: 1.Road diets had a higher percentage of angle crashes 2. Road diets had a lower percentage of rear-end crashes	Difference: 1.Road diets had a higher percentage of angle crashes 2.Road diets had a lower percentage of rear-end crashes

Source: *Evaluation of Lane Reduction "Road Diet" Measures on Crashes and Injuries*, Herman F. Huang, Paper No. 02-2955

As stated in Table 13, crash frequency was found to be lower in the "after" period. The study further explained that one may expect that converting a four-lane road to a three-lane road would likely reduce total crashes by 6% or less.

Fehr & Peers conducted research on several road dieted roadways (four-lanes to three-lanes) in the western United States and found the following information regarding traffic flows (i.e. ADT and speeds).

Based on the local and national comparison results, it is likely that if 2700 South were reduced to three-lanes, one could expect a reduction in crash frequency, slower speeds, a reduction to no change in ADT, and a more livable and multi-modal street.

TABLE 14
ROAD DIET TRAFFIC FLOW COMPARISON SUMMARY

Roadway	ADT Before	ADT After	% Change in ADT	Observations/Comments
Marin Avenue (Berkeley, CA)	21,877	17,502	-20%	Slower traffic, more bikes, more tailgating
Valencia Street (San Francisco, CA)	22,000	19,800	-10%	-20% change in collisions[1], 140% increase in bicycling, 10% traffic diverted to adjacent streets
900 East[2] (Salt Lake City, UT)	15,200	11,900	-22%	Commuters didn't like the change, but residents who live on the street said the street was more livable
1300 East[2] (Salt Lake City, UT)	20,450	20,840	+2%	Commuters didn't like the change, but residents who live on the street said the street was more livable, helped overall traffic flow

[1] Total collisions per month include vehicles, bicycle, and pedestrian.
[2] Data and comments supplied by Salt Lake City
Source: Fehr & Peers, 2012

V. CONCLUSION

South Salt Lake City has proposed a road diet along 2700 South to change the configuration of the roadway from the current two lanes in each direction to one lane in each direction with a center turn lane and bike lanes. Road diets are a good traffic calming and safety tool that require no right of way purchase and, in many cases, can be as simple as restriping.

In the existing (2012) conditions all study intersections operate at a LOS C or better during the AM and PM peak hours. With the proposed road diet, intersection delay would increase by 1.8 seconds and 11.3 seconds of delay or less to the AM and PM peak hours, respectively, with the same signal timings. This still allows the study intersections to operate at a LOS C or better during both peak hours. When signal timings were optimized and changed from split phase timings to protected left turn timings for the proposed road diet the study intersections operated at a LOS C in the PM peak hour. The new signal timings added 8.8 seconds and 10.4 seconds of delay or less to the AM and PM peak hours, respectively.

Travel times between the existing roadway configuration and the road diet are estimated to increase by roughly ten seconds between 300 West and 500 East for the westbound and eastbound AM directions. The eastbound PM direction travel time is estimated to increase by one minute and thirty seconds.

The results of this analysis show that implementing a road diet on 2700 South between 300 West and 500 East would still operate at acceptable LOS (LOS C or better) during both the AM and PM peak hours with the existing traffic volumes and would not significantly increase travel times. New signal timings with protected left turns for the eastbound and westbound traffic would add delay to the study intersections, but would still allow the intersections to operate efficiently.

For bicyclists, the road diet has significant improvements, increasing LOS from Bs and Cs in the existing conditions to As in the road diet conditions. This indicates the proposed bicycle lane would improve bicyclists' comfort level.

As shown previously in Chapter IV, it is likely that if 2700 South were reduced to three-lanes, one could expect a reduction in crash frequency, slower speeds, a reduction to no change in ADT, and a more livable and multi-modal street.

The results of this study indicate a road diet along 2700 South would have minimal to no significant impact on 2700 South to automobile traffic. The road diet increases bicycle comfort and would be a good first step towards a city-wide bicycle network.

APPENDIX

Traffic Counts

FEHR & PEERS
TRANSPORTATION CONSULTANTS

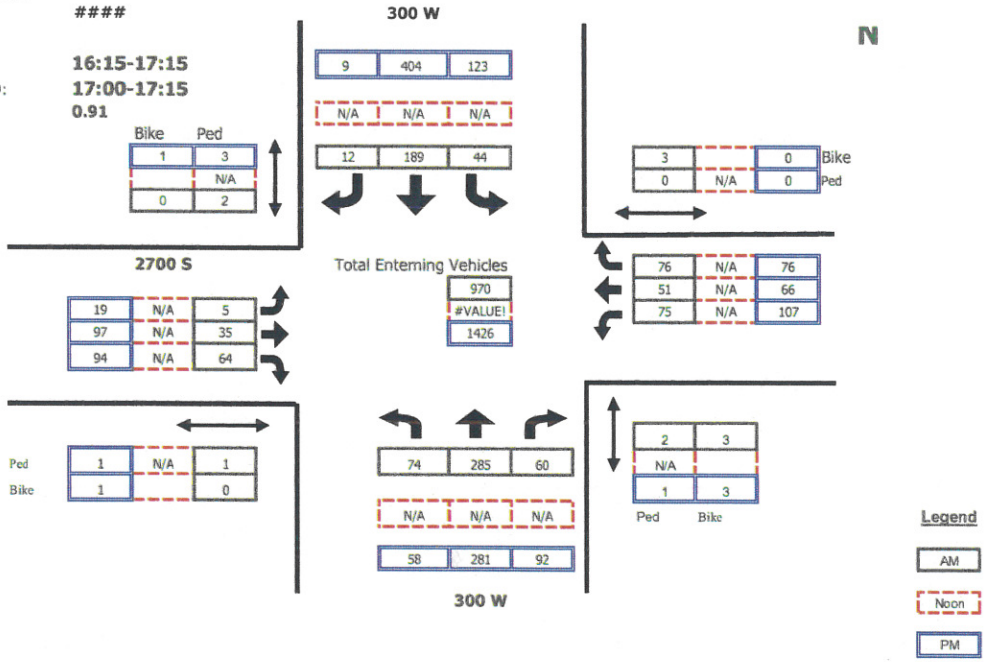
Intersection Turning Movement Summary

Intersection:	**300 W & 2700 S**	**Date:**	**Tuesday, July 10, 2012**
	North/South: 300 W	**Day of Week Adjustment:**	**100.34%**
	East/West: 2700 S	**Month of Year Adjustment:**	**99.96%**
Jurisdiction:		**Adjustment Station #:**	
Project Title:	**2700 S Road Diet**	**Growth Rate:**	**0.0%**
Project No:	**UT12-942**	**Number of Years:**	**0**
Weather:			

AM PEAK HOUR PERIOD: **8:00-9:00**
AM PEAK 15 MINUTE PERIOD: **8:00-8:15**
AM PHF: **0.88**

NOON PEAK HOUR PERIOD:
NOON PEAK 15 MINUTE PERIOD:
NOON PHF: **####**

PM PEAK HOUR PERIOD: **16:15-17:15**
PM PEAK 15 MINUTE PERIOD: **17:00-17:15**
PM PHF: **0.91**



RAW COUNT SUMMARIES	300 W Northbound				300 W Southbound				2700 S Eastbound				2700 S Westbound				
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00-7:15	16	37	12	0	13	12	0	0	2	7	10	0	9	15	5	0	138
7:15-7:30	17	70	5	1	8	34	2	0	2	12	26	0	25	15	13	0	229
7:30-7:45	24	43	11	0	3	22	1	0	2	11	12	0	11	15	7	0	162
7:45-8:00	30	63	6	0	4	51	1	0	3	13	14	0	19	18	18	1	240
8:00-8:15	28	77	14	0	7	54	3	1	1	7	20	0	28	15	23	0	277
8:15-8:30	19	84	8	0	14	58	5	1	1	12	17	1	15	15	20	0	268
8:30-8:45	12	54	17	2	5	34	1	0	1	4	13	0	12	11	12	0	176
8:45-9:00	15	70	21	0	18	43	3	0	2	12	14	0	20	10	21	0	249

NOON PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
14:00-14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15-14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30-14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45-15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00-15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15-15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30-15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45-16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00-16:15	18	78	19	0	18	101	5	0	10	7	24	0	33	18	19	0	350
16:15-16:30	20	82	23	0	30	90	2	1	6	22	15	0	30	12	17	0	349
16:30-16:45	14	62	16	1	34	101	3	1	3	31	20	0	25	23	17	0	349
16:45-17:00	8	57	24	0	26	105	4	1	4	23	29	1	27	12	19	0	338
17:00-17:15	16	80	29	0	33	108	0	0	6	21	30	0	25	19	23	0	390
17:15-17:30	6	32	8	1	35	76	2	0	5	19	15	0	15	9	21	0	243
17:30-17:45	10	57	20	0	35	100	5	0	6	26	20	0	25	11	14	0	329
17:45-18:00	4	36	8	0	19	56	4	0	0	12	7	0	9	7	23	0	185

FEHR & PEERS
TRANSPORTATION CONSULTANTS

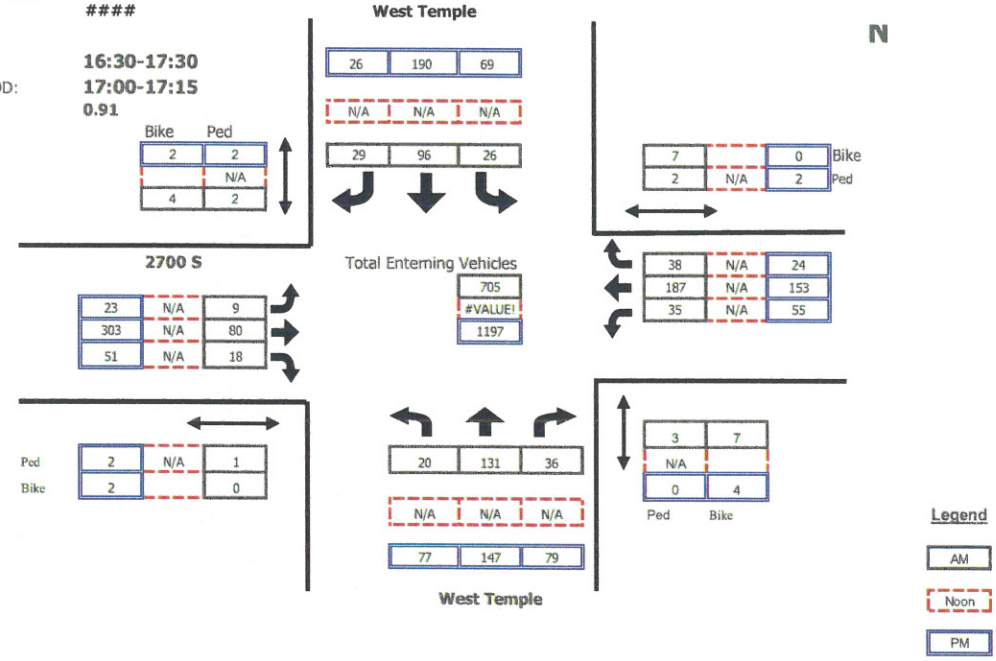
Intersection Turning Movement Summary

Intersection:	**West Temple/2700 S**	**Date:**	**Tuesday, July 10, 2012**
	North/South: West Temple	**Day of Week Adjustment:**	**100.34%**
	East/West: 2700 S	**Month of Year Adjustment:**	**99.96%**
Jurisdiction:		**Adjustment Station #:**	
Project Title:	**2700 S Road Diet**	**Growth Rate:**	**0.0%**
Project No:	**UT12-942**	**Number of Years:**	**0**
Weather:			

AM PEAK HOUR PERIOD: **7:30-8:30**
AM PEAK 15 MINUTE PERIOD: **7:45-8:00**
AM PHF: **0.87**

NOON PEAK HOUR PERIOD:
NOON PEAK 15 MINUTE PERIOD:
NOON PHF: **####**

PM PEAK HOUR PERIOD: **16:30-17:30**
PM PEAK 15 MINUTE PERIOD: **17:00-17:15**
PM PHF: **0.91**



RAW COUNT SUMMARIES	West Temple Northbound				West Temple Southbound				2700 S Eastbound				2700 S Westbound				
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00-7:15	2	19	3	0	1	11	2	0	1	9	3	0	5	11	3	0	70
7:15-7:30	7	25	4	1	2	19	7	0	1	23	4	0	10	35	4	0	141
7:30-7:45	4	30	13	0	3	26	9	0	0	22	4	0	8	48	10	0	177
7:45-8:00	7	34	3	0	7	27	12	1	0	21	4	0	17	59	12	1	203
8:00-8:15	4	38	12	3	10	22	2	0	6	16	5	0	5	48	8	0	176
8:15-8:30	5	29	8	0	6	21	6	1	3	21	5	1	5	32	8	1	149
8:30-8:45	9	23	8	0	3	24	3	0	7	21	4	0	7	26	9	0	144
8:45-9:00	10	35	9	1	6	25	12	0	2	39	9	1	18	46	5	2	216

NOON PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
14:00-14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15-14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30-14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45-15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00-15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15-15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30-15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45-16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00-16:15	6	46	10	0	16	44	11	0	8	46	5	0	16	53	6	0	267
16:15-16:30	12	32	8	0	5	49	6	0	3	55	6	0	9	55	4	0	244
16:30-16:45	19	34	9	0	16	52	8	1	6	82	12	1	14	48	5	2	305
16:45-17:00	19	30	9	0	13	45	4	0	6	74	18	0	12	40	5	0	275
17:00-17:15	31	39	34	0	22	49	7	1	7	83	12	0	10	32	3	0	329
17:15-17:30	8	44	27	0	18	44	7	0	4	64	9	1	19	33	11	0	288
17:30-17:45	12	29	16	0	15	35	3	0	2	66	7	0	8	34	5	0	232
17:45-18:00	6	28	12	0	13	22	2	0	1	40	4	0	9	30	6	0	173

FEHR & PEERS
TRANSPORTATION CONSULTANTS

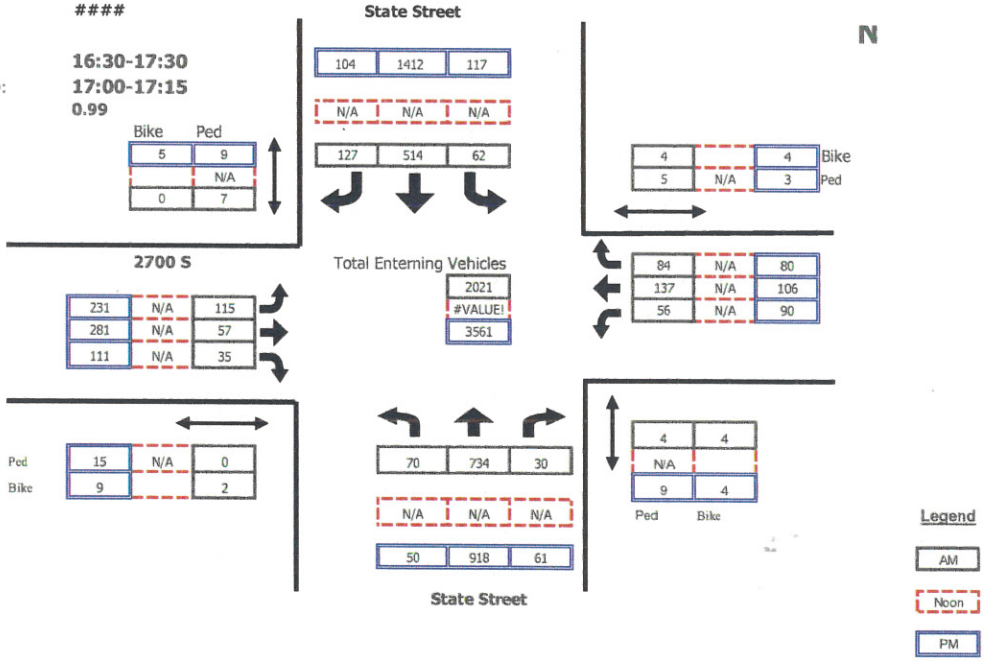
Intersection Turning Movement Summary

Intersection:	**State Street/2700 S**	**Date:**	**Tuesday, July 10, 2012**
	North/South: State Street	**Day of Week Adjustment:**	**100.34%**
	East/West: 2700 S	**Month of Year Adjustment:**	**99.96%**
Jurisdiction:		**Adjustment Station #:**	
Project Title:	**2700 S Road Diet**	**Growth Rate:**	**0.0%**
Project No:	**UT12-942**	**Number of Years:**	**0**
Weather:			

AM PEAK HOUR PERIOD: **8:00-9:00**
AM PEAK 15 MINUTE PERIOD: **8:45-9:00**
AM PHF: **0.97**

NOON PEAK HOUR PERIOD:
NOON PEAK 15 MINUTE PERIOD:
NOON PHF: **####**

PM PEAK HOUR PERIOD: **16:30-17:30**
PM PEAK 15 MINUTE PERIOD: **17:00-17:15**
PM PHF: **0.99**



RAW COUNT SUMMARIES	State Street Northbound				State Street Southbound				2700 S Eastbound				2700 S Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00-7:15	9	123	7	1	8	86	9	3	8	6	1	1	12	20	16	1	305
7:15-7:30	13	156	6	0	4	73	26	0	17	5	4	0	10	25	19	0	358
7:30-7:45	21	211	7	3	10	73	23	3	22	9	6	1	10	39	28	2	459
7:45-8:00	28	230	9	0	9	108	34	2	20	10	5	1	16	33	21	0	523
8:00-8:15	18	170	8	2	15	121	42	2	30	15	4	0	20	40	22	1	505
8:15-8:30	23	209	5	0	16	120	30	1	30	16	9	0	5	27	17	0	507
8:30-8:45	13	176	12	1	14	122	22	3	23	11	14	0	19	40	20	4	486
8:45-9:00	16	179	5	1	17	151	33	1	32	15	8	0	12	30	25	0	523

NOON PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
14:00-14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15-14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30-14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45-15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00-15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15-15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30-15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45-16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00-16:15	17	205	8	0	23	247	14	2	39	56	12	2	14	23	17	2	675
16:15-16:30	12	197	7	2	40	275	31	0	31	40	18	1	13	22	19	2	705
16:30-16:45	6	224	15	3	32	335	38	3	53	65	25	4	35	28	17	2	873
16:45-17:00	14	239	16	2	28	381	23	1	62	51	28	3	9	21	20	0	892
17:00-17:15	15	225	14	2	22	333	20	0	61	94	26	3	34	34	23	0	901
17:15-17:30	15	230	16	2	35	363	23	5	55	71	32	5	12	23	20	1	895
17:30-17:45	14	208	16	0	36	339	19	0	45	58	23	0	20	40	24	0	842
17:45-18:00	17	197	23	1	32	331	16	1	32	30	13	2	20	22	24	0	757

FEHR & PEERS
TRANSPORTATION CONSULTANTS

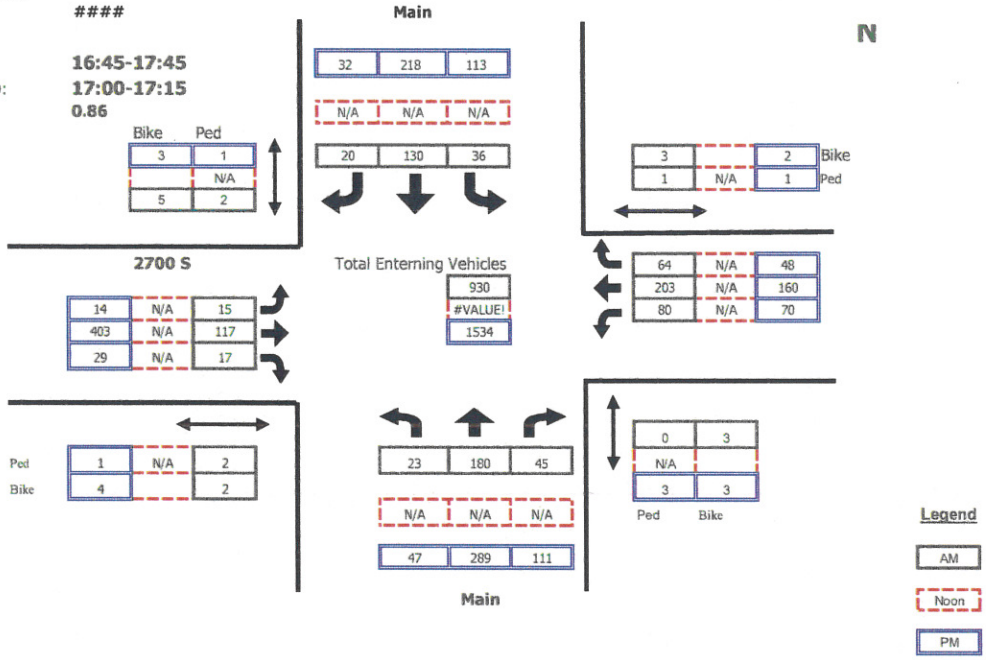
Intersection Turning Movement Summary

Intersection:	**Main & 2700 S**	**Date:**	**Tuesday, July 10, 2012**
	North/South: Main	**Day of Week Adjustment:**	**100.34%**
	East/West: 2700 S	**Month of Year Adjustment:**	**99.96%**
Jurisdiction:		**Adjustment Station #:**	
Project Title:	**2700 S Road Diet**	**Growth Rate:**	**0.0%**
Project No:	**UT12-942**	**Number of Years:**	**0**
Weather:			

AM PEAK HOUR PERIOD: **8:00-9:00**
AM PEAK 15 MINUTE PERIOD: **8:45-9:00**
AM PHF: **0.97**

NOON PEAK HOUR PERIOD:
NOON PEAK 15 MINUTE PERIOD:
NOON PHF: **####**

PM PEAK HOUR PERIOD: **16:45-17:45**
PM PEAK 15 MINUTE PERIOD: **17:00-17:15**
PM PHF: **0.86**



RAW COUNT SUMMARIES	Main Northbound				Main Southbound				2700 S Eastbound				2700 S Westbound				
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00-7:15	4	27	2	0	4	8	2	0	2	13	3	0	7	25	4	0	101
7:15-7:30	7	23	2	0	3	13	2	0	1	17	3	0	5	40	11	0	127
7:30-7:45	5	36	4	0	10	23	3	0	1	25	5	0	12	38	16	2	178
7:45-8:00	8	51	6	0	1	29	1	0	2	16	3	0	23	76	20	1	236
8:00-8:15	7	47	12	0	13	22	4	2	1	26	6	0	24	64	12	0	238
8:15-8:30	2	46	11	0	7	26	5	0	3	28	4	0	22	44	19	0	217
8:30-8:45	8	48	10	0	10	40	4	0	8	19	2	0	15	54	18	1	236
8:45-9:00	6	39	12	0	6	42	7	0	3	44	5	2	19	41	15	0	239

NOON PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
14:00-14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15-14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30-14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45-15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00-15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15-15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30-15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45-16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00-16:15	12	67	28	0	25	63	8	0	5	67	11	1	10	55	13	0	364
16:15-16:30	8	39	19	0	9	42	4	3	6	50	7	2	10	33	7	0	234
16:30-16:45	12	53	24	0	23	51	4	1	6	79	8	1	11	46	5	1	322
16:45-17:00	18	52	35	0	27	54	8	0	3	93	8	0	21	42	8	0	369
17:00-17:15	16	98	21	2	32	28	9	0	5	150	6	1	24	46	12	1	447
17:15-17:30	5	72	32	1	23	71	6	1	3	81	6	0	8	30	11	0	348
17:30-17:45	8	67	23	0	31	65	9	0	3	79	9	0	17	42	17	0	370
17:45-18:00	12	69	18	2	11	71	4	0	5	46	9	0	9	31	13	0	298

FEHR & PEERS
TRANSPORTATION CONSULTANTS

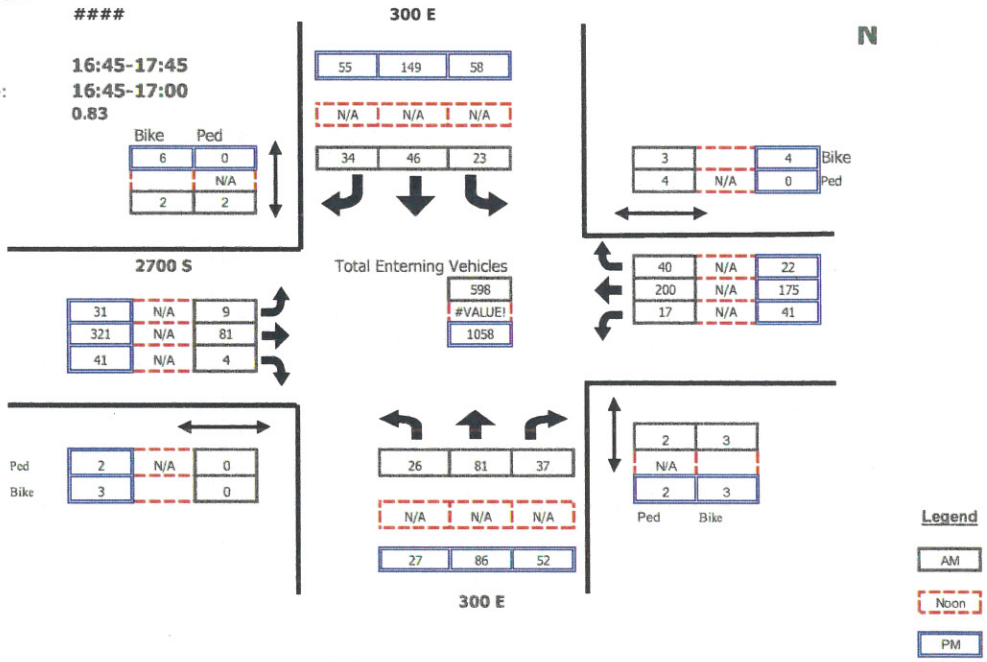
Intersection Turning Movement Summary

Intersection:	**300 E & 2700 S**	**Date:**	**Tuesday, July 10, 2012**
	North/South: 300 E	**Day of Week Adjustment:**	**100.34%**
	East/West: 2700 S	**Month of Year Adjustment:**	**99.96%**
Jurisdiction:		**Adjustment Station #:**	
Project Title:	**2700 S Road Diet**	**Growth Rate:**	**0.0%**
Project No:	**UT12-942**	**Number of Years:**	**0**
Weather:			

AM PEAK HOUR PERIOD: **7:45-8:45**
AM PEAK 15 MINUTE PERIOD: **7:45-8:00**
AM PHF: **0.83**

NOON PEAK HOUR PERIOD:
NOON PEAK 15 MINUTE PERIOD:
NOON PHF: **####**

PM PEAK HOUR PERIOD: **16:45-17:45**
PM PEAK 15 MINUTE PERIOD: **16:45-17:00**
PM PHF: **0.83**



RAW COUNT SUMMARIES	300 E Northbound				300 E Southbound				2700 S Eastbound				2700 S Westbound				
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00-7:15	2	6	4	1	1	7	5	0	0	29	1	0	3	28	1	0	87
7:15-7:30	11	12	12	1	2	5	7	1	2	11	1	0	3	28	9	1	103
7:30-7:45	6	16	7	0	3	8	6	1	0	16	7	1	2	43	4	1	118
7:45-8:00	8	38	14	1	7	16	13	1	1	13	1	0	3	56	10	0	180
8:00-8:15	8	13	7	1	2	7	8	0	2	29	0	0	4	57	6	1	143
8:15-8:30	3	19	8	0	7	12	5	1	0	18	3	0	6	40	13	3	134
8:30-8:45	7	11	8	0	7	11	8	0	6	21	0	0	4	47	11	0	141
8:45-9:00	9	12	9	0	10	11	6	8	1	25	4	0	3	49	12	0	151

NOON PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
14:00-14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15-14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30-14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45-15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00-15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15-15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30-15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45-16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00-16:15	11	17	11	0	12	35	9	0	8	57	8	1	12	38	7	0	225
16:15-16:30	2	20	14	0	18	29	5	0	3	67	12	0	20	49	8	1	247
16:30-16:45	7	22	14	7	12	35	13	0	6	75	8	1	12	49	6	0	259
16:45-17:00	4	28	14	2	14	56	15	0	10	86	12	0	11	59	8	0	317
17:00-17:15	4	15	8	0	9	34	15	0	8	67	4	0	8	28	7	0	207
17:15-17:30	10	26	14	0	17	25	5	0	7	86	12	1	7	38	3	0	250
17:30-17:45	9	17	16	0	18	34	20	0	6	82	13	1	15	50	4	0	284
17:45-18:00	11	26	12	0	8	32	7	0	7	45	10	1	16	59	8	0	241

FEHR & PEERS
TRANSPORTATION CONSULTANTS

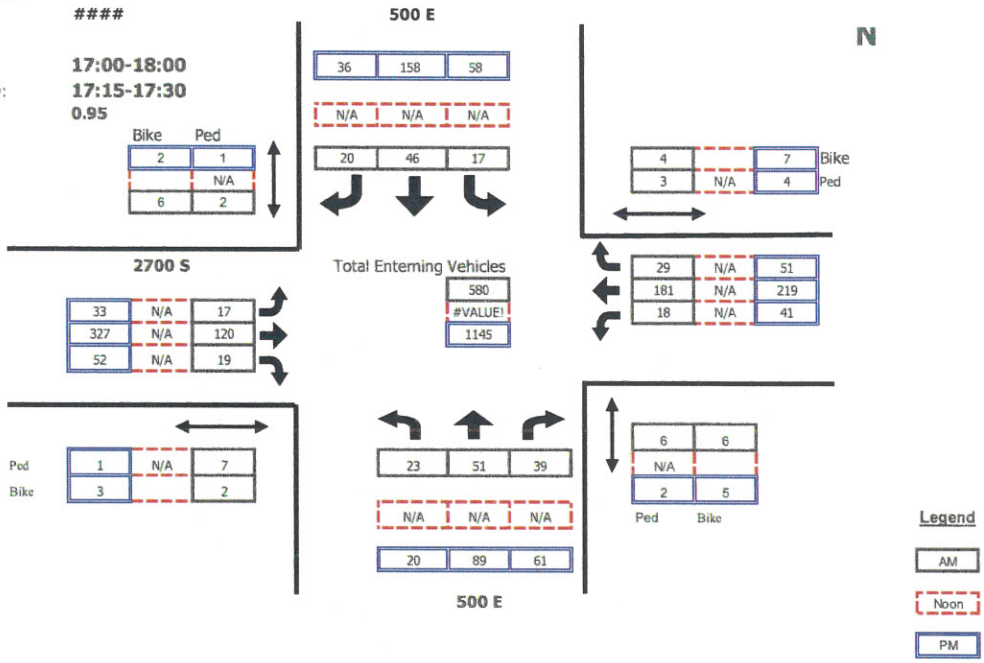
Intersection Turning Movement Summary

Intersection:	**500 E & 2700 S**	**Date:**	**Tuesday, July 10, 2012**
	North/South: 500 E	**Day of Week Adjustment:**	**100.34%**
	East/West: 2700 S	**Month of Year Adjustment:**	**99.96%**
Jurisdiction:		**Adjustment Station #:**	
Project Title:	**2700 S Road Diet**	**Growth Rate:**	**0.0%**
Project No:	**UT12-942**	**Number of Years:**	**0**
Weather:			

AM PEAK HOUR PERIOD: **8:00-9:00**
AM PEAK 15 MINUTE PERIOD: **8:45-9:00**
AM PHF: **0.92**

NOON PEAK HOUR PERIOD:
NOON PEAK 15 MINUTE PERIOD:
NOON PHF: **####**

PM PEAK HOUR PERIOD: **17:00-18:00**
PM PEAK 15 MINUTE PERIOD: **17:15-17:30**
PM PHF: **0.95**



RAW COUNT SUMMARIES	500 E Northbound				500 E Southbound				2700 S Eastbound				2700 S Westbound				
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00-7:15	4	12	8	3	1	4	3	2	2	24	4	2	1	20	10	3	93
7:15-7:30	6	13	6	1	2	5	2	3	5	21	4	1	3	25	1	1	93
7:30-7:45	3	24	10	1	4	6	6	0	3	26	4	1	2	42	7	0	137
7:45-8:00	2	29	7	2	5	10	7	1	4	24	3	3	4	47	8	0	150
8:00-8:15	5	11	18	1	4	8	8	0	6	33	4	3	1	38	9	1	145
8:15-8:30	7	11	6	0	5	11	3	1	3	23	5	0	6	52	5	1	137
8:30-8:45	3	11	12	2	4	9	5	1	5	27	7	3	5	48	4	1	140
8:45-9:00	8	18	3	3	4	18	4	0	3	37	3	1	6	43	11	0	158

NOON PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
14:00-14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15-14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30-14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45-15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00-15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15-15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30-15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45-16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00-16:15	4	17	8	0	6	27	7	1	8	59	6	0	8	50	11	0	211
16:15-16:30	8	26	11	3	11	33	3	1	10	74	5	0	11	66	10	2	268
16:30-16:45	6	28	10	0	8	32	10	2	8	63	20	0	6	52	14	1	257
16:45-17:00	5	28	14	1	11	36	8	0	6	62	12	0	12	50	11	1	255
17:00-17:15	3	32	10	1	14	32	9	0	8	88	14	0	11	52	10	0	283
17:15-17:30	6	26	12	1	16	41	6	0	13	81	18	1	10	52	20	0	301
17:30-17:45	3	17	14	0	15	42	12	1	8	89	14	0	8	57	13	1	292
17:45-18:00	8	14	25	0	13	43	9	0	4	69	6	0	12	58	8	3	269

Detailed LOS

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

2700 S Road Diet
Existing Conditions
AM Peak Hour

Intersection 1 300 West/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	74	77	103.6%	11.3	1.6	B
	Through	285	282	99.0%	9.0	1.6	A
	Right Turn	60	62	103.0%	5.0	1.3	A
	Subtotal	**419**	**421**	**100.4%**	**8.8**	**1.4**	**A**
SB	Left Turn	44	42	94.5%	12.9	0.8	B
	Through	189	191	100.8%	9.5	1.0	A
	Right Turn	12	13	104.2%	5.5	3.0	A
	Subtotal	**245**	**245**	**99.9%**	**9.9**	**0.9**	**A**
EB	Left Turn	5	5	98.0%	25.9	7.5	C
	Through	35	37	104.3%	23.9	2.1	C
	Right Turn	64	66	102.5%	7.8	0.3	A
	Subtotal	**104**	**107**	**102.9%**	**14.1**	**0.9**	**B**
WB	Left Turn	75	73	96.7%	21.1	2.1	C
	Through	51	53	104.3%	19.8	3.2	B
	Right Turn	76	74	97.2%	8.4	1.9	A
	Subtotal	**202**	**200**	**98.8%**	**16.0**	**1.7**	**B**
Total		**970**	**972**	**100.2%**	**11.1**	**1.0**	**B**

Intersection 2 West Temple/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	20	16	79.5%	11.6	3.8	B
	Through	131	133	101.5%	10.2	1.2	B
	Right Turn	36	38	106.7%	6.6	1.1	A
	Subtotal	**187**	**187**	**100.1%**	**9.6**	**1.2**	**A**
SB	Left Turn	26	24	93.1%	14.5	3.8	B
	Through	96	90	94.2%	9.6	1.4	A
	Right Turn	29	31	106.2%	4.2	1.2	A
	Subtotal	**151**	**145**	**96.3%**	**9.3**	**1.1**	**A**
EB	Left Turn	9	7	78.9%	25.2	7.6	C
	Through	80	83	104.0%	24.0	2.7	C
	Right Turn	18	18	102.2%	4.9	1.8	A
	Subtotal	**107**	**109**	**101.6%**	**20.7**	**2.3**	**C**
WB	Left Turn	35	33	94.0%	23.4	2.8	C
	Through	187	194	103.5%	23.0	1.8	C
	Right Turn	38	40	103.9%	13.2	2.9	B
	Subtotal	**260**	**266**	**102.3%**	**21.6**	**1.7**	**C**
Total		**705**	**707**	**100.3%**	**15.8**	**0.8**	**B**

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

2700 S Road Diet
Existing Conditions
AM Peak Hour

Intersection 3 Main Street/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	23	26	113.5%	19.6	2.6	B
	Through	180	177	98.1%	12.5	0.9	B
	Right Turn	45	47	104.0%	6.9	1.6	A
	Subtotal	**248**	**250**	**100.6%**	**12.2**	**0.9**	**B**
SB	Left Turn	36	37	103.9%	21.4	3.1	C
	Through	130	129	99.5%	12.9	1.2	B
	Right Turn	20	19	92.5%	6.9	1.8	A
	Subtotal	**186**	**185**	**99.6%**	**14.0**	**0.9**	**B**
EB	Left Turn	15	13	88.0%	24.4	6.5	C
	Through	117	125	107.2%	24.4	1.6	C
	Right Turn	17	16	92.4%	8.5	2.9	A
	Subtotal	**149**	**154**	**103.6%**	**22.7**	**1.5**	**C**
WB	Left Turn	80	83	103.1%	20.1	1.9	C
	Through	203	209	102.9%	21.1	2.2	C
	Right Turn	64	69	108.0%	12.9	2.1	B
	Subtotal	**347**	**360**	**103.9%**	**19.3**	**1.6**	**B**
Total		**930**	**949**	**102.1%**	**16.9**	**0.8**	**B**

Intersection 4 State Street/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	70	74	105.0%	14.6	2.6	B
	Through	734	732	99.7%	12.2	0.7	B
	Right Turn	30	32	107.3%	5.1	1.0	A
	Subtotal	**834**	**838**	**100.4%**	**12.1**	**0.7**	**B**
SB	Left Turn	62	58	93.4%	19.0	2.7	B
	Through	514	526	102.4%	11.6	1.5	B
	Right Turn	127	128	100.6%	6.8	0.5	A
	Subtotal	**703**	**712**	**101.3%**	**11.4**	**1.1**	**B**
EB	Left Turn	115	116	101.1%	44.1	4.2	D
	Through	57	62	109.5%	42.6	4.3	D
	Right Turn	35	40	113.1%	19.3	5.2	B
	Subtotal	**207**	**218**	**105.5%**	**39.2**	**2.3**	**D**
WB	Left Turn	56	52	93.6%	32.7	4.2	C
	Through	137	149	108.5%	41.4	3.3	D
	Right Turn	84	79	94.5%	7.9	2.1	A
	Subtotal	**277**	**280**	**101.2%**	**30.3**	**2.9**	**C**
Total		**2021**	**2048**	**101.3%**	**17.2**	**0.7**	**B**

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

2700 S Road Diet
Existing Conditions
AM Peak Hour

Intersection 5 300 East/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	26	25	96.9%	31.2	5.7	C
	Through	81	82	100.6%	28.5	3.6	C
	Right Turn	37	38	101.9%	11.7	2.6	B
	Subtotal	**144**	**144**	**100.3%**	**24.6**	**2.5**	**C**
SB	Left Turn	23	24	102.6%	33.9	8.4	C
	Through	46	46	98.9%	25.4	3.9	C
	Right Turn	34	35	101.5%	8.6	2.6	A
	Subtotal	**103**	**104**	**100.6%**	**21.6**	**2.4**	**C**
EB	Left Turn	9	8	85.6%	19.0	6.8	B
	Through	81	81	100.2%	16.2	2.1	B
	Right Turn	4	4	87.5%	11.0	10.5	B
	Subtotal	**94**	**92**	**98.3%**	**16.2**	**1.8**	**B**
WB	Left Turn	17	17	101.2%	37.0	9.9	D
	Through	200	206	102.8%	34.3	1.7	C
	Right Turn	40	38	94.3%	24.4	5.5	C
	Subtotal	**257**	**260**	**101.3%**	**33.0**	**1.9**	**C**
Total		**598**	**601**	**100.5%**	**26.4**	**1.3**	**C**

Intersection 6 500 East/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	23	24	104.3%	40.3	8.1	D
	Through	51	57	111.6%	41.4	5.0	D
	Right Turn	39	41	105.4%	17.3	5.2	B
	Subtotal	**113**	**122**	**108.0%**	**33.1**	**3.6**	**C**
SB	Left Turn	17	16	93.5%	51.0	7.9	D
	Through	46	48	103.9%	36.9	3.8	D
	Right Turn	20	18	92.0%	13.0	4.7	B
	Subtotal	**83**	**82**	**98.9%**	**34.3**	**3.3**	**C**
EB	Left Turn	17	15	85.9%	32.0	5.4	C
	Through	120	122	101.8%	27.9	3.6	C
	Right Turn	19	17	91.1%	1.9	0.3	A
	Subtotal	**156**	**154**	**98.7%**	**25.3**	**3.0**	**C**
WB	Left Turn	18	14	75.6%	26.0	5.7	C
	Through	181	178	98.2%	28.2	2.2	C
	Right Turn	29	30	104.5%	18.4	4.0	B
	Subtotal	**228**	**222**	**97.2%**	**26.7**	**2.5**	**C**
Total		**580**	**580**	**100.0%**	**28.7**	**1.6**	**C**

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

2700 S Road Diet
Existing Conditions
PM Peak Hour

Intersection 1 300 West/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	58	58	100.7%	15.3	1.2	B
	Through	281	274	97.3%	17.0	1.2	B
	Right Turn	92	90	97.7%	10.3	2.0	B
	Subtotal	**431**	**422**	**97.9%**	**15.3**	**0.8**	**B**
SB	Left Turn	123	126	102.4%	18.3	1.0	B
	Through	404	413	102.1%	15.1	1.0	B
	Right Turn	9	9	103.3%	12.0	5.4	B
	Subtotal	**536**	**548**	**102.2%**	**15.8**	**1.0**	**B**
EB	Left Turn	19	17	89.5%	28.0	5.5	C
	Through	97	98	100.7%	27.2	2.0	C
	Right Turn	94	95	101.5%	9.2	0.6	A
	Subtotal	**210**	**210**	**100.0%**	**19.1**	**1.1**	**B**
WB	Left Turn	107	107	100.4%	25.5	3.0	C
	Through	66	69	104.8%	22.8	3.7	C
	Right Turn	76	81	106.3%	9.6	1.2	A
	Subtotal	**249**	**257**	**103.4%**	**19.8**	**2.2**	**B**
Total		**1426**	**1437**	**100.8%**	**16.8**	**0.5**	**B**

Intersection 2 West Temple/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	77	76	98.8%	23.8	2.6	C
	Through	147	154	104.8%	18.0	1.8	B
	Right Turn	79	81	102.9%	11.3	2.7	B
	Subtotal	**303**	**312**	**102.8%**	**17.6**	**1.9**	**B**
SB	Left Turn	69	72	104.9%	23.6	2.1	C
	Through	190	196	102.9%	16.9	1.3	B
	Right Turn	26	27	103.8%	11.1	3.3	B
	Subtotal	**285**	**295**	**103.5%**	**18.0**	**1.4**	**B**
EB	Left Turn	23	23	99.6%	24.1	2.6	C
	Through	303	311	102.7%	23.5	2.0	C
	Right Turn	51	52	101.0%	13.5	3.2	B
	Subtotal	**377**	**386**	**102.3%**	**22.2**	**1.9**	**C**
WB	Left Turn	55	54	97.6%	26.9	3.9	C
	Through	153	160	104.6%	28.3	2.6	C
	Right Turn	24	24	99.6%	13.6	2.8	B
	Subtotal	**232**	**238**	**102.4%**	**26.5**	**2.7**	**C**
Total		**1197**	**1230**	**102.7%**	**20.9**	**1.1**	**C**

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

2700 S Road Diet
Existing Conditions
PM Peak Hour

Intersection 3 Main Street/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	47	51	108.1%	25.4	3.7	C
	Through	289	287	99.2%	18.2	1.7	B
	Right Turn	111	114	102.8%	13.6	2.2	B
	Subtotal	**447**	**452**	**101.0%**	**17.8**	**1.7**	**B**
SB	Left Turn	113	116	102.2%	33.3	1.9	C
	Through	218	220	100.8%	17.7	1.6	B
	Right Turn	32	34	105.0%	10.3	2.3	B
	Subtotal	**363**	**369**	**101.6%**	**22.0**	**1.0**	**C**
EB	Left Turn	14	14	102.9%	30.2	4.7	C
	Through	403	422	104.7%	27.8	2.2	C
	Right Turn	29	30	103.4%	18.9	4.2	B
	Subtotal	**446**	**466**	**104.6%**	**27.4**	**2.2**	**C**
WB	Left Turn	70	66	94.4%	29.5	3.9	C
	Through	160	170	106.1%	27.7	2.4	C
	Right Turn	48	51	105.4%	14.8	3.4	B
	Subtotal	**278**	**286**	**103.0%**	**25.8**	**2.4**	**C**
Total		**1534**	**1573**	**102.5%**	**23.1**	**0.9**	**C**

Intersection 4 State Street/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	50	49	98.2%	28.9	4.7	C
	Through	918	923	100.6%	19.7	0.9	B
	Right Turn	61	61	99.7%	7.3	0.8	A
	Subtotal	**1029**	**1033**	**100.4%**	**19.4**	**0.7**	**B**
SB	Left Turn	117	115	98.4%	27.7	2.2	C
	Through	1412	1412	100.0%	20.3	1.5	C
	Right Turn	104	111	107.0%	10.0	0.8	A
	Subtotal	**1633**	**1638**	**100.3%**	**20.1**	**1.5**	**C**
EB	Left Turn	231	237	102.7%	46.6	8.7	D
	Through	281	297	105.8%	39.3	3.2	D
	Right Turn	111	106	95.2%	36.8	4.1	D
	Subtotal	**623**	**640**	**102.8%**	**41.7**	**4.3**	**D**
WB	Left Turn	90	89	99.1%	48.4	3.5	D
	Through	106	107	100.8%	48.1	5.8	D
	Right Turn	80	81	101.6%	12.4	1.8	B
	Subtotal	**276**	**277**	**100.5%**	**37.7**	**2.9**	**D**
Total		**3561**	**3589**	**100.8%**	**25.1**	**0.7**	**C**

Intersection 5 **300 East/2700 South** **Signalized**

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	27	27	101.5%	24.4	3.7	C
	Through	86	91	105.9%	17.6	1.6	B
	Right Turn	52	52	100.6%	9.6	1.3	A
	Subtotal	**165**	**171**	**103.5%**	**16.2**	**1.1**	**B**
SB	Left Turn	58	58	100.3%	24.4	2.6	C
	Through	149	151	101.5%	18.8	2.3	B
	Right Turn	55	54	97.6%	11.3	1.9	B
	Subtotal	**262**	**263**	**100.5%**	**18.5**	**2.1**	**B**
EB	Left Turn	31	29	94.2%	18.8	3.7	B
	Through	321	341	106.1%	17.6	1.2	B
	Right Turn	41	37	90.5%	9.0	1.6	A
	Subtotal	**393**	**407**	**103.5%**	**16.9**	**1.3**	**B**
WB	Left Turn	41	40	96.3%	24.2	2.8	C
	Through	175	181	103.6%	22.8	1.0	C
	Right Turn	22	19	87.3%	14.2	5.0	B
	Subtotal	**238**	**240**	**100.8%**	**22.3**	**1.3**	**C**
Total		**1058**	**1081**	**102.2%**	**18.4**	**0.8**	**B**

Intersection 6 **500 East/2700 South** **Signalized**

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	20	18	91.5%	51.2	10.3	D
	Through	89	89	100.4%	42.1	1.9	D
	Right Turn	61	65	105.7%	21.9	2.8	C
	Subtotal	**170**	**172**	**101.3%**	**35.5**	**1.8**	**D**
SB	Left Turn	58	57	97.9%	62.1	7.4	E
	Through	158	151	95.8%	44.5	1.9	D
	Right Turn	36	34	94.7%	32.3	6.6	C
	Subtotal	**252**	**242**	**96.2%**	**46.8**	**2.5**	**D**
EB	Left Turn	33	36	107.6%	25.6	6.1	C
	Through	327	329	100.6%	25.4	2.1	C
	Right Turn	52	53	101.5%	2.7	0.5	A
	Subtotal	**412**	**417**	**101.3%**	**22.6**	**2.1**	**C**
WB	Left Turn	41	39	94.6%	28.6	3.6	C
	Through	219	223	101.6%	28.3	2.4	C
	Right Turn	51	46	91.0%	16.7	3.6	B
	Subtotal	**311**	**308**	**99.0%**	**26.6**	**1.8**	**C**
Total		**1145**	**1140**	**99.5%**	**30.8**	**1.2**	**C**

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

2700 S Road Diet
Road Diet Same Signal Timings
AM Peak Hour

Intersection 1 300 West/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	74	73	98.5%	11.6	1.4	B
	Through	285	296	103.9%	9.7	1.6	A
	Right Turn	60	55	92.3%	5.5	1.6	A
	Subtotal	**419**	**425**	**101.3%**	**9.5**	**1.2**	**A**
SB	Left Turn	44	44	99.8%	13.0	1.0	B
	Through	189	188	99.5%	9.7	1.7	A
	Right Turn	12	13	107.5%	5.3	2.7	A
	Subtotal	**245**	**245**	**99.9%**	**10.0**	**1.4**	**A**
EB	Left Turn	5	5	100.0%	27.0	5.3	C
	Through	35	35	99.1%	24.0	3.5	C
	Right Turn	64	66	102.7%	7.9	0.2	A
	Subtotal	**104**	**105**	**101.3%**	**14.1**	**1.4**	**B**
WB	Left Turn	75	66	88.4%	19.8	2.0	B
	Through	51	49	96.9%	21.0	1.7	C
	Right Turn	76	78	103.2%	9.6	1.4	A
	Subtotal	**202**	**194**	**96.1%**	**16.0**	**1.0**	**B**
Total		**970**	**969**	**99.9%**	**11.4**	**0.9**	**B**

Intersection 2 West Temple/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	20	20	98.0%	14.6	4.6	B
	Through	131	129	98.1%	12.2	1.5	B
	Right Turn	36	39	107.8%	6.1	1.9	A
	Subtotal	**187**	**187**	**99.9%**	**11.1**	**1.5**	**B**
SB	Left Turn	26	22	84.2%	15.9	3.2	B
	Through	96	95	98.5%	11.6	1.5	B
	Right Turn	29	30	103.1%	5.2	1.9	A
	Subtotal	**151**	**146**	**97.0%**	**10.9**	**1.5**	**B**
EB	Left Turn	9	9	94.4%	21.1	5.5	C
	Through	80	80	100.3%	24.4	1.9	C
	Right Turn	18	17	91.7%	9.4	2.9	A
	Subtotal	**107**	**105**	**98.3%**	**21.8**	**1.3**	**C**
WB	Left Turn	35	30	84.9%	22.1	5.0	C
	Through	187	181	96.6%	25.9	2.6	C
	Right Turn	38	39	102.6%	16.6	3.6	B
	Subtotal	**260**	**249**	**95.9%**	**24.0**	**2.5**	**C**
Total		**705**	**688**	**97.6%**	**17.4**	**1.2**	**B**

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

2700 S Road Diet
Road Diet Same Signal Timings
AM Peak Hour

Intersection 3 Main Street/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	23	23	100.9%	19.3	4.0	B
	Through	180	178	99.1%	14.1	1.2	B
	Right Turn	45	44	98.2%	8.3	1.3	A
	Subtotal	**248**	**246**	**99.1%**	**13.5**	**0.9**	**B**
SB	Left Turn	36	37	103.6%	24.7	3.1	C
	Through	130	131	100.6%	14.5	2.0	B
	Right Turn	20	19	94.0%	7.0	2.1	A
	Subtotal	**186**	**187**	**100.5%**	**15.8**	**1.9**	**B**
EB	Left Turn	15	15	96.7%	25.0	4.5	C
	Through	117	118	100.5%	27.0	2.2	C
	Right Turn	17	19	110.6%	15.7	2.3	B
	Subtotal	**149**	**151**	**101.3%**	**25.4**	**1.9**	**C**
WB	Left Turn	80	76	94.4%	20.7	3.1	C
	Through	203	193	95.2%	23.1	2.0	C
	Right Turn	64	67	104.1%	14.7	2.5	B
	Subtotal	**347**	**335**	**96.7%**	**20.8**	**1.8**	**C**
Total		**930**	**919**	**98.8%**	**18.6**	**1.0**	**B**

Intersection 4 State Street/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	70	66	94.6%	14.6	1.4	B
	Through	734	743	101.2%	12.8	1.4	B
	Right Turn	30	29	95.3%	5.0	0.5	A
	Subtotal	**834**	**838**	**100.5%**	**12.7**	**1.2**	**B**
SB	Left Turn	62	58	93.4%	19.3	1.3	B
	Through	514	521	101.4%	12.3	1.3	B
	Right Turn	127	124	97.4%	7.5	0.5	A
	Subtotal	**703**	**703**	**100.0%**	**12.0**	**1.0**	**B**
EB	Left Turn	115	108	93.7%	45.2	5.8	D
	Through	57	60	105.4%	45.1	4.7	D
	Right Turn	35	37	105.1%	4.2	1.0	A
	Subtotal	**207**	**205**	**98.9%**	**37.7**	**2.9**	**D**
WB	Left Turn	56	50	89.1%	35.8	4.6	D
	Through	137	136	99.3%	43.6	4.1	D
	Right Turn	84	79	93.9%	9.7	2.5	A
	Subtotal	**277**	**265**	**95.6%**	**32.0**	**3.1**	**C**
Total		**2021**	**2010**	**99.5%**	**17.5**	**0.9**	**B**

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

2700 S Road Diet
Road Diet Same Signal Timings
AM Peak Hour

Intersection 5 300 East/2700 South **Signalized**

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	26	23	88.1%	32.1	5.6	C
	Through	81	81	100.4%	29.0	2.4	C
	Right Turn	37	42	113.8%	13.4	3.2	B
	Subtotal	**144**	**146**	**101.6%**	**25.0**	**2.0**	**C**
SB	Left Turn	23	22	97.0%	39.0	9.4	D
	Through	46	44	96.5%	27.5	2.3	C
	Right Turn	34	32	94.7%	8.8	2.8	A
	Subtotal	**103**	**99**	**96.0%**	**24.1**	**2.4**	**C**
EB	Left Turn	9	10	114.4%	18.6	6.5	B
	Through	81	76	94.1%	21.3	3.6	C
	Right Turn	4	5	120.0%	9.3	8.5	A
	Subtotal	**94**	**91**	**97.1%**	**20.3**	**3.3**	**C**
WB	Left Turn	17	18	105.9%	32.4	8.4	C
	Through	200	200	99.8%	35.9	2.6	D
	Right Turn	40	40	99.3%	27.7	3.9	C
	Subtotal	**257**	**257**	**100.1%**	**34.3**	**2.0**	**C**
Total		**598**	**594**	**99.3%**	**28.2**	**1.1**	**C**

Intersection 6 500 East/2700 South **Signalized**

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	23	22	97.4%	45.5	7.5	D
	Through	51	54	105.9%	39.4	6.2	D
	Right Turn	39	39	99.5%	16.3	5.7	B
	Subtotal	**113**	**115**	**101.9%**	**32.7**	**5.0**	**C**
SB	Left Turn	17	18	103.5%	48.2	8.8	D
	Through	46	51	110.9%	36.0	4.6	D
	Right Turn	20	20	101.5%	15.9	4.8	B
	Subtotal	**83**	**89**	**107.1%**	**33.9**	**3.9**	**C**
EB	Left Turn	17	16	91.8%	27.8	7.2	C
	Through	120	115	95.9%	26.9	3.4	C
	Right Turn	19	20	102.6%	14.3	5.1	B
	Subtotal	**156**	**150**	**96.3%**	**25.4**	**2.8**	**C**
WB	Left Turn	18	17	92.2%	29.6	4.1	C
	Through	181	169	93.1%	29.8	1.2	C
	Right Turn	29	29	100.3%	19.2	4.0	B
	Subtotal	**228**	**214**	**93.9%**	**28.4**	**0.9**	**C**
Total		**580**	**569**	**98.0%**	**29.3**	**1.3**	**C**

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

2700 S Road Diet
Road Diet Same Signal Timings
PM Peak Hour

Intersection 1 300 West/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	58	55	95.3%	14.6	1.0	B
	Through	281	284	101.2%	16.4	1.4	B
	Right Turn	92	91	98.8%	11.0	2.1	B
	Subtotal	**431**	**431**	**99.9%**	**15.0**	**1.4**	**B**
SB	Left Turn	123	121	98.3%	19.0	2.1	B
	Through	404	400	98.9%	14.5	1.1	B
	Right Turn	9	10	115.6%	11.7	3.5	B
	Subtotal	**536**	**531**	**99.0%**	**15.5**	**1.3**	**B**
EB	Left Turn	19	18	95.8%	31.4	5.4	C
	Through	97	93	95.9%	28.2	2.3	C
	Right Turn	94	88	94.0%	9.2	0.4	A
	Subtotal	**210**	**200**	**95.0%**	**20.0**	**0.9**	**B**
WB	Left Turn	107	106	99.3%	23.5	2.6	C
	Through	66	65	98.6%	23.5	1.9	C
	Right Turn	76	76	100.4%	11.3	1.7	B
	Subtotal	**249**	**248**	**99.5%**	**19.7**	**1.7**	**B**
Total		**1426**	**1409**	**98.8%**	**16.7**	**0.9**	**B**

Intersection 2 West Temple/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	77	80	103.4%	28.8	4.3	C
	Through	147	154	104.6%	22.5	1.1	C
	Right Turn	79	83	105.2%	15.7	2.8	B
	Subtotal	**303**	**316**	**104.4%**	**22.3**	**2.1**	**C**
SB	Left Turn	69	69	100.0%	32.3	4.7	C
	Through	190	181	95.2%	20.7	2.4	C
	Right Turn	26	27	104.6%	11.3	3.5	B
	Subtotal	**285**	**277**	**97.2%**	**22.6**	**2.0**	**C**
EB	Left Turn	23	22	97.4%	25.0	6.7	C
	Through	303	298	98.2%	36.2	12.8	D
	Right Turn	51	49	95.1%	30.9	16.8	C
	Subtotal	**377**	**369**	**97.7%**	**34.8**	**12.9**	**C**
WB	Left Turn	55	56	102.0%	30.6	5.2	C
	Through	153	145	94.9%	30.7	3.7	C
	Right Turn	24	22	89.6%	18.0	3.8	B
	Subtotal	**232**	**223**	**96.0%**	**29.4**	**3.1**	**C**
Total		**1197**	**1185**	**99.0%**	**27.7**	**4.4**	**C**

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

2700 S Road Diet
Road Diet Same Signal Timings
PM Peak Hour

Intersection 3 Main Street/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	47	48	101.1%	31.1	4.7	C
	Through	289	288	99.7%	22.0	2.0	C
	Right Turn	111	113	101.4%	20.8	2.6	C
	Subtotal	**447**	**448**	**100.3%**	**22.6**	**1.3**	**C**
SB	Left Turn	113	118	104.0%	43.9	4.1	D
	Through	218	219	100.2%	21.3	1.8	C
	Right Turn	32	32	99.4%	13.2	4.9	B
	Subtotal	**363**	**368**	**101.3%**	**27.9**	**1.7**	**C**
EB	Left Turn	14	11	78.6%	39.3	7.5	D
	Through	403	411	101.9%	52.5	7.4	D
	Right Turn	29	29	99.3%	49.6	15.1	D
	Subtotal	**446**	**451**	**101.0%**	**52.1**	**7.7**	**D**
WB	Left Turn	70	70	100.6%	33.7	4.0	C
	Through	160	159	99.4%	35.5	1.0	D
	Right Turn	48	46	95.8%	26.2	4.6	C
	Subtotal	**278**	**276**	**99.1%**	**33.5**	**1.5**	**C**
Total		**1534**	**1542**	**100.5%**	**34.4**	**2.3**	**C**

Intersection 4 State Street/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	50	48	95.8%	27.9	3.3	C
	Through	918	911	99.2%	21.0	0.9	C
	Right Turn	61	61	100.0%	9.1	1.0	A
	Subtotal	**1029**	**1020**	**99.1%**	**20.6**	**0.7**	**C**
SB	Left Turn	117	116	99.1%	27.8	2.2	C
	Through	1412	1401	99.2%	22.5	1.2	C
	Right Turn	104	106	101.7%	11.3	0.9	B
	Subtotal	**1633**	**1622**	**99.3%**	**22.2**	**1.1**	**C**
EB	Left Turn	231	228	98.6%	59.0	8.4	E
	Through	281	295	104.9%	53.9	5.9	D
	Right Turn	111	114	102.7%	32.5	6.8	C
	Subtotal	**623**	**637**	**102.2%**	**51.9**	**5.8**	**D**
WB	Left Turn	90	88	97.4%	46.1	3.5	D
	Through	106	102	96.6%	51.5	4.1	D
	Right Turn	80	82	102.1%	13.6	3.3	B
	Subtotal	**276**	**272**	**98.5%**	**38.3**	**3.5**	**D**
Total		**3561**	**3550**	**99.7%**	**28.3**	**1.4**	**C**

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

2700 S Road Diet
Road Diet Same Signal Timings
PM Peak Hour

Intersection 5 300 East/2700 South — Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	27	23	86.7%	32.9	4.3	C
	Through	86	88	101.7%	21.3	2.5	C
	Right Turn	52	53	101.9%	11.0	2.1	B
	Subtotal	**165**	**164**	**99.3%**	**19.7**	**2.0**	**B**
SB	Left Turn	58	58	100.3%	33.0	5.1	C
	Through	149	151	101.2%	25.0	1.4	C
	Right Turn	55	57	102.7%	13.9	2.0	B
	Subtotal	**262**	**266**	**101.3%**	**24.5**	**1.2**	**C**
EB	Left Turn	31	33	105.2%	16.1	3.0	B
	Through	321	330	102.9%	20.9	1.7	C
	Right Turn	41	41	99.5%	15.7	2.1	B
	Subtotal	**393**	**404**	**102.7%**	**20.0**	**1.6**	**B**
WB	Left Turn	41	43	104.4%	21.6	3.7	C
	Through	175	173	98.9%	25.6	2.6	C
	Right Turn	22	24	110.0%	17.4	3.8	B
	Subtotal	**238**	**240**	**100.8%**	**24.0**	**2.6**	**C**
Total		**1058**	**1073**	**101.4%**	**22.0**	**1.0**	**C**

Intersection 6 500 East/2700 South — Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	20	22	108.5%	50.0	9.3	D
	Through	89	92	103.5%	42.5	3.6	D
	Right Turn	61	66	107.7%	23.3	3.3	C
	Subtotal	**170**	**180**	**105.6%**	**36.6**	**1.9**	**D**
SB	Left Turn	58	57	98.3%	62.6	9.1	E
	Through	158	151	95.4%	46.1	4.7	D
	Right Turn	36	37	101.9%	33.9	8.0	C
	Subtotal	**252**	**245**	**97.0%**	**48.3**	**5.0**	**D**
EB	Left Turn	33	31	92.4%	22.5	4.1	C
	Through	327	327	99.9%	30.3	3.2	C
	Right Turn	52	57	109.6%	21.9	4.3	C
	Subtotal	**412**	**414**	**100.6%**	**28.6**	**3.0**	**C**
WB	Left Turn	41	42	102.0%	31.5	3.6	C
	Through	219	219	99.8%	32.3	2.2	C
	Right Turn	51	48	94.3%	23.0	2.8	C
	Subtotal	**311**	**308**	**99.2%**	**30.7**	**2.0**	**C**
Total		**1145**	**1147**	**100.1%**	**34.6**	**1.8**	**C**

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

2700 S Road Diet
Road Diet Revised Signal Timings
AM Peak Hour

Intersection 1 300 West/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	74	74	99.3%	10.6	0.9	B
	Through	285	289	101.4%	8.5	1.0	A
	Right Turn	60	59	98.5%	6.1	1.8	A
	Subtotal	**419**	**422**	**100.6%**	**8.5**	**0.8**	**A**
SB	Left Turn	44	47	107.3%	13.2	1.8	B
	Through	189	182	96.3%	8.5	1.2	A
	Right Turn	12	10	80.0%	3.9	1.7	A
	Subtotal	**245**	**239**	**97.5%**	**9.2**	**1.1**	**A**
EB	Left Turn	5	7	134.0%	71.9	15.1	E
	Through	35	34	98.3%	56.7	4.1	E
	Right Turn	64	68	105.8%	8.2	0.3	A
	Subtotal	**104**	**109**	**104.6%**	**27.4**	**2.4**	**C**
WB	Left Turn	75	77	102.1%	58.0	4.6	E
	Through	51	52	102.7%	32.0	7.5	C
	Right Turn	76	78	102.0%	16.9	6.7	B
	Subtotal	**202**	**207**	**102.2%**	**35.8**	**4.1**	**D**
Total		**970**	**976**	**100.6%**	**16.5**	**1.2**	**B**

Intersection 2 West Temple/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	20	20	97.5%	13.0	3.6	B
	Through	131	134	102.0%	8.5	1.3	A
	Right Turn	36	36	100.8%	4.8	1.8	A
	Subtotal	**187**	**189**	**101.3%**	**8.2**	**1.3**	**A**
SB	Left Turn	26	27	101.9%	16.0	5.4	B
	Through	96	96	99.9%	7.9	1.6	A
	Right Turn	29	34	117.2%	4.6	1.6	A
	Subtotal	**151**	**156**	**103.6%**	**8.5**	**1.5**	**A**
EB	Left Turn	9	8	83.3%	57.0	16.5	E
	Through	80	82	102.9%	37.0	4.0	D
	Right Turn	18	18	102.2%	20.8	5.9	C
	Subtotal	**107**	**108**	**101.1%**	**35.8**	**3.9**	**D**
WB	Left Turn	35	31	88.9%	50.6	7.4	D
	Through	187	195	104.2%	24.1	3.4	C
	Right Turn	38	38	98.9%	17.0	5.0	B
	Subtotal	**260**	**264**	**101.4%**	**26.2**	**3.2**	**C**
Total		**705**	**718**	**101.8%**	**19.1**	**1.9**	**B**

SimTraffic Post-Processor
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2700 S Road Diet
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Intersection 3 Main Street/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	23	22	97.0%	15.8	3.8	B
	Through	180	172	95.4%	10.1	1.3	B
	Right Turn	45	49	108.7%	6.3	1.0	A
	Subtotal	**248**	**243**	**98.0%**	**9.8**	**1.0**	**A**
SB	Left Turn	36	35	97.8%	16.7	3.6	B
	Through	130	132	101.7%	9.5	1.9	A
	Right Turn	20	20	101.5%	5.6	1.4	A
	Subtotal	**186**	**188**	**100.9%**	**10.4**	**1.6**	**B**
EB	Left Turn	15	14	90.7%	48.5	8.1	D
	Through	117	121	103.1%	46.6	3.0	D
	Right Turn	17	18	102.9%	30.8	8.4	C
	Subtotal	**149**	**152**	**101.8%**	**45.1**	**2.6**	**D**
WB	Left Turn	80	85	106.8%	49.8	4.5	D
	Through	203	208	102.6%	34.4	2.2	C
	Right Turn	64	66	103.0%	24.1	2.5	C
	Subtotal	**347**	**360**	**103.6%**	**36.1**	**1.2**	**D**
Total		**930**	**942**	**101.3%**	**25.7**	**1.1**	**C**

Intersection 4 State Street/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	70	72	103.1%	23.1	4.6	C
	Through	734	749	102.0%	11.5	1.1	B
	Right Turn	30	33	108.7%	4.7	0.8	A
	Subtotal	**834**	**854**	**102.4%**	**12.2**	**1.2**	**B**
SB	Left Turn	62	62	100.5%	26.1	2.3	C
	Through	514	511	99.3%	10.5	0.7	B
	Right Turn	127	129	101.7%	8.1	0.9	A
	Subtotal	**703**	**702**	**99.9%**	**11.5**	**0.6**	**B**
EB	Left Turn	115	115	100.1%	47.1	3.0	D
	Through	57	61	106.7%	34.7	5.0	C
	Right Turn	35	37	105.4%	4.6	0.6	A
	Subtotal	**207**	**213**	**102.8%**	**36.2**	**1.1**	**D**
WB	Left Turn	56	58	103.2%	56.8	5.0	E
	Through	137	143	104.2%	61.3	3.7	E
	Right Turn	84	87	103.0%	18.1	4.2	B
	Subtotal	**277**	**287**	**103.6%**	**47.4**	**2.8**	**D**
Total		**2021**	**2056**	**101.7%**	**19.4**	**0.6**	**B**

SimTraffic Post-Processor
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2700 S Road Diet
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Intersection 5 300 East/2700 South **Signalized**

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	26	26	100.4%	12.0	2.9	B
	Through	81	87	107.3%	9.5	2.2	A
	Right Turn	37	38	101.4%	4.2	1.9	A
	Subtotal	**144**	**151**	**104.5%**	**8.7**	**1.7**	**A**
SB	Left Turn	23	21	93.0%	14.7	3.4	B
	Through	46	46	99.3%	9.4	2.2	A
	Right Turn	34	33	95.6%	4.2	1.9	A
	Subtotal	**103**	**100**	**96.7%**	**8.8**	**1.5**	**A**
EB	Left Turn	9	8	92.2%	72.7	21.2	E
	Through	81	82	101.4%	43.8	4.9	D
	Right Turn	4	6	140.0%	19.5	12.4	B
	Subtotal	**94**	**96**	**102.1%**	**44.6**	**3.2**	**D**
WB	Left Turn	17	16	92.9%	68.8	9.7	E
	Through	200	218	108.8%	33.7	7.2	C
	Right Turn	40	42	105.0%	25.2	8.1	C
	Subtotal	**257**	**275**	**107.1%**	**34.4**	**6.6**	**C**
Total		**598**	**621**	**103.9%**	**25.7**	**3.1**	**C**

Intersection 6 500 East/2700 South **Signalized**

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	23	21	92.2%	11.3	3.5	B
	Through	51	51	100.2%	7.0	1.7	A
	Right Turn	39	42	107.2%	2.7	0.7	A
	Subtotal	**113**	**114**	**101.0%**	**6.2**	**0.9**	**A**
SB	Left Turn	17	17	100.0%	12.5	4.5	B
	Through	46	50	107.8%	7.7	1.9	A
	Right Turn	20	18	89.0%	3.2	1.4	A
	Subtotal	**83**	**84**	**101.7%**	**7.8**	**1.2**	**A**
EB	Left Turn	17	19	108.8%	40.7	7.5	D
	Through	120	122	101.4%	34.6	3.4	C
	Right Turn	19	15	77.9%	22.0	6.5	C
	Subtotal	**156**	**155**	**99.4%**	**34.2**	**2.7**	**C**
WB	Left Turn	18	16	89.4%	65.6	8.1	E
	Through	181	192	106.2%	43.6	2.0	D
	Right Turn	29	31	106.9%	31.8	4.9	C
	Subtotal	**228**	**239**	**105.0%**	**43.5**	**1.8**	**D**
Total		**580**	**593**	**102.2%**	**28.8**	**1.0**	**C**

SimTraffic Post-Processor
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2700 S Road Diet
Road Diet Revised Signal Timings
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Intersection 1 300 West/2700 South **Signalized**

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	58	54	93.8%	13.5	2.0	B
	Through	281	273	97.0%	13.9	1.9	B
	Right Turn	92	93	100.8%	9.5	1.8	A
	Subtotal	**431**	**420**	**97.4%**	**12.9**	**1.7**	**B**
SB	Left Turn	123	122	99.3%	16.3	2.3	B
	Through	404	405	100.2%	12.7	1.3	B
	Right Turn	9	10	108.9%	9.6	4.5	A
	Subtotal	**536**	**537**	**100.2%**	**13.4**	**1.4**	**B**
EB	Left Turn	19	18	95.8%	64.9	11.5	E
	Through	97	100	103.0%	50.5	4.1	D
	Right Turn	94	96	102.2%	9.6	0.5	A
	Subtotal	**210**	**214**	**102.0%**	**33.3**	**3.4**	**C**
WB	Left Turn	107	108	101.3%	59.7	6.2	E
	Through	66	65	98.0%	37.4	3.4	D
	Right Turn	76	81	106.4%	18.6	2.9	B
	Subtotal	**249**	**254**	**102.0%**	**40.9**	**4.0**	**D**
Total		**1426**	**1425**	**99.9%**	**21.1**	**1.4**	**C**

Intersection 2 West Temple/2700 South **Signalized**

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	77	79	103.1%	24.9	4.5	C
	Through	147	147	100.2%	18.8	1.3	B
	Right Turn	79	79	100.4%	12.4	1.3	B
	Subtotal	**303**	**306**	**101.0%**	**18.8**	**1.3**	**B**
SB	Left Turn	69	70	101.4%	26.0	3.3	C
	Through	190	189	99.5%	17.9	2.2	B
	Right Turn	26	27	102.3%	11.2	3.9	B
	Subtotal	**285**	**286**	**100.2%**	**19.3**	**1.9**	**B**
EB	Left Turn	23	24	102.6%	57.1	8.3	E
	Through	303	311	102.7%	36.2	2.0	D
	Right Turn	51	49	96.1%	28.6	3.4	C
	Subtotal	**377**	**384**	**101.8%**	**36.5**	**1.8**	**D**
WB	Left Turn	55	55	100.5%	59.6	7.0	E
	Through	153	150	98.2%	42.8	3.2	D
	Right Turn	24	25	102.9%	29.9	5.8	C
	Subtotal	**232**	**230**	**99.2%**	**45.4**	**3.3**	**D**
Total		**1197**	**1206**	**100.7%**	**29.7**	**1.2**	**C**

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2700 S Road Diet
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Intersection 3 **Main Street/2700 South** **Signalized**

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	47	45	96.6%	25.5	4.3	C
	Through	289	283	97.9%	19.4	1.4	B
	Right Turn	111	108	97.5%	17.7	1.8	B
	Subtotal	**447**	**437**	**97.7%**	**19.6**	**1.5**	**B**
SB	Left Turn	113	109	96.6%	36.2	4.0	D
	Through	218	218	99.9%	18.3	1.3	B
	Right Turn	32	33	104.4%	11.6	2.8	B
	Subtotal	**363**	**360**	**99.3%**	**23.1**	**1.5**	**C**
EB	Left Turn	14	15	107.9%	74.8	9.9	E
	Through	403	415	103.0%	25.4	3.8	C
	Right Turn	29	31	106.2%	18.6	5.4	B
	Subtotal	**446**	**461**	**103.4%**	**26.5**	**3.8**	**C**
WB	Left Turn	70	68	97.0%	55.0	4.6	D
	Through	160	162	101.4%	27.3	4.1	C
	Right Turn	48	51	105.2%	16.9	4.8	B
	Subtotal	**278**	**281**	**101.0%**	**32.2**	**3.2**	**C**
Total		**1534**	**1539**	**100.3%**	**24.8**	**1.7**	**C**

Intersection 4 **State Street/2700 South** **Signalized**

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	50	51	102.4%	48.3	8.0	D
	Through	918	925	100.7%	19.1	0.8	B
	Right Turn	61	59	96.6%	9.0	1.0	A
	Subtotal	**1029**	**1035**	**100.6%**	**20.0**	**0.7**	**B**
SB	Left Turn	117	121	103.5%	45.0	3.5	D
	Through	1412	1432	101.4%	23.0	1.3	C
	Right Turn	104	106	101.6%	11.6	0.9	B
	Subtotal	**1633**	**1659**	**101.6%**	**23.8**	**1.2**	**C**
EB	Left Turn	231	227	98.3%	30.0	2.8	C
	Through	281	290	103.3%	32.1	2.6	C
	Right Turn	111	111	99.9%	13.1	1.3	B
	Subtotal	**623**	**628**	**100.8%**	**27.9**	**1.2**	**C**
WB	Left Turn	90	87	96.1%	70.2	4.5	E
	Through	106	112	105.5%	52.2	4.8	D
	Right Turn	80	82	102.1%	17.5	2.9	B
	Subtotal	**276**	**280**	**101.4%**	**47.7**	**4.0**	**D**
Total		**3561**	**3602**	**101.1%**	**25.3**	**0.7**	**C**

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

2700 S Road Diet
Road Diet Revised Signal Timings
PM Peak Hour

Intersection 5 300 East/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	27	25	93.7%	22.0	4.2	C
	Through	86	91	106.3%	16.7	3.7	B
	Right Turn	52	54	103.7%	10.2	2.1	B
	Subtotal	**165**	**171**	**103.4%**	**15.4**	**2.7**	**B**
SB	Left Turn	58	57	98.6%	24.9	3.6	C
	Through	149	146	98.1%	18.2	2.5	B
	Right Turn	55	50	91.5%	10.9	2.9	B
	Subtotal	**262**	**254**	**96.8%**	**18.3**	**1.8**	**B**
EB	Left Turn	31	32	104.2%	66.1	9.2	E
	Through	321	330	102.6%	37.9	2.8	D
	Right Turn	41	38	93.7%	31.7	6.2	C
	Subtotal	**393**	**400**	**101.8%**	**39.6**	**3.0**	**D**
WB	Left Turn	41	39	95.1%	57.1	4.0	E
	Through	175	186	106.4%	27.4	2.0	C
	Right Turn	22	25	113.2%	18.3	2.6	B
	Subtotal	**238**	**250**	**105.1%**	**31.1**	**1.9**	**C**
Total		**1058**	**1075**	**101.6%**	**28.8**	**1.2**	**C**

Intersection 6 500 East/2700 South Signalized

		Volume (veh/hr)			Total Delay (sec/veh)		
Direction	Movement	Demand	Served	% Served	Average	Std. Dev.	LOS
NB	Left Turn	20	20	99.0%	23.7	5.6	C
	Through	89	87	97.5%	17.3	2.1	B
	Right Turn	61	65	106.2%	10.7	1.6	B
	Subtotal	**170**	**171**	**100.8%**	**15.5**	**0.8**	**B**
SB	Left Turn	58	57	99.0%	23.6	3.5	C
	Through	158	161	101.6%	19.0	2.6	B
	Right Turn	36	38	105.3%	10.4	2.2	B
	Subtotal	**252**	**256**	**101.5%**	**18.7**	**1.8**	**B**
EB	Left Turn	33	34	104.2%	79.8	5.4	E
	Through	327	325	99.3%	32.8	4.4	C
	Right Turn	52	50	95.6%	23.4	4.1	C
	Subtotal	**412**	**409**	**99.2%**	**35.7**	**4.2**	**D**
WB	Left Turn	41	43	105.9%	64.5	5.2	E
	Through	219	219	100.2%	33.8	2.9	C
	Right Turn	51	51	100.0%	25.2	4.8	C
	Subtotal	**311**	**314**	**100.9%**	**36.7**	**2.2**	**D**
Total		**1145**	**1150**	**100.4%**	**29.2**	**1.9**	**C**

Bicycle LOS

D. Compute Bicycle LOS

Street: **2700 South** EB AM

1. Geometric Input Data

Segment	Outside Lane Width (ft)	Bike/Shldr Lane Width (ft)	Through Lanes (lanes)	Divided/ Undivided (D/UD)	Shoulder Width (ft)	Bike Lane Width (ft)	from
1	10.5	0.0	2	UD	0	0	Input_XSection
2	10.5	0.0	2	UD	0	0	Input_XSection
3	10.5	0.0	2	UD	0	0	Input_XSection
4	10.5	0.0	2	UD	0	0	Input_XSection
5	10.5	0.0	2	UD	0	0	Input_XSection

2. Compute Cross-Section Adjustment Factor

Segment	Effective Width W_V (ft)	Heavy Vehicle (%)	Adj. Width of Paved Outside Shoulder, W_{0s}' ft	On-Street Parking Occ (decimal)	Effective Width of Outside Thru Lane (ft)	Cross-Section Adjustment Factor	from
1	14.5	6.5%	0.0	0.00	14.5	-1.06	Input_SegData, Input_XSection
2	13.3	6.0%	0.0	0.00	13.3	-0.89	Input_SegData, Input_XSection
3	10.5	6.0%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection
4	14.6	6.0%	0.0	0.00	14.6	-1.07	Input_SegData, Input_XSection
5	13.2	6.5%	0.0	0.00	13.2	-0.88	Input_SegData, Input_XSection

3. Compute Vehicle Volume and Speed Adjustment Factors, and Pavement Condition Adjustment Factor

Segment	Vehicle Demand Flow Rate (veh/h)	Adj. Veh. Demand Flow Rate (veh/h)	Avg. Vehicle Running Spped (mph)	Adj. Heavy Vehicle (%)	Adjusted Ave. Vehicle Running Speed (mph)	Pavement Condition Rating	Veh. Volume Adjustment Factor	Veh. Speed Adjustment Factor	Pavement Cond. Adjustment Factor	from
1	123	123	14.3	6.5%	21.0	3.0	1.39	0.16	0.79	Input_SegData, In
2	146	146	14.4	6.0%	21.0	3.0	1.47	0.16	0.79	Input_SegData, In
3	203	203	14.3	6.0%	21.0	3.0	1.64	0.16	0.79	Input_SegData, In
4	122	122	14.1	6.0%	21.0	3.0	1.38	0.16	0.79	Input_SegData, In
5	148	148	14.4	6.5%	21.0	3.0	1.48	0.16	0.79	Input_SegData, In

4. Determine Bicycle LOS for Link

Segment	Bicycle LOS Score	Bicycle LOS
1	2.04	B
2	2.29	B
3	2.80	C
4	2.02	B
5	2.31	B

Score	LOS
-100	A
0	A
2.00001	B
2.75001	C
3.50001	D
4.25001	E
5.00001	F

D. Compute Bicycle LOS

Street: **2700 South** EB PM

1. Geometric Input Data

Segment	Outside Lane Width (ft)	Bike/Shldr Lane Width (ft)	Through Lanes (lanes)	Divided/ Undivided (D/UD)	Shoulder Width (ft)	Bike Lane Width (ft)	from
1	10.5	0.0	2	UD	0	0	Input_XSection
2	10.5	0.0	2	UD	0	0	Input_XSection
3	10.5	0.0	2	UD	0	0	Input_XSection
4	10.5	0.0	2	UD	0	0	Input_XSection
5	10.5	0.0	2	UD	0	0	Input_XSection

2. Compute Cross-Section Adjustment Factor

Segment	Effective Width W_v (ft)	Heavy Vehicle (%)	Adj. Width of Paved Outside Shoulder, W_{os}, ft	On-Street Parking Occ (decimal)	Effective Width of Outside Thru Lane (ft)	Cross-Section Adjustment Factor	from
1	10.5	6.5%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection
2	10.5	6.0%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection
3	10.5	6.0%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection
4	10.5	6.0%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection
5	10.5	6.5%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection

3. Compute Vehicle Volume and Speed Adjustment Factors, and Pavement Condition Adjustment Factor

Segment	Vehicle Demand Flow Rate (veh/h)	Adj. Veh. Demand Flow Rate (veh/h)	Avg. Vehicle Running Spped (mph)	Adj. Heavy Vehicle (%)	Adjusted Ave. Vehicle Running Speed (mph)	Pavement Condition Rating	Veh. Volume Adjustment Factor	Veh. Speed Adjustment Factor	Pavement Cond. Adjustment Factor	from
1	345	345	18.2	6.5%	21.0	3.0	1.91	0.16	0.79	Input_SegData, In
2	449	449	17.7	6.0%	21.0	3.0	2.04	0.16	0.79	Input_SegData, In
3	625	625	17.6	6.0%	21.0	3.0	2.21	0.16	0.79	Input_SegData, In
4	426	426	17.9	6.0%	21.0	3.0	2.02	0.16	0.79	Input_SegData, In
5	422	422	18.2	6.5%	21.0	3.0	2.01	0.16	0.79	Input_SegData, In

4. Determine Bicycle LOS for Link

Segment	Bicycle LOS Score	Bicycle LOS
1	3.06	C
2	3.20	C
3	3.37	C
4	3.17	C
5	3.17	C

Score	LOS
-100	A
0	A
2.00001	B
2.75001	C
3.50001	D
4.25001	E
5.00001	F

D. Compute Bicycle LOS

Street: **2700 South** WB AM

1. Geometric Input Data

Segment	Outside Lane Width (ft)	Bike/Shldr Lane Width (ft)	Through Lanes (lanes)	Divided/ Undivided (D/UD)	Shoulder Width (ft)	Bike Lane Width (ft)	from
1	10.5	0.0	2	UD	0	0	Input_XSection
2	10.5	0.0	2	UD	0	0	Input_XSection
3	10.5	0.0	2	UD	0	0	Input_XSection
4	10.5	0.0	2	UD	0	0	Input_XSection
5	10.5	0.0	2	UD	0	0	Input_XSection

2. Compute Cross-Section Adjustment Factor

Segment	Effective Width W_v (ft)	Heavy Vehicle (%)	Adj. Width of Paved Outside Shoulder, W_{os} ft	On-Street Parking Occ (decimal)	Effective Width of Outside Thru Lane (ft)	Cross-Section Adjustment Factor	from
1	10.5	6.9%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection
2	10.5	6.9%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection
3	10.5	6.9%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection
4	10.5	6.9%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection
5	10.5	6.9%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection

3. Compute Vehicle Volume and Speed Adjustment Factors, and Pavement Condition Adjustment Factor

Segment	Vehicle Demand Flow Rate (veh/h)	Adj. Veh. Demand Flow Rate (veh/h)	Avg. Vehicle Running Spped (mph)	Adj. Heavy Vehicle (%)	Adjusted Ave. Vehicle Running Speed (mph)	Pavement Condition Rating	Veh. Volume Adjustment Factor	Veh. Speed Adjustment Factor	Pavement Cond. Adjustment Factor	from
1	241	241	14.4	6.9%	21.0	3.0	1.73	0.16	0.79	Input_SegData, In
2	269	269	14.1	6.9%	21.0	3.0	1.78	0.16	0.79	Input_SegData, In
3	237	237	14.3	6.9%	21.0	3.0	1.72	0.16	0.79	Input_SegData, In
4	253	253	14.4	6.9%	21.0	3.0	1.75	0.16	0.79	Input_SegData, In
5	219	219	14.4	6.9%	21.0	3.0	1.68	0.16	0.79	Input_SegData, In

4. Determine Bicycle LOS for Link

Segment	Bicycle LOS Score	Bicycle LOS
1	2.88	C
2	2.94	C
3	2.88	C
4	2.91	C
5	2.84	C

Score	LOS
-100	A
0	A
2.00001	B
2.75001	C
3.50001	D
4.25001	E
5.00001	F

D. Compute Bicycle LOS

Street: **2700 South** WB PM

1. Geometric Input Data

Segment	Outside Lane Width (ft)	Bike/Shldr Lane Width (ft)	Through Lanes (lanes)	Divided/ Undivided (D/UD)	Shoulder Width (ft)	Bike Lane Width (ft)	from
1	10.5	0.0	2	UD	0	0	Input_XSection
2	10.5	0.0	2	UD	0	0	Input_XSection
3	10.5	0.0	2	UD	0	0	Input_XSection
4	10.5	0.0	2	UD	0	0	Input_XSection
5	10.5	0.0	2	UD	0	0	Input_XSection

2. Compute Cross-Section Adjustment Factor

Segment	Effective Width W_v (ft)	Heavy Vehicle (%)	Adj. Width of Paved Outside Shoulder, W_{Os}' ft	On-Street Parking Occ (decimal)	Effective Width of Outside Thru Lane (ft)	Cross-Section Adjustment Factor	from
1	10.5	6.9%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection
2	10.5	6.9%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection
3	10.5	6.9%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection
4	10.5	6.9%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection
5	10.5	6.9%	0.0	0.00	10.5	-0.55	Input_SegData, Input_XSection

3. Compute Vehicle Volume and Speed Adjustment Factors, and Pavement Condition Adjustment Factor

Segment	Vehicle Demand Flow Rate (veh/h)	Adj. Veh. Demand Flow Rate (veh/h)	Avg. Vehicle Running Spped (mph)	Adj. Heavy Vehicle (%)	Adjusted Ave. Vehicle Running Speed (mph)	Pavement Condition Rating	Veh. Volume Adjustment Factor	Veh. Speed Adjustment Factor	Pavement Cond. Adjustment Factor	from
1	257	257	18.2	6.9%	21.0	3.0	1.76	0.16	0.79	Input_SegData, In
2	267	267	17.9	6.9%	21.0	3.0	1.78	0.16	0.79	Input_SegData, In
3	268	268	17.6	6.9%	21.0	3.0	1.78	0.16	0.79	Input_SegData, In
4	236	236	17.7	6.9%	21.0	3.0	1.72	0.16	0.79	Input_SegData, In
5	253	253	18.2	6.9%	21.0	3.0	1.75	0.16	0.79	Input_SegData, In

4. Determine Bicycle LOS for Link

Segment	Bicycle LOS Score	Bicycle LOS
1	2.92	C
2	2.93	C
3	2.94	C
4	2.87	C
5	2.91	C

Score	LOS
-100	A
0	A
2.00001	B
2.75001	C
3.50001	D
4.25001	E
5.00001	F

D. Compute Bicycle LOS

Street: **2700 South** EB AM Road Diet

1. Geometric Input Data

Segment	Outside Lane Width (ft)	Bike/Shldr Lane Width (ft)	Through Lanes (lanes)	Divided/ Undivided (D/UD)	Shoulder Width (ft)	Bike Lane Width (ft)	from
1	11.0	5.5	1	D	0	6	Input_XSection
2	11.0	5.5	1	D	0	6	Input_XSection
3	11.0	5.5	1	D	0	6	Input_XSection
4	11.0	5.5	1	D	0	6	Input_XSection
5	11.0	5.5	1	D	0	6	Input_XSection

2. Compute Cross-Section Adjustment Factor

Segment	Effective Width W_V (ft)	Heavy Vehicle (%)	Adj. Width of Paved Outside Shoulder, W_{Os}' ft	On-Street Parking Occ (decimal)	Effective Width of Outside Thru Lane (ft)	Cross-Section Adjustment Factor	from
1	16.5	6.5%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
2	16.5	6.0%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
3	16.5	6.0%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
4	16.5	6.0%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
5	16.5	6.5%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection

3. Compute Vehicle Volume and Speed Adjustment Factors, and Pavement Condition Adjustment Factor

Segment	Vehicle Demand Flow Rate (veh/h)	Adj. Veh. Demand Flow Rate (veh/h)	Avg. Vehicle Running Spped (mph)	Adj. Heavy Vehicle (%)	Adjusted Ave. Vehicle Running Speed (mph)	Pavement Condition Rating	Veh. Volume Adjustment Factor	Veh. Speed Adjustment Factor	Pavement Cond. Adjustment Factor	from
1	123	123	14.3	6.5%	21.0	3.0	1.74	0.16	0.79	Input_SegData, In
2	146	146	14.4	6.0%	21.0	3.0	1.82	0.16	0.79	Input_SegData, In
3	203	203	14.3	6.0%	21.0	3.0	1.99	0.16	0.79	Input_SegData, In
4	122	122	14.1	6.0%	21.0	3.0	1.73	0.16	0.79	Input_SegData, In
5	148	148	14.4	6.5%	21.0	3.0	1.83	0.16	0.79	Input_SegData, In

4. Determine Bicycle LOS for Link

Segment	Bicycle LOS Score	Bicycle LOS
1	1.03	A
2	1.11	A
3	1.28	A
4	1.02	A
5	1.12	A

Score	LOS
-100	A
0	A
2.00001	B
2.75001	C
3.50001	D
4.25001	E
5.00001	F

D. Compute Bicycle LOS

Street: **2700 South** EB PM Road Diet

1. Geometric Input Data

Segment	Outside Lane Width (ft)	Bike/Shldr Lane Width (ft)	Through Lanes (lanes)	Divided/ Undivided (D/UD)	Shoulder Width (ft)	Bike Lane Width (ft)	from
1	11.0	5.5	1	D	0	6	Input_XSection
2	11.0	5.5	1	D	0	6	Input_XSection
3	11.0	5.5	1	D	0	6	Input_XSection
4	11.0	5.5	1	D	0	6	Input_XSection
5	11.0	5.5	1	D	0	6	Input_XSection

2. Compute Cross-Section Adjustment Factor

Segment	Effective Width W_v (ft)	Heavy Vehicle (%)	Adj. Width of Paved Outside Shoulder, W_{os}, ft	On-Street Parking Occ (decimal)	Effective Width of Outside Thru Lane (ft)	Cross-Section Adjustment Factor	from
1	16.5	6.5%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
2	16.5	6.0%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
3	16.5	6.0%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
4	16.5	6.0%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
5	16.5	6.5%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection

3. Compute Vehicle Volume and Speed Adjustment Factors, and Pavement Condition Adjustment Factor

Segment	Vehicle Demand Flow Rate (veh/h)	Adj. Veh. Demand Flow Rate (veh/h)	Avg. Vehicle Running Spped (mph)	Adj. Heavy Vehicle (%)	Adjusted Ave. Vehicle Running Speed (mph)	Pavement Condition Rating	Veh. Volume Adjustment Factor	Veh. Speed Adjustment Factor	Pavement Cond. Adjustment Factor	from
1	345	345	18.2	6.5%	21.0	3.0	2.26	0.16	0.79	Input_SegData, In
2	449	449	17.7	6.0%	21.0	3.0	2.39	0.16	0.79	Input_SegData, In
3	625	625	17.6	6.0%	21.0	3.0	2.56	0.16	0.79	Input_SegData, In
4	426	426	17.9	6.0%	21.0	3.0	2.37	0.16	0.79	Input_SegData, In
5	422	422	18.2	6.5%	21.0	3.0	2.36	0.16	0.79	Input_SegData, In

4. Determine Bicycle LOS for Link

Segment	Bicycle LOS Score	Bicycle LOS
1	1.55	A
2	1.68	A
3	1.85	A
4	1.66	A
5	1.65	A

Score	LOS
-100	A
0	A
2.00001	B
2.75001	C
3.50001	D
4.25001	E
5.00001	F

D. Compute Bicycle LOS

Street: **2700 South** WB AM Road Diet

1. Geometric Input Data

Segment	Outside Lane Width (ft)	Bike/Shldr Lane Width (ft)	Through Lanes (lanes)	Divided/ Undivided (D/UD)	Shoulder Width (ft)	Bike Lane Width (ft)	from
1	11.0	5.5	1	D	0	6	Input_XSection
2	11.0	5.5	1	D	0	6	Input_XSection
3	11.0	5.5	1	D	0	6	Input_XSection
4	11.0	5.5	1	D	0	6	Input_XSection
5	11.0	5.5	1	D	0	6	Input_XSection

2. Compute Cross-Section Adjustment Factor

Segment	Effective Width W_v (ft)	Heavy Vehicle (%)	Adj. Width of Paved Outside Shoulder, W_{Os}' ft	On-Street Parking Occ (decimal)	Effective Width of Outside Thru Lane (ft)	Cross-Section Adjustment Factor	from
1	16.5	6.9%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
2	16.5	6.9%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
3	16.5	6.9%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
4	16.5	6.9%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
5	16.5	6.9%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection

3. Compute Vehicle Volume and Speed Adjustment Factors, and Pavement Condition Adjustment Factor

Segment	Vehicle Demand Flow Rate (veh/h)	Adj. Veh. Demand Flow Rate (veh/h)	Avg. Vehicle Running Spped (mph)	Adj. Heavy Vehicle (%)	Adjusted Ave. Vehicle Running Speed (mph)	Pavement Condition Rating	Veh. Volume Adjustment Factor	Veh. Speed Adjustment Factor	Pavement Cond. Adjustment Factor	from
1	241	241	14.4	6.9%	21.0	3.5	2.08	0.16	0.58	Input_SegData, In
2	269	269	14.1	6.9%	21.0	3.5	2.13	0.16	0.58	Input_SegData, In
3	237	237	14.3	6.9%	21.0	3.5	2.07	0.16	0.58	Input_SegData, In
4	253	253	14.4	6.9%	21.0	3.5	2.10	0.16	0.58	Input_SegData, In
5	219	219	14.4	6.9%	21.0	3.5	2.03	0.16	0.58	Input_SegData, In

4. Determine Bicycle LOS for Link

Segment	Bicycle LOS Score	Bicycle LOS
1	1.16	A
2	1.21	A
3	1.15	A
4	1.18	A
5	1.11	A

Score	LOS
-100	A
0	A
2.00001	B
2.75001	C
3.50001	D
4.25001	E
5.00001	F

D. Compute Bicycle LOS

Street: **2700 South** WB PM Road Diet

1. Geometric Input Data

Segment	Outside Lane Width (ft)	Bike/Shldr Lane Width (ft)	Through Lanes (lanes)	Divided/ Undivided (D/UD)	Shoulder Width (ft)	Bike Lane Width (ft)	from
1	11.0	5.5	1	D	0	6	Input_XSection
2	11.0	5.5	1	D	0	6	Input_XSection
3	11.0	5.5	1	D	0	6	Input_XSection
4	11.0	5.5	1	D	0	6	Input_XSection
5	11.0	5.5	1	D	0	6	Input_XSection

2. Compute Cross-Section Adjustment Factor

Segment	Effective Width W_v (ft)	Heavy Vehicle (%)	Adj. Width of Paved Outside Shoulder, W_{bs}' ft	On-Street Parking Occ (decimal)	Effective Width of Outside Thru Lane (ft)	Cross-Section Adjustment Factor	from
1	16.5	6.9%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
2	16.5	6.9%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
3	16.5	6.9%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
4	16.5	6.9%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection
5	16.5	6.9%	0.0	0.00	22.0	-2.42	Input_SegData, Input_XSection

3. Compute Vehicle Volume and Speed Adjustment Factors, and Pavement Condition Adjustment Factor

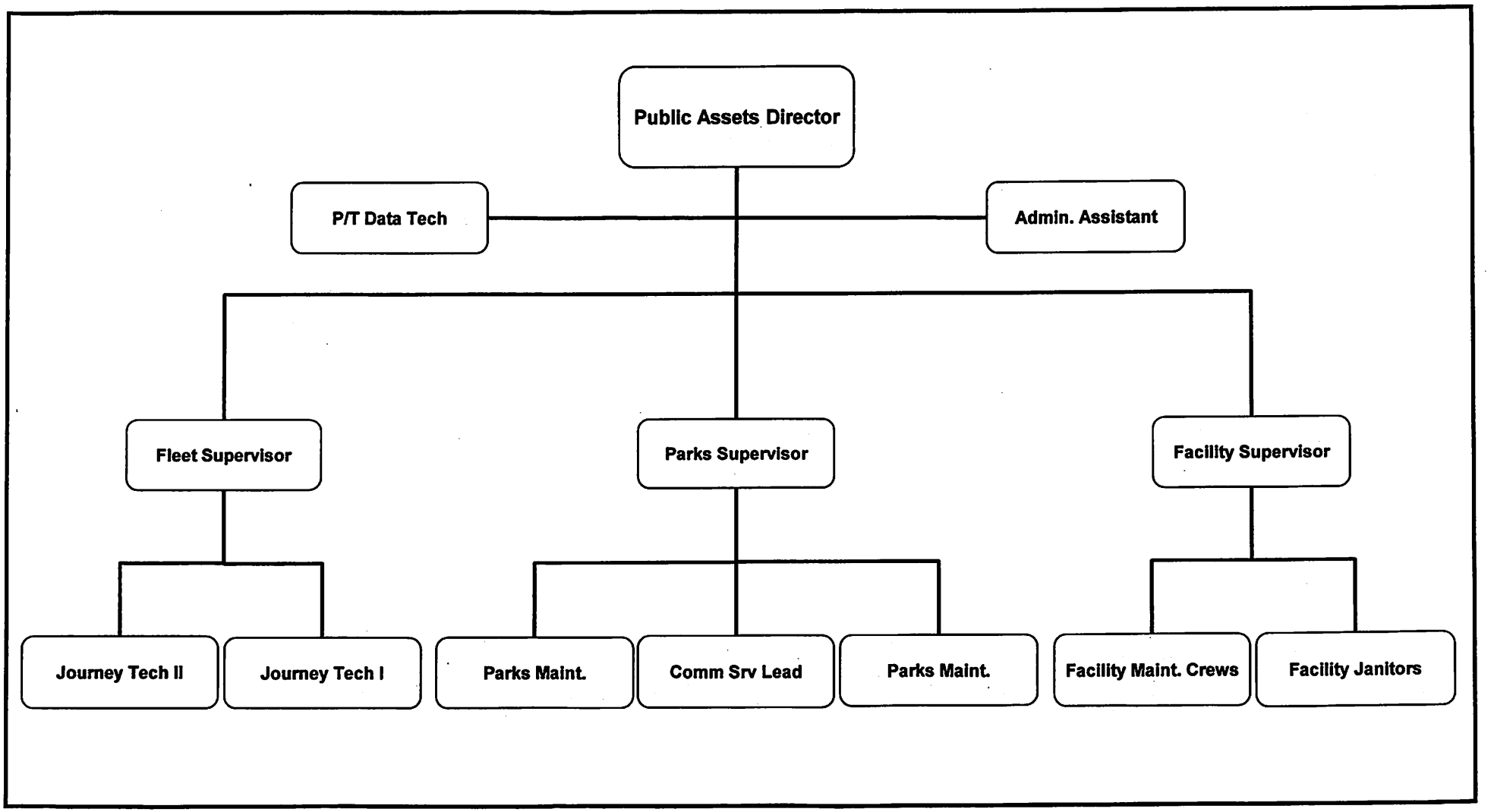
Segment	Vehicle Demand Flow Rate (veh/h)	Adj. Veh. Demand Flow Rate (veh/h)	Avg. Vehicle Running Spped (mph)	Adj. Heavy Vehicle (%)	Adjusted Ave. Vehicle Running Speed (mph)	Pavement Condition Rating	Veh. Volume Adjustment Factor	Veh. Speed Adjustment Factor	Pavement Cond. Adjustment Factor	from
1	257	257	18.2	6.9%	21.0	3.0	2.11	0.16	0.79	Input_SegData, In
2	267	267	17.9	6.9%	21.0	3.0	2.13	0.16	0.79	Input_SegData, In
3	268	268	17.6	6.9%	21.0	3.0	2.13	0.16	0.79	Input_SegData, In
4	236	236	17.7	6.9%	21.0	3.0	2.07	0.16	0.79	Input_SegData, In
5	253	253	18.2	6.9%	21.0	3.0	2.10	0.16	0.79	Input_SegData, In

4. Determine Bicycle LOS for Link

Segment	Bicycle LOS Score	Bicycle LOS
1	1.40	A
2	1.42	A
3	1.42	A
4	1.36	A
5	1.39	A

Score	LOS
-100	A
0	A
2.00001	B
2.75001	C
3.50001	D
4.25001	E
5.00001	F

CITY OF SOUTH SALT LAKE PUBLIC ASSETS DIVISION - Organizational Chart



County Contract No._____
D.A. No. 14-00920

INTERLOCAL COOPERATION AGREEMENT

between

SALT LAKE COUNTY

and

SOUTH SALT LAKE

This Interlocal Cooperation Agreement (this "Agreement") is made and entered into this ____ day of _____, 2014, by and between Salt Lake County, a body corporate and politic of the State of Utah (the "County"); and the City of South Salt Lake, a municipal corporation of the State of Utah (the "City"). The County and the City are sometimes referred to collectively as the "Parties" and either may be referred to individually as a "Party," all as governed by the context in which such words are used.

W I T N E S S E T H :

WHEREAS, the County and the City are public agencies as defined by Chapter 11-13, UTAH CODE ANN. (the "Interlocal Act"). Section 11-13-202 of the Interlocal Act provides that any two or more public agencies may enter into an agreement with one another for joint or cooperative action; and

WHEREAS, pursuant to Section 41-1a-1222, UTAH CODE ANN., the County has imposed a local option highway construction and transportation corridor preservation fee on each motor vehicle registration within the County; and

WHEREAS, fifty-percent of the revenue generated by said fee is deposited into the County of the First Class State Highway Projects Fund pursuant to Section 72-2-121, UTAH CODE ANN.; and

WHEREAS, during the 2013 General Session, the State legislature amended Section 72-2-121, UTAH CODE ANN., to provide a portion of the revenue in the County of the First Class State Highway Projects Fund be transferred to the legislative body of Salt Lake County to be used for certain purposes; and

WHEREAS, the County desires to use the revenue to further regional development in Salt Lake County by financing all or a portion of the costs of certain highway construction, reconstruction and maintenance projects throughout the County in accordance with applicable law; and

WHEREAS, the County and the City desire to enter into this Agreement to provide for $135,000 of the revenue to be transferred to the City to pay for highway construction, reconstruction, or maintenance projects.

A G R E E M E N T :

NOW, THEREFORE, in consideration of the mutual covenants and agreements hereafter set forth, and for other valuable consideration, the receipt and sufficiency of which the Parties acknowledge, it is hereby agreed as follows:

1. Revenue – Use. The County and the City hereby agree as follows:

(a) Upon full execution of this Agreement, the County shall transfer One Hundred and Thirty-five Thousand Dollars ($135,000, hereinafter referred to as the "Revenue") to the City. The Revenue shall be used by the City for certain highway construction, reconstruction, or maintenance projects on Parley's Trail/ Bike Route at the 300 West crossing, and along 2700 South, consistent with Section 72-2-121, UTAH CODE ANN., and in accordance with all other applicable federal, state and local laws, rules and regulations.

(b) The City warrants that it shall use the Revenue transferred to the City by the County pursuant to subparagraph 1(a), above, only to pay for highway construction, reconstruction, or maintenance projects, consistent with Section 72-2-121, UTAH CODE ANN., and in accordance with all other applicable federal, state and local laws, rules and regulations. The City shall make a good faith effort to expend the Revenue by June 30, 2015.

2. Final Reporting. Within thirty days after completion of the project described in Section 1(a), but by no later than June 30, 2015, the City shall prepare and submit a final reporting to the County of the expenditure of the Revenue received by the City. The report shall include an accounting to show all the Revenue received by the City was used for the project described in Section 1(a).

3. Liability and Indemnification.

(a) The City and the County are governmental entities under the Utah Governmental Immunity Act, UTAH CODE ANN. § 63G-7-101. Consistent with the terms of the Act, and as provided herein, it is mutually agreed that each party is responsible and liable for its own wrongful or negligent acts which are committed by it or by its agents, officers or employees. Neither party waives any defenses otherwise available under the Act nor does any party waive any limits of liability currently provided by the Act.

(b) The City agrees to indemnify, hold harmless, and defend the County, its officers, agents, and employees from and against any and all actual or threatened claims, losses, damages, injuries, debts, and liabilities of, to, or by third Parties, including demands for repayment or penalties, however allegedly caused, resulting directly or indirectly from, or arising out of, the City's breach of this Agreement or any acts or omissions of or by the City, its agents, representatives, officers, employees, or subcontractors in connection with the performance of this Agreement. The City agrees that its duty to defend and indemnify the County under this Agreement includes all attorney's fees, litigation and court costs, expert witness fees, and any sums expended by

or assessed against the County for the defense of any claim or to satisfy any settlement, arbitration award, debt, penalty, or verdict paid or incurred on behalf of the County.

4. Interlocal Cooperation Act Requirements. In satisfaction of the requirements of the Interlocal Act, and in connection with this Agreement, the Parties agree as follows:

(a) This Agreement shall be approved by each Party pursuant to Section 11-13-202.5 of the Interlocal Act;

(b) This Agreement shall be reviewed as to proper form and compliance with applicable law by a duly authorized attorney on behalf of each Party, pursuant to Section 11-13-202.5 of the Interlocal Act;

(c) A duly executed original counterpart of this Agreement shall be filed with keeper of records of each Party, pursuant to Section 11-13-209 of the Interlocal Act;

(d) Except as otherwise specifically provided herein, each Party shall be responsible for its own costs of any action taken pursuant to this Agreement, and for any financing of such costs; and

(e) No separate legal entity is created by the terms of this Agreement. To the extent that this Agreement requires administration other than as set forth herein, it shall be administered by the mayors of the City and the County. No real or personal property shall be acquired jointly by the Parties as a result of this Agreement. To the extent that a Party acquires, holds or disposes of any real or personal property for use in the joint or cooperative undertaking contemplated by this Agreement, such Party shall do so in the same manner that it deals with other property of such Party.

5. Counterparts. This Agreement may be executed in counterparts by the City and the County.

6. Notices. Any notice required or permitted to be given hereunder shall be deemed sufficient if given by a communication in writing, and shall be deemed to have been received (a) upon personal delivery or actual receipt thereof, or (b) within three days after such notice is deposited in the United States mail, postage pre-paid, and certified and addressed as follows:

If to Salt Lake County:	County Mayor 2001 South State, N2100 Salt Lake City, Utah 84190
With a copy to:	Salt Lake District Attorney 2001 South State, S3700 Salt Lake City, Utah 84190
If to the City:	South Salt Lake City 220 East Morris Avenue South Salt Lake, Utah 84115

7. County Ethical Standards. The City represents that it has not: (a) provided an illegal gift or payoff to any County officer or employee, or former County officer or employee, or to any relative or business entity of a County officer or employee, or relative or business entity of a former County officer or employee; (b) retained any person to solicit or secure this Agreement upon an agreement or understanding for a commission, percentage, brokerage or contingent fee, other than bona fide employees of bona fide commercial agencies established for the purpose of securing business; (c) breached any of the ethical standards set forth in State statutes or Salt Lake County's Ethics Code, Chapter 2.07, Salt Lake County Code of Ordinances, 2001; or (d) knowingly influenced, and hereby promises that it will not knowingly influence, any County officer or employee or former County officer or employee to breach any of the ethical standards set forth in State statutes or Salt Lake County ordinances.

8. Governing Law. This Agreement shall be governed by the laws of the State of Utah both as to interpretation and performance.

9. Resolution of Claims and Disputes. In any action brought to enforce the terms of this Agreement, the Parties agree that the appropriate venue shall be the Third Judicial District Court in and for Salt Lake County, Utah.

10. Entire Agreement. This Agreement contains the entire agreement between the Parties with respect to the subject matter hereof, and no statements, promises, or inducements made by either Party or agents for either Party that are not contained in this written Agreement shall be binding or valid; and this Agreement may not be enlarged, modified, or altered except in writing, and signed by the Parties.

11. Amendments. This Agreement may be amended, changed, modified or altered only by an instrument in writing which shall be (a) approved by the governing bodies of the County and City, including the adoption of any necessary resolutions or ordinances by the County and the City authorizing the execution of any amendment, change, modification or alteration of this Agreement by the appropriate person or persons for the County and the City, respectively, (b) executed by a duly authorized official of each of the Parties, (c) submitted to an attorney for each Party that is authorized to represent said Party for review as to proper form and compliance with applicable law, pursuant to Section 11-13-202.5 of the Interlocal Act, and the execution by each respective attorney, and (d) filed with the keeper of the records of each Party.

12. Term of Agreement. This Agreement shall take effect immediately upon the completion of the following: (a) the approval of the Agreement by the governing bodies of the County and the City, including the adoption of any necessary resolutions or ordinances by the County and the City authorizing the execution of this Agreement by the appropriate person or persons for the County and the City, respectively, (b) the execution of this Agreement by a duly authorized official of each of the Parties, (c) the submission of this Agreement to an attorney for each Party that is authorized to represent said Party for review as to proper form and compliance with applicable law, pursuant to Section 11-13-202.5 of the Interlocal Act, and the approval of each respective attorney, and (d) the filing of a copy of this Agreement with the keeper of records of each Party. This Agreement shall terminate on the earlier of (i) the completion of the project described in Section 1(a); or (ii) June 30, 2015.

13. Termination. Except as set forth in Section 12, above, this Agreement may only be terminated by written consent of the County and the City. Upon termination of this Agreement, if any of the $135,000 transferred to the City is unexpended, then the City shall return all such unexpended Revenue to the County. The disposition of any other real or personal property shall be handled as set forth above in Section 4(e).

14. Severability. If any provision hereof shall be held or deemed to be or shall, in fact, be inoperative or unenforceable as applied in any particular case in any jurisdiction or in all jurisdictions, or in all cases because it conflicts with any other provision or provisions hereof or any constitution or statute or rule of public policy, or for any other reason, such circumstances shall not have the effect of rendering the provision in question inoperative or unenforceable in any other case or circumstance, or of rendering any other provision or provisions herein contained invalid, inoperative, or unenforceable to any extent whatever.

The invalidity of any one or more phrases, sentences, clauses, or paragraphs herein contained, shall not affect the remaining portions hereof, or any part thereof.

[SIGNATURE PAGE TO FOLLOW]

IN WITNESS WHEREOF, the Parties have subscribed their names and seals the day and year first above written.

SALT LAKE COUNTY

By _____
Mayor Ben McAdams or Designee

Approved as to Form and Legality:
Salt Lake County District Attorney

By _____
Deputy District Attorney
Date_____

CITY OF SOUTH SALT LAKE

By _____
Mayor_____

ATTEST:

_____
City Recorder

Approved as to Form and Legality:

By _____
South Salt Lake City Attorney
Date_____

RESOLUTION No. R2014-__11__

A RESOLUTION OF THE CITY OF SOUTH SALT LAKE CITY COUNCIL APPROVING AND AUTHORIZING THE EXECUTION OF AN INTERLOCAL AGREEMENT WITH SALT LAKE COUNTY REGARDING A GRANT FOR TRAIL AND BIKE ROUTE IMPROVEMENTS.

WHEREAS, Salt Lake County has imposed a local option highway construction and transportation corridor preservation fee on motor vehicle registrations within the County; and

WHEREAS, the County desires to use this revenue for regional development of trail and bike path networks within the County; and

WHEREAS, the County has made $135,000.00 available to the City for the construction, reconstruction and maintenance of Parley's Trail and Bike Routes located at 300 West and along 2700 South, which monies shall be expended by June 30, 2015; and

WHEREAS, the City desires to accept these funds for the identified projects; and

WHEREAS, pursuant to the Interlocal Cooperation Act (Utah Code Ann. § 11-13-101 et seq.), the County and City are permitted to contract with one another in order to make efficient use of their powers and resources; and

WHEREAS, the Utah Interlocal Cooperation Act requires the approval of the entity's legislative body as it relates to such agreements,

BE IT RESOLVED, therefore, by the City Council of the City of South Salt Lake that the Interlocal Cooperation Agreement Between Salt Lake County and South Salt Lake City (attached as Exhibit "A"), is hereby approved by the City Council, and the Mayor is authorized to execute the Agreement in accordance with state and local law. The Council directs that a copy of the executed agreement be filed with the Office of the City Recorder and the Office of the Lieutenant Governor.

(signatures appear on separate page)

DATED this 9th day of July, 2014.

BY THE CITY COUNCIL:

Irvin H. Jones, Jr., Council Chair

ATTEST:

Craig D. Burton, City Recorder

City Council Vote as Recorded:

Beverly	Aye
Gold	Aye
Jones	Aye
Rapp	Aye
Rutter	Aye
Snow	Aye
Turner	Aye

Recorded on this 10th day of July, 2014.

Craig D. Burton, City Recorder

CITY OF SOUTH SALT LAKE
CORPORATE
Seal
SALT LAKE COUNTY, UTAH

SOUTH SALT LAKE

DRINKING WATER SYSTEM MASTER PLAN

(HAL Project No.: 126.27.200)

FINAL

December 2013

HANSEN ALLEN & LUCE inc
ENGINEERS

CITY OF SOUTH SALT LAKE

DRINKING WATER SYSTEM MASTER PLAN

(HAL Project No.: 126.27.200)

Steven C. Jones, P.E.
Project Engineer

HANSEN ALLEN & LUCE INC
ENGINEERS

December 2013

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ACKNOWLEDGMENTS

Successful completion of this study was made possible by the cooperation and assistance of many individuals, including the Mayor of South Salt Lake, City Council Members, and City Staff personnel as shown below. We sincerely appreciate the cooperation and assistance provided by these individuals.

City of South Salt Lake

Mayor

Cherie Wood

City Council

Casey R. Fitts
Mike Rutter
Ryan Gold
Boyd Marshall
John B. Weaver
Roy Turner
Irvin Jones

City Staff

Dennis Pay, Public Works Director
Ed Rufener, Deputy Director
Marvin Taylor, Water Division Supervisor
Jason Taylor, Field Supervisor

GLOSSARY OF TECHNICAL TERMS

Average Daily Flow: The average yearly demand volume expressed in a flow rate.

Average Yearly Demand: The volume of water used during an entire year.

Build-out: When the development density reaches maximum allowed by planned development.

Demand: Required water flow rate or volume.

Distribution System: The network of pipes, valves and appurtenances contained within a water system.

Drinking Water: Water of sufficient quality for human consumption. Also referred to as Culinary or Potable water.

Dynamic Pressure: The pressure exerted by water within the pipelines and other water system appurtenances when water is flowing through the system.

Equivalent Residential Connection: A measure used in comparing water demand from non-residential connections to residential connections.

Fire Flow Requirements: The rate of water delivery required to extinguish a particular fire. Usually it is given in rate of flow (gallons per minute) for a specific period of time (hours).

Head: A measure of the pressure in a distribution system that is exerted by the water. Head represents the height of the free water surface (or pressure reduction valve setting) above any point in the hydraulic system.

Headloss: The amount of pressure lost in a distribution system under dynamic conditions due to the wall roughness and other physical characteristics of pipes in the system.

Peak Day: The day(s) of the year in which a maximum amount of water is used in a 24-hour period.

Peak Day Demand: The average daily flow required to meet the needs imposed on a water system during the peak day(s) of the year.

Peak Instantaneous Demand: The flow required to meet the needs imposed on a water system during maximum flow on a peak day.

Pressure Reducing Valve (PRV): A valve used to reduce excessive pressure in a water distribution system.

Pressure Zone: The area within a distribution system in which water pressure is maintained within specified limits.

Service Area: Typically the area within the boundaries of the entity or entities that participate in the ownership, planning, design, construction, operation and maintenance of a water system.

Static Pressure: The pressure exerted by water within the pipelines and other water system appurtenances when water is not flowing through the system, i.e., during periods of little or no water use.

Storage Reservoir: A facility used to store, contain and protect drinking water until it is needed by the customers of a water system. Also referred to as a Storage Tank.

Transmission Pipeline: A pipeline that transfers water from a source to a reservoir or from a reservoir to a distribution system.

Water Conservation: Planned management of water to prevent waste.

ABBREVIATIONS

ac-ft	acre-feet
DDW	The State of Utah Division of Drinking Water
ERC	Equivalent Residential Connection
GIS	Geographic Information System
gpd	Gallons per Day
gpd/conn	Gallons per Day per Connection
gpm	Gallons per Minute
HAL	Hansen, Allen & Luce, Inc.
JVWCD	Jordan Valley Water Conservancy District
MG	Million Gallons
PRV	Pressure Reducing Valve
psi	Pounds per Square Inch
SCADA	Supervisory Control And Data Acquisition

CHAPTER I

INTRODUCTION

PURPOSE

The purpose of this master plan is to provide specific direction to the City of South Salt Lake for decisions that will be made over the next 5 to 40 years in order to help the City provide adequate water to customers at the most reasonable cost. Recommendations are based on City drinking water demand data and standards established by the Utah Division of Drinking Water (DDW).

SCOPE

The scope of this master plan includes a study of the City's drinking water system and customer water use including: build-out growth projections, source requirements, water rights, storage requirements, distribution system requirements and water quality. From this study of the water system, an implementation plan with recommended improvements has been prepared. The implementation plan includes conceptual-level cost estimates for the recommended improvements.

The conclusions and recommendations of this study are limited by the accuracy of the development projections and other assumptions used in preparing the study. It is expected that the City will review and update this master plan every 5-10 years or more frequently if indicated by a significant change in development.

BACKGROUND

The City of South Salt Lake was incorporated in 1938. The desire for water and sewer services was one of the primary motivations in the effort to incorporate the City. South Salt Lake experienced rapid growth following incorporation, and shortly after World War II, the population had reached 10,000. After the initial rapid increase in population, residential growth slowed, while considerable commercial and industrial development continued. In 1998, South Salt Lake annexed areas to the south of the City between 3300 South and 3900 South. Two years after the annexation, the 2000 Census was completed. At that time the City had a population of just over 22,000. Modest growth continued through the following decade and in 2010 the most recent census gave a population of just over 23,600. Over time, South Salt Lake has developed into a diverse mix of single- and multi-family residences, commercial and business areas, and a variety of light industries.

An aging water distribution system and wells with declining flow capacity are two major issues that South Salt Lake City must address in order to meet future water system demands. Much of the existing water distribution system was constructed in 1948. Many of the original unlined cast iron pipes have now been in the ground for over 50 years and are nearing the end of their useful life. Culinary water for South Salt Lake is currently supplied from two general source categories. The City owns and operates its own wells and the City purchases wholesale water from Jordan Valley Water Conservancy District (JVWCD). Growing water demand and no excess capacity in the City wells have forced the City to an increasing dependence on water supplied from JVWCD, which is significantly more expensive than water obtained from the City's wells. In addition to the two primary sources, South Salt Lake also maintains two connections with the Salt Lake City distribution network. However, usage of the Salt Lake connections is generally avoided as the cost is much higher than the JVWCD water.

Figure I-1 illustrates the extent of the South Salt Lake water system. To the east of State Street the land usage is primarily residential. Between State Street and I-15 there is a mix of land usage with commercial, residential, light industrial and mixed use zones. West of I-15, the land usage is primarily light industrial. As shown, the distribution network is divided into western and eastern pressure zones. The eastern zone has been labeled as Zone 1, and is composed of a mixture of various land uses. The western zone, Zone 2, is composed primarily of light industrial areas. Although Zone 1 and Zone 2 have similar elevations, the pressure in Zone 2 is maintained 25 to 30 psi higher than the pressure in Zone 1. Combining the two zones into a single zone has been considered; however, many of the buildings in Zone 2 include fire suppression sprinkler systems which were designed based on the higher Zone 2 pressures. For this reason, the separation between the pressure zones has been maintained.

WATER SYSTEM MASTER PLANNING APPROACH

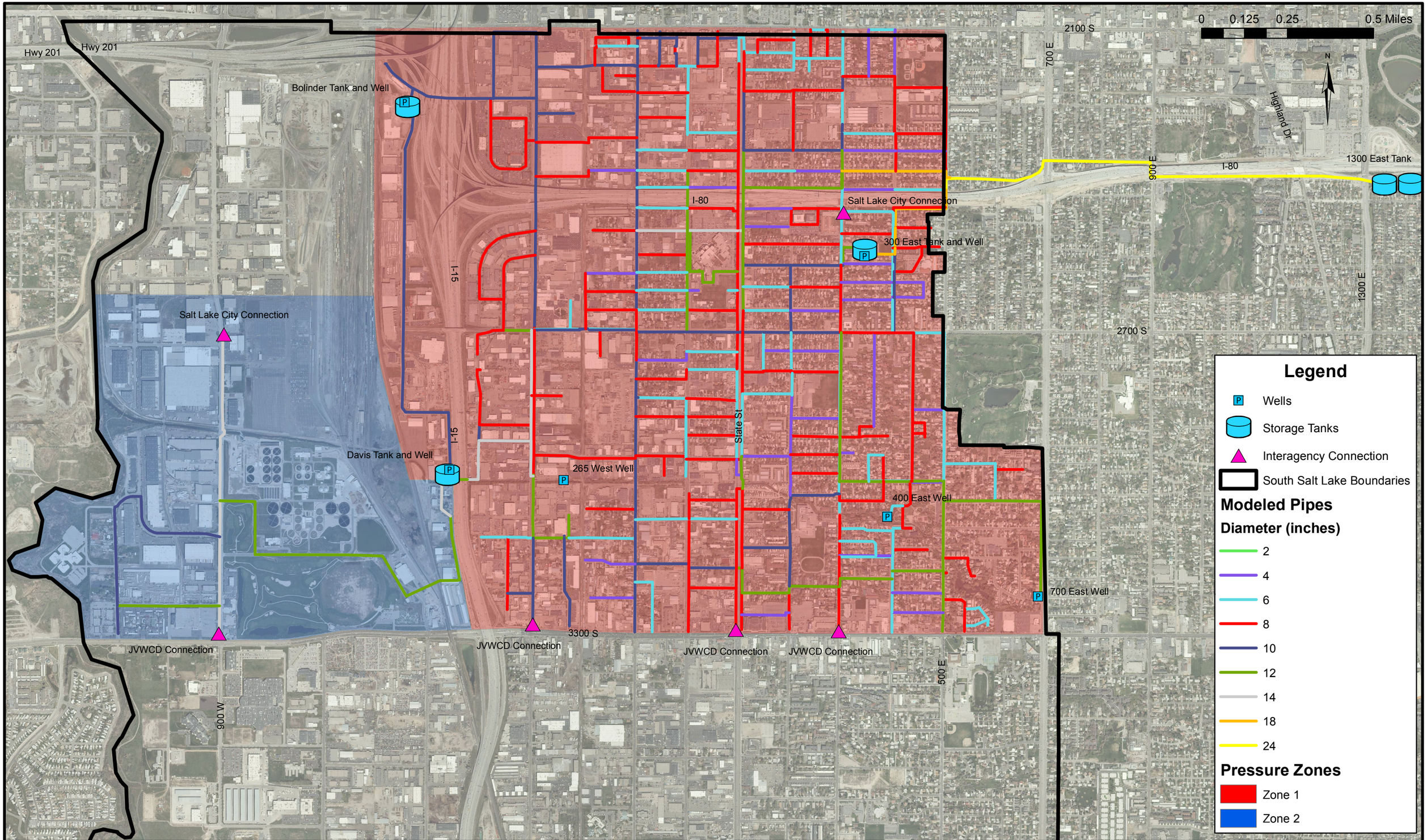
The South Salt Lake water distribution network is made up of a variety of components including booster pumps, storage facilities, valves, and pipes. The City water system must be capable of responding to daily and seasonal variations in demand while concurrently providing adequate capacity for firefighting and other emergency needs. In order to meet these goals, each of the distribution system components must be designed and operated properly. Furthermore, careful planning is required in order to ensure that the distribution system is capable of meeting the City's needs over the next several decades.

Both present and future needs were evaluated in this master plan. Present water needs were calculated according to Utah Division of Drinking Water (DDW) requirements and compared with actual water use records obtained from billing record data and system flow records. Future water needs were estimated by identifying locations where redevelopment is expected, adding the incremental increase in water demand associated with the development to the current demand. South Salt Lake's build-out water demand was estimated by applying this process throughout City.

In order to facilitate the analysis of South Salt Lake's drinking water system, a computer model of the system was prepared and analyzed in two parts. First, the performance of existing facilities with present water demands was analyzed. Next, projected future demands were added to the drinking water system and the analysis was repeated. Recommendations for system improvements were prepared based on the results of this analysis. This report is organized to follow the outline of the DDW requirements found in section R309-510 of the Utah Administrative Code entitled "Minimum Sizing Requirements".

KEY SYSTEM DESIGN CRITERIA AND PERFORMANCE FINDINGS

Summaries of the key water system design criteria and performance findings for the South Salt Lake drinking water system are included in Table I-1. The design criteria were used in evaluating system performance and in recommending future water system improvements. Table I-2 presents the design flows analyzed in the drinking water model.



HANSEN ALLEN & LUCE INC ENGINEERS

SOUTH SALT LAKE CITY DRINKING WATER SYSTEM MASTER PLAN

EXISTING SYSTEM

FIGURE I-1

TABLE I-1
KEY SYSTEM DESIGN CRITERIA

	CRITERIA	2013 EXISTING REQUIREMENTS	ESTIMATED BUILD-OUT REQUIREMENTS
EQUIVALENT RESIDENTIAL CONNECTIONS	Calculated	6,337 ERCs	12,677 ERCs
SOURCE			
Peak Day Demand	R309-510	5,779 gpm	9,301 gpm
Average Yearly Demand	R309-510	4,550 ac-ft	7,391 ac-ft
STORAGE			
Equalization	R309-510	4.16 MG	6.70 MG
Fire Suppression	Highest fire flow volumes	1.50 MG	1.50 MG
Emergency	20% of Fire and Eq.	1.13 MG	1.64 MG
Total		6.79 MG	9.84 MG
DISTRIBUTION			
Peak Instantaneous	1.6 x Peak Day Demand	9,246 gpm	14,882 gpm
Minimum Fire Flow	@ 20 psi	1,200 gpm	1,200 gpm
Max Operating Pressure	City Preference	110 psi	110 psi
Min. Operating Pressure	City Preference	50 psi	50 psi

TABLE I-2
DESIGN FLOW SUMMARY

SCENARIO		CALCULATION PROCEDURE	DEMAND	FLOW RATIO
Average Day	Existing	0.445 gpm/ERC	2,821 gpm	ADD/ADD = 1.00
	Build-Out	Existing demand Indoor demand for new future ERCs	2,821 gpm 1,761 gpm 4,582 gpm	ADD/ADD = 1.00
Peak Day	Existing	0.912 gpm/ERC	5,779 gpm	PDD/ADD = 2.05
	Build-Out	Existing demand Indoor demand for new future ERCs	5,779 gpm 3,522 gpm 9,301 gpm	PDD/ADD = 2.03
Peak Instantaneous	Existing	1.459 gpm/ERC	9,246 gpm	PID/ADD = 3.28
	Build-Out	Existing demand Indoor demand for new future ERCs	9,246 gpm 5,636 gpm 14,882 gpm	PID/ADD = 3.25

CHAPTER II

CONNECTIONS

EXISTING CONNECTIONS

According to 2012 connection information reported to the Division of Water Resources, the South Salt Lake distribution network includes 3,314 connections. Of this total, 2,371 are residential connections and 943 connections are nonresidential. An Equivalent Residential Connection (ERC) is a measure used in comparing water demand from non-residential connections to residential connections. By definition, each typical residential connection represents 1 ERC. The demand per ERC was evaluated based on Utah Administrative Code R309-510-7. As defined by Utah code, the peak day indoor demand per ERC is 800 gallons/day (0.56 gpm/ERC).

Outdoor demand per ERC is dependent upon the irrigated acreage associated with each ERC. Irrigated acreage was estimated by randomly selecting ten residential properties and measuring the irrigated acreage attached to each property. Based on these measurements, an average irrigated acreage of 0.09 acres was associated with each ERC. Multiplying 0.09 acres/ERC by the total number ERCs gives a total irrigated acreage of 570 acres. South Salt Lake is located in consumptive use zone 4 (refer to R309-510-7(3)), giving a peak day outdoor demand of 0.36 gpm/ERC.

Summing the indoor and outdoor demands gives a total peak day demand of 1313 gallons/day (0.91 gpm) per ERC. In order to express the commercial and industrial demands in terms of ERCs, the average demand for those connections was divided by the demand per ERC. Additional ERCs were also added to account for the irrigation of the open spaces located throughout the City. In all, the total number of ERCs computed for South Salt Lake was 6,337. Of the total, 2,605 represent residential demands, 2,837 represent commercial and industrial demands, and 895 represent the irrigation of open spaces (see Appendix A for ERC calculations). Table II-1 is a summary of ERCs by pressure zone.

TABLE II-1
EXISTING ERCS

PRESSURE ZONE	ERCs
1	5,542
2	795
TOTAL	**6,337**

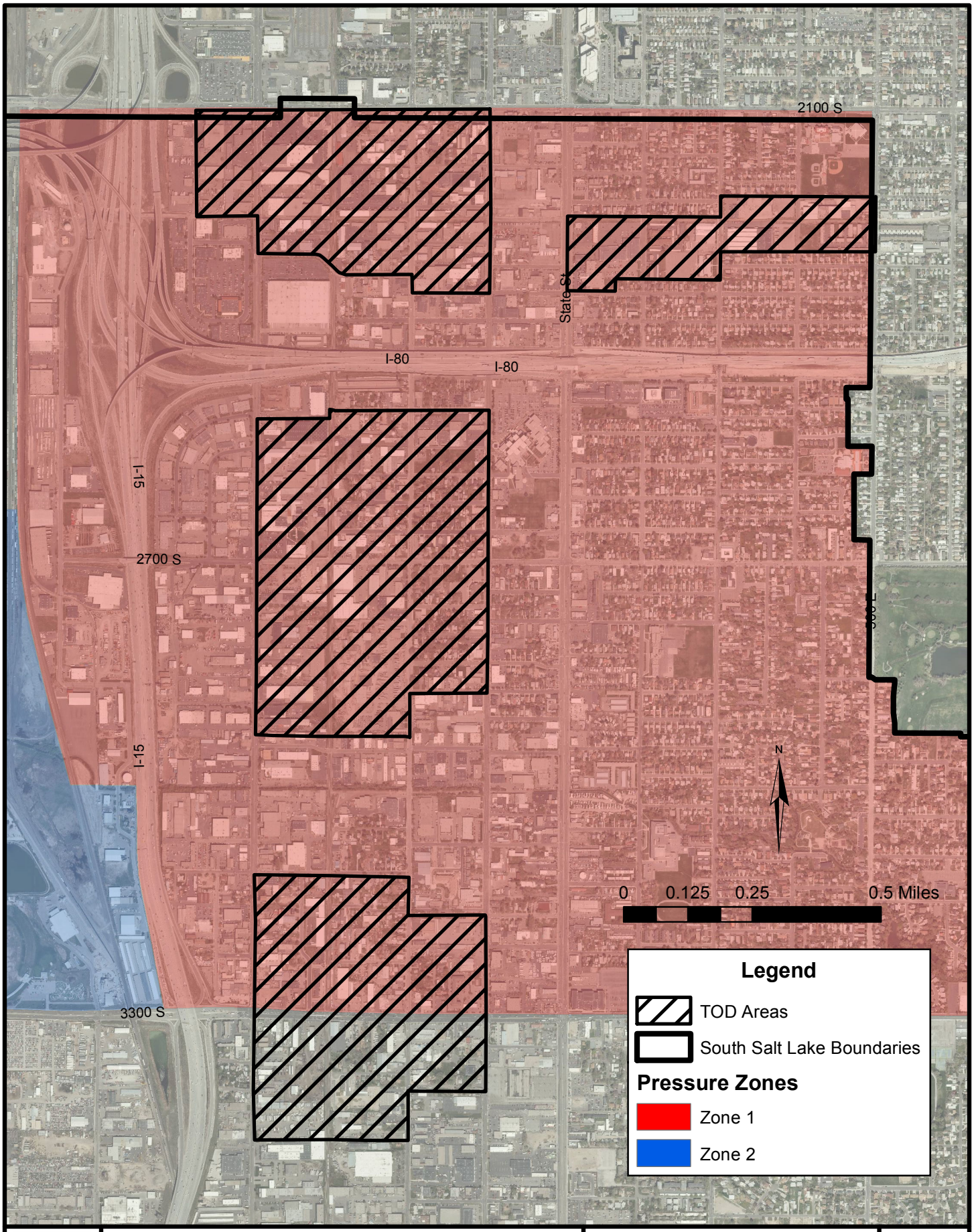
Existing system design flows were calculated based on the calculated ERCs and R309-510. Demand within the system was distributed using billing data. The billing data included the billed water used as well as the address describing the location of use. The addresses were used to geocode the locations of each billing account. By assigning the demands associated with the billing account to the nearest nodes within the South Salt Lake drinking water system, demands were distributed in a realistic manner based on actual usage. Because the geocoded demands were obtained from monthly data, it was then necessary to scale the individual nodal demands so that the sum of the individual demands equaled the design flow.

CONNECTIONS PROJECTED AT BUILD-OUT

South Salt Lake City is close to build-out. As a result, increases in demand are primarily expected to be the result of redevelopment. By extension, indoor demand is expected to increase over time as new connections are added, while outdoor demand is expected to remain mostly unchanged. Using the population projections from the 2010 census and the Governor's Office of Planning & Budget, the population of the city is expected to increase by about 100% by 2050. South Salt Lake has designated overlays for the purpose of directing redevelopment within specific areas. In particular, four transit oriented development (TOD) overlays exist within the service area of the South Salt Lake drinking water distribution network (see Figure II-1). Based on a review of building requirements within the TOD overlay areas, 25 ERCs/acre was selected as the total build-out ERC density for three of the overlay areas and the density of the fourth was raised to 9.65 ERCs/Arcre. It was assumed that all of the future growth will occur within the overlay areas. By 2050, 6,340 ERCs are expected to be added to the TOD areas. Table II-2 provides a summary of the build-out ERCs by pressure zone.

TABLE II-2
BUILD-OUT ERCS

ZONE	ERC
1	11,882
2	795
TOTAL	**12,677**



HANSEN ALLEN & LUCE INC ENGINEERS	SOUTH SALT LAKE CITY DRINKING WATER SYSTEM MASTER PLAN	TOD Areas	FIGURE II-1

CHAPTER III

SOURCES

EXISTING SOURCES

The following paragraphs outline the water rights owned by South Salt Lake along with the corresponding sources. A summary of South Salt Lake water rights tied to existing wells is shown in Table III-1.

TABLE III-1
SUMMARY OF SOUTH SALT LAKE WELLS

SOURCE	PHYSICAL CAPACITY (gpm)	TOTAL OF ASSOCIATED WATER RIGHTS[1] (gpm)
300 East Well	725	920
265 West Well[2]	850	898
400 East Well[2]	500	707
700 East Well	1,000	1,795
Bolinder Well[2]	2,000	2,244
Davis Well	2,900	2,944

1. For an itemized list of the individual water rights see Appendix B
2. Currently not in use

The water rights included in Table III-1 sum to 9,508 gpm. However, the 265 West and Bolinder Wells have been abandoned, and the 400 East Well is currently inactive, leaving 5,659 gpm of useable water rights. The water rights associated with the unused and abandoned wells are unusable without transferring the rights to other potential sources. In addition, the City owns water rights that are not connected to existing or previous municipal water sources. These additional rights total to 2,103 gpm. All of the City's wells are located in Zone 1. A complete listing of the water rights owned by South Salt Lake has been included in Appendix B.

Besides the City owned wells, South Salt Lake also maintains four connections with Jordan Valley Water Conservancy District (JVWCD) as listed in Table III-2.

TABLE III-2
SUMMARY OF JVWCD CONNECTIONS

ZONE	SOURCE	METER SIZE (inches)	FLOW CAPACITY (gpm)	ANNUAL CONTRACT (acre-feet)
1	300 East JVWCD	6	700	1,020
1	State St JVWCD	6	700	
1	300 West JVWCD	8	1,300	
2	900 West JVWCD	10	1,500	
	TOTAL	**-**	**4,200**	**1,020**

All of the JVWCD connections are located along 3300 South. The connections are used to supplement the water obtained from the City's wells. South Salt Lake's current contract with JVWCD limits annual withdrawals from these connections to 1,020 acre-feet. As shown in Table III-2, the 900 West connection provides water to Zone 2, while the remaining connections provide water to Zone 1. The South Salt Lake network also shares two connections with the Salt Lake City network. One of the Salt Lake City connections is connected to Zone 1 and is located at 300 East Robert Avenue. The second is located at 2775 South 900 West and is connected to Zone 2. The Salt Lake City connections are only utilized during emergency situations.

EXISTING SOURCE REQUIREMENTS

DDW standards require that distribution network water sources must be able to meet the expected water demand for two conditions: peak day demand and average yearly demand. Each of these criteria will be addressed in the following paragraphs.

Existing Peak Day Demand

Peak day demand is the water demand on the day of the year with the highest water use and is used to determine the required source capacity under existing and build-out conditions. The two primary descriptors in characterizing peak day demand are the diurnal demand curve and average peak day demand. The peak day diurnal curve, in non-dimensional form, is shown Figure III-1.

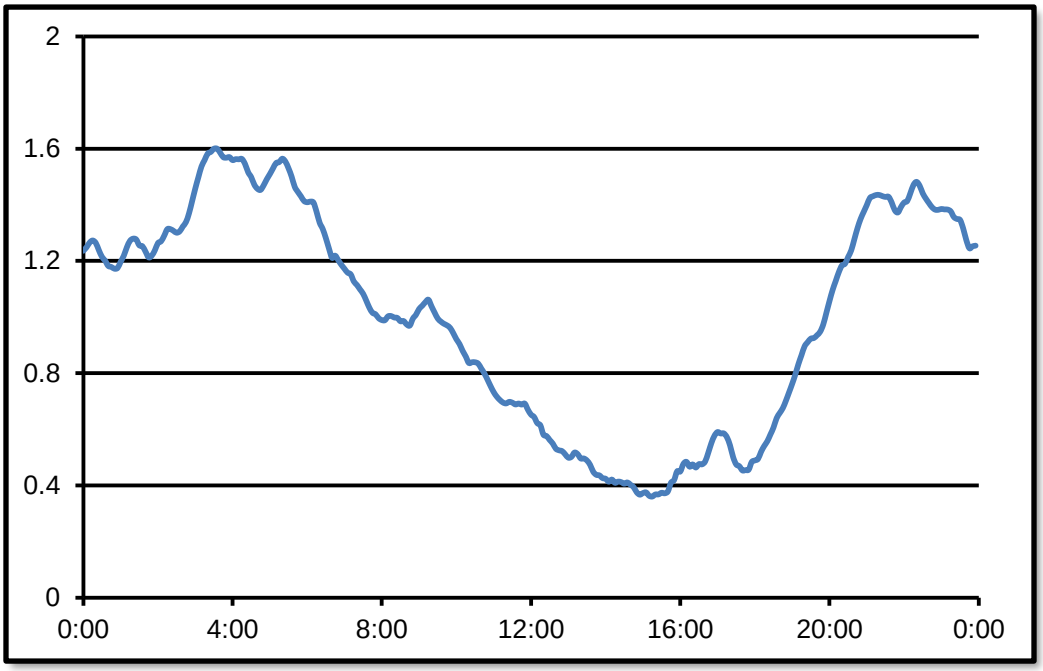


FIGURE III-2: PEAK DAY DIURNAL CURVE FOR SOUTH SALT LAKE CITY

The diurnal curve was obtained by analyzing South Salt Lake's production data. The non-dimensional form was obtained by dividing the instantaneous flow values by the daily average flow. The peak day average demand was found to be 0.912 gpm/ERC, corresponding to an average yearly flow of 0.556 gpm/ERC and a peak instantaneous flow of 1.459 gpm/ERC.

The primary peak occurs in the morning at about 3:45 AM, with a prolonged peak lasting until

about 5:45 AM. The period with the lowest demand is during midafternoon at about 3:00 PM. The relatively high nighttime demand is likely a result of night time irrigation using automatic sprinklers.

Existing source requirements and capacities for each pressure zone are summarized in Table III-3. The "ERCs" and "Zone Demand (gpm/ERC)" columns are, respectively, the number of ERCs in each pressure zone and the average demand per ERC, both as outlined previously. The "Zone Demand (gpm)" column is the average demand estimated for each zone on the peak day.

TABLE III-3
EXISTING SOURCE REQUIREMENTS

ZONE	EXISTING SOURCE (PEAK DAY) DEMAND			EXISTING SOURCE CAPACITY (gpm)		CAPACITY REMAINING (gpm)	
	ERCs	DEMAND[1] (gpm/ERC)	DEMAND (gpm)	PHYSICAL	AVAILABLE[2]	PHYSICAL	AVAILABLE
1	5,542	0.912	5,054	7,325	8,359	2,271	3,305
2	795	0.912	725	1,500	1,450	725	725
TOTAL	6,337	NA	5,779	8,825	9,809	NA	NA

1. The demands are based on State Standards
2. Total of water rights tied to wells and contracted JVWCD water

Approximately **5,779** gpm is required to meet the existing demands of South Salt Lake City, with 5,054 gpm, and 725 gpm required for the individual pressure zones 1 and 2.

The "Existing Source Capacity" has been divided into "Physical" and "Available" categories. "Physical" capacity is the sum of the maximum physical capacities of each source (all wells and JVWCD connections) within the respective zone. Available capacity was determined through summation of the instantaneous water rights and the contracted JVWCD connection flow rates. "Capacity Remaining" is defined as the "Zone Demand" subtracted from the "Existing Source Capacity" and is divided into "physical" and "available" categories. For Zone 1, the remaining available source capacity is 3,305 gpm. However, due to the currently unavailable sources with associated water rights, the remaining physical capacity for Zone 1 is 2,271 gpm.

In addition to the sources listed above, water can also be pumped from Zone 1 into Zone 2 via the West Davis Booster Station; however, the City operates the West Davis Booster Pump as a redundant source for the JVWCD connection located at 900 West. As such, during general usage the City does not use the booster pump; rather, all of the water in Zone 2 is supplied by the JVWCD connection. For this reason the capacity associated with the West Davis Booster Station has not been included in Table III-3.

Existing Average Yearly Demand

Water utilities must also be able to supply the average yearly demand. Average yearly demand is the average volume of water used during the course of one year. Using State Standards, the average yearly demand for the South Salt Lake City distribution system was found to be **4,550** ac-ft. Summation of the water rights of available sources for the City gives 9,129 ac-ft, and the

annual contract with JVWCD limits the connection volume to 1,020 ac-ft. The combination of available water rights and JVWCD connection (10,149 ac-ft) exceeds the average year demand. Therefore, on an annual basis 4,458 ac-ft of annual source capacity remains.

BUILD-OUT SOURCE REQUIREMENTS

Water demand is expected to increase as redevelopment occurs within the city. The following build-out source projections assume that the outdoor demand per ERC will not change between the existing and build-out scenarios. Accordingly, indoor use is expected to be the primary source of increased demand while outdoor use is expected to stay the same or perhaps decrease. South Salt Lake is mostly built-out and in order for additional development to occur open spaces will be reduced or existing development will be redeveloped to higher densities. As with existing water source requirements, future water source needs were evaluated on the basis of peak day demand and average yearly demand. Each requirement is addressed separately in the following paragraphs.

Build-Out Peak Day Demand

Table III-4 provides a summary of the build-out source requirements for South Salt Lake City with each column heading as previously defined for Table III-3. The projected total peak day demand at build-out is **9,301 gpm**. Zone 1 is projected to have deficits of 1,401 gpm in physical capacity and 217 gpm in available source capacity. Table III-4 illustrates that the City will need to obtain water sources capable of providing about 1,400 gpm to Zone 1. Water conservation efforts represent one alternative for reducing the projected shortfall. Two additional options for addressing this deficiency are making improvements in order to return unused and abandoned wells back into service and increasing the capacity of the City's JVWCD connections.

TABLE III-4
BUILD-OUT SOURCE REQUIREMENTS

ZONE	BUILD-OUT SOURCE (PEAK DAY) DEMAND			EXISTING SOURCE CAPACITY (gpm)		CAPACITY REMAINING (gpm)	
	ERCs	DEMAND[1] (gpm/ERC)	DEMAND (gpm)	PHYSICAL	AVAILABLE	PHYSICAL	AVAILABLE
1	5,542 (Ex.) 6,340 (Fut.) 11,882	0.912 0.556	5,054 3,522 8,576	7,175	8,359	-1,401	-217
2	795	0.912	725	1,450	1,450	725	725
TOTAL	12,677	NA	9,301	8,625	9,809	NA	NA

1. The demands are based on State Standards

Build-Out Average Yearly Demand

The projected average yearly demand at build-out is **7,391 ac-ft**. Of the total demand, 7,079 ac-ft is projected to be required for Zone 1 and 714 ac-ft for Zone 2, showing that all of the projected growth is expected to occur in Zone 1. The build-out annual demand is expected to be met by the annual available amount of water rights and contractual volume through the JVWCD connections. The physical capabilities of the sources are less than the water rights for the sources but still total to 8,238 ac-ft which will meet the build-out annual demand.

TABLE III-5
BUILD-OUT AVERAGE YEARLY REQUIREMENTS

ZONE	BUILD-OUT ANNUAL DEMAND (ac-ft)	BUILD-OUT ANNUAL CAPACITY	
		AVAILABLE (ac-ft)	REMAINING (ac-ft)
1	6,820	9,129[1]	2,309
2	571	1,020[2]	449
TOTAL	7,391	10,149	N/A

1. Available Water Rights for South Salt Lake City
2. Contractual annual volume for the JVWCD connection

SOURCE REDUNDANCY

It is recommended that the drinking water system have sufficient source capacity in order to meet all of the demand objectives with a major source unavailable. It is advisable to have sufficient capacity so there is no single source which is indispensable. For that reason it is recommended that redundancy be evaluated assuming the largest source will be unavailable. The largest South Salt Lake source is Davis Well, with a capacity of 2900 gpm. Under existing conditions, the City has a surplus physical capacity of 2,271 gpm; however, if Davis Well were to be unavailable, the City would face a deficit of 629 gpm.

Under the build-out scenario, there is insufficient capacity even with all of the current sources at full capacity. In order to meet build-out demands with full source redundancy South Salt Lake will need to be able to meet the projected deficit of 1,401 gpm without using Davis Well. Therefore the effective build-out deficit, considering redundancy, is 4,301 gpm.

SOURCE RECOMMENDATIONS

Under existing conditions, South Salt Lake has a deficit of 629 gpm when source redundancy is considered. When build-out demands are considered the deficit, including redundancy, swells to 4,301 gpm. As obtaining new water rights is generally difficult, it is recommended that South Salt Lake City meet the projected water demands through a combination of transferal of existing water rights and increasing their JVWCD contract volume. South Salt Lake City owns several water rights associated with sources that are not currently in service, such as the 300 West Well, 400 East Well, the Scott Hatchery Wells, and the Bolinder Well. It is recommended that existing water rights be transferred to viable sources, or that the necessary actions be taken so that sources currently out of service may be reintroduced to the drinking water system.

Specifically, it is recommended that a new well be drilled near the abandoned Bolinder Well. Bolinder Well was abandoned due to a collapse within the formation. Prior to abandonment, Bolinder Well provided good production with a nominal capacity of about 2,000 gpm. Furthermore, drilling a new well near the existing well will allow the City to use the Bolinder water rights, and Bolinder Tank. A new well at this location could supply sufficient water to provide redundancy under existing conditions.

Under build-out conditions additional sources will be needed. Assuming a replacement for Bolinder Well will produce about 2,000 gpm, another 2,300 gpm of capacity will still be required. It is recommended that the remaining flow capacity be reached through the construction of one new well and increasing the capacity from JVWCD to make up the difference. Because of the limited availability of undeveloped property in South Salt Lake, it is expected that property acquisition will be the limiting factor in new well construction. For this reason, it is suggested

that the City assemble a list of suitable locations and prioritize the locations based on suitability. Items that should be considered include: proximity to transmission pipeline, impacts on water quality, property costs, issues associated with transferal of water rights, etc. One possible location for the well would be near the inactive 400 East Well.

In order to increase capacity from JVWCD, two options are suggested. The first option would be to add a new connection at 3300 S West Temple into the existing 10" line. A second option is to upsize the existing 300 East connection. The 300 East connection currently feeds into an 8-inch pipeline. However, there is a 12-inch transmission line just to the north at 3185 South and upsizing the pipe between the connection and the existing transmission line should increase the capacity of the connection. Prior to constructing any improvements for the purpose of increasing the City's capacity from JVWCD, the JVWCD system should be modeled and field testing conducted to ensure the JVWCD system has sufficient capacity to convey the desired flow. Within the "Capital Cost" section of this master plan it was assumed the first option, adding a new connection at 3300 S West Temple, would be selected.

CHAPTER IV

WATER STORAGE AND BOOSTER PUMPS

EXISTING STORAGE

The City's current drinking water system includes four storage facilities with a total capacity of 8 MG. The locations of storage facilities are shown on Figure I-1. The 1300 East tank is directly connected to Zone 1 and provides water to that zone via gravity flow. Bolinder Tank and 300 East tank are connected to Zone 1 via booster pump stations. Davis Tank is connected to both Zones 1 and 2 by booster pump stations. Table IV-1 presents a listing of the names and select attributes of the South Salt Lake water storage tanks.

TABLE IV-1
EXISTING STORAGE TANKS

FACILITY	TYPE	DIAMETER (ft)	VOLUME (MG)	TANK LEVELS			
				OUTLET	EMERG. STORAGE	FIRE SUPP.	OVERFLOW/ EQU.
300 East Tank	Concrete	110	1.0	4262.0 (0 feet)	N/A	N/A	4277.0 (15.0 feet)
1300 East Tank	Concrete	N/A	4.0	4402.0 (0 feet)	4409.9 (7.9)	4416.5 (14.5 feet)	4424.5 (22.5 feet)
Bolinder Tank	Steel	50	1.0	4236.0 (0 feet)	N/A	N/A	4272.0 (36.0 feet)
Davis Tank	Steel	95	2.0	4242.0 (0 feet)	N/A	N/A	4277.0 (35.0 feet)

Although Bolinder Tank is in serviceable condition, it is not currently operational. Previously, water from Bolinder Well was pumped into Bolinder Tank before being pumped out to Zone 1 via the Bolinder Booster Station. Bolinder Well is out of service due to irreparable damage. For this reason, the storage associated with Bolinder Tank has not been included in later tables within this section.

EXISTING STORAGE REQUIREMENTS

According to DDW standards, storage tanks must be able to provide: 1) equalization storage volume to make up the difference between the peak day flow rate and the peak instantaneous demand; 2) fire suppression storage volume to supply water for firefighting; and 3) emergency storage, if deemed necessary. A summary of the existing storage requirements for the drinking water system is provided in Table IV-2. Detailed explanations for each requirement have been included in the following paragraphs.

Equalization Storage

The need for equalization storage is highest during the irrigation season on days of peak water use. Equalization storage is used to meet peak demands during the time when demand exceeds the capacity of the sources. For South Salt Lake the required equalization storage was calculated according to the guidelines outlined by Utah Administrative Code R309-510-8. Storage requirements include an indoor component of 400 gallons per ERC and an outdoor component of 2,848 gallons per irrigated acre. Based on a value of 0.09 irrigated acres per ERC, the storage requirement for outdoor demands is 256 gallons per ERC. Combining the indoor and outdoor demands gives a total requirement of 656 gallons per ERC. The existing

equalization storage requirement for South Salt Lake was found to be **4.16 MG**. Of that total 3.64 MG is required for Zone 1 and 0.52 MG is required for Zone 2. Because Zone 2 does not have any storage tanks, peak instantaneous flows to Zone 2 are supplied by the 900 West JVWCD connection.

TABLE IV-2
EXISTING WATER STORAGE REQUIREMENTS

PRESSURE ZONE	ERCs	REQUIRED STORAGE (MG)				EXISTING STORAGE (MG)	REMAINING (MG)
		EQUALIZATION (MG)	FIRE SUPP. (MG)	EMERG. (MG)	TOTAL (MG)		
1	5,542	3.64	1.50	1.03	6.17	7.00	0.83
2	795	0.52	1.00	0.30	1.82	0	-1.82
TOTAL	**6,337**	**4.16**	**2.50**	**1.33**	**7.99**	**7.00**	**NA[1]**

1. There is no means to convey adequate fire suppression flow from Zone 1 to Zone 2. For this reason the total "Remaining" value is reported as not applicable.

Fire Suppression Storage

Fire suppression storage is required for water systems that provide water for firefighting. The South Salt Lake Fire Department has jurisdiction over the City and the fire flow requirements in this master plan were set by the Fire Marshall, Boyd Johnson. The contact information for the South Salt Lake Fire department is as follows:

Phone: (801)483-4000

Address: 2600 S Main St
South Salt Lake, UT 84115

The minimum fire flow requirement for a building was **1,200 gpm for 4 hours.** Depending on the size of the building and the type of construction, higher flow requirements were assessed based on the International Fire Code and fire marshal recommendations. The required fire suppression storage for a given zone is determined by the building in the zone with the highest fire flow requirement. Granite Park Junior High School was assessed a required flow of **6,250 gpm for 4 hours** (1.5 MG), which was the largest requirement in Zone 1. In Zone 2, two industrial buildings at 2850 S 900 W and 2828 S 900 W were each assessed fire suppression flows of **4000 gpm for 4 hours**, which corresponds to a volume of about 1 MG. However, as stated previously, there are no storage tanks located in Zone 2. Moreover, JVWCD does not allow wholesale customers to consider JVWCD storage tanks in meeting fire storage requirements.

It is essential that the water system is managed so that the storage volume dedicated to fire suppression is available to meet fire flow requirements whenever or wherever it is needed. This can be accomplished by designating minimum storage tank water levels that provide reserve storage equal to the required fire suppression storage. Although it is important to utilize

equalization storage, typical daily water fluctuations in the tanks should never be allowed below the minimum established levels except during fire or emergency situations. Fire suppression tank levels are included in Table IV-1. All of the fire suppression storage for Zone 1 has been assigned to the 1300 East Tank because it is the only tank within Zone 1 that can supply water via gravity flow.

Emergency Storage

DDW standards suggest that emergency storage be considered in the sizing of storage facilities. Emergency storage is intended to provide a safety factor that can be used in the case of unexpectedly high demands, pipeline failures, equipment failures, electrical power outages, water supply contamination, or natural disasters. Emergency storage has been assigned to each zone at a rate of 20% of the sum of the equalization volume and fire suppression volume.

BUILD-OUT STORAGE REQUIREMENTS

The storage volumes required at build-out are based on the same equalization, fire suppression, pump operation, and emergency storage requirements as were calculated for the existing conditions. The build-out equalization storage will be higher than existing conditions because the number of ERCs is projected to increase. However, similar to the source requirements, only indoor storage requirements have been considered for new future development. The indoor storage requirement is 400 gallons per ERC. Moreover, fire suppression volumes are not expected to increase. Instead, it is likely that the required fire suppression volume will be lower at build-out as a result of older buildings being replaced with newer buildings that meet updated building codes. However, because it is not known if, or when such upgrades will occur, the existing fire suppression volumes have been carried over to the build-out projections. Emergency storage was again calculated as 20% of the sum of the equalization volume and fire suppression volume. The City's future storage requirements at build-out are presented in Table IV-3.

TABLE IV-3
BUILD-OUT STORAGE REQUIREMENTS

ZONE	RECOMMENDED STORAGE REQUIREMENTS					EXISTING STORAGE (MG)	REMAINING (MG)
	ERCs	Equalization (MG)	Fire Suppression (MG)	Emergency (MG)	Total (MG)		
1	5,542 (Ex.) 6,340 (Fut.) 11,882	3.64 2.54 6.18	1.50	1.54	9.22	7.0	-2.22
2	795	0.52	1.00	0.30	1.82	0	-1.82
TOTAL	**12,677**	**6.70**	**2.50**	**1.84**	**11.04**	**7.0**	**-4.04**

EXISTING BOOSTER PUMPS

With the exception of the 1300 East Tank, the storage reservoirs in the South Salt Lake distribution network are not able to supply water via gravity flow. Booster pumping stations are needed to pump water out of the 300 East Tank, Bolinder Tank, and Davis Tank and into the supply network. The 300 East and Davis Booster Stations pump water into Zone 1. Davis Booster Station also includes pumps to Zone 2. When operable, Bolinder Booster Station

supplies water to Zone 1; however, as with other Bolinder facilities, the Bolinder booster station in not currently in use because the well is out of service. Data regarding the booster pumps was obtained through communication with South Salt City personnel and is presented in Table IV-4.

TABLE IV-4
BOOSTER PUMP CHARACTERISTICS

FACILITY	BOOSTER PUMP DATA		NOTES
	POWER (HP)	CAPACITY (gpm)	
300 East			Normally only one booster pump is on, usually the smaller pump.
Booster 1	40	700	
Booster 2	75	800	
Bolinder			Not currently in use.
Booster 1	50	600	
Booster 2	50	600	
Davis			Normally only one booster is on at a time.
Booster 1	100	1,200	
Booster 2	100	1,200	
Booster 3	75	850	
West Davis			No recent data for this pump. The pump serves as a redundant source for the 900 West JVWCD connection.
Booster 1	No Data	400	

In order to make full use of a drinking water source capacity, storage tanks and booster pumps that are associated with wells should be sized based on the capacity of the well. For example, 300 East Well, with a capacity of 725 gpm is able to provide for the peak day demand of 795 ERCs (725 gpm ÷ 0.912 gpm/ERC). The tank should have at least enough capacity to provide equalization storage for the ERCs the well can serve. For South Salt Lake, the required storage is 656 gallons per ERC, which results in a required equalization volume of about 0.52 MG for the 300 East Tank. Similarly, booster pumps should be sized to provide the peak instantaneous demand for the ERCs a well serves. The existing peak instantaneous demand for South Salt Lake is 1.459 gpm per ERC which gives a required capacity of 1,160 gpm for the 300 East Booster Station. Similar calculations were completed for all of the facilities where a well feeds directly into a storage tank and the results are displayed in Table IV-5.

TABLE IV-5
STORAGE AND BOOSTER RECOMMENDATIONS

FACILITY	WELL CAPACITY (gpm)	ERCs SERVED	STORAGE (MG)	BOOSTER (gpm)
300 East	725	795	0.52	1,160
Bolinder	2,000	2,193	1.44	3,200
Davis	2,900	3,180	2.09	4,640

It was assumed that the existing rated capacity of the pumps is equal to the sum of the individual pump capacities, minus the capacity of the largest pump. Although not currently operational, the Bolinder facilities have been included for completeness and because it is recommended to drill a new well in the same general location. Sizing of the storage and booster facilities at Bolinder well should be reviewed if or when the new well is completed and the source capacity is known. However, based on the previous capacity of Bolinder Well, an

additional storage volume of 0.44 MG will be required. In order to provide peak instantaneous flows the booster station will need an additional capacity of 2,600 gpm.

With regard to the facilities that are currently in use, the 300 East Tank is large enough to provide peak day equalization storage with about 0.48 MG of extra storage that could be considered emergency or fire suppression storage. Conversely, Davis Tank is slightly undersized with respect to equalization storage. Nonetheless, the deficiency is small enough that adding additional equalization storage would be impractical. The 300 East booster station includes two pumps. The larger pump has a reported capacity of 800 gpm while the smaller pump has a capacity of about 700 gpm. Although capacities of the two pumps sum to 1,500 gpm, which is greater than the required value of 1,160 gpm, redundancy should be incorporated such that the pump station can supply the flow with the largest pump out of service. Therefore, an additional 460 gpm of capacity is recommended for the 300 East pump station. The Davis Booster Station includes two 1,200 gpm pumps and one 850 gpm pump. In order to provide the recommended capacity with the largest pump offline, an additional capacity of 2,590 gpm would be needed.

BOOSTER PUMP AND STORAGE RECOMMENDATIONS

South Salt Lake City currently has 7.0 MG of storage, all located in Zone 1. Under existing conditions there is an adequate volume of storage to provide equalization, fire suppression, and emergency needs in Zone 1. However, based on the evaluations of the booster stations, the equalization storage in Davis Tank is not useable and a portion of the equalization storage in 300 East Tank has no provision for redundancy. The 300 East Booster Station requires an additional 460 gpm of capacity, and the Davis Booster Station an additional 2,590 gpm of capacity. Therefore, it is recommended that additional pump capacity be added to both booster stations. Upsizing the existing booster facilities may be possible and should be explored as an option. However, since it is not clear whether upsizing the existing facilities is feasible, the cost estimates presented later assume that new pump stations will be built to replace the existing pump stations. It is recommended that the rated capacity of the proposed 300 East Booster Station should be 1,160 gpm. A rated capacity of 4,640 is recommended for the Davis Booster Station. In addition, if Bolinder Well is replaced, additional facilities will be needed at that location in order to take advantage of the expected 2,000 gpm well capacity. It is expected that the storage at Bolinder Tank will need to be expanded by about 0.5 MG and that a new pump station, with a flow rate of 3200 gpm, will be required. However, improvements to Bolinder facilities should be completed only after the well has been constructed and the capacity of the well is known.

Zone 1 has a build-out storage requirement of 9.22 MG, giving a build-out deficit of 2.22 MG. Reactivating Bolinder Tank (currently 1 MG) and increasing the storage at the location by 0.5 MG, cuts the build-out deficit to 0.72 MG. In order to provide the required storage it is suggested that a new Zone 1 storage facility be considered with a volume of about 1.00 MG. It is proposed that the extra capacity should be added at the location of the existing 1300 East Storage Tanks, if possible. An additional option for eliminating the storage deficit is to accept a reduction in emergency storage. Utah Administrative Code R309-105-8(4) requires consideration of emergency storage; however, no explicit guidelines regarding the required emergency storage volume are provided. Instead, the following guidance is offered:

> It is advisable to provide water storage for emergency situations, such as pipeline failures, major trunk main failures, equipment failures, electrical power outages, water treatment facility failures, raw-water supply contamination, or natural disasters. Generally, the need for emergency storage shall be determined by the water supplier and design engineer.

Based on conversations with City personnel, an emergency storage volume equal to 20% of the combined equalization and fire flow storage volumes has been recommended. Past experience has indicated that Utah State Standards for equalization storage are generally quite conservative. For this reason, additional emergency storage is not always needed. If the future emergency storage requirement is reduced to 10% of the combined equalization and fire storage volumes, the additional storage suggested at the location of the 1300 East Storage Tanks becomes unnecessary.

Two options have been identified that will allow the City to provide fire storage to Zone 2. The first option is for the City to utilize the existing Salt Lake City connection located at 2775 S 900 W. Communication with City personnel indicates that the connection to South Salt Lake is 12-inches. In addition, South Salt Lake provided fire flow test records to HAL during the process of preparing this master plan. The records show that a fire flow test was conducted by Insurance Services Offices, Inc. at 2600 S 900 W, just north of the Salt Lake City connection. Fire flows at that location were provided by the Salt Lake distribution system and total 4,800 gpm. Based on this data, it is probable that the Salt Lake City connection could provide the 4,000 gpm fire flow that is required in Zone 2. In order to use this fire flow, South Salt Lake would need to enter into an agreement with Salt Lake City. Salt Lake City would need to agree to provide the flow and also 1 MG of fire suppression storage. An automatic valve would need to be installed at 2775 S 900 W that would open if pressures dropped in the South Salt Lake system due to emergency flows.

A second option for providing fire flows and fire suppression storage to Zone 2 would be to add a connection at Davis Tank that would allow water to flow from Zone 1 to Zone 2 if the pressure in Zone 2 dropped due to a fire event. In addition to adding the connection, the transmission lines connecting Davis Tank to Zone 1 would need to be upsized and a parallel line would need to be installed between Davis Tank and 900 West. State Street acts as a bottle neck for water moving from the 1300 East tank to the west side of the distribution system. For this reason, an additional connection across State Street will be needed. Additional details are provided under the “Capital Improvements” portion of this master plan. It is assumed within this master plan that the City will continue to use the JVWCD connection at 900 West to supply peak instantaneous flow rates to Zone 2. Therefore, JVWCD provides the equalization storage for Zone 2.

CHAPTER V

DISTRIBUTION SYSTEM

EXISTING DISTRIBUTION SYSTEM

The distribution system consists of all pipelines, valves, fittings, and other appurtenances used to convey water from the water sources and storage tanks to the water users. The existing water system contains over 50 miles of distribution pipe ranging in size from 2 to 24 inches in diameter. Figure V-1 presents a summary of pipe length by diameter.

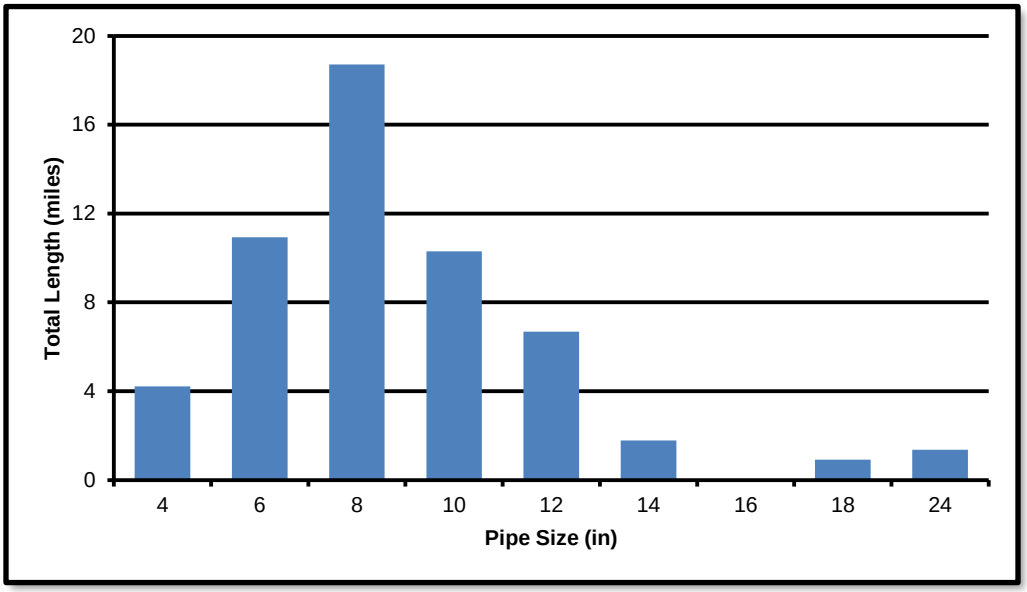


FIGURE V-1: SUMMARY OF PIPE LENGTH BY DIAMETER

Two pressure zones exist in South Salt Lake City. Zone 1 is in a physically separate system from Zone 2. The existing distribution system is shown in Figure I-1.

EXISTING DISTRIBUTION SYSTEM REQUIREMENTS

Utah Administrative Code R309-105-9(1) applies to existing systems approved prior to January 1, 2007 and requires that distribution systems be able to maintain a minimum of 20 psi at all points in the system during normal operating conditions and during conditions of fire flow and peak day demand. R309-105-9(2) adds the following minimum water pressure constraints: (a) 20 psi during conditions of fire flow and fire demand experienced during peak day demand; (b) 30 psi during peak instantaneous demand; and (c) 40 psi during peak day demand. R309 105-9(2) applies to new systems approved after January 1, 2007 and to new areas or subdivisions of existing systems. Much of South Salt Lake City is subject only to R309-105-9(1); however, new developments will need to meet the criteria outlined by R309-105-9(2). The City further prefers that the distribution system maintain pressures between **50 and 110 psi** at all points in the system under normal operating conditions, including Peak Instantaneous, Peak Day, and Average Day.

Existing Peak Instantaneous Demand

Peak instantaneous demand is the highest demand on the peak day. The pipes in the distribution system must be large enough to convey the peak instantaneous demand while maintaining a pressure at connections between 50 and 110 psi. The peaking factor from the

peak day average flow to peak instantaneous flow was estimated to be 1.6 at 3:40 a.m. based on flow data out of the tank on June 16th-18th 2010 (see Figure III-2). Applying this peaking factor of 1.6 to the peak day demand gives a total existing peak instantaneous demand of **9,246 gpm**.

Existing Peak Day Plus Fire Flow Demand

In accordance with DDW regulations, the distribution system must be capable of delivering fire flow to a specified location within the system while supplying the peak day demand to the entire distribution system and maintaining 20 psi minimum pressure at all delivery points within the distribution system. A minimum fire flow demand of **1,200 gpm** or more is required for all demand nodes in the system. Larger fire flows are required at larger structures throughout the system based on the International Fire Code and recommendations from the South Salt Lake City Fire Marshall. As noted above, Granite Park Junior High School was assessed a required flow of **6,250 gpm for 4 hours**, which was the largest requirement in Zone 1. The highest Zone 2 requirement was **4,000 gpm for 4 hours**, assessed to two industrial buildings at about 2850 S 900 W and 2828 S 900 W. All fire flows were simulated under peak day demand conditions (see Chapter III for a complete explanation of peak day demand).

BUILD-OUT DISTRIBUTION SYSTEM REQUIREMENTS

The existing system requirements apply to the projected build-out system as outlined previously. Similar to existing conditions, the build-out system was evaluated based on the City's preferences of 50 psi and 110 psi for minimum and maximum pressures.

Build-Out Peak Instantaneous Demand

Assuming the same peaking factor of 1.6 applies to the build-out peak day demand gives a peak instantaneous demand of **14,882 gpm**.

Build-Out Peak Day Demand Plus Fire Flow

The distribution network was also simulated using build-out demands in order to identify the improvements that will be necessary with future City development. The build-out system was evaluated using the same criteria as the existing system (R309-105-9(2) and City preference). The following sections outline the demand requirements for the build-out system.

COMPUTER MODEL

A computer model of the City's water distribution system was developed to analyze the performance of the existing and future distribution system and to prepare solutions for existing facilities that cannot meet the DDW or City criteria for water system pressures. The software used for the model was EPANET 2.0. EPANET 2.0 is a computer program that models the hydraulic behavior of piping networks. The pipe, tank, and valve data used to develop the model were obtained from a previous model of the South Salt Lake City water system and updated according to information supplied by the City. The previous model of the South Salt Lake City water system was a steady state model, while the model of the water system developed for this Master Plan is an extended period model. System controls were provided by the City in order to correctly model the on and off triggers for sources and valves.

Computer models were developed for three phases of water system development. The first phase was the development of a model of the existing system (existing model). This model was used to calibrate the model and identify deficiencies in the existing system. A second model was developed which was used to identify those corrections necessary to improve existing

system deficiencies (corrected existing model). The third phase was the development of a future model to indicate those improvements that will be necessary for the projected "build-out" condition (future model).

MODEL COMPONENTS

The two basic elements of the computer model are pipes and nodes. A pipe is described by its inside diameter, overall length, minor friction loss factors, and a roughness value associated with friction head losses. A pipe can include elbows, bends, valves, pumps, and other operational elements. Nodes are the end points of a pipe and they can be categorized as junction nodes or boundary nodes. A junction node is a point where two or more pipes meet, where a change in pipe diameter occurs, or where flow is put in or taken out of the system. A boundary node is a point where the hydraulic grade is known (a reservoir or PRV).

The computer model of the water distribution system is not an exact replica of the actual water system. Pipeline locations used in the model are approximate and every pipeline may not be included in the model, although efforts were made to make the model as complete and accurate as possible. It is not necessary to include all of the distribution system pipes in the model to accurately simulate its performance.

Pipe Network

As indicated previously, the pipe network layout was based upon the model prepared for South Salt Lake City's previous drinking water master plan. Updates to the model were made from maps and drawings provided by the City.

Demands

Water demands were input into the water system model by flow in gallons per minute. Existing and Future water demand was assigned to nodes in the model which best represented the location of the demand. Demand data sets were created in the model for the appropriate demand conditions for each scenario. The data sets include the average demand according to the billing data between September 2008 and September 2010, the State Standards for the existing system, and the State Standards for the build-out system. In the extended period model scenarios, the model runs for 24 hours or more and the demand changes over time according to the diurnal curve defined by Figure III-1.

Sources, Storage Tanks, and Booster Stations

The sources of water in the model are the wells and connections with the JVWCD water system. The levels in the tanks are modeled in the extended period model scenario. Several of the South Salt Lake wells feed directly into tanks with booster stations needed to pump water out into the distribution network. The extended period model predicts the levels in the tanks as they fill from sources and as water is pumped out to meet demand in the system.

MODEL CALIBRATION

A water system computer model should be calibrated before it may be relied on to accurately simulate the performance of the distribution system. Calibration is a comparison of the computer results, field tests, and actual system performance. Field tests are accomplished by performing fire flow tests and pressure tests on the system. When the computer model does not match the field tests within an acceptable level of accuracy, the computer model is adjusted to match field conditions. Calibration is especially useful for identifying pipe sizes that are not correct and PRVs or isolation valves that are not operating as expected. Pipe roughness is an

additional characteristic which may also be adjusted during calibration. Many of the pipelines within the South Salt Lake distribution network have been in use for over 50 years. However, the City maintains an ongoing pipeline replacement program. Consequently, although many of the pipelines are old, a significant number of newer pipelines are also mixed in. Sufficient data for characterizing all of the pipes based on age and condition was not provided. For this reason, no attempt was made to characterize individual pipes; rather, all of the pipes in the distribution model were assigned a roughness of 0.003 feet (0.036 inches). This is a fairly large roughness and is most applicable to the older pipes with significant corrosion.

The model was calibrated successfully with the use of fire flow tests, pressure tests, and system performance information. Calibration results are included in Appendix C. In general, the static pressures in the model averaged about 15% lower in Zone 1 and 2% higher in Zone 2 as compared to measured values. Moreover, source utilization was also considered during the hydraulic calibration. Flow patterns from the South Salt City sources that were active during July and August of 2010 were compared against modeled sources. Included in the calibration were 700 East Well, Davis Well, 300 East Well, and the JVWCD connections. The overall flow patterns in the model matched the observed values very well (flow data is included in Appendix C). It is recommended that City staff continue to conduct fire flow tests on an ongoing basis and review SCADA information to refine the model calibration as system conditions change.

ANALYSIS METHODOLOGY

The EPANET 2.0 model was used to analyze the performance of the water system for current and projected future demands under three main operating conditions: low flow (highest pressure) conditions, peak instantaneous conditions, and peak day plus fire flow conditions. Each of these conditions put the water system into a worst-case situation so the performance of the distribution system may be analyzed for compliance with DDW and South Salt Lake City's requirements. The results of the model for each of the conditions are discussed below.

High Pressure Conditions

Low flow or static conditions are usually the worst case for high pressures in a water distribution system. In the wintertime, water demand during night time hours is very low, tanks are nearly full, and movement of water through the system is minimal. Under these conditions, the water system approaches a static condition and water pressure in the distribution system is dependent only upon the elevation differences and pressure regulating devices. Another condition similar to static condition that can also cause high pressures in the City's water system occurs in the summer when demand is low and pumps are on to fill storage tanks. During times of low demand, the pumps increase the pressure in the system high enough to reverse the flow coming from the tanks. The highest pressures are reached when pumps are on, tanks are almost full, and demand is low. Both of these high pressure conditions were simulated with the model. While modeling these scenarios, observed pressures were below the City's preferred maximum pressure of 110 psi.

Peak Instantaneous Demand Conditions

Peak Instantaneous demand conditions can sometimes be the worst-case scenario for low pressures throughout a water distribution system. The water system reaches peak instantaneous demand conditions during the hottest days of the summer when both indoor and outdoor water use is the highest. The high demand creates high velocities in the distributions pipes which reduces pressure. R309-105-9(2) requires the pipes in the distribution system to be capable of delivering peak instantaneous demand to the entire service area and maintain a minimum pressure of 30 psi at any service connection within the distribution system. Usually,

minimum pressures of 30 psi at peak instantaneous demand are too low for customer satisfaction; hence, the City prefers a minimum pressure of 50 psi under this condition. Within the model of the existing system, minimum pressures were observed in the northeast portion of the system and reached as low as 58 psi. The future model, which includes build-out demands as well as recommended system improvements, had a low pressure of 47 psi. The low pressure in the future model was observed in the northeast area of the system. Due to the difficulties associated with projecting future demands, and because this modeled pressure is just less than the threshold set by South Salt Lake for minimum pressures, no projects to address this deficiency have been suggested at this time. Instead, it is recommended that the possibility of low pressures in that area should be reevaluated in future master plans.

Peak Day Demand Plus Fire Flow Conditions

Even though peak instantaneous conditions are the worst-case for the lowest pressure and highest demand for the entire system, the peak day plus fire flow is often the worst-case scenario for the lowest pressures for specific locations in the system. This condition occurs when fire hydrants are being used on a day of high water demand. The distribution system must be capable of delivering the required fire flow to the specified location within the system, while supplying the peak day demand to the entire distribution system. In accordance with the recommendations from the South Salt Lake City Fire Marshal, the required fire flows must be delivered while maintaining 20 psi minimum residual pressure at the delivery point and to all service connections within the distribution system.

Identifying every pipe which is not capable of supplying the required fire flow is beyond the scope of this study. While the computer analysis is useful for providing general indications of the fire flow capacity, it does not calculate the capacity at every fire hydrant, nor does it identify every water line where fire flow capacity is inadequate. The computer analysis checks fire flow capacity at model junction nodes which are generally placed at the intersections of two or more pipes. Fire flow capacity at fire hydrants between model nodes could be less than the computer analysis indicates. For this reason, the computer analysis should not replace physical fire flow tests at fire hydrants as the primary method of determining fire flow capacity.

The following fire flow deficiencies were identified in the in computer model:

1. Insufficient fire flow delivered to an office building at 180 E 2100 S.
2. Insufficient fire flow delivered to residential area along 400 E near 2100 S.
3. Fire hydrant at about 200 East Burton Avenue does not provide sufficient fire flow.
4. Insufficient fire flow delivered to industrial area at about 230 W 2700 S.
5. Insufficient fire flow delivered to South Salt Lake Police Athletic/Activities League .building at 2825 S 200 E and to Granite Park Junior High at 3031 S 200 E.
6. Dead-end 4-inch pipeline in Angelo Avenue between West Temple and 200 W provides insufficient fire flows.
7. Inadequate fire flow delivered to a residential area along 300 E near 2100 S.
8. Insufficient fire flow capacity to fire hydrant on Richards Street.
9. Inadequate fire flow delivered along Walton Avenue.
10. Insufficient fire flow delivered to an industrial building at about 2115 S 400 W.
11. Insufficient fire flow in Zone 2.

Specific recommendation to address these deficiencies are included below under the heading “Distribution System Recommendations”.

Peak Day Extended Period

The peak day extended period model was used to model the water system performance over time. An extended period model is actually a static model run several times for each time period, like a movie is made up of individual pictures put together. The peak day extended period model was used to set system conditions for the static models, calibrate zone to zone water transfers, analyze system controls and the performance of the system over time, analyze system recommendations for performance over time, and analyze the water system for optimization recommendations. The peak day extended period model was run for several days with the peak day demand curve repeating every 24 hours such that the model operated in a stable pattern. The model has reached stabilization when the filling and emptying cycles of the tanks repeat in a consistent pattern without running empty. System recommendations for existing conditions and future conditions at build-out were checked with the extended period model to confirm adequacy.

The primary deficiency identified during the extended period modeling was relatively high flow velocities in the pipes connecting the Davis Pump Station to Zone 1. The high velocities lead to high head loss within the pipes. This deficiency is addressed below by projects outlined within the "Distribution System Recommendations" section. The deficiency is not addressed individually, but instead is corrected by the projects included for providing fire flow to Zone 2.

MODEL OUTPUT

The model output primarily consists of the computed pressures at nodes and flow rates through pipes. The model also provides additional data related to pipeline flow velocity and head loss to help evaluate the performance of the various components of the distribution system. Results from the model are available on a CD in Appendix D. Due to the large number of pipes and nodes in the model, it is impractical to prepare a figure which illustrates pipe numbers and node numbers. The reader should refer to the CD to review model output.

CONTINUED USE OF THE COMPUTER PROGRAM

It is recommended that the City continue updating the model as the water system changes. Below is a list of ways in which the model could help the City with water system management. The computer model can assist City staff in determining:

- Effect on the system if individual facilities are added or taken out of service
- Selection of pipe diameters and location of proposed water mains
- Capacity of the water system to provide fire flows in specific areas
- Water age for water quality monitoring
- Residual chlorine and fluoride levels in the system

The computer model should be maintained for future use. Necessary data required for continued use of the program are:

- The location , length, diameter, pipe material, and ground elevation at each end of each new pipeline constructed
- Changes in water supply location and characteristics
- Location and demand for new large customers
- Changes in chlorine and fluoride dosing rates and procedures

DISTRIBUTION SYSTEM RECOMMENDATIONS

Distribution system recommendations provide solutions for existing deficiencies and define improvements to provide capacity for projected future growth. Projects have been divided into two groups. Group one includes general project recommendations. Group two includes all projects specifically developed for providing fire flow to Zone 2. The general project recommendations are included in Table V-1. The Zone 2 project recommendations are included in Table V-2. Conceptual level costs for the proposed projects are presented in Chapter VI.

TABLE V-1
PROPOSED GENERAL IMPROVEMENT PROJECTS

LOCATION	ELEMENT ID	PROBLEM DESCRIPTION	PREFERRED SOLUTION
180 East 2100 South	J-264	Insufficient fire flow	Add a fire hydrant just to the south near the corner of Commonwealth Ave. and 200 East
400 East from Utopia Ave. to 2100 South	J-49	Insufficient fire flow	Replace existing pipe with an 8" pipeline in 400 East from Utopia Ave. to 2100 South
Burton Ave. from 200 East to 300 East	P-71	Insufficient fire flows	Replace existing pipe with an 8" pipeline in Burton Ave. from 200 East to 300 East
2700 South 230 West	P-125	Insufficient fire flows and aging pipe behind industrial buildings	Replace existing pipe with a 10" pipeline in the alley at approximately 230 West from 2700 South to approximately 2620 South
200 East from Gregson Ave. to Sunset Ave.	P-500, P-499, P-480, P-479, P-596, P-597, P-557, P-374, P-591, P-546, P-547, P-545	Insufficient fire flows	Replace existing pipe with a 10" pipeline in 200 East from Gregson Ave to Sunset Ave.
150 W Angelo Ave.	P-414	Insufficient fire flows	Replace existing pipe with an 8" pipeline in Angelo Ave from West Temple to approximately 200 West
300 East from 2100 South to Commonwealth Ave.	P-252	Insufficient fire flows	Replace existing pipe with an 8" pipeline in 300 East between 2100 South and Commonwealth Ave.
Andy Ave. from 600 West	P-395, P-42, P-43, P-45	High velocity and head loss, insufficient fire flows at industrial building at 2115 S 400 W	Install a parallel 12" pipeline in Andy Ave. from 600 West to 300 West alongside the existing 10" pipeline. In addition, requires improvements to Bolinder Well, Tank, and Pump Station.
Richards Street from 3222 South to 3200 South connecting over to West Temple	P-399	Insufficient fire flows	Replace existing pipe with an 8" pipeline in Richards St. and connecting over to West Temple
Walton Ave from West Temple to 300 West	P-186	Insufficient fire flows	Replace existing pipe with a 10" pipeline in Walton Ave.

TABLE V-2
PROPOSED ZONE 2 FIRE FLOW IMPROVEMENT PROJECTS

LOCATION	ELEMENT ID	PROBLEM DESCRIPTION	PREFERRED SOLUTION
Through parking lot at about 2920 South from 300 West to 400 West, In 400 West from 2920 South to 2970 South, Under I-15 from 400 West to the existing Davis Booster Station	P-164, P-162, P-433	Insufficient conveyance from Zone 1 to Davis Booster Station	Replace existing pipelines with a 16-inch pipeline
South from Davis Pump Station in 465 West to about 3180 South, southwest across train tracks following existing 12-inch line to Central Valley Road, in Central Valley Road from 650 West to about 850 West, in 850 West from Central Valley Road to 3100 South, in 3100 South from 850 West to 900 West	P-444, P-5, P-449	Insufficient conveyance from Davis Booster Station to Zone 2	Install parallel 16-inch pipeline alongside existing 12-inch pipeline
North from 3100 South along 900 West to 2780 South	P-434	Insufficient conveyance along 900 W	Install parallel 18-inch pipeline in addition to existing 14-inch pipeline
Intersection of State Street and Truman Ave.	N/A	High velocities in pipelines along State Street	New connection across State Street
In 3160 South from 900 West to 1030 West, and in 1030 West from 3160 South to 3120 South	27	Inadequate fire flow to industrial buildings at 3120 S 1030 W	Install a parallel 10-inch pipeline in 3160 S and 1030 W

CHAPTER VI

WATER QUALITY

One advantage of the EPANET extended period model is the ability to model water quality. Water age, disinfection byproduct potential, chlorine residual, and fluoride concentration were modeled to analyze the existing water system for water quality issues.

WATER AGE AND DISINFECTION BYPRODUCT EVALUATION

The extended period model was used to predict the areas in the water system that have the highest potential for disinfection by-product (DPB) production. The month that typically has the highest DBP levels in Utah is October and DBP testing has confirmed this to be true for the City's water system. This is because the water is still relatively warm and water use is less than during the summer. The potential for DBP production is higher in warmer and older water. Water demand for October 2008 was used to simulate water demand conditions in the model. Water age was then calculated for every location in the system by running the model to simulate several days in October. The locations having poor circulation and thus the oldest water were identified as having the highest potential for DBP production. Figure VI-1 on the following page illustrates a snapshot of the results of the water age model scenario run for 96 hours. The water age at a given location varies depending on the operating condition of the distribution network. For example, as a pump turns on, new water is pushed out into the system. This is illustrated by the light and dark blue in the areas around 700 East Well and Davis well. On the other hand, the water coming from the 1300 East Tank is considerably older. Dead end lines with low demands also tend to have older water. Based on the model results, DBP testing should focus on the northeast area of the system. This area is fed predominantly by the 1300 East Tank with minor contributions from other sources.

CHLORINE RESIDUAL EVALUATION

Chlorine residual is the amount of free chlorine remaining in the water at the time of the test. While chlorine is an effective disinfectant in controlling many microorganisms in drinking water, it reacts with organic material found in drinking water to form potentially harmful disinfection byproducts (DBPs) as it decays. Although the risk of becoming ill from microbial pathogens is tens of thousands of times greater than the risk of becoming ill from DBPs, it is enough of a concern that the Environment Protection Agency (EPA) has developed rules to balance the risks between microbial pathogens and DBPs. A drinking water system needs enough chlorine to destroy pathogens but also not produce excessive DBPs. Chlorine dosing rates were set at the sources of water in the system. The chlorine dosing concentrations assumed for each source are shown in Table VI-1.

Chlorine residuals are influenced by how much organic material is in the water. Therefore, modeling chlorine residuals requires calibration using system specific data. Chlorine decay was modeled as a first order reaction with a bulk coefficient of -1.0 per day. This bulk rate coefficient was selected based on comparisons with the field data using a sampling of 19 chlorine residual field test sites from the spring of 2008 (refer to Appendix E for tabular water quality data).

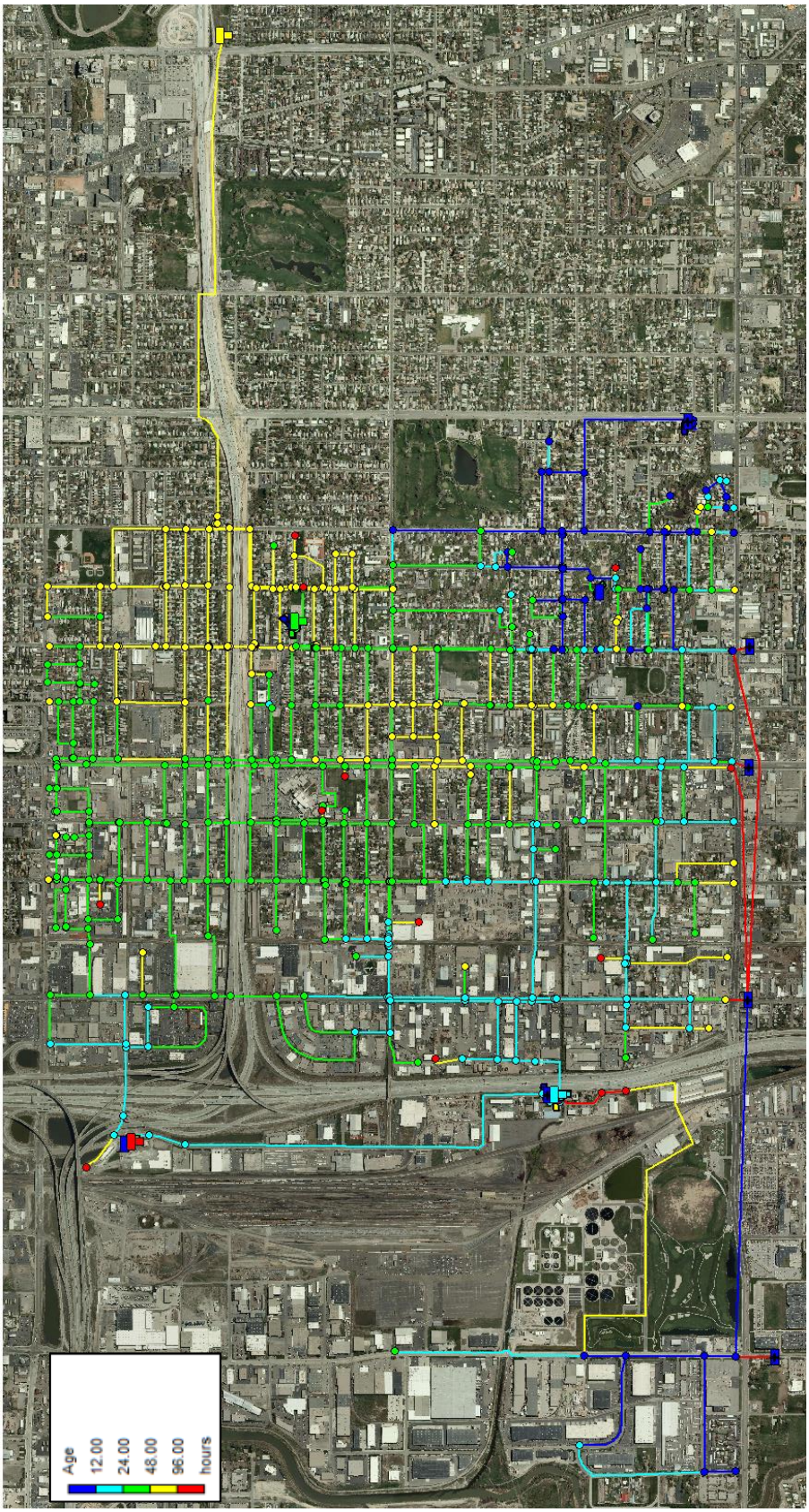


FIGURE VI-1: WATER AGE MODELING RESULTS

TABLE VI-1
DOSING CONCENTRATIONS ASSUMED AT SOURCES

SOURCE	CHLORINE CONCENTRATION (mg/L)
Davis Well	0.27
300 E Well	0.18
700 E Well	0.18
900 W JVWCD	0.14
300 W JVWCD	0.20
State St JVWCD	0.13
300 E JVWCD	0.13

The model was run sufficiently long for the chlorine residual to stabilize into a recurring daily pattern. Three days of model run time was generally adequate to reach this state of pseudo-equilibrium, depending on the water demand. Total chlorine residual test results from South Salt Lake and Central Valley Laboratory were used to calibrate the model with a demand set from October. The month of October was selected because low flows commonly occur during that month. As a result of the low flows, residence times in drinking water storage tanks are high, leading to low residual concentrations. Model results are shown in Figure VI-2 and generally follow the same pattern as water age. Higher concentrations of chlorine residual were found in areas around wells while lower concentrations were found in areas fed primarily by storage tanks where the water is stored for long periods of time, or in areas with low demand where the amount of time for the water to travel from source to demand is excessive. Figure VI-3 presents a comparison between field test and modeled chlorine residuals.

Some of the same areas that indicated the oldest water from the DBP model also have the lowest chlorine residuals. This suggests that improving the circulation of water will increase chlorine residuals and reduce DBPs. Several methods exist for increasing circulation within a distribution system. Often, two of the most practical are: strategic operation of drinking water sources and maximizing the use of equalization storage in the storage tanks. Both options require minimal capital investment while offering the potential to reduce chlorine and DBP issues. The drinking water model is a valuable tool in identifying source production patterns which promote circulation. New transmission lines are an additional option which can increase circulation if properly planned. If improvement to circulation is not able to resolve water quality issues, an additional possibility would be to install mechanical mixing or chlorine dosing at the larger storage tanks.

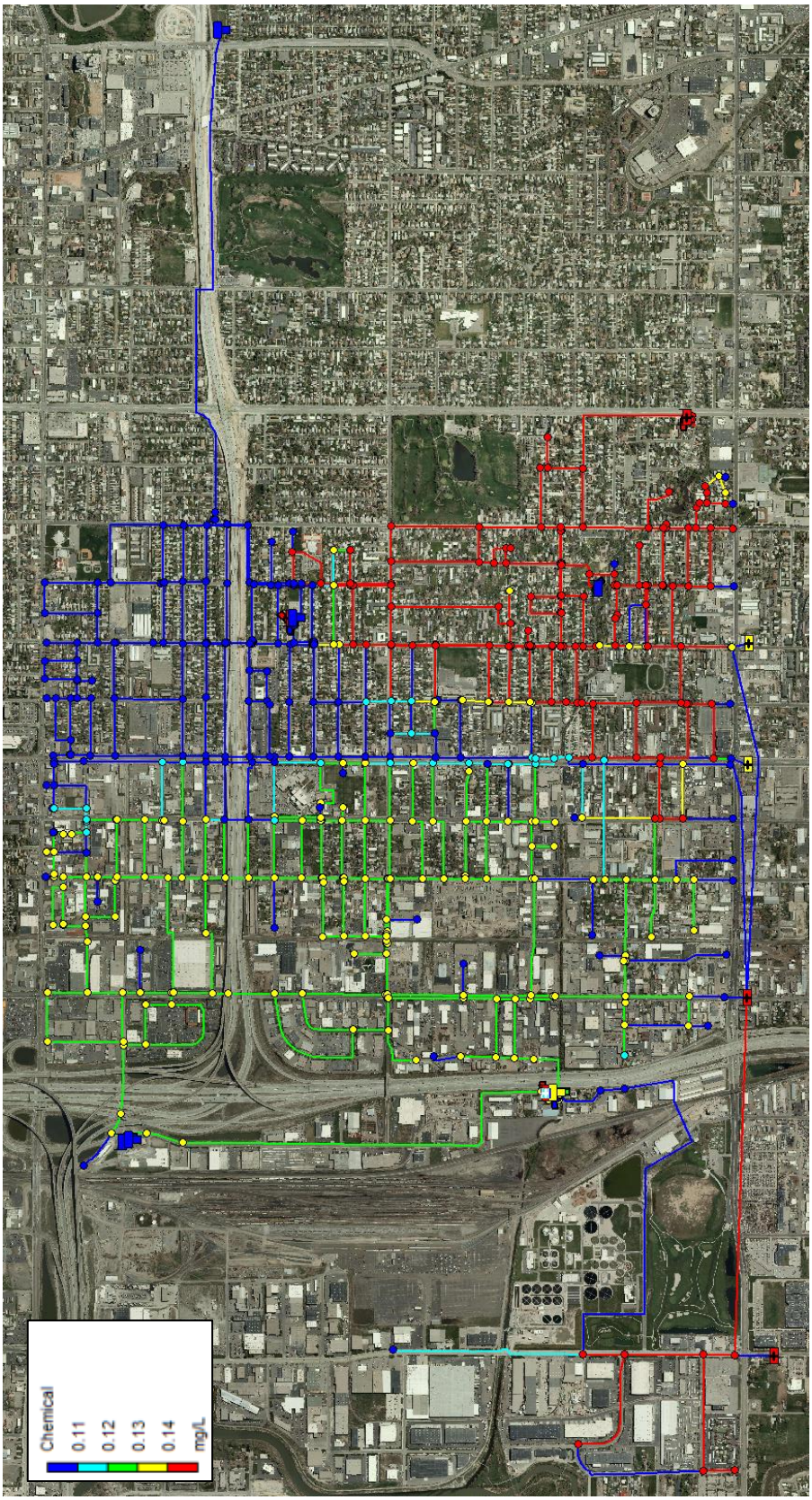


FIGURE VI-2: CHLORINE RESIDUAL MODELING RESULTS

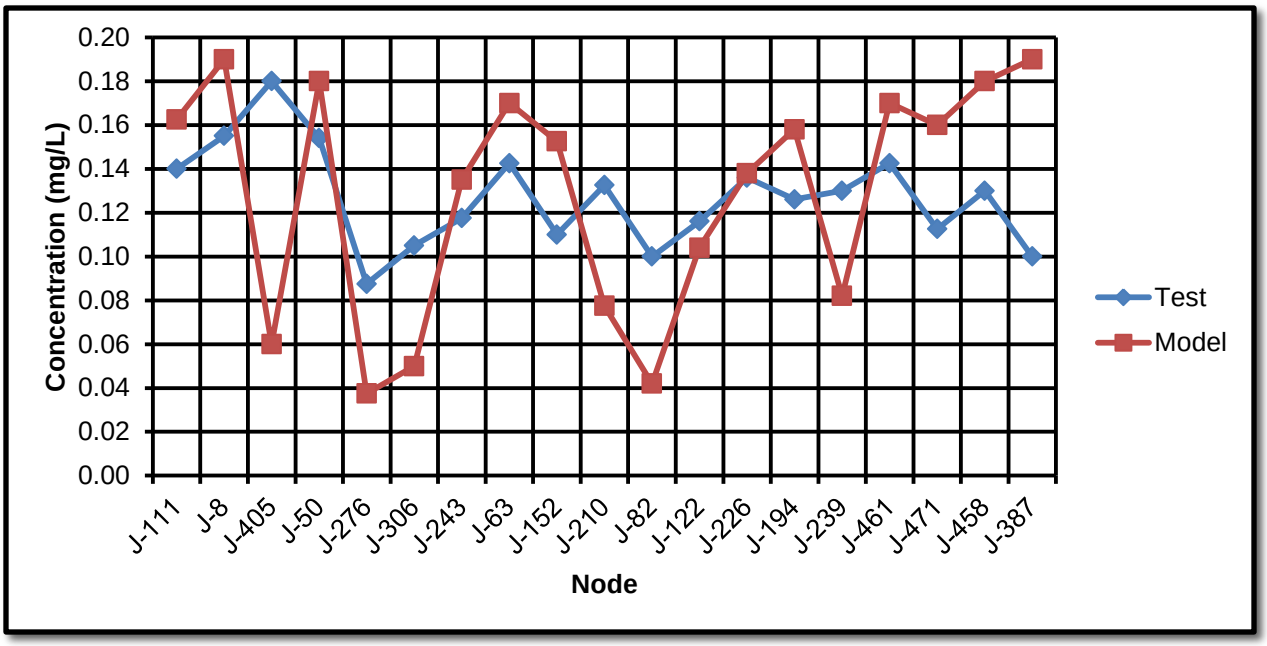


FIGURE VI-3: FIELD TEST VS. MODELED CHLORINE

SUMMARY OF WATER QUALITY RECOMMENDATIONS

Based on the field test results and the water quality model, circulation appears to generally be adequate within the South Salt Lake system. More specifically, areas in close proximity to wells generally had very good circulation. Conversely, the northeast area of the system appears to be the most susceptible to water quality issues. Demands are fairly low in this area and water is provided almost exclusively by the 1300 East Tank. Due to the size of the 1300 East Tank it is particularly important that the equalization storage in the tank be utilized in order to promote mixing in the tank. The following general recommendations are offered:

1. Continue to monitor water quality test results. If problem areas are identified, use the water quality model to determine source production patterns which promote water circulation.
2. Maximize the use of equalization storage in the storage tanks.

Many water quality problems can be effectively dealt with at a low cost by applying the above recommendations. Additional options for managing water quality include installing new pipelines to complete loops on dead end pipelines and applying mixing technologies to storage tanks.

CHAPTER VII

CAPITAL IMPROVEMENTS PLAN

Throughout the master planning process, the three main components of the City's water system (source, storage, and distribution) were analyzed to determine the system's ability to meet existing demands and also the anticipated future demands at build-out. Each of the system deficiencies identified in the master planning process and described previously in this report were presented in an alternatives workshop with City staff. Possible solutions were discussed for each of the identified system deficiencies as well as possible solutions for maintenance and other system needs not identified in the system analysis. After the workshop, HAL studied the feasibility of the solution alternatives and developed conceptual costs.

One important method of paying for system improvements is through impact fees. Impact fees are collected from new development and should only be used to pay for system improvements related to new development. For this reason it is important to identify which projects are related to resolving existing deficiencies, and which projects are related to providing anticipated future capacity for new development.

PRECISION OF COST ESTIMATES

When considering cost estimates, there are several levels or degrees of precision, depending on the purpose of the estimate and the percentage of detailed design that has been completed. The following levels of precision are typical:

Type of Estimate	Precision
Master Planning	±50%
Preliminary Design	±30%
Final Design or Bid	±10%

For example, at the master planning level (or conceptual or feasibility design level), if a project is estimated to cost $1,000,000, then the precision or reliability of the cost estimate would typically be expected to range between approximately $500,000 and $1,500,000. While this may seem very imprecise, the purpose of master planning is to develop general sizing, location, cost, and scheduling information on a number of individual projects that may be designed and constructed over a period of many years. Master planning also typically includes the selection of common design criteria to help ensure uniformity and compatibility among future individual projects. Details such as the exact capacity of individual projects, the level of redundancy, the location of facilities, the alignment and depth of pipelines, the extent of utility conflicts, the cost of land and easements, the construction methodology, the types of equipment and material to be used, the time of construction, interest and inflation rates, permitting requirements, etc., are typically developed during the more detailed levels of design.

At the preliminary or 30% design level, some of the aforementioned information will have been developed. Major design decisions such as the size of facilities, selection of facility sites, pipeline alignments and depths, and the selection of the types of equipment and material to be used during construction will typically have been made. At this level of design the precision of the cost estimate for a $1,000,000 project would typically be expected to range between approximately $700,000 and $1,300,000.

After the project has been completely designed, and is ready to bid, all design plans and technical specifications will have been completed and nearly all of the significant details about the project should be known. At this level of design, the precision of the cost estimate for the

same $1,000,000 project would typically be expected to range between approximately $900,000 and $1,100,000.

SYSTEM IMPROVEMENT PROJECTS

As discussed in previous chapters, several source, storage and distribution system deficiencies were identified during the system analysis. Project costs for water system improvements are presented in Table VII-1 with the location of each project shown in Figure VII-1. Each recommendation includes a conceptual cost estimate for construction.

Unit costs for the construction cost estimates are based on conceptual level engineering. Sources used to estimate construction costs include:

1. "Means Heavy Construction Cost Data, 2013"
2. Price quotes from equipment suppliers
3. Recent construction bids for similar work

All costs are presented in 2013 dollars. Recent price and economic trends indicate that future costs are difficult to predict with certainty. Engineering cost estimates provided in this study should be regarded as conceptual level for use as a planning guide. Only during final design can a definitive and more accurate estimate be provided for each project. A cost estimate calculation for each project is provided in Appendix F and Table VII-1 provides a cost summary for the recommended system improvements.

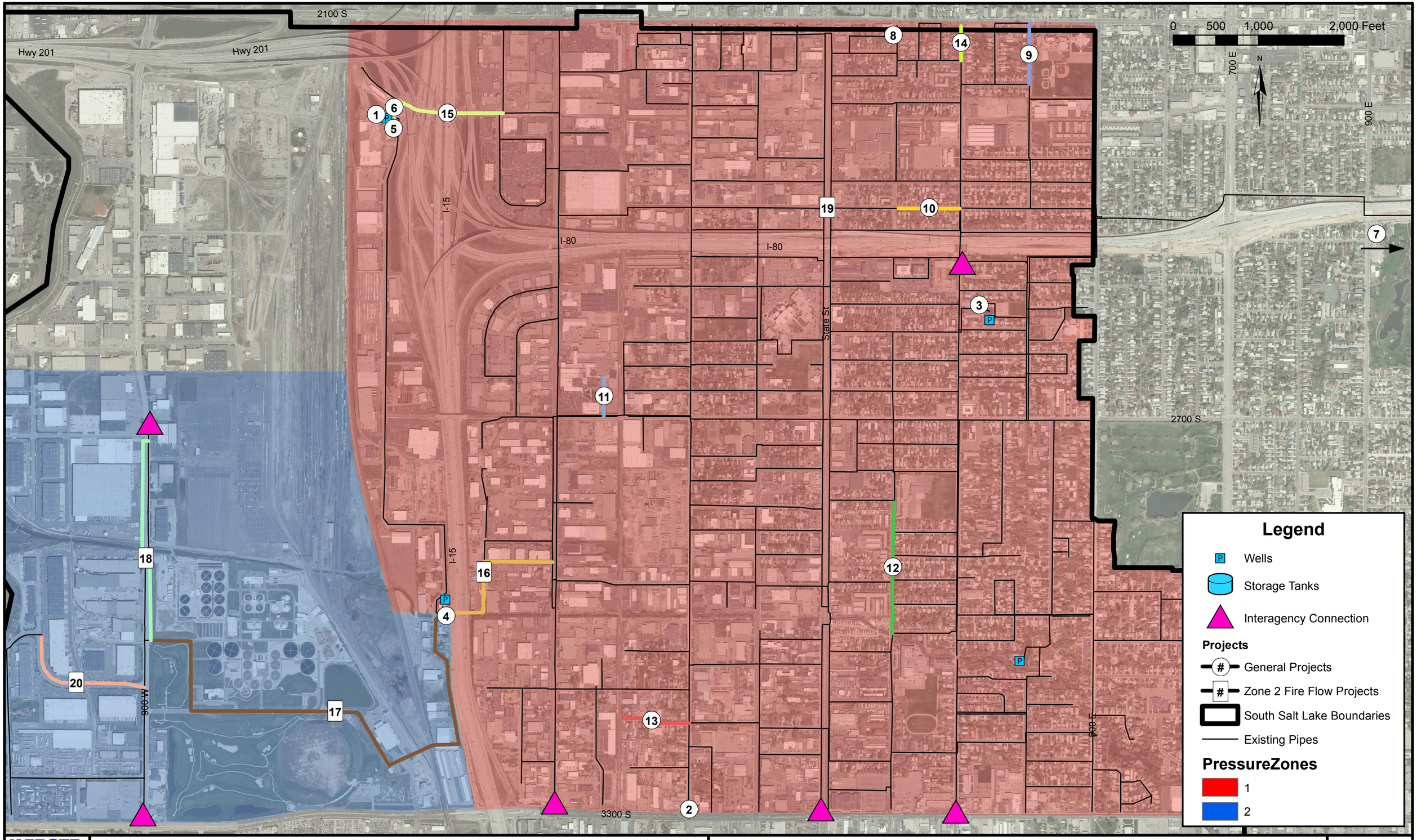
TABLE VII-1
PROJECT COSTS FOR SYSTEM IMPROVEMENTS

TYPE[1]	MAP ID	RECOMMENDED PROJECT[2]	COST
Existing	1	Construct a replacement for Bolinder Well	$945,000
Future	NA	Construct a new Zone 1 well	$945,000
Future	2	Install a new JVWCD connection at 3300 South West Temple	$41,000
Existing	3	Construct a new booster pump station with a rated capacity of 1,160 gpm at the 300 East Tank	$540,000
Existing	4	Construct a new booster pump station at Davis Tank, with a capacity of 4,640 gpm	$1,080,000
Existing	5	Expand the existing Bolinder Tank by 0.5 MG by either building a new 0.5 MG Tank, or by replacing the existing 1.0 MG tank with a 1.5 MG tank (cost estimate for new 0.5 MG tank)	$540,000
Existing	6	Construct a new booster pump station at Bolinder Tank, with a rated capacity of 3,200 gpm	$844,000
Future	7	Construct a new 1.0 MG Zone 1 storage facility by the existing 1300 East Tanks	$1,080,000
Existing	8	Install fire hydrant at 200 East and approximately 2115 South	$7,000
Existing	9	Replace existing pipe with 725 feet of 8" pipeline in 400 East from Utopia Ave. to 2100 South	$90,000

TYPE[1]	MAP ID	RECOMMENDED PROJECT[2]	COST
Existing	10	Replace existing pipe with 725 feet of 8" pipeline in Burton Ave. from 250 East to 300 East	$90,000
Existing	11	Replace existing pipe with 450 feet of 10" pipeline in the alley at approximately 230 West from 2700 South to approximately 2620 South	$63,000
Existing	12	Replace existing pipe with 1,550 feet of 10" pipeline in 200 East from Gregson Ave. to Sunset Ave.	$216,000
Existing	13	Replace existing pipe with 785 feet 8" pipeline in Angelo Ave. from West Temple to approximately 200 West	$97,000
Existing	14	Replace existing pipe with 410 feet of 8" pipeline in 300 East from 2100 South to Commonwealth Ave.	$51,000
Existing	15	Install 1,465 feet of 12" pipeline in Andy Ave. between 600 West and 300 West parallel to the existing 10" pipeline. This project addresses a fire Flow deficiency at 2115 W 400 S. In order to fully address the deficiency, projects 1, 5, and 6 must also be completed.	$229,000
Existing	16	Install 1,900 feet of new 16" pipeline parallel to existing pipeline, through parking lot at about 2920 S from 300 W to 400 W, in 400 W from 2920 S to 2970 S, Under I-15 from 400 West to the existing Davis Booster Station	$333,000
Existing	17	Install 6,500 feet of new parallel 16" pipeline south from Davis Pump Station in 465 W until about 3180 S, southwest across train tracks following the existing 12-inch line to Central Valley Road, in Central Valley Road from 650 W to about 850 W, in 850 W from Central Valley Road to 3100 S, and in 3100 S from 850 W to 900 W	$1,365,000
Existing	18	Install 2,480 feet of 18" pipeline along 900 W from 3100 S to 2780 S	$525,000
Existing	19	Connection across State Street at intersection of State Street and Truman Ave	$68,000
Existing	20	Install 1,740 feet of 10" pipeline parallel to the existing pipeline in 3160 S from 900 W to 1030 W, and in 1030 W from 3160 S to 3120 S	$242,000
Total			**$9,391,000**

1. Projects categorized as "Existing" are needed to address existing system deficiencies. "Future" projects address deficiencies which are projected to occur in the future based on growth and demand projections.
2. See descriptions in the source, storage and distribution system recommendation summaries presented in previous chapters.

All existing system improvement projects are recommended to be completed in 0 to 5 years. The total estimated cost of projects which address existing deficiencies is $7,325,000. Projects which address future deficiencies sum to $2,066,000.



HANSEN ALLEN & LUCE inc ENGINEERS

SOUTH SALT LAKE CITY DRINKING WATER SYSTEM MASTER PLAN

PROJECT LOCATIONS

FIGURE VII-1

FUNDING OPTIONS

Funding options for the recommended projects, in addition to water use fees, could include the following options: general obligation bonds, revenue bonds, State/Federal grants and loans, and impact fees. In reality, the City may need to consider a combination of these funding options. The following discussion describes each of these options.

General Obligation Bonds

This form of debt enables the City to issue general obligation bonds for capital improvements and replacement. General Obligation (G.O.) Bonds would be used for items not typically financed through the Water Revenue Bonds (for example, the purchase of water source to ensure a sufficient water supply for the City in the future). G.O. bonds are debt instruments backed by the full faith and credit of the City which would be secured by an unconditional pledge of the City to levy assessments, charges or ad valorem taxes necessary to retire the bonds. G.O. bonds are the lowest-cost form of debt financing available to local governments and can be combined with other revenue sources such as specific fees, or special assessment charges to form a dual security through the City's revenue generating authority. These bonds are supported by the City as a whole, so the amount of debt issued for the water system is limited to a fixed percentage of the real market value for taxable property within the City.

Revenue Bonds

This form of debt financing is also available to the City for utility related capital improvements. Unlike G.O. bonds, revenue bonds are not backed by the City as a whole, but constitute a lien against the water service charge revenues of a Water Utility. Revenue bonds present a greater risk to the investor than do G.O. bonds, since repayment of debt depends on an adequate revenue stream, legally defensible rate structure and sound fiscal management by the issuing jurisdiction. Due to this increased risk, revenue bonds generally require a higher interest rate than G.O. bonds, although currently interest rates are at historic lows. This type of debt also has very specific coverage requirements in the form of a reserve fund specifying an amount, usually expressed in terms of average or maximum debt service due in any future year. This debt service is required to be held as a cash reserve for annual debt service payment to the benefit of bondholders. Typically, voter approval is not required when issuing revenue bonds.

State/Federal Grants and Loans

Historically, both local and county governments have experienced significant infrastructure funding support from state and federal government agencies in the form of block grants, direct grants in aid, interagency loans, and general revenue sharing. Federal expenditure pressures and virtual elimination of federal revenue sharing dollars are clear indicators that local government may be left to its own devices regarding infrastructure finance in general. However, state/federal grants and loans should be further investigated as a possible funding source for needed water system improvements.

It is also important to assess likely trends regarding federal / state assistance in infrastructure financing. Future trends indicate that grants will be replaced by loans through a public works revolving fund. Local governments can expect to access these revolving funds or public works trust funds by demonstrating both the need for and the ability to repay the borrowed monies, with interest. As with the revenue bonds discussed earlier, the ability of infrastructure programs to wisely manage their own finances will be a key element in evaluating whether many secondary funding sources, such as federal/state loans, will be available to the City.

Impact Fees

Impact fees can be applied to water related facilities under the Utah Impact Fees Act. The Utah Impacts Fees Act is designed to provide a logical and clear framework for establishing new development assessments. It is also designed to establish the basis for the fee calculation which the City must follow in order to comply with the statute. However, the fundamental objective for the fee structure is the imposition on new development of only those costs associated with providing or expanding water infrastructure to meet the capacity needs created by that specific new development. Also, impact fees cannot be applied retroactively.

SUMMARY OF RECOMMENDATIONS

Several recommendations were made throughout the master plan report. A summary of the recommendations is presented below, with the projects organized by whether they apply to existing or future deficiencies.

Existing recommendations which should be completed within the next five years:

- Construct a replacement for Bolinder Well and return the Bolinder Tank and Pump Station to service. It is expected that the storage should be expanded by 0.5 MG and that the capacity of the booster pumps should be increased to 3,200 gpm.
- Replace the existing booster pump station at the 300 East Tank with a new pump station with a rated capacity of 1,200 gpm.
- Construct a new pump station at Davis Tank with a rated capacity of 4,640 gpm.
- All of the Zone 1 fire flow projects should be completed.
- Projects necessary for providing fire flow volume to Zone 2 should also be completed. Two separate options have been suggested above. The first option presented was to obtain the fire flow from Salt Lake City and the second option included capital improvements to allow water from 1300 East Tank to be used in Zone 2.
- The City should update the model as the water system changes.
- Continue to monitor water quality test results, particularly in the northeast area of the City. If problem areas are identified, use the water quality model to determine source production patterns which promote water circulation.
- Maximize the use of equalization storage in the tanks, especially 1300 East Tank.

Future recommendations which should be monitored and addressed as needed:

- Construct a new well in Zone 1 to address projected future source deficiencies.
- Install a new JVWCD connection to the existing 10” South Salt Lake pipeline at 3300 S West Temple.
- Construct a new 1 MG Zone 1 storage tank alongside the existing 1300 East Tank.

REFERENCES

Environmental Protection Agency (EPA). 2006. *Fluoride: Dose-Response Analysis For Non-cancer Effects*. EPA 820-R-10-019. U.S. Environmental Protection Agency, Health and Ecological Criteria Division, Office of Water. Washington, D.C.

Governor's Office of Planning & Budget, 2013.

International Fire Code Institute, Uniform Fire Code, 1997.

State of Utah, Utah Administrative Code.

APPENDIX A
ERC Calculations

HANSEN ALLEN & LUCE inc
ENGINEERS

CLIENT City of South Salt Lake
PROJECT Drinking Water Master Plan
FEATURE ERC calculation
PROJECT NO 126.27.200

SHEET 1 OF 1
COMPUTED RTC
CHECKED
DATE 11-01-2010

Given Annual Production data

Find The total number of ERCs, and ERC breakdown for South Salt Lake City

Solution

Annual use info for 2009 gives the following totals

Connections

Domestic: 2605
Commercial: 698

(water data indicates the total 2010 connections is 3,426)

Annual Use

Domestic: 1131.63 Acre-feet
Commercial: 1232.32 Acre-feet

Define ERC => South Salt Lake is in Zone 4 of the (R309-510) Consumptive use map which give 3.96 gpm/acre. Reviewed 10 residential properties, the average irrigated acreage/property was ~0.09 acres

$$\frac{800\ gal}{d \cdot Conn} \cdot \frac{d}{1440\ min} + \frac{3.96\ gal}{min \cdot acre} \cdot \frac{0.09\ Acres}{conn} = 0.91\ gpm/ERC$$

Convert Commercial/Industrial connections to ERCs

$$\frac{1232.32\ Acre\text{-}ft/698\ Com/Ind}{1131.63\ Acre\text{-}ft/2605\ ERCs} = 4.06\ \frac{ERCs}{com/ind\ conn}$$

Calculate ERCs for Open Space

South Salt Lake GIS Gives 206 acres of Public Open Space (from SSL Planning Map)

$$206\ Acres \cdot \frac{3.96\ gpm}{Acre} = 816\ gpm$$

Calculate total ERCs

$$2605\ ERCs + 4.06\ \frac{ERCs}{com/ind\ conn}\left(698\ conn.\right) + 816\ gpm / 0.91\ gpm/ERC$$

$$= 2,605\ ERCs + 2,837\ ERCs + 895\ ERCs = 6337\ ERCs$$

SYSTEM COMPONENTS	EXISTING	FUTURE	
Population	22,274	44,560	ppl
Population Growth	22,286		ppl
% Population Growth	100.05%		Percent
# Connections	3,303	6,608	Conn.
Growth of ERCs	**6,340**		**ERC**
System ERCs	6,337	**12,677**	ERC
ERCs in Zone 1	5,542	11,882	ERC
ERCs in Zone 2	795	795	ERC
ERCs/Connections	1.92		ERC/Conn
Irr. Crop Consumptive Use Zone	4		Zone
Irr. Acres per ERC	0.09		Irr. Ac/ERC
Estimated Irr. Acres	570	570	ac

Population growth is based on estimates made in 2008 from the Governor's Office of Planning and Budget

Input
Output

PEAK DAY DEMAND	EXISTING	FUTURE	
Outdoor Peak Day State Standard	3.96		gpm/irr ac
	2,259	2,259	gpm
Indr. Peak Day SS	800		gpd/ERC
Indoor Peak Day State Standard	0.556		gpm/ERC
	3,521	7,043	gpm
Total Peak Day SS	**5,779**	**9,301**	gpm

PEAK INSTANTANEOUS DEMAND	EXISTING	FUTURE	
Peak Instant. (1.6x Peak Day)	9,246	14,882	gpm
Minimum Fire Flow @ 20 psi	1,200	1,200	gpm
Max Pressure Standard	110	110	psi
Min Pressure Standard	50	50	psi

AVERAGE YEARLY DEMAND	EXISTING	FUTURE	
Outdoor Average Yearly Demand	3.0		ac-ft/irr ac
State Standard	1,711	1,711	ac-ft
Indr. Average Yearly Demand SS	146,000		gal/ERC
Indoor Average Yearly Demand	925	1,851	MG/yr
State Standard	2,839	5,680	ac-ft/yr
Total Average Yearly Demand State	**4,550**	**7,391**	ac-ft/yr
Standard	2,821	4,582	gpm

State Standards require 1.87 ac-ft/irr ac. A conveyance efficiency of 90% and irrigation efficiency of 70% were used to calculate 3.0 ac-ft/irr ac

STORAGE	EXISTING	FUTURE	
Indoor Equalization SS	400		gal/ERC
Indoor Equalization SS	2.53	5.07	MG
Outdoor Equalization State	2,848		gal/irr ac
Standard	1.62	1.62	MG
Total Equalization SS	4.16	6.70	MG
Fire Suppression	2.5	2.5	MG
Emergency (20% of FF & EQ)	1.33	1.84	MG
Total	**7.99**	**11.04**	**MG**

FIRE FLOW	EXISTING	FUTURE	
Min Fire Flow	1,200	1,200	gpm
Granite Park Jr High Fire Flow	6,250	6,250	gpm
Fire Flow Duration	4	4	hr
Min Fire Volume	0.288	0.288	MG
Hospital Fire Volume	1.5	1.5	MG

FLOWS AND VOLUMES	Peak Day	Ave Yr	
	gpm	gpm	ac-ft
Existing Zone 1	5,054	2,467	3,979
Existing Zone 2	725	354	571
Existing Total	**5,779**	**2,821**	**4,550**
Future Zone 1	8,576	4,228	6820
Future Zone 2	725	354	571
Future Total	**9,301**	**4,582**	**7391**

Future ERCs

Assumptions:

1. Utah Population Estimates Committee projections are accurate
2. City-wide growth projections are representative of the growth expected in the study area, which includes the portion of the City north of 3300 South.
3. New connections only add additional indoor use

Calculations:

The Utah Population Estimates Committee estimates that the 2010 population of South Salt Lake is about 22,270 people. They further project that in 2050 the population will be 44,560, an increase of about 100%. The current number of connections within the study area is 3,303. The total number of ERCs is 6,337, producing a connection to ERC ratio of 1:1.918. Increasing the number of connections proportionally with population gives a projection of 6,608 connections in 2050 with an additional 3305 connections. Because the City is essentially "built-out", it is reasonable that additional connections will add to the indoor water demand but not to the outdoor water demand. Based on aerial imagery of South Salt Lake it is estimated that the average lot within the R-1 residential zone has 0.09 irrigable acres. The additional average day demand from new development is calculated to be:

$$3305\ conn. \times 1.918 \frac{ERC}{conn} = 6{,}340\ ERCs$$

If added to the existing 6,337 ERCs, the projected future total is 12,677 ERCs.

APPENDIX B
Water Rights

Source	WR Number	Flow (cfs)	Flow (gpm)	Status
300 East	57-1056	1.000	448.83	Certificated
	57-2660	1.050	471.27	Certificated
265 West	57-1057	1.000	448.83	Certificated
	57-8684	0.180	80.79	Certificated
	57-1058	0.820	368.04	Certificated
400 East Well	57-4246	0.172	77.20	No Action Required
	57-4247	0.082	36.80	No Action Required
	57-4248	0.082	36.80	No Action Required
	57-4249	0.107	48.02	No Action Required
	57-4250	0.078	35.01	No Action Required
	57-4251	0.016	7.18	No Action Required
	57-4253	0.056	25.13	No Action Required
	57-4254	0.056	25.13	No Action Required
	57-4255	0.134	60.14	No Action Required
	57-4256	0.033	14.81	No Action Required
	57-4257	0.125	56.10	No Action Required
	57-4258	0.134	60.14	No Action Required
	57-4259	0.096	43.09	No Action Required
	57-4260	0.051	22.89	No Action Required
	57-4261	0.060	26.93	No Action Required
	57-4262	0.045	20.20	No Action Required
	57-4263	0.096	43.09	No Action Required
	57-4264	0.082	36.80	No Action Required
	57-4265	0.071	31.87	No Action Required
700 East	57-8374	1.560	700.18	Certificated
	57-8789	2.440	1,095.15	Proof due 10/31/2014
Bolinder Well	57-3157	1.000	448.83	Certificated
	57-8037	1.390	623.88	Certificated
	57-8683	2.610	1,171.45	Proof due 10/31/2020
Davis Well	57-641	2.610	1,171.45	Certificated
	57-8288	0.330	148.11	Certificated
	57-8717	1.330	596.95	Certificated
	57-6010	2.000	897.66	Certificated
	57-7515	0.290	130.16	Certificated
Scott Hatchery Wells	57-208	4.373[1]	1,962.74	Certificated
	57-5665	0.245	109.96	No Action Required
Miscellaneous	57-818	0.015	6.73	No Action Required
	57-3113	0.030	13.46	Certificated
	57-7160	0.022	9.87	No Action Required
	57-10113	NA[2]	NA	No Action Required
	Totals =	25.871	11,611.71	

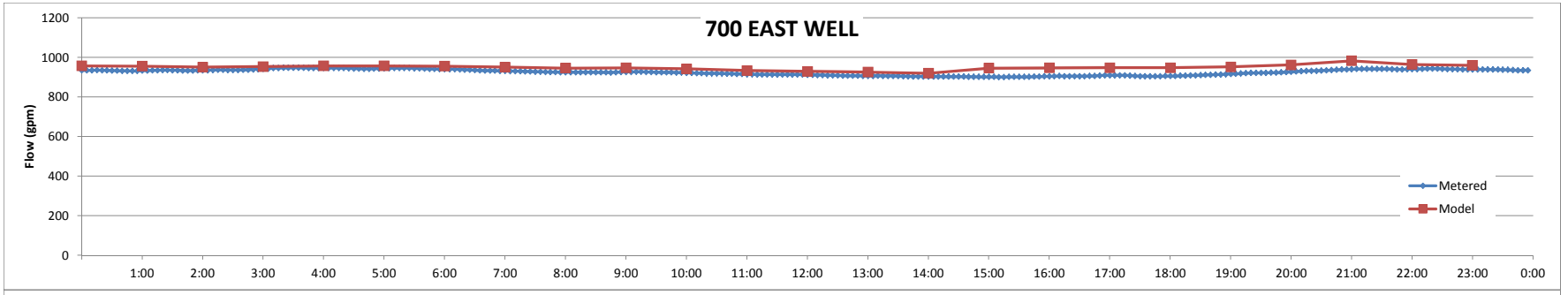
1. 57-208 is limited to an annual volume of 3006.95 acre-feet
2. 57-10113 does not have a flow rate limitation, but is limited to an annual volume of 1.1 acre-feet

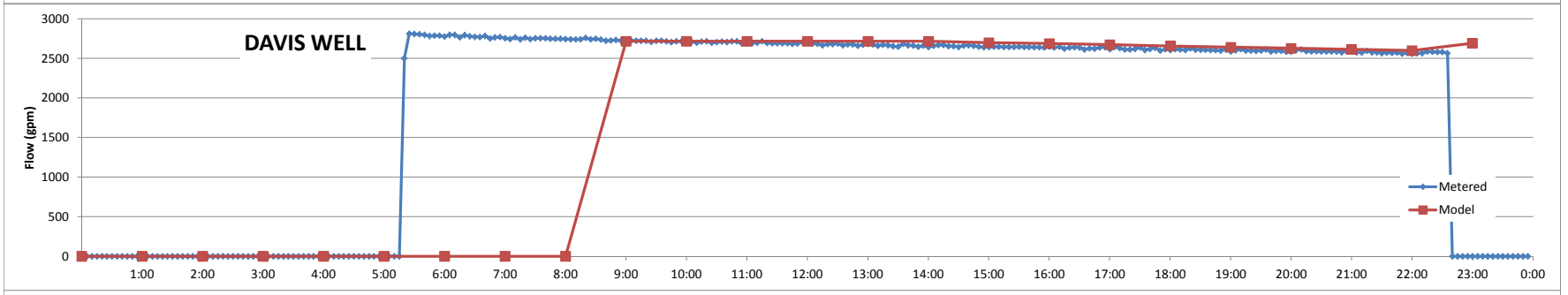
APPENDIX C
Calibration Data

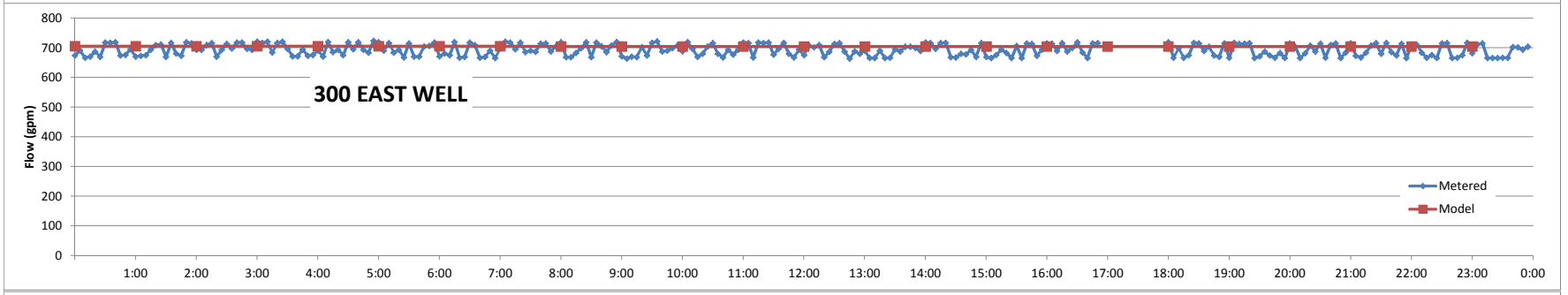
Insurance Services Office, Inc.
Hydrant Flow Data Summary
27-May-03

Test No.	Type Dist.	Test Location	Service	Flow (gpm) $Q=(29.83(C(d^2)p^{0.5}))$			Pressure (psi)		Flow (gpm) @ 20 psi $Q_R=Q_F(h_R^{0.54}/h_F^{0.54})$		Remarks	Model Node	Pressure (psi)		(psi)		Zone
				Individual Hydrants		Total	Static	Resid.	Needed	Avail.			Static	Diff.	Resid.	Diff.	
1	Commercial	2565 S 300 W	SSLC	1,210	1,030	2,240	96	84	9,000	6,100	(A)-(4760 gpm)	J-152	80	-17%	66	-21%	1
1A	Commercial	2566 S 300 W	SSLC	1,210	1,030	2,240	96	84	3,500	6,100		J-152	80	-17%	66	-21%	1
2	Commercial	909 W 2900 S	SSLC	1,260		1,260	90	45	5,000	1,600		J-50	98.88	10%			2
2A	Commercial	910 W 2900 S	SSLC	1,260		1,260	90	45	3,500	1,600		J-50	98.88	10%			2
3	Commercial	3180 S Eldridge	SSLC	1,110	1,570	2,680	95	65	6,500	4,400	(A)-(3090 gpm)	J-199	78	-18%	43	-34%	1
3A	Commercial	3181 S Eldridge	SSLC	1,110	1,570	2,680	95	65	2,000	4,400		J-199	78	-18%	43	-34%	1
4	Commercial	2330 S 300 W	SSLC	1,060	2,120	3,180	96	75	4,500	6,400		J-109	81.5	-15%	73	-3%	1
4A	Commercial	2331 S 300 W	SSLC	1,060	2,120	3,180	96	75	3,500	6,400		J-109	81.5	-15%	73	-3%	1
5	Commercial	Burton 200 W	SSLC	1,220		1,220	96	85	4,500	3,500	(A)-(3090 gpm)	J-130	81	-16%	68	-20%	1
5A	Commercial	Burton 200 W	SSLC	1,220		1,220	96	85	2,500	3,500		J-130	81	-16%	68	-20%	1
6	Commercial	2700 S 600 W	SSLC	760	1,620	2,380	100	65	4,000	3,700	(A)-(2840 gpm)	J-62	82.5	-18%	66	2%	1
7	Commercial	3007 S West Temple	SSLC	1,030	1,810	2,840	89	70	4,000	5,700		J-224	75.5	-15%	65	-7%	1
7A	Commercial	3008 S West Temple	SSLC	1,030	1,810	2,840	89	70	2,500	5,700		J-224	75.5	-15%	65	-7%	1
8	Commercial	3131 S West Temple	SSLC	580	530	1,110	85	75	4,000	3,100		J-215	75	-12%	73	-3%	1
8A	Commercial	3132 S West Temple	SSLC	580	530	1,110	85	75	3,500	3,100		J-215	75	-12%	73	-3%	1
9	Commercial	3148 S 1100 W	SSLC	480	860	1,340	90	40	4,000	1,600		12	98.35	9%			2
10	Commercial	Oakland Ave State St	SSLC	1,580	1,680	3,260	80	65	4,000	3,900		J-311	73.5	-8%	72	11%	1
10A	Commercial	Oakland Ave State St	SSLC	1,580	1,680	3,260	80	65	1,250	3,900		J-311	73.5	-8%	72	11%	1
11	Commercial	2600 S 900 W	SSLC	1,160	1,300	2,460	125	95	3,500	4,800	(C)-(2827 gpm)	J-405	100.25	-20%			2
12	Commercial	420 E 3760 S	SSLC	1,030		1,030	66	58	3,000	2,600		NA					
12R	Residential	421 E 3760 S	SSLC	1,030		1,030	66	58	1,500	2,600		NA					
13	Commercial	3410 S 700 W	SSLC	760		760	90	66	2,500	1,400		NA					
14	Commercial	3645 S State St	SSLC	1,170		1,170	80	65	2,000	2,500		NA					

Zone	average	stdev
1	-15%	3%
2	2%	15%


700 EAST WELL
Flow (gpm)
1200
1000
800
600
400
200
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Metered
Model


DAVIS WELL
Flow (gpm)
3000
2500
2000
1500
1000
500
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Metered
Model


300 EAST WELL
Flow (gpm)
800
700
600
500
400
300
200
100
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
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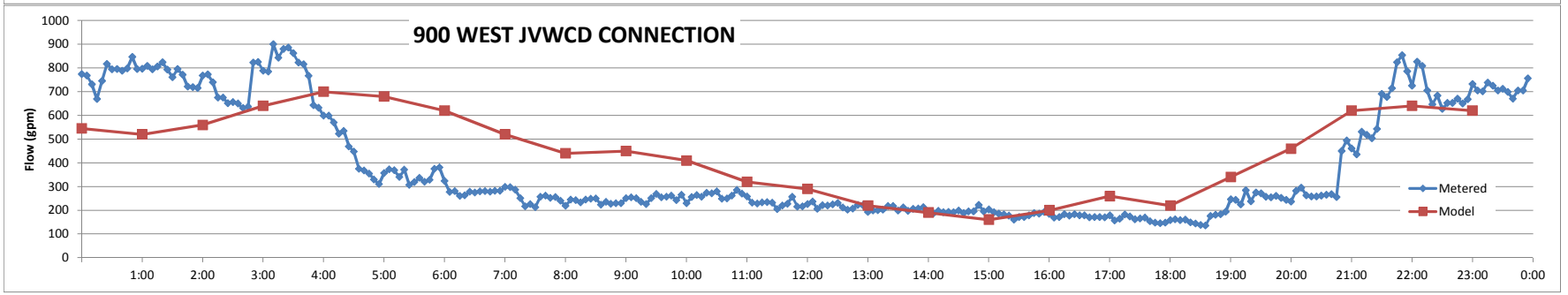
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Metered
Model


900 WEST JVWCD CONNECTION
Flow (gpm)
1000
900
800
700
600
500
400
300
200
100
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Metered
Model

APPENDIX D
Computer Model Output

SEE DISK

APPENDIX E
Water quality Calibration Data

Water Quality Calibration Results

	Test	Model	Diff.
Junction	mg/L	mg/L	
J-111	0.14	0.16	16%
J-8	0.16	0.19	23%
J-405	0.18	0.06	-67%
J-50	0.15	0.18	17%
J-276	0.09	0.04	-57%
J-306	0.11	0.05	-52%
J-243	0.12	0.14	15%
J-63	0.14	0.17	19%
J-152	0.11	0.15	39%
J-210	0.13	0.08	-42%
J-82	0.10	0.04	-58%
J-122	0.12	0.10	-10%
J-226	0.14	0.14	1%
J-194	0.13	0.16	25%
J-239	0.13	0.08	-37%
J-461	0.14	0.17	19%
J-471	0.11	0.16	42%
J-458	0.13	0.18	38%
J-387	0.10	0.19	90%

APPENDIX F
Cost Estimate Calculations

COST CALCULATIONS FOR RECOMMENDED PROJECTS

MAP ID	Project Description	UNIT	UNIT TYPE	UNIT COST	COST	Contingency (20%) and Engineering (15%)	TOTAL COST
1	Replacment fo Bolinder Well	1	ea	$700,000.00	$700,000	$245,000	$945,000
NA	New Zone 1 Well	1	ea	$700,000.00	$700,000	$245,000	$945,000
2	JVWCD Connection at 3300 S West Temple	1	ea	$30,000.00	$30,000	$10,500	$41,000
3	New 300 East booster station	1	ea	$400,000.00	$400,000	$140,000	$540,000
4	New Davis Tank booster station	1	ea	$800,000.00	$800,000	$280,000	$1,080,000
5	Build new 0.5 MG Tank	500,000	gal	$0.80	$400,000	$140,000	$540,000
6	New Bolinder booster station	1	ea	$625,000.00	$625,000	$218,750	$844,000
7	Build new 1.0 MG Tank	1,000,000	gal	$0.80	$800,000	$280,000	$1,080,000
8	Install fire hydrant	1	ea	$5,000.00	$5,000	$1,750	$7,000
9	725 feet of 8-inch pipe	725	foot	$92.00	$66,700	$23,345	$90,000
10	725 feet of 8-inch pipe	725	foot	$92.00	$66,700	$23,345	$90,000
11	450 feet of 10-inch pipe	450	foot	$103.00	$46,350	$16,223	$63,000
12	1,550 feet of 10-inch pipe	1,550	foot	$103.00	$159,650	$55,878	$216,000
13	785 feet of 8-inch pipe	785	foot	$92.00	$72,220	$25,277	$97,000
14	410 feet of 8-inch pipe	410	foot	$92.00	$37,720	$13,202	$51,000
15	1,465 feet of 12" pipeline	1,465	foot	$116.00	$169,940	$59,479	$229,000
16	1,900 feet of 16" pipe	1,900	foot	$130.00	$247,000	$86,450	$333,000
17	6,500 feet of 16" pipe	6,500	foot	$130.00	$845,000	$295,750	$1,141,000
	Millcreek crossing	60	foot	$260.00	$15,600	$5,460	$21,000
	Railroad crossing	1	ea	$150,000.00	$150,000	$52,500	$203,000
18	2,480 feet of 18" pipline	2,390	feet	$152.00	$363,280	$127,148	$490,000
	Concrete street crossing	90	foot	$290.00	$26,100	$9,135	$35,000
19	Connection across State Street	1	ea	$50,000.00	$50,000	$17,500	$68,000
20	1,740 feet of 10" pipeline	1,740	foot	$103.00	$179,220	$62,727	$242,000

TOTAL $9,391,000

APPENDIX G
DDW Report Certification

HYDRAULIC MODEL DESIGN ELEMENTS & SYSTEM CAPACITY EXPANSION REPORT

REPORT CERTIFICATION

It is herby certified that the Hydraulic Model Design Elements & System Capacity Expansion Report for:

City of South Salt Lake Drinking Water Master Plan
(Project Name)

18032
(Water System Number)

South Salt Lake Culinary Water
(Water System Name)

(DDW File Number, If Available)

7/15/2013
(Date)

Meets all requirements as set forth in *R309-511 Hydraulic Modeling Rule* and *R309-110-4 Definitions* and complies with the provisions thereof, as well as the sizing requirements of *R309-510*, and the minimum water pressures of *R309-105-9*. Where applicable the proposed additions to the distribution system will not cause the pressures at any new or existing connections to be less than those specified in R309-105-9. The calibration methodology is described in the report and the model is sufficiently calibrated and accurate to represent the conditions within this water system. The hydraulic modeling method is (*use of computer software or hand calculations*), and the computer software used was *(name and version).*

Steven C. Jones, P.E.

State of Utah No. 362076-2202

CHECKLIST FOR HYDRAULIC MODEL DESIGN ELEMENTS REPORT

This hydraulic model checklist identifies the components included in the Hydraulic Model Design Elements Report for

City of South Salt Lake Drinking Water Master Plan
(Project Name)

18032
(Water System Number)

South Salt Lake Culinary Water
(Water System Name)

7/15/2013
(Date)

The checkmarks or P.E. initials after each item indicate the conditions supporting P.E. Certification of this Report.

1. The Report contains:

   (a) A listing of sources including: the source name, the source type (i.e., well, spring, reservoir, stream etc.) for both existing sources and additional sources identified as needed for system expansion, the minimum reliable flow of the source in gallons per minute, the status of the water right and the flow capacity of the water right. *[R309-110-4 "Master Plan" definition]* ☑ SH

   (b) A listing of storage facilities including: the storage tank name, the type of material (i.e., steel, concrete etc.), the diameter, the total volume in gallons, and the elevation of the overflow, the lowest level (elevation) of the equalization volume, the fire suppression volume, and the emergency volume or the outlet. *[R309-110-4 "Master Plan" definition]* ☑ SH

   (c) A listing of pump stations including: the pump station name and the pumping capacity in gallons per minute. Under this requirement one does not need to list well pump stations as they are provided in requirement (a) above. *[R309-110-4 "Master Plan" definition]* ☑ SH

   (d) A listing by customer type (i.e., single family residence, 40 unit condominium complex, elementary school, junior high school, high school, hospital, post office, industry, commercial etc.) along with an assessment of their associated number of ERC'S. *[R309-110-4 "Master Plan" definition]* ☑ SH

   (e) The number of connections along with their associated ERC value that the public drinking water system is committed to serve, but has not yet physically connected to the infrastructure. *[R309-110-4 "Master Plan" definition]* ☑ SH

(f) A description of the nature and extent of the area currently served by the water system and a plan of action to control addition of new service connections or expansion of the public drinking water system to serve new development(s). The plan shall include current number of service connections and water usage as well as land use projections and forecasts of future water usage. *[R309-110-4 "Master Plan" definition]* ☑

(h) A hydraulic analysis of the existing distribution system along with any proposed distribution system expansion identified in (g) above. *[R309-110-4 "Master Plan" definition]* ☑

(i) A description of potential alternatives to manage system growth, including interconnections with other existing public drinking water systems, developer responsibilities and requirements, water rights issues, source and storage capacity issues and distribution issues. *[R309-110-4 "Master Plan" definition]* ☑

2. At least 80 percent of the total pipe lengths in the distribution system affected by the proposed project are included in the model. *[R309-511-5(1)]* ☑

3. 100 percent of the flow in the distribution system affected by the proposed project is included in the model. If customer usage in the system is metered, water demand allocations in the model account for at least 80 percent of the flow delivered by the distribution system affected by the proposed project. *[R309-511-5(2)]* ☑

4. All 8-inch diameter and larger pipes are included in the model. Pipes smaller than 8-inch diameter are also included if they connect pressure zones, storage facilities, major demand areas, pumps, and control valves, or if they are known or expected to be significant conveyers of water such as fire suppression demand. *[R309-511-5(3)]* ☑

5. All pipes serving areas at higher elevations, dead ends, remote areas of a distribution system, and areas with known under-sized pipelines are included in the model. *[R309-511-5(4)]* ☑

6. All storage facilities and accompanying controls or settings applied to govern the open/closed status of the facility for standard operations are included in the model. *[R309-511-5(5)]* ☑

7. Any applicable pump stations, drivers (constant or variable speed), and accompanying controls and settings applied to govern their on/off/speed status for various operating conditions and drivers are included in the model. *[R309-511-5(6)]* ☑

8. Any control valves or other system features that could significantly affect the flow of water through the distribution system (i.e. interconnections with other systems,

pressure reducing valves between pressure zones) for various operating conditions are included in the model. *[R309-511-5(7)]* ☑

9. Imposed peak day and peak instantaneous demands to the water system's facilities are included in the model. The Hydraulic Model Design Elements Report explains which of the Rule-recognized standards for peak day and peak instantaneous demands are implemented in the model (i.e., (i) peak day and peak instantaneous demand values per *R309-510, Minimum Sizing Requirements*, (ii) reduced peak day and peak instantaneous demand values approved by the Executive Secretary per *R309-510-5, Reduction of Requirements*, or (iii) peak day and peak instantaneous demand values expected by the water system in excess of the values in *R309-510, Minimum Sizing Requirements*). The Hydraulic Model Design Elements Report explains the multiple model simulations to account for the varying water demand conditions, or it clearly explains why such simulations are not included in the model. The Hydraulic Model Design Elements Report explains the extended period simulations in the model needed to evaluate changes in operating conditions over time, or it clearly explains (e.g., in the context of the water system, the extent of anticipated fire event, or the nature of the new expansion) why such simulations are not included in the model. *[R309-511-5(8) & R309-511-6(1)(b)]* ☑

10. The hydraulic model incorporates the appropriate demand requirements as specified in *R309-510, Minimum Sizing Requirements*, and *R309-511, Hydraulic Modeling Rule*, in the evaluation of various operating conditions of the public drinking water system. The Report includes:
    - the methodology used for calculating demand and allocating it to the model;
    - a summary of pipe length by diameter;
    - a hydraulic schematic of the distribution piping showing pressure zones, general pipe connectivity between facilities and pressure zones, storage, elevation, and sources; and
    - a list or ranges of values of friction coefficient used in the hydraulic model according to pipe material and condition in the system. In accordance with Rule stipulation, all coefficients of friction used in the hydraulic analysis are consistent with standard practices.

    [R309-511-7(4)] ☑

11. The Hydraulic Model Design Elements Report documents the calibration methodology used for the hydraulic model and quantitative summary of the calibration results (i.e., comparison tables or graphs). The hydraulic model is sufficiently accurate to represent conditions likely to be experienced in the water delivery system. The model is calibrated to adequately represent the actual field conditions using field measurements and observations. *[R309-511-4(2)(b), R309-511-5(9), R309-511-6(1)(e) & R309-511-7(7)]* ☑

12. The Hydraulic Model Design Elements Report includes a statement regarding whether fire hydrants exists within the system. Where fire hydrants are connected to the distribution system, the model incorporates required fire suppression flow standards. The statement that appears in the Report also

identifies the local fire authority's name, address, and contact information, as well as the standards for fire flow and duration explicitly adopted from *R309-510-9(4), Fireflows*, or alternatively established by the local fire suppression agency, pursuant to *R309-510-9(4), Fireflows.* The Hydraulic Model Design Elements Report explains if a steady-state model was deemed sufficient for residential fire suppression demand, or acknowledges that significant fire suppression demand warrants extended model simulations and explains the run time used in the simulations for the period of the anticipated fire event. *[R309-511-5(10) & R309-511-7(5)]* ☑

13. If the public drinking water system provides water for outdoor use, the Report describes the criteria used to estimate this demand. If the irrigation demand map in *R309-510-7(3), Estimated Outdoor Use,* is not used, the report provides justification for the alternative demands used in the model. If the irrigation demands are based on the map in *R309-510-7(3), Estimated Outdoor Use,* the Report identifies the irrigation zone number, a statement and/or map of how the irrigated acreage is spatially distributed, and the total estimated irrigated acreage. The indicated irrigation demands are used in the model simulations in accordance with Rule stipulation. The model accounts for outdoor water use, such as irrigation, if the drinking water system supplies water for outdoor use. *[R309-511-5(11) & R309-511-7(1)]* ☑

14. The Report states the total number of connections served by the water system including existing connections and anticipated new connections served by the water system after completion of the construction of the project. *[R309-511-7(2)]* ☑

15. The Report states the total number of equivalent residential connections (ERC) including both existing connections as well as anticipated new connections associated with the project. In accordance with Rule stipulation, the number of ERC's includes high as well as low volume water users. In accordance with Rule stipulation, the determination of the equivalent residential connections is based on flow requirements using the anticipated demand as outlined in *R309-510, Minimum Sizing Requirements*, or is based on alternative sources of information that are deemed acceptable by the Executive Secretary. *[R309-511-7(3)]* ☑

16. The Report identifies the locations of the lowest pressures within the distribution system, and areas identified by the hydraulic model as not meeting each scenario of the minimum pressure requirements in *R309-105-9, Minimum Pressure Requirements*. *[R309-511-7(6)]* ☑

17. The Hydraulic Model Design Elements Report identifies the hydraulic modeling method, and if computer software was used, the Report identifies the software name and version used. *[R309-511-6(1)(f)]* ☑

18. For community water system models, the community water system management has been provided with a copy of input and output data for the hydraulic model

with the simulation that shows the worst case results in terms of water system pressure and flow. *[R309-511-6(2)(c)]* ☑ SA

19. The hydraulic model predicts that new construction will not result in any service connection within the new expansion area not meeting the minimum distribution system pressures as specified in *R309-105-9, Minimum Pressure Requirements.* *[R309-511-6(1)(c)]* ☑ SA

20. The hydraulic model predicts that new construction will not decrease the pressures within the existing water system to such that the minimum pressures as specified in *R309-105-9, Minimum Pressure Requirements* are not met. *[R309-511-6(1)(d)]* ☑ SA

SOUTH SALT LAKE COMMUNITY DEVELOPMENT

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To: City Council

From: Michael Florence

Date: July 1, 2013

RE: Reconsideration of a land use map amendment from Commercial General to Residential Multiple and Planned Unit Development for the property located at 3824 S. 700 W. (Carlisle Place Townhomes)

The sole purpose of this reconsideration motion is to correct a clerical error in which a portion of the Council's action was not included on the final ordinance.

On July 31, 2013, the South Salt Lake City Council approved a 57 unit townhome development located at 3824 S. 700 W. known as the Carlisle Place Townhomes. With approval of the townhome development the City Council also amended the zoning of the property in order for the development to be constructed. All staff reports and notices to the public, including hearing notices, indicated that the zone change would be to both Residential Multiple and PUD Overlay. Presentations by staff and the property owner, as well as all discussions in the meeting, indicated that it would be a PUD Overlay. Indeed, the project could not have been approved if it was not located in a PUD Overlay zone.

Since receiving approval, the final plat was approved and signed, and the developer has made substantial progress toward project completion, acting in reliance on the zoning and plat approval.

Recently, staff was updating the zoning map and realized that a clerical error was made on the ordinance that the City Council approved. The ordinance adopted by the Council left off the Planned Unit Development Overlay zoning in the description of the zone change, and included only a change to the RM zone.

The Attorney's office has advised that the most expeditious solution to this issue is to bring this item back to the City Council for reconsideration and to correct the adopted ordinance and include the omitted words.

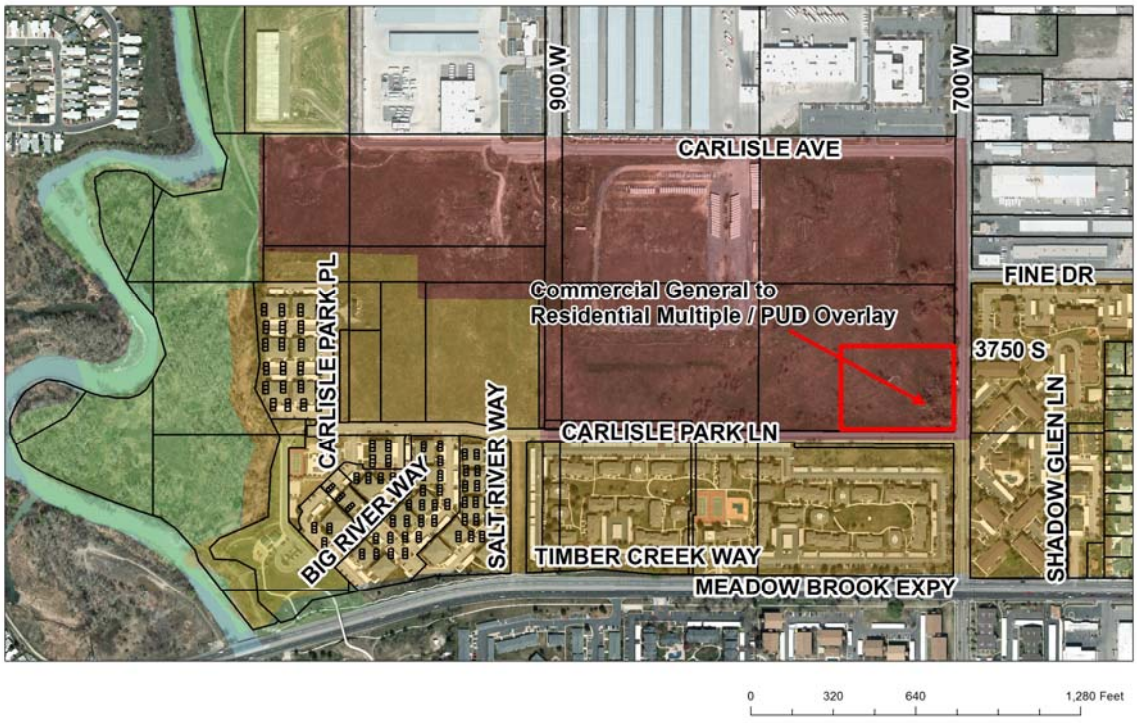
Attached is the public notice and staff report that was sent to the public and City Council.

SOUTH SALT LAKE CITY NOTICE OF PUBLIC HEARING

Public notice is hereby given that the South Salt Lake City Council will hold a public meeting in the Council Chambers located in City Hall at 220 East Morris Avenue on **Wednesday, July 22, 2013 at 5:00 p.m.** or as soon thereafter as possible for the purpose of discussing the following item:

Final Plat Approval and a rezone from General Commercial to Residential Multiple / PUD Overlay for Carlisle Place, a 57-unit Planned Unit Development located at 3824 South 700 West. This item will be heard pending a recommendation from the South Salt Lake Planning Commission.

Notice is further given that the public is invited to attend this meeting. In compliance with Americans with Disabilities Act, individuals needing auxiliary communicative aids or other services for this meeting should contact Francis Lilly at 412-3224, giving at least 24 hours notice.



CITY COUNCIL STAFF REPORT

MEETING DATE:	**22 July 2013**
APPLICANT:	**Hamlet Development Corporation – Michael Brodsky**
ADDRESS:	**3824 South 700 West**
REQUEST:	**Final Plat and Rezone Approval for Carlisle Place, a 57-unit Townhome PUD**
ZONE:	**Commercial General to Residential Multiple – PUD Overlay**
PREPARED BY:	**Michael Florence**

SYNOPSIS: The applicant, Hamlet Development, is a residential homebuilder seeking preliminary plat and rezone approval for a 57-unit owner-occupied townhome planned unit development located on 3.3 acres of land at 3824 South 700 West. The applicant proposes a housing style that is similar in nature to the townhomes at Waverly Station, another Hamlet project. The Planning Commission will forward a recommendation to the City Council on a rezone and final plat approval for this PUD.

SUMMARY:

- In 1998, when the land was annexed into South Salt Lake, it was zoned M-1 (manufacturing). In 2004, the City Council rezoned the land to single-family residential and adopted the Meadowbrook Master Plan which called for single-family residential on the last-remaining large parcel of open land in the City.
- In 2009, the City Council rezoned the subject property from single-family residential to commercial general, and it was to be included as part of a master redevelopment of adjacent UTA property for use as on office/warehouse park. In 2010, a new General Plan was adopted, designating the future land use as general commercial.
- In July 2013, the City Council amended the future land use map to change the future land use on the 3.3 acre parcel to high density residential.
- The proposal meets the minimum lot widths for townhomes in an ordinance that was recommended for approval by the Planning Commission on June 6, 2013, and is currently pending adoption by the City Council.
- This project would add 57 new owner-occupied townhomes in an area of South Salt Lake that previous long range plans targeted for residential development. The project as proposed includes substantial landscaped areas, rear-loaded garages, sufficient parking, and a significant enhancement to the Carlisle Park streetscape.
- The Planning Commission recommended approval to amend the zoning and for preliminary subdivision approval with the following changes:
    1. Since the project is over-parked according to our City parking ordinance remove the 7 visitor stalls at the west end of the development to increase the amount of common open space.
    2. Keep the two eastern most drive approaches closed for safer pedestrian access to the development.
    3. Fencing installed on the West and North property lines is to be constructed of a material to help deter graffiti.
- The City Council will need to wait until the next meeting to give final approval because there is a pending ordinance regarding townhome lots sizes that needs to be approved before the development can receive final approval.

STAFF ALTERNATIVES

The Planning Commission approved the preliminary plat for the Carlisle Place Planned Unit Development and recommend to the City Council final plat approval and a zone change for the Planned Unit Development, with the following conditions.

1. The applicant will continue to work with City staff to make all technical corrections necessary for recording.

2. The applicant will work with the City Engineer and Fire Marshal to provide a second access for emergency vehicles somewhere on the site.

3. Bonds for all common and public improvements will be submitted to the City prior to any development or improvements installed before the plat is signed.

4. The applicant will submit a landscape plan, including greater detail on the site amenities provided in the common areas.

5. The applicant will submit an updated design book, providing greater detail on site lighting and community amenities.

6. The applicant will work with staff on a perimeter fencing solution before the plat is signed.

7. The applicant will provide updated CC&R's and an estimate of the HOA fees before the plat is signed.

8. The applicant will work with staff to modify the sidewalk location at the southwest corner of the property to tie into the future sidewalk when the UTA property is redeveloped

9. The applicant will complete a CPTED review prior to obtaining building permits.

10. Remove the seven visitor parking stalls on the west end of the development to allow for additional common open space

11. The two eastern most drive approaches to remain closed for safer pedestrian access

12. Developer work with staff on a fencing material that will help deter graffiti

13. All items of the staff report.

CITY COUNCIL STAFF REPORT

General Information:

Location: 3824 South 700 West

Surrounding Zoning and Land Uses:
North: Commercial General / Vacant Land
South: Residential Multiple / Apartments
East: Residential Multiple / Apartments
West: Commercial General / Vacant Land

General Plan: The Future Land Use Map designates this parcel as multifamily residential. This proposal is supported by the following General Plan elements:

Goal LU-8. Accommodate higher density housing in appropriate areas.
Goal HE-3. Infill housing should be encouraged
Goal HE-4. Improve the overall home ownership ratio.

Size: The proposed PUD will be approximately 3.3 acres in size. The project includes 39 units that are 22 feet wide and approximately 940 sf and 18 units at the end of each structure that are 26 feet wide and1,200 sf. The end units will feature enhanced architectural finishes.

Density: 17 units per acre

Access: The project has two access off 700 West and the Western most drive approach on Carlisle Avenue. An additional emergency access will be required somewhere on the site.

Water, Sewer, and Other Public Utilities: Water and sewer services will be provided by the Jordan Valley Water Conservancy District and the Mount Olympus Improvement District. Storm water service is provided by the South Salt Lake Public Works Department. The Public Works Department requires that storm water developed on a parcel be drained on that parcel. The City Engineer will review the subdivision plat prior to recording.

Design: The applicant proposes a design that is very similar to the Waverly Station townhomes. A similar level of finishes and landscaping is anticipated. The final design will be subject to the landscape ordinance (17.25) and the pending residential design standards ordinance.

Parking: Each unit will have an alley-loaded two-car garage. An additional 44 parking stalls were proposed for guests but the Planning Commission asked the developer to remove the seven western most stalls to allow for additional open space since the development is over parked. The applicant proposes 2.6 stalls per unit, in excess of the 2.5 spaces per unit required by the pending parking ordinance.

Fence: A perimeter fence will be required to be installed on the north and west boundaries of the property. Normally, a light-tight fence would be required, but the Planning Commission

recommended another material that is more appropriate at this location that will not attract graffiti.

Garbage: The applicant proposes two waste container locations on the north side of the property. Approved waste container enclosures will be required subject to the design standards in §17.06.140 of the South Salt Lake Code of Ordinances. The homeowners association will need to contract with a private company for garbage collection. E

Bonding: The developer will be required to provide a bond guaranteeing the completion of the development of all public infrastructures.

Open space: The PUD ordinance requires 20 percent common usable open space, not including setbacks, as part of the development. The Planning Commission recommended removing the seven western most stalls to provide additional open space since the project is over parked. Before the inclusion of the additional common area the applicants proposal included 24.5 percent open space. Staff requests more detail on the specific amenities provided in the common open space at the west end of the property. Furthermore, the applicant will be required to recalculate open space excluding the required eight-foot setback along Carlisle Park Drive and 700 West.

Public Sidewalks: A development agreement signed with UTA established a 30-foot buffer between Carlisle Park Drive and the proposed office/warehouse park development. Staff expects that this buffer be installed when the UTA property is adjacent. Since Carlisle Place is adjacent, staff requested that the developer modify the sidewalk location at the southwest corner of the property to tie into the future sidewalk when the UTA property is redeveloped. This could be accomplished through a bond or an escrow agreement.

Public Works: The applicant will need to continue to work with the City Engineer to review and approve final civil drawings.

Fire and Emergency Vehicle Access: The applicant proposes three fire hydrants along Kirkbride Avenue. The Fire Marshal will require that the hydrants have a minimum flow of 1,000 gallons per minimum at a pressure of 20 psi. The Fire Marshal will require provisions for an additional emergency vehicle access somewhere on the site. This access may be gated subject to final approval by the Fire Marshal.

CC&R's and Estimated HOA Fees: The applicant was required to submit draft covenants, codes, and restrictions for the proposed PUD, as well as cost estimate for maintaining services and replacing common area infrastructure. The applicant believes that the HOA fees will be similar to those at Waverly Station: $123.00 per month. The applicant will be required to submit CC&R's and an accurate cost estimate for the HOA fees before the plat is signed.

Requirements:

Title 17 Chapter 13 – Land Use Districts

17.13.030 – Planned Unit Development Overlay (PUD) District

A. Purpose.

1. The purpose of the Planned Unit Development (PUD) District is to provide for additional flexibility in designing new single family, townhome and condominium neighborhoods.

2. To encourage home ownership
3. To encourage efficient use of available land within an urban setting
4. To encourage innovative and sustainable building design and site improvements

B. Uses. In the PUD district, uses, buildings, structures or land shall not be used or developed except in accordance with the adopted land use matrix as found in Chapter 15 of this title.

C. Regulations.

1. **Compatibility.** PUD developments shall be compatible in lot size, density, height and site amenities with the district wherein the development is proposed. PUD developments must be compatible with surrounding uses. All development is intended to complement and strengthen neighborhoods as a compatible component of the City's housing stock. See PUD subdivision regulations.
2. **Buildings and Site Development.** Buildings, sites and structures shall comply with the requirements for design review found in Chapter 21 of this title and any other building, fire, or other relevant codes in effect within the City.
3. **Approval Process.** The City Council is the land use authority for all PUD applications. See Title 17.08.040.
4. **Minimum Area**. See Title 15.12 for minimum subdivision requirements
5. **Lot width and area requirements**. Established in the in the underlying base district

Title 15 Article VIII – Planned Unit Development (PUD)

15.12.810 - Purpose and intent.

A. Planned unit development (PUD) is intended to permit flexibility, to encourage new and imaginative concepts in the design of neighborhood and single-family housing projects and to provide a means of encouraging preservation and enhancement of housing ownership in the city. To this end, the PUD developments should be planned as one complex land use rather than an aggregation of individual unrelated buildings located on separate unrelated lots.

B. Substantial compliance with the zone regulations and other provisions of the zoning ordinance in requiring adequate standards related to the public health, safety, and general welfare shall be observed, without unduly inhibiting the advantages of unified site planning.

C. PUD developments are intended to be flexible yet the development must be compatible with surrounding uses. On parcels greater than five acres, PUD regulations allow for some flexibility in density and housing character; however PUD developments are not intended to promote housing that substantially alters the neighborhood in which it is to be located. PUD regulations are not intended to allow for circumvention of zoning requirements in such a way as to result in significantly higher densities in size of development in otherwise low density residential neighborhoods. All development is intended to complement and strengthen neighborhoods as a compatible component of the city's housing stock. The planning commission and city council shall determine if a PUD is deemed compatible and may deny approval if the proposal is determined to be incompatible.

15.12.820 - Use and zoning regulations.

A. Notwithstanding any other provisions of city ordinances to the contrary, PUD developments shall be permitted in all districts of the city except the LI light industrial zone. The provisions as herein set forth shall be applicable if any conflict exists.

B. An overall development plan for a PUD showing building types, location, size, heights, expected uses, number of residential units, access roads, open spaces, parking, landscaping and all other appropriate items may be approved by the planning commission and city council. If approved, building permits may be issued in accordance with such plan, even though the uses, housing types, development specifications and the location of the buildings proposed differ from the uses, housing types, and regulations governing such items in effect in the zone in which the development is proposed, provided the provisions of this chapter are complied with and a specific development plan is approved.

C. The planning commission and city council may vary all yard, setback, and similar zoning regulations, as well as vary the city's development specifications, within PUD developments approved under this chapter provided the provisions of this chapter are complied with and a specific development plan is approved for each development. The planning commission and city council may approve PUD developments with use variations provided all provisions of this chapter are complied with and the following restrictions are followed:

    1. Use variations in residential districts may be for residential uses only. No commercial or industrial use variations allowed.

    2. Use variations in commercial districts shall be limited to commercial and residential uses only. No industrial use variations allowed.

15.12.830 - Scope of development.

A. Mixed use PUDs may be approved according to the following:

    1. In commercial and business districts and along the light rail corridor only, developments may combine commercial uses and residential uses and may contain all forms of residential dwellings.

    2. In the R-1 and A-1 districts, developments may only contain detached single-family dwellings and twin homes as permitted in Section 15.12.850 and if it can be shown that the inclusion of the twin homes will result in more usable open space for the development. The inclusion of twin homes may not increase the overall density of the development above that if only single-family homes were included in the development with the exception of a PUD that is five acres or greater, whereupon twin homes may actually increase density, only if the twin homes are used as a buffer between higher density residential, retail or commercial uses.

    3. In R-M districts, developments may contain all forms of residential dwellings.

B. Any development containing rental residential components must meet the requirements for rental residential developments found in Chapter 15.12, Article IX for that portion of the project containing such uses.

C. Any development containing twin homes must be developed as permitted in Section 15.12.850 of this title.

D. Any development for strictly rental residential must be developed as a rental residential development found in Chapter 15.12, Article IX.

E. Any development for strictly commercial/industrial uses must be developed as a nonresidential development.

15.12.840 - General requirements.

A. The development shall be in single or corporate ownership or the application filed jointly by the owners of the property.

B. The properties adjacent to the PUD shall not be adversely affected, and to this end, the planning commission may require, in the absence of appropriate physical boundaries or installed buffers, that uses of least intensity and greatest compatibility be arranged around the boundaries of the project. Yard and height conditions of the adjacent properties should be closely matched on the periphery of the project.

C. Site development specifications and sign regulations shall be determined when approving the site development plan.

D. Minimum Scale of Projects. No subdivisions may be considered planned unit developments unless consisting of at least three lots.

E. Density. In R-1, A-1 and R-M zones, the number of dwelling units shall be based upon the lot area requirements of the zone in which the PUD is located. In commercial or overlay zones, the city shall determine a density based upon the general plan as well as other area specific master plans and the proximity to mass transit. In commercial and business zones, density shall be determined by the parking and open space requirements. In a PUD that is five or more acres, a density increase may be granted by the planning commission and city council. The minimum lot size the planning commission and city council can approve in PUD's five or more acres in area is four thousand five hundred (4,500) square feet. To qualify for a density increase and smaller lot sizes, the city shall require higher quality design standards with additional architectural and site amenities.

F. As part of the preliminary and final plat applications, and in addition to all other required drawings, all PUD developments shall be required to provide a project design guidebook. At a minimum, this guide book will illustrate and provide the following design standards and amenities to ensure that a unique identity is created for each neighborhood. The city council and planning commission may require additional building and site related features as deemed necessary to ensure that the PUD development is compatible with the surrounding neighborhood and the development results in more desirable, modern and attractive housing.

    1. Building Design Standards: the guidebook shall provide and demonstrate architectural renderings of each type of proposed building, the inclusion of additional architectural details to the exterior façades, the exterior front facades of the buildings shall have at a minimum two different types of exterior materials. Where feasible, buildings should include the use of porches and alternative placement of garages. Buildings on contiguous lots that share a lot line shall not have the same exterior front elevation.

2. Site amenities: The guidebook shall provide and demonstrate design and dimensional layout of the development, roadway widths, pedestrian lighting plan unique to the neighborhood, sidewalk or trails, open space, landscape plan and street tree plantings species that will be installed in the park strip areas or in front of individual homes.

G. Sustainable Practices. The use of renewable energy strategies is encouraged in all new developments. In order to positively contribute to the human and environmental footprint of new neighborhoods buildings shall, where feasible, incorporate sustainable design practices by providing solar panels and other renewable energy strategies into the design of residential buildings. In the event that renewable energy is not being implemented in the project, the developer and architect are to anticipate the introduction of solar technologies in the future. The building design is to be "solar ready" so that renewable energy systems can be easily installed.

H. Setbacks. In R-1, A-1 and R-M zones, the planning commission may vary rear and side yard setbacks. The minimum front yard setbacks in R-1, A-1 and R-M zones shall be eighteen (18) feet if the home has a front loading garage. If a home has a rear loading garage, the front setback may be reduced to eight feet as long as the yard area where the driveway is located has an eighteen-foot setback from the property line. The planning commission may vary all setbacks in all other zones.

I. Roads. Road widths shall be based upon the number of dwelling units.

1. Three to Four units twenty-foot minimum pavement width, no parking on road;

2. Five to ten units twenty-five-foot minimum pavement width, parking one side only;

3. Ten to fifteen units thirty-foot minimum pavement width sidewalk one side;

4. Fifteen (15) units and up, adopted road and sidewalk standards must be followed with the following exceptions.

    a. A reduction in the adopted standard roadway pavement width to a minimum thirty (30) feet may be approved by the planning commission and city council upon a favorable recommendation from the public works director. The director will evaluate such items as traffic patterns, design of the development, traffic counts and other information provided by the developer that will be necessary to ensure a proper evaluation.

    b. A reduction in the standard roadway width to thirty (30) feet of pavement may be considered if alleys are used to access rear loading garages on a majority of the units. An alley is required to be a minimum of twenty (20) feet in width.

5. Private roads, driveways and alleys may be calculated as part of the lot area but must be limited to fifteen (15) percent of each total lot area.

6. Dedication of private roads and lanes. Where it can be demonstrated that such acceptance would be of benefit to the city, and the construction standards of such lanes meet city standards or some compensation arrangements are made to the satisfaction of the city council, the city council may consider accepting private lanes as a dedicated public right-of-way.

J. Building Height. In R-1 and R-M zones, new construction may have a greater height than existing dwellings but may only be forty (40) percent taller than the tallest existing adjacent dwelling unit(s) as measured from the grade of the nearest public right-of-way, up to a maximum of thirty-five (35) feet in height. In A-1 zones, the maximum height is thirty-five (35) feet.

1. Commercial and Business Zones. The maximum normal height is forty-five (45) feet except as allowed in the following section.

2. Heights Greater Than Forty-Five (45) Feet. For all locations where buildings and/or developments have proposed heights of forty-five (45) feet or greater, the following additional standards shall apply:

    a. Planning Commission and City Council Approval Required. All proposed heights greater than forty-five (45) feet shall require design review approval by the planning commission following procedures as set forth in this chapter.

    b. Mitigation of Impacts to Scale. Where greater heights are proposed, the city may require the provision of amenities intended to mitigate the effects of the greater height with regard to providing a human scale at the street level on the site. The city may require the inclusion of plazas, appropriate landscaping, and street-oriented objects such as benches, planters, street lights and lamp posts, and other such items as deemed appropriate considering the particular development.

    c. Mitigation of Impacts to Infrastructure. Where greater heights are proposed, the city may require the provision of additional measures to mitigate impacts directly related to the increased density of such a building. These may include underground or other structured parking, traffic control devices, street and capital facilities improvements, and other such items as deemed appropriate by the city.

    d. Architectural Features Required. Where greater heights are proposed, the city may require the provision of architectural features at the street level, which are sufficient in detail to be compatible with and enhance the pedestrian and vehicle traffic at the scale of the street on which the building is located.

    e. Mitigation of Height if Adjacent to an R-1 Zone. If a building in a commercial or business zone is proposed to be a height of greater than forty-five (45) feet and is adjacent to an R-1 zone, the building shall be setback from the property line(s) contiguous to the R-1 zone a distance equal to half the height of the proposed building unless the planning commission determines that a lesser setback is appropriate.

K. Open Space. All planned unit developments shall include twenty (20) percent common usable open space as part of the development

1. Exceptions or Reductions. If it can be shown that open space or the required twenty (20) percent open space is implausible or undesirable, the planning commission and city council may consider granting an exception or reduction to that requirement upon finding any of the following:

a. A more effective design and one more compatible with the surrounding neighborhood will be obtained;

b. The location is in close proximity to a light rail station;

c. The location is within one-quarter mile of a city or county park.

2. Common use open space shall be in usable size segments not in small scattered pieces as determined by the city. Open space shall not include yard areas, required landscaping or required setback areas but shall be in addition to such areas.

3. Common use open space areas shall be landscaped and shall include amenities such as lighting, benches, walkways, playgrounds, pavilions and other gathering areas, play courts, playground equipment, tot lots and other items. The amount, size and layout of amenities shall be determined by the city as part of the approval of the development plan and shall be based on the size and configuration of the common use open space.

4. The city council, upon recommendation of the planning commission, shall require the preservation, maintenance, and ownership of common use open space and common use facilities utilizing at the city's option one of the following methods:

    a. Dedication of the land as a public park or parkway system or public facility;

    b. Granting to the city a permanent open space easement on and over said private open spaces to guarantee that the open space remain perpetually in recreation use, with ownership and maintenance being the responsibility of a homeowners' association established with articles of association and bylaws which are satisfactory to the city; and recording an agreement with the city for assumption of facilities in the event of failure to maintain and/or dissolution of the homeowners' association; or

    c. Complying with the provisions of the Condominium Ownership Act of the state of Utah, which provides for the payment of common expenses for the upkeep of common areas and facilities. Recreation uses and facilities may be developed within the common space areas in compliance with a recreation and landscaping plan approved as part of the approved final development plan of the PUD.

    d. If the second or third method, as set forth above, is utilized to maintain the open spaces and facilities, but the organization established fails to maintain said in reasonable order and condition the city may, at its option, do or contract to have the required maintenance completed and shall invoice the individually owned properties within the PUD the cost of the property maintenance. If the maintenance costs are not paid, the assessment shall be a lien against property and shall be filed with the county recorder, or the city may bring suit to collect the maintenance fees together with a reasonable attorney's fees and costs.

5. The developer shall submit plans for landscaping and improving the common open space. The developer shall also explain the intended use of the open space and provide detailed provisions of how the improvements thereon are to be financed and the area maintained.

6. A project must generally meet the intent of the requirements of the zoning ordinances, must insure proper use, construction and maintenance of common use open space and common use facilities, and must demonstrate that the development will benefit the future residents of the project, surrounding residents, and the general public.

L. If the project contains private infrastructure, amenities and roadways prior to recordation of a subdivision plat and associated documents, the developer shall submit to the city a plan describing the following:

1. The actual installation costs of all common area improvements;

2. The anticipated functional life of roads or common driveways;

3. The anticipated functional life span of all common sewer, storm sewer and water systems;

4. The anticipated functional lifespan of all common area amenities;

5. A plan showing a maintenance or replacement schedule for common area roads or common driveways and amenities;

6. A reserve study estimating the amount of fees that will need to be annually collected to maintain and replace common improvements.

M. The developer shall be required to provide a bond in an amount determined by the city engineer guaranteeing the completion of the development of all common facilities or areas, including access and open space or facilities, or any phase thereof. When completed in accordance with the approved plan, the bond shall be released. If uncompleted at the end of two years, the city will review the progress and may proceed to use the bond funds to make the improvements in accordance with the approved plan. The bond shall be approved by the community development department and shall be accompanied by a bond agreement acceptable to the department and shall be filed with the city recorder.

N. Once the overall development plan has been approved by the city council after recommendations from the planning commission, no changes or alterations to such development plans or uses shall be made without first obtaining approval of the planning commission and city council.

O. The design of the preliminary and final plans and plats in relation to streets, access, blocks, lots, common open spaces, and other design factors shall be in harmony with the intent of the city's general plan, development specifications, zoning ordinances and all applicable ordinances, laws and regulations. Streets and access shall be so designed as to take advantage of open space vistas and create drives with an open space character.

P. The city may place whatever additional conditions or restrictions it may deem necessary to insure development and maintenance of the desired residential character. Such conditions may include plans for disposition or reuse of property if common use open space and common use facilities are not maintained in the manner agreed upon or such is abandoned by the owners and may include requirements for recorded provisions which would allow the city to perform maintenance to access and infrastructure (roads

and utility facilities) in the event of failure of the property owners to perform needed maintenance or repairs.

15.12.850 - Review considerations.

A. In considering a proposed PUD, the city shall consider the following as well as other items of the zoning ordinances, this chapter, the city's development specifications and any applicable considerations. Design review criteria shall also apply.

1. Resultant Design. In any use of the planned unit development standards for subdivisions, it should be shown that the resultant design is better in terms of livability, appearance, function and contribution to the city's housing stock, while still allowing for alternative housing styles and economic viability of the project, than could be achieved by means of regular subdivision standards for the zone in which the project is to be located.

2. Porches. To encourage front porches, and their use, porches shall be allowed to extend into the required front yard by a maximum of five feet, provided that the porch will cover the width of at least fifty (50) percent of the home's front face.

3. Parking. All planned unit developments must provide appropriate off-street parking for each lot and/or unit in the development. Except for those projects containing multiple-unit buildings and other exceptions, spaces for two vehicles side by side per unit shall be the normal condition.

4. Individual Lot PUDs. In primarily individual lot PUD developments, garages, either attached or detached, are required for each unit. In order to mitigate impacts of the generally small lot, higher density nature of PUD developments, the city shall encourage alternative garage systems wherever possible. To that end, the city may consider the following when reviewing parking on a proposed project:

    a. Shared Drives. Where side or rear entry garages are to be used, shared drives (meaning driveways which are directly abutting) may be allowed. Such drives shall not be greater than thirty (30) feet in width (total together). All other driveways must be separated by a minimum of six feet.

    b. Capacity. All front loading garage designs shall have a minimum capacity of two vehicles, side by side.

    c. Exception. Alternative garage designs (other than front loading) may be eligible for an exception to the above standard, if it can be shown that the off-street parking in the project would not be negatively impacted.

5. Multiple-Unit PUD. In primarily multiple-unit PUD subdivisions (meaning those with primarily buildings containing multiple units), two parking spaces per unit shall be provided with one space being covered by an approved carport. Additional parking stalls (guest or RV parking) may be required by the city based on review of the site amenities, access conditions and other factors appropriate to the project.

6. Relationships. The design of buildings and their relationship on the site and their relationship to development beyond the boundaries of the project shall be a factor for consideration.

7. Site Issues. Some of the site issues for consideration shall include the following:

    a. The landscaping and screening as related to the several uses within the development and as a means of its integration into its surroundings;

    b. The size, location, design, and nature of signs if any, and the intensity and direction of area or flood lighting.

8. Completion. The demonstrated ability of the proponents of the planned unit development to financially carry out the proposed project under total or phase development proposals within the time limit established shall be a consideration.

B. Twin Homes. In order to avoid any increase in the already high rental housing stock of the city, and yet to allow for alternative housing styles and economy of development and design, twin homes may be allowed only as found herein.

1. In individual lot, noncondominium PUDs located in primarily individual lot residential areas, twin home structures may be allowed as a portion of the development. In determining their allowance, the planning commission shall apply the following criteria:

    a. Allowance. Twin homes may be allowed as a maximum ratio of the units in the project of one set of twin homes (meaning one building) for every four single-family buildings in the project.

    b. Lot Size. Lots designated for twin homes (meaning the combination of the two abutting lots which will house one twin home building) shall be a minimum of twenty (20) percent larger in area than the average of the lots for the single-family residences in the same project.

    c. Flag Lot. No twin homes shall be allowed on a flag lot.

    d. Appearance. Twin homes shall be designed to have the appearance of a single-family residence. Factors such as differing drive approaches, placement on corners in the subdivision, offsetting entries, differing porches and other architectural features should be used to achieve compliance with this standard.

    e. Location in Project. Except under special circumstances demonstrated to the city, any lots designed for twin homes in a planned unit development shall not be located in a manner that disrupts the continuity of the neighborhood character in the area where the project is being designed. Except in special circumstances as determined by the city, twin home lots (meaning the combination of two abutting lots intended to house one building) shall not be located contiguous to another twin home lot.

2. In primarily nonresidential areas, those along the light rail corridor, and for condominium PUD developments in both nonresidential and residential areas, twin homes may be allowed as determined by the planning commission based on project design, density, compatibility with the surrounding neighborhood, consistency with the intent of subsection B of this section, and other factors deemed appropriate to the project.

15.12.860 - Procedures and submittals.

A. PUD development shall be approved by the city using the procedures contained in this chapter for concept plan, preliminary plan and final plat.

B. All plan, documents, plats and applications as required by this chapter shall be provided by the developer. The community development department shall determine any special items needed for PUD development review, including any as may be necessary to determine that the contemplated arrangement of uses make it desirable to apply regulations and requirements differing from those ordinarily applicable under the zoning ordinances, other regulations and specifications of the city.

Residential Design Standards:

3. **Townhome-style Multifamily Building.** The Townhome-style Multifamily Building is a building form that accommodates up to twelve dwelling units that are located side by side. The uses permitted within a building are determined by the base and overlay zoning districts in which it is located. Buildings using this form that are part of a rental development shall include amenities as specified in this chapter.

    a. **Compliance with Standards for Detached House Building Form.** In addition to the standards using the Townhome-style Multifamily Building Form shall be subject to the standards for a Detached House except that Townhome-style Multifamily Buildings shall be exempted from the garage and architectural variability standards described in the previous section. In the event of a conflict between the Detached House Building Form standards and the Townhome-style Multifamily Building Form standards, these standards shall apply.

    b. **Maximum Number of Units.** No more than twelve Townhome-style dwelling units shall be attached in a single row within a single building.

    c. **Frontage and Orientation**

        i. **Single-Building Developments.** Developments composed of a single structure using the Townhome-style Multifamily form shall comply with the frontage and orientation standards described in the General Design Standards section of this chapter.

        ii. **Multiple Building Developments.** The primary entrance and front façade of individual buildings within a multiple building development shall be oriented toward the following, listed in priority order:

            1. Public streets
            2. Perimeter streets
            3. Primary internal streets
            4. Parks, courtyards, paseos, or other common open space; and
            5. Secondary internal streets or alleys

        Primary entrances or facades shall not be oriented toward off-street parking lots, garages, or carports.

    d. **Primary Facade.** Regardless of the number of dwelling units, all structures using the Townhome-style Multifamily Building Form shall include at least one single primary entrance on the front façade. Nothing

in this subsection shall limit the ability of each dwelling unit to have a secondary pedestrian entrance on side or rear facades.

e. Façade Design.

i. All sides of a structure using the Townhome-style Multifamily Building Form visible from existing single-family residential uses, an existing street or pedestrian right-of-way, or a park or improved open space shall display a similar level of quality and architectural detailing.

ii. All building details on a single structure using the Townhome-style Multifamily Building Form, including roof forms, siding materials, windows, doors, and trim shall reflect a consistent architectural style.

f. Garages.

i. Attached or detached garages serving a structure using a Townhouse-style Multifamily Building that is oriented toward a public street shall be placed to the side or rear of the building.

ii. Garages serving Townhome-style Multifamily buildings that are not oriented toward a public street shall be recessed at least four feet behind the front façade of the building and shall not visually or architecturally dominate the front façade elevation.

g. Driveways and Off-Street Parking Areas

i. Except on corner lots, all structures using the Townhouse-style Multifamily Building Form shall be served by a single driveway and off-street parking area. Buildings on corner lots may have up to two individual driveways provided each driveway is accessed by a different street.

ii. No off-street parking area shall be located between a structure using the Townhome-style Multifamily Building and the street it fronts, except on driveways as allowed.

iii. Off-street parking areas (including access and drive aisles) located to the side of a building shall not occupy more than thirty percent (30%) of the lot's frontage.

h. Common Open Space. Buildings using the Townhome-style Multifamily Building Form shall include common open space, according the following standards:

i. At least 20 percent of the development site, excluding dedicated rights-of-way, shall be common open space. The Land Use

Authority may approve a reduction in the open space requirement by 25 percent if the site is within one quarter mile, as measured at the closest property lines, of a light rail station, a streetcar stop, or a public park.

ii. To qualify for the reduction, the site must include a pedestrian access in the form of a sidewalk at least five feet wide from each unit to the nearest public sidewalk or trail.

i. Meter and Equipment Placement. Wall-mounted and ground-based meters, HVAC, and utility equipment serving a Townhouse-style Multifamily Building shall:

i. Be fully screened from view, or located to the sides or rear of the structure they serve, and

ii. Be placed in close proximity to one another.

j. Waste Container Placement. Waste containers serving a Townhouse-style Multifamily building shall not be located between the building and the street it fronts. Waste containers shall be designed according to the standards for waste container enclosures set forth in this title.

k. Building Height. Buildings using this form shall not exceed thirty eight feet (38') in height from grade to the parapet or the peak of the roof. Buildings using this form located within 100 feet of an existing single-family residential zone measured at the closest property lines shall not exceed three stories. Buildings using the Townhome-style Multifamily form on lots in an existing R1, RM, or Agriculture land use district may be up to fifty (50) percent taller than the tallest existing adjacent dwelling unit(s) as measured from grade.

Staff Analysis:
The proposed plat meets the City's minimum PUD standards Staff recommends approval of the proposed PUD, conditioned on more detail for the amenities to be included in the open space, and that the applicant provide an additional access for emergency vehicles.

Staff Alternatives:
The Planning Commission approved the preliminary plat for the Carlisle Place Planned Unit Development and recommend to the City Council final plat approval and a zone change for the Planned Unit Development, with the following conditions.

1. The applicant will continue to work with City staff to make all technical corrections necessary for recording.

2. The applicant will work with the City Engineer and Fire Marshal to provide a second access for emergency vehicles somewhere on the site.

3. Bonds for all common and public improvements will be submitted to the City prior to any development or improvements installed before the plat is signed.

4. The applicant will submit a landscape plan, including greater detail on the site amenities provided in the common areas.

5. The applicant will submit an updated design book, providing greater detail on site lighting and community amenities.

6. The applicant will work with staff on a perimeter fencing solution before the plat is signed.

7. The applicant will provide updated CC&R's and an estimate of the HOA fees before the plat is signed.

8. The applicant will work with staff to modify the sidewalk location at the southwest corner of the property to tie into the future sidewalk when the UTA property is redeveloped

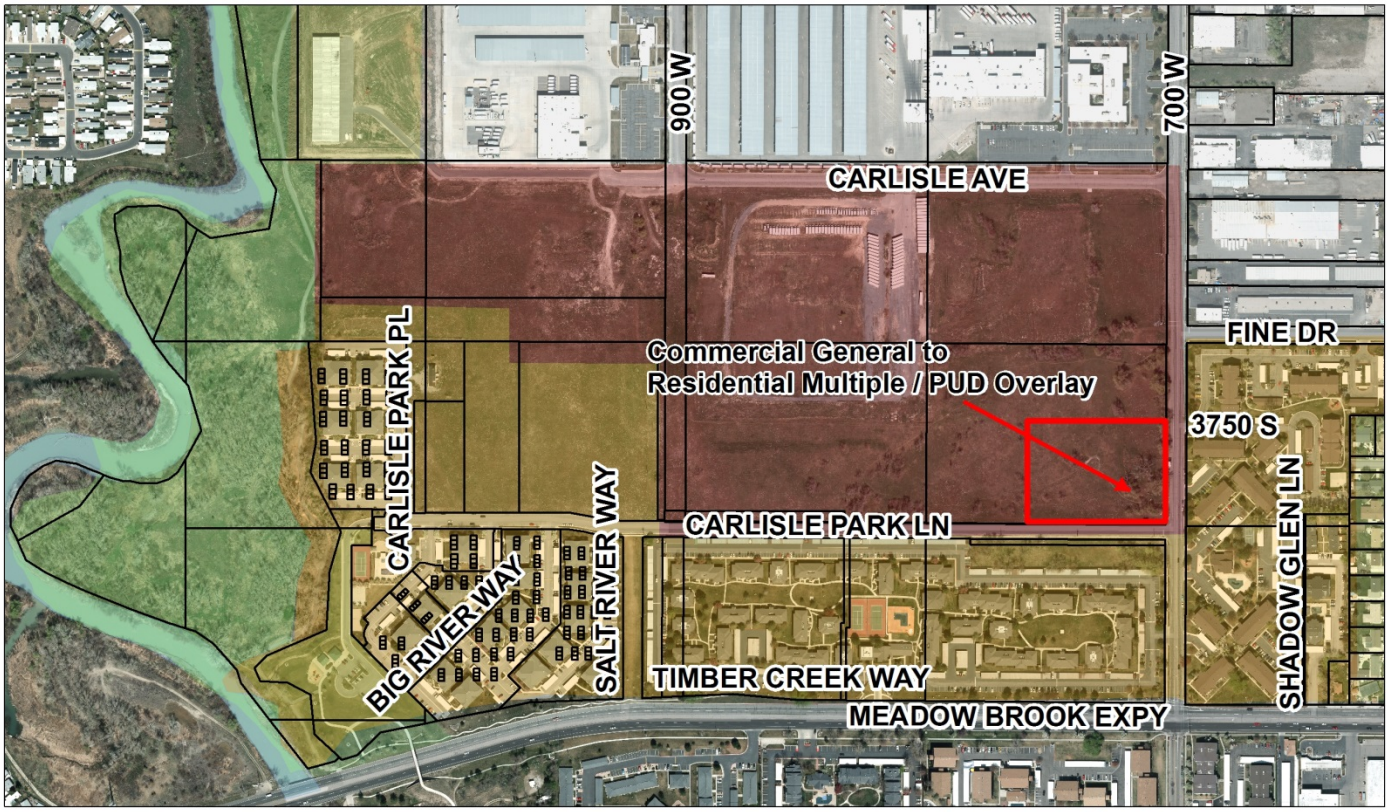
9. The applicant will complete a CPTED review prior to obtaining building permits.

10. Remove the seven visitor parking stalls on the West end of the development to allow for additional common open space

11. The two Eastern most drive approaches to remain closed for safer pedestrian access

Attachments:
1. Zoning Map
2. Proposed Subdivision Plat
3. Proposed Landscape Plan
4. Applicant Letter
5. Proposed floor plans
6. Precedent Photos from Waverly Station

Attachment 1: Zoning Map


900 W
700 W
CARLISLE AVE
FINE DR
Commercial General to
Residential Multiple / PUD Overlay
3750 S
CARLISLE PARK PL
CARLISLE PARK LN
SALT RIVER WAY
BIG RIVER WAY
SHADOW GLEN LN
TIMBER CREEK WAY
MEADOW BROOK EXPY
0
320
640
1,280 Feet

EDM Partners LLC
PO Box 522056 Salt Lake City, UT 84152-2056
(801) 201-7494 wvvw.edmllc.net

NORTH

SCALE: 1" = 20'

0 10 20 40 60

OWNER / APPLICANT:
Hamlet Development
308 East 4500 South, Suite 200
Murray, UT 84107

NOTES:

1. The location of this subdivision is depicted on FEMA Flood Insurance Rate Map number 49021902831F and is shown as an area that is Zone X.
2. All sanitary sewer improvements shall conform with the standards and specifications of Mt. Olympus Improvement District.
3. All culinary water improvements shall conform with the standards and specifications of Jordan Valley Water Conservancy District.
4. All improvements in the public right of way shall conform with the standards and specifications of South Salt Lake City.
5. Contractor to field locate and verify the horizontal and vertical location of all utilities prior to beginning work.
6. Project benchmark is a dome monument located in the intersection of 700 West and Carlisle Park Lane, Elev = 4256.95
7. Gas, power, telephone and cable TV designs to be provided by the respective utility companies.

PROJECT STATISTICS:

Total Area	3.30 Acres	
Total Units	57	(17.3 units/acre)
Parking Stalls	158	(2.77 per unit)
Open Space	35,379 SF	(24.6% of total)

Carlisle Place Subdivision

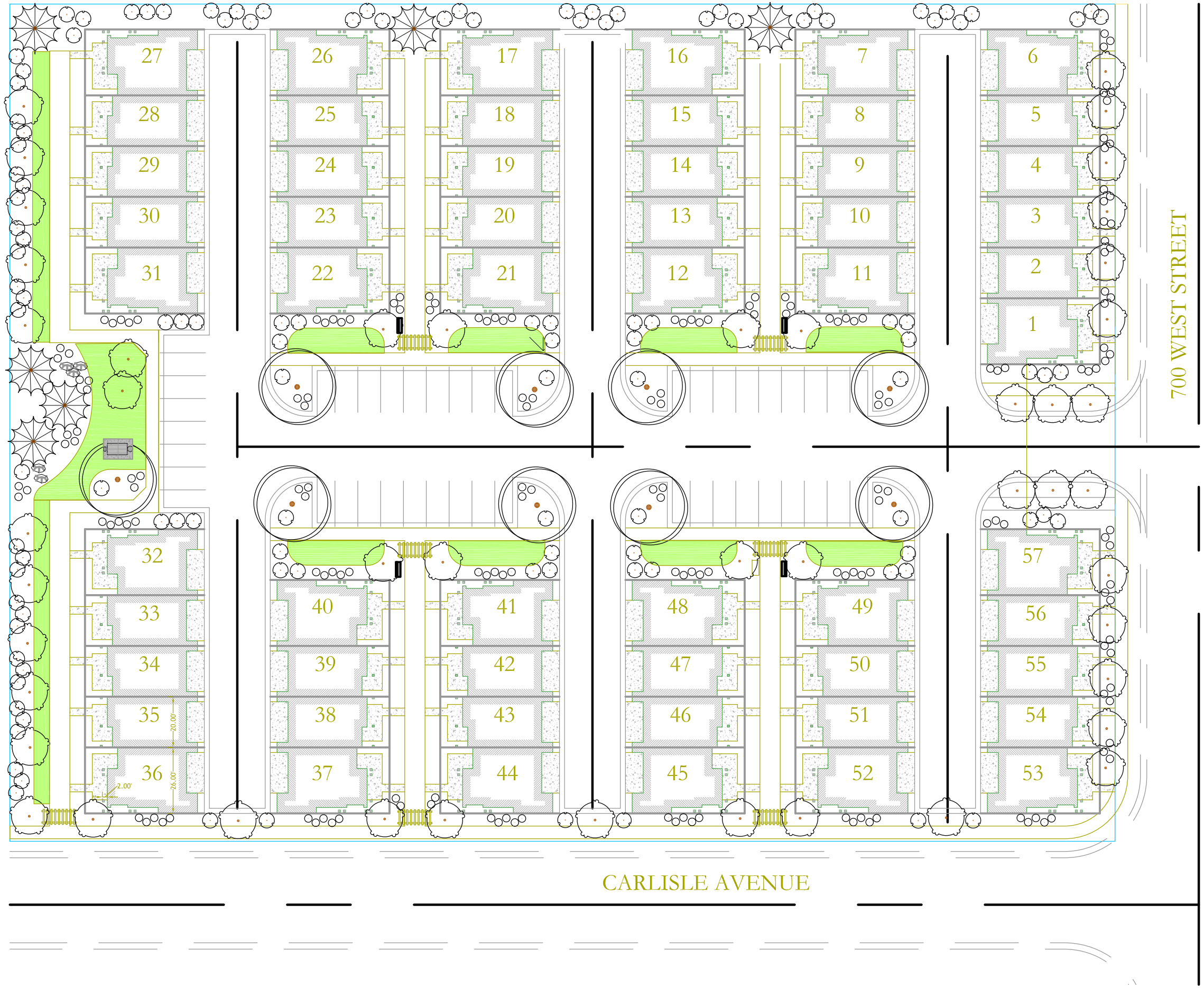
Site Plan

PROJECT:	1310
DRAWN BY:	NMM
REVIEWED BY:	NMM
REVISIONS:	
No. DATE	REMARKS

DATE: June 28, 2013

SHEET NUMBER: C-1

C:\Users\Nick\Dropbox\Projects\Carlisle Place\Drawing\1-Site Plan.dwg



SCALE
1"=40'

CARLISLE PLACE – [illegible]

Landscape Concept Plan

PROJECT STATISTICS

TOTAL AREA	3.30 ACRES	
TOTAL UNITS	57	(17.3 UNITS / ACRE)
PARKING STALLS	158	(2.77 PER UNIT)
OPEN SPACE	43,794 SF (30.5% OF TOTAL)	

HAMLET HOMES
GREAT HOMES, GREAT PEOPLE, GREAT EXPERIENCE.

June 25, 2013

RE: Carlisle Place Project Narrative

Carlisle place is a new community located at the intersection of Carlisle Avenue and 700 West Street in South Salt Lake City. It is contained within a 3.3 acre parcel. The build-out will be comprised of 57 single family, attached fee simple homes.

The homes will be similar in nature to those homes that Hamlet built in Waverly Station. We are in the process of modifying and updating the designs to reflect the experience that we have had with the 160 homebuyers at Waverly Station. Some of the changes contemplated will be as follows:

1. Enlarging the bedroom areas to allow secondary bedrooms to be larger
2. Providing washer and dryer facilities on the bedroom level
3. Modifying exterior balconies to increase the size of the balconies
4. Modifying the patio area off the paseos to enhance this area as well

There will be additional interior and exterior changes based on buyer feedback that we have received.

This community is being done as a planned unit development and a copy of the CC&Rs are attached to this application. As in the Waverly Station community, there is a restriction within the CC&Rs that no more than ten percent (10%) of these homes may be rentals.

We intend to treat the paseos in a very similar manner to Waverly Station, noting that the intense landscaping that was provided in these paseos is a major feature contributing to the very attractive appearance. We have further embellished the landscaping along both sides of Kirkbride Avenue and provided a small park with shade trees, lawn area, and picnic facilities at the end of this road.

The property will be owned by a single purpose limit liability company, Carlisle Place, LLC. The general contractor to build the homes is Hamlet Homes Corporation and the general contractor who will be overseeing the land development process is Hamlet Development Corporation.

We recently presented an application to amend the City Master Plan to both the South Salt Lake City Planning Commission and the South Salt Lake City Council. We received a unanimous recommendation from the Planning Commission to City Council to approve a modification to the

THE DUNBAR

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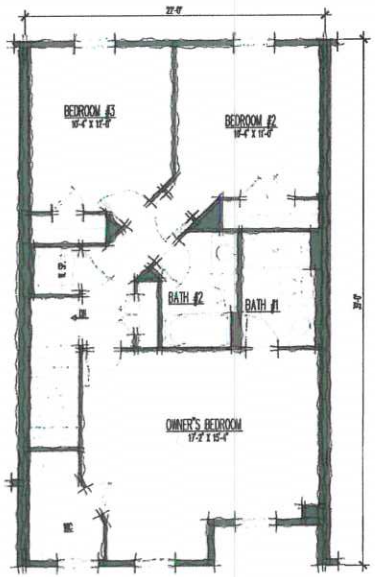
CARLISLE PLACE

HAMLET HOMES



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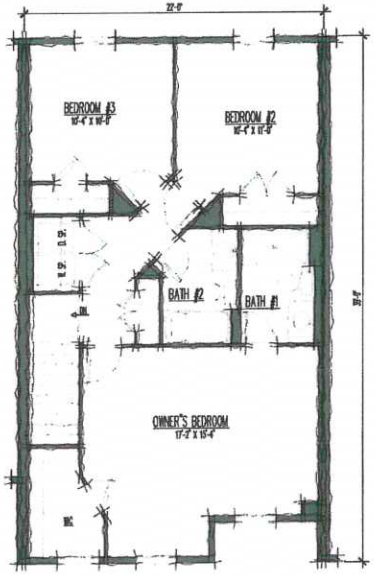
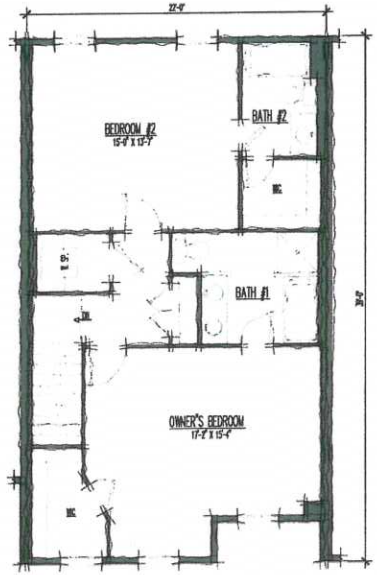
THREE BEDROOM (STACKABLE)



UPPER LEVEL
THREE BEDROOM (SIDE BY SIDE)



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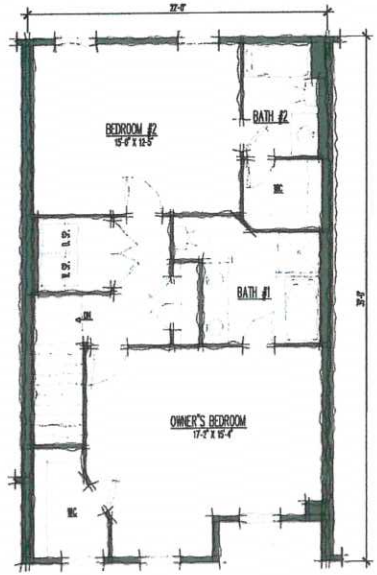

UPPER LEVEL
TWO BEDROOM (SIDE BY SIDE)

THE DUNBAR

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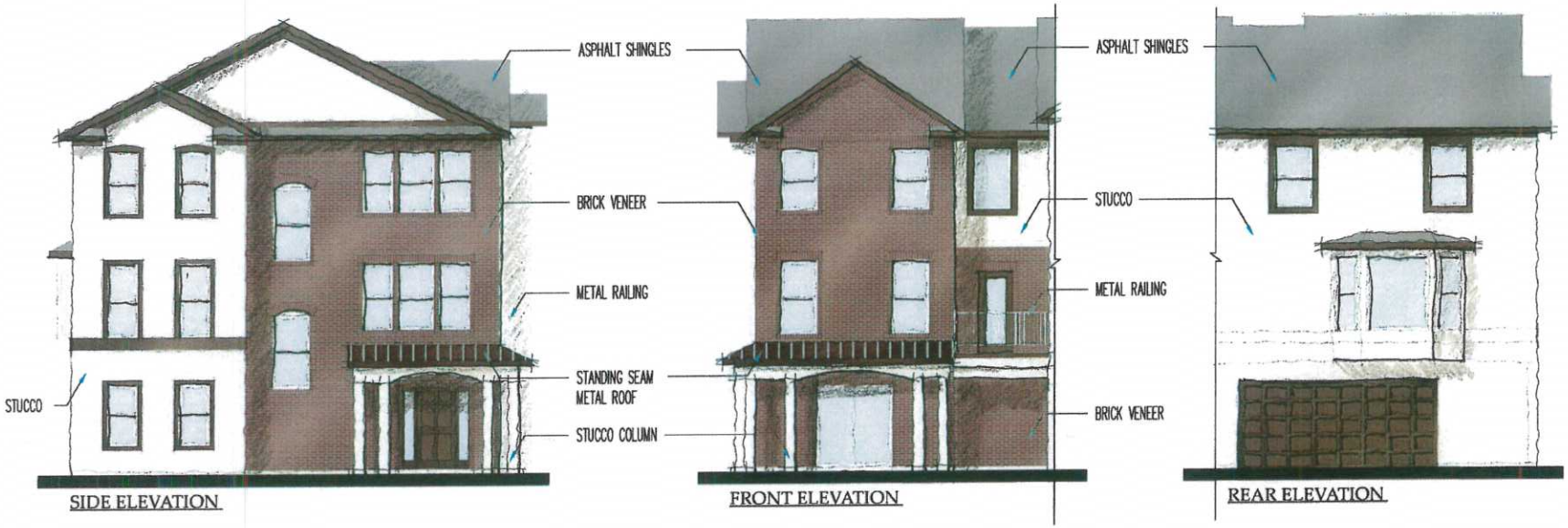
CARLISLE PLACE

HAMLET HOMES



THE FALKIRK

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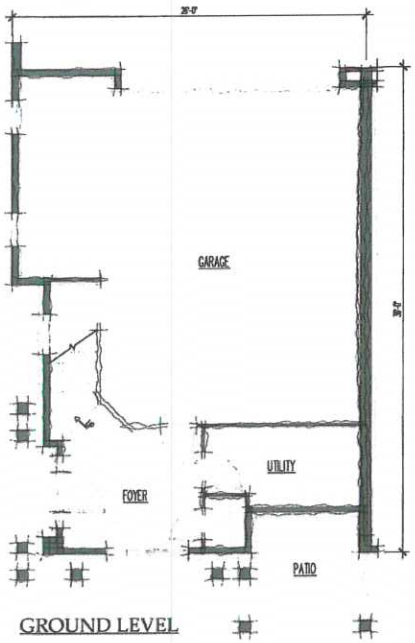
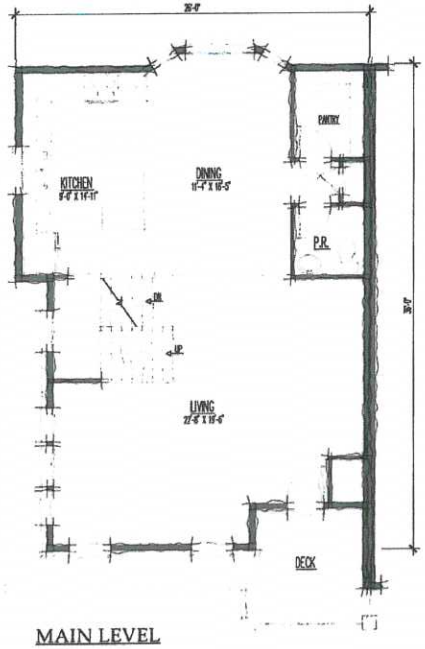
CARLISLE PLACE

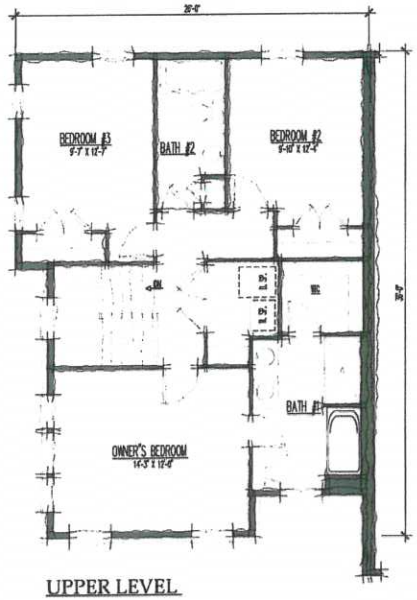
HAMLET HOMES



GROUND LEVEL



MAIN LEVEL



UPPER LEVEL

THE FALKIRK

dw taylor ARCHITECT

CARLISLE PLACE

HAMLET HOMES

master plan to permit this development. At this time we are waiting for city council to render an opinion.

We are prepared to present an application to Planning Commission and subsequently to City Council to rezone the property to a PUD zone to permit our intended use.

We are expecting to begin construction of the infrastructure by the end of August, and because the location of the model homes are bordered by existing paved streets on two sides, we also expect to commence construction of our first five (5) residential units in early September as well. Completion of models and the first production homes will occur by the end of November 2013.

Based on current market conditions, we expect this community to take approximately 18 months from start to finish.


3723

ORDINANCE NO. 2014-17

AN ORDINANCE OF THE CITY OF SOUTH SALT LAKE CITY COUNCIL TO RECONSIDER CHANGING THE LAND USE DISTRICT DESIGNATION FROM COMMERCIAL GENERAL (CG) TO RESIDENTIAL MULTIPLE (RM) AND PLANNED UNIT DEVELOPMENT OVERLAY IN AN AREA AS DESCRIBED HEREIN

WHEREAS: the City is authorized by law to enact ordinances establishing zone districts, regulations for land use, and the subdivision of land; and

WHEREAS: the City Council finds that certain changes are desirous in order to implement the General Plan of the City; and

WHEREAS: the City Council finds that a rezone would achieve the intent of the South Salt Lake City General Plan to accommodate higher density housing in appropriate areas, encourage in-fill housing, improve the overall home ownership ratio, regulate land uses based on compatibility with surrounding uses; and

WHEREAS: the City Council has received an affirmative recommendation from the South Salt Lake City Planning Commission,

BE IT ORDAINED, therefore, by the City Council of the City of South Salt Lake that the zoning map of the City of South Salt Lake be amended as follows:

Map Amendment: On the date of approval July 31, 2013, which was parcel number 15-35-200-027, is hereby changed from Commercial General (CG) land use district designation to Residential Multiple (RM) and Planned Unit Development Overlay land use district designations.

This ordinance will take effect upon execution by the Mayor or after fifteen days from transmission to the office of Mayor if neither approved nor disapproved by the Mayor.

(signatures appear on separate page)

DATED this 9th day of July, 2014.

BY THE CITY COUNCIL:

Irvin H. Jones Jr., Council Chair

ATTEST:

Craig D. Burton, City Recorder

City Council Vote as Recorded:

Snow	Aye
Gold	Aye
Turner	Aye
Rapp	Aye
Rutter	Aye
Jones	Aye
Beverly	Aye

Transmitted to the Mayor's office on this 10th day of July 2014.

Craig D. Burton, City Recorder

MAYOR'S ACTION: APPROVED

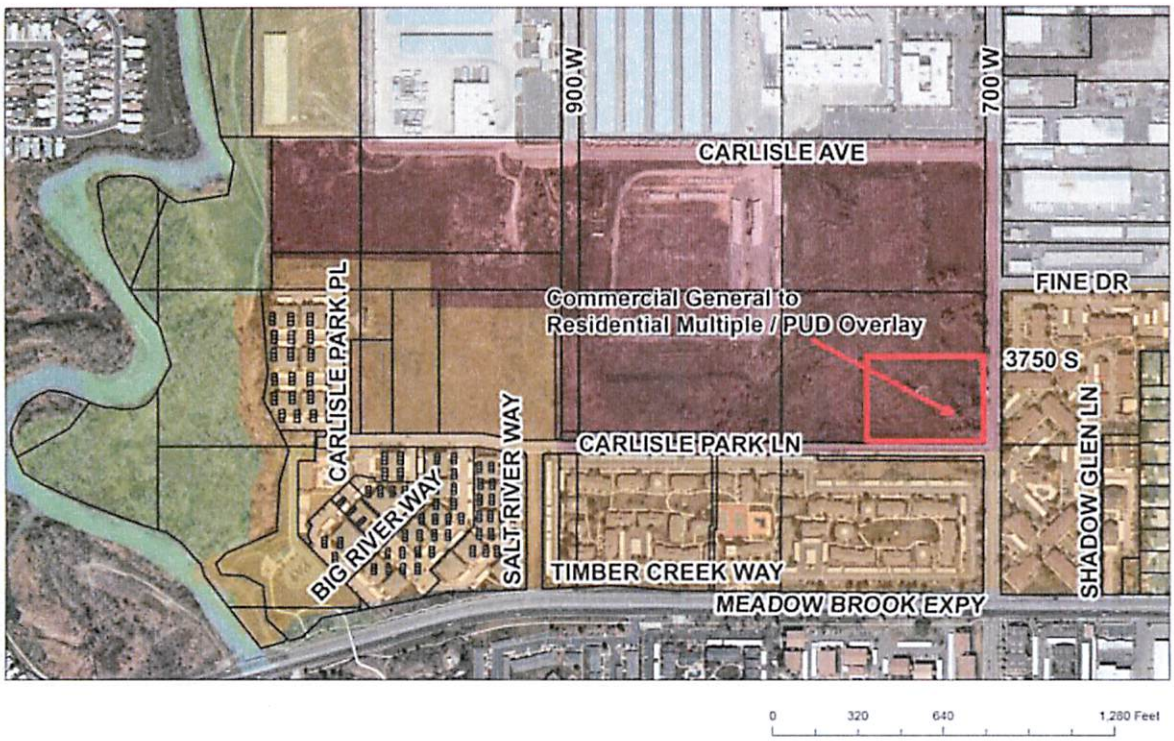
Dated this 11 day of July, 2014.

Cherie Wood, Mayor

ATTEST:

Craig D. Burton, City Recorder

CITY OF SOUTH SALT LAKE CORPORATE Seal SALT LAKE COUNTY, UTAH


900 W
700 W
CARLISLE AVE
FINE DR
Commercial General to
Residential Multiple / PUD Overlay
3750 S
CARLISLE PARK PL
CARLISLE PARK LN
SALT RIVER WAY
BIG RIVER WAY
TIMBER CREEK WAY
SHADOW GLEN LN
MEADOW BROOK EXPY
0
320
640
1,280 Feet

4770 S. 5600 W.
P.O. BOX 704005
WEST VALLEY CITY, UTAH 84170
FED.TAX I.D.# 87-0217663
801-204-6910

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CUSTOMER NAME AND ADDRESS	ACCOUNT NUMBER	DATE
CITY OF SOUTH SALT LAKE, ATTN: AMY DALLEY ATTN: CRAIG BURTON 220 E MORRIS AVE. SOUTH SALT LAKE CITY UT 84115	9001382697	7/17/2014

ACCOUNT NAME	
CITY OF SOUTH SALT LAKE,	
TELEPHONE	**ADORDER# / INVOICE NUMBER**
8014836000	0000970896 /
SCHEDULE	
Start 07/17/2014	End 07/17/2014
CUST. REF. NO.	
NO. 2014-17	
CAPTION	
CITY OF SOUTH SALT LAKE ORDINANCE NO. 2014-17 An Ordinance of the City of South Sa	
SIZE	
26 Lines	1.00 COLUMN
TIMES	**RATE**
2	
MISC. CHARGES	**AD CHARGES**
	TOTAL COST
	37.50

CITY OF SOUTH SALT LAKE ORDINANCE NO. 2014-17

An Ordinance of the City of South Salt Lake City Council to reconsider changing the land use district designation from Commercial General (CG) to Residential Multiple (RM) and Planned Unit Development Overlay in an area at approx. 3824 South 700 West.

s/ Irvin H. Jones, Jr.
Council Chair

The complete Ordinance 2014-17 is available in the office of the City Recorder, 220 East Morris Avenue, South Salt Lake, Utah.

Published: Thursday, July 17, 2014
970896 UPAXLP

AFFIDAVIT OF PUBLICATION

AS NEWSPAPER AGENCY COMPANY, LLC dba MEDIAONE OF UTAH LEGAL BOOKER, I CERTIFY THAT THE ATTACHED ADVERTISEMENT OF **CITY OF SOUTH SALT LAKE ORDINANCE NO. 2014-17 An Ordinance of the City of South Salt Lake City Council to reconsider changing the land use district designation** FOR **CITY OF SOUTH SALT LAKE,** WAS PUBLISHED BY THE NEWSPAPER AGENCY COMPANY, LLC dba MEDIAONE OF UTAH, AGENT FOR THE SALT LAKE TRIBUNE AND DESERET NEWS, DAILY NEWSPAPERS PRINTED IN THE ENGLISH LANGUAGE WITH GENERAL CIRCULATION IN UTAH, AND PUBLISHED IN SALT LAKE CITY, SALT LAKE COUNTY IN THE STATE OF UTAH. NOTICE IS ALSO POSTED ON UTAHLEGALS.COM ON THE SAME DAY AS THE FIRST NEWSPAPER PUBLICATION DATE AND REMAINS ON UTAHLEGALS.COM INDEFINATELY. COMPLIES WITH UTAH DIGITAL SIGNATURE ACT UTAH CODE 46-2-101; 46-3-104.

PUBLISHED ON Start 07/17/2014 End 07/17/2014

SIGNATURE

DATE 7/17/2014

VIRGINIA CRAFT
NOTARY PUBLIC - STATE OF UTAH
My Comm. Exp. 01/12/2018
Commission # 672963

NOTARY SIGNATURE

THIS IS NOT A STATEMENT BUT A "PROOF OF PUBLICATION"
PLEASE PAY FROM BILLING STATEMENT