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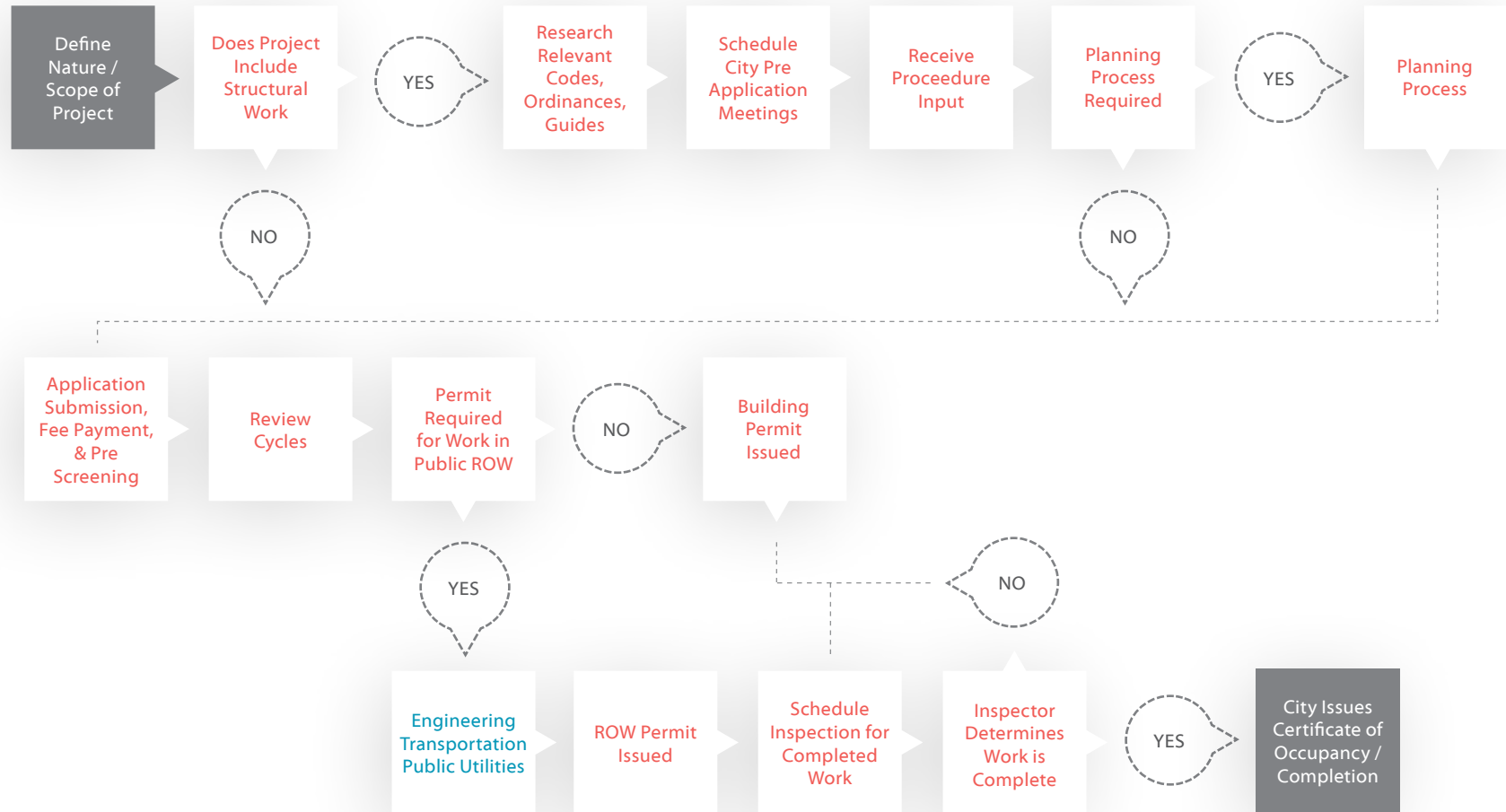
Building Design & Processes Manual

A Guide to
Planning
Construction
& Completion
for

Home Owners
Business Owners
Designers
& Builders

Preliminary Process

Pre-Application Process



Plans Review & Permitting

Inspection & Certificates

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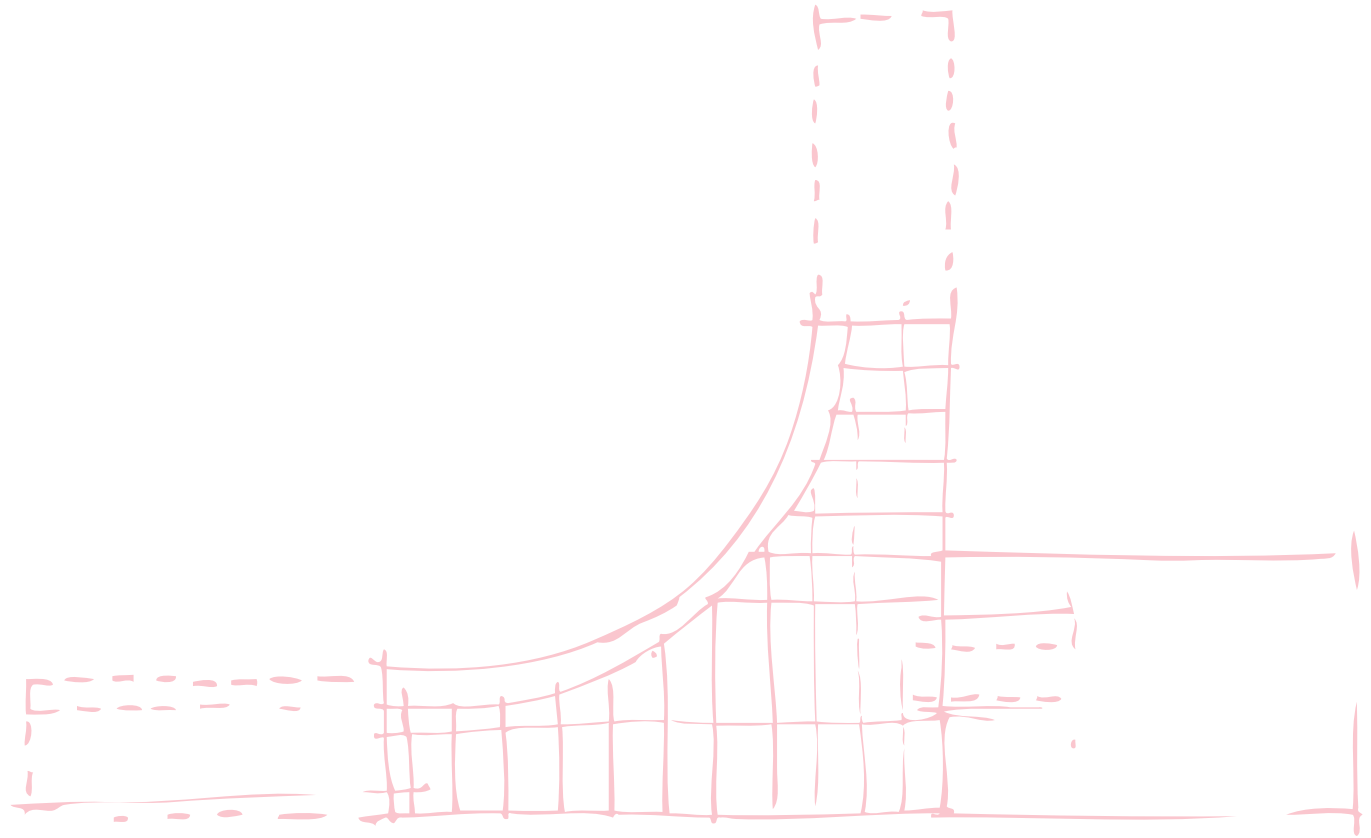
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Part 1

Administration Process



1.1 Pre-Application Process

Building Permits One Stop Shop
Salt Lake City & County Building
451 E. State St., Room 215

1.1.1 General Information

The City encourages owners of building projects in early stages of development to become familiar with City laws, ordinances and standards. The project owner is encouraged to bring as much information about the project as possible to the Building Permits One Stop Shop for additional guidance prior to permit application.

Certain projects will benefit from or require Pre-Application Meetings. Together the Planning and Zoning, Building Services & Code Enforcement (BSCE), Public Utilities, Transportation and Engineering divisions conduct these meetings to ensure project stakeholders and the City are thoroughly informed of how City requirements and considerations will impact a project, saving everyone time and money during project development.

1.1.2 Due Diligence

The project owner is responsible for ensuring the project meets the requirements of all applicable City laws, ordinances and standards. The project owner and the design and construction teams of a project should become familiar with this guide and other online resources, including the City code and various Master Plans, and refer to them when questions arise throughout pre-construction and construction.

Questions? Call the One Stop Shop at 801-535-7968 for assistance.

Gather Project Information

Providing complete information will result in faster and more effective assistance. The following information is required to login at the City One Stop Shop:

Point of Contact for the Project

- Name
- Email address
- Mailing address
- Phone number

Information About the Project Property

- Complete address
- Existing zoning: dotnet.slcgov.com/General/AddressInformation/zoningbyaddress.aspx
- *Additional information about the project that will enable more effective service:*
- Project description
- Site plan
- Existing and proposed occupancy classification and construction type
- Existing and proposed site use
- Uses adjacent to the site
- Hazardous materials and process disclosure

Visit One Stop Shop with Gathered Information

Once a visitor is logged in at the One Stop Shop, he or she is directed by staff to the appropriate advisor for further assistance.

Depending upon the nature of the project, staff may require or advise the applicant to schedule a pre-application review meeting.

1.1.3 Pre-Application Review Meetings

During the concept stage of project development, before a project is 40% complete, project owners can schedule meetings with City representatives to discuss city codes and policies, and conditions that may be placed on the project to achieve compliance with them. These meetings can be especially helpful in when submitting applications to work in Historic Districts or on Landmark Sites. In some circumstances these meetings are required.

Pre-Application Review Meetings include

- Design Review Team Meeting: Technical review
- Planning Pre-Submittal Review Meeting: Planning review

Development Review Team (DRT) Meeting

M - Th 3:00-4:30 pm, 30 - 60 min

Salt Lake City & County Building
451 E. State St., Room 215

Development Review Facilitator: 801-535-6629

The DRT is comprised of staff members from City departments and divisions responsible for reviewing Building Permit applications. The DRT's goal is to provide thorough and consistent communication between the City and project owners and design teams, facilitating shorter review times and simplifying administrative processes.

At the meeting, DRT members will discuss project considerations within their respective fields of expertise:

- Public Utilities: water, sewage, and storm drainage requirements; evaluation of some environmental and geo-hazards associated with land development
- Transportation: whether a traffic study will be required; if the project will exceed "Levels of Traffic Service"
- Fire Department: compliance with adopted state and city fire codes, including the adequacy and accessibility of fire services
- Police Department: design characteristics related to crime prevention and possible crime which could be associated with the location of a project or the use of a particular business
- Engineering: public way improvements; assessing needs for repairs, improvements, and design
- Office of Sustainability: compatibility with City sustainability objectives, policies and ordinances
- Building Services & Code Enforcement (BSCE): petitions for zoning code and building code issues

The DRT will provide a written report following its review to be included in a Building Permit Application, ensuring that all agreements and conditions of the initial review are carried forward to City plan reviewers.

Scheduling and Attending a DRT Meeting

- Complete DRT Worksheet and contact the Development Review Facilitator to schedule the meeting
- Bring a copy of the preliminary site plan to the meeting

Canceling or Rescheduling

At least 24 hours prior to your scheduled meeting, contact the Development Review Facilitator to cancel or reschedule.

Suggestions for a successful meeting

- Bring as much information about the project as possible



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1.1.3 Pre Application Review Meetings

- Prepare by becoming familiar with City building guidelines online and in this manual
- Invite or coordinate questions from the design team
- Questions may include: permitted land uses, right-of-way issues, on-site maneuvering and parking, water and sewer connections, storm drainage requirements, fire code issues, etc.
- Be prepared to record information for future reference. You will likely receive site-specific comments concerning unique characteristics of the property, development requirements, information on what next steps are required and what needs to be included in a plan submittal for permit issuance.

If a project entails planning considerations beyond the scope of the DRT, an applicant will be advised or required to attend a Planning Pre-Submittal Team Meeting.

Planning Pre-Submittal Team Meeting

Thursday, 1:30 pm

Salt Lake City and County Building
451 E. State St., Room 251

Meetings are scheduled by Planning staff

The Pre-Submittal Team reviews site plans, elevations, and other project information to determine a any planning process that may be required, i.e., subdivision, special exceptions, master plan amendments, and other processes.

This process allows an applicant and the City to assess issues prior to the applicant committing to the expense of drafting plans, which may be unacceptable, and time spent filing a formal application which does not meet city requirements.

If necessary, following this meeting the Pre-Submittal Team will advise the applicant about beginning the Planning Process.



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1.2 Planning Processes

1.2.1 About the Planning Process

Projects with certain characteristics pertaining to City development standards may be identified during Pre-Application as needing to go through the Planning Process. City staff will identify which Planning process will be required and advise the project developer on how to proceed.

About The Planning and Zoning Division

The Salt Lake City Planning Division is responsible for creating land use development codes and their implementation. The division is committed to setting the standard for planning in the region, engaging the community and providing professional planning services.

City Planners' purview includes developing the following City development standards, and providing project guidance to ensure they are upheld:

- Master Plans: Provide vision and goals for future development in the City
- City Zoning Ordinance: Ensures minimum development standards are met
- Subdivision Ordinance: Ensures any division of land provides adequate sized lots for development and access to the property
- Historical Preservation Ordinance: Protects historically important neighborhoods and sites in the City for existing and future citizens

About decision-making commissions

The Planning and Zoning Division provides staff support for the following City commissions, which make final decisions regarding City development standards:

- The Historic Landmark Commission: Ensures the preservation of important historic structures and sites including the review of applications in the city's local historic districts.

- The Planning Commission: Determines the appropriate types and intensity of uses in various geographic areas and determines dimensional requirements (such as maximum heights of structures, amount of open space on a lot and the distance of buildings from property lines) to minimize impacts on other properties.
- The Appeals Hearing Officer: Hears appeals to Historic Landmark and Planning Commission decisions and grants variances to the zoning ordinance.

More Information:

Appendix 1.2A - Additional Information about Commissions

1.2.2 Filing an Application for Planning

After receiving a response about development requirements from the Development Review Team and Planning Pre-Submittal Meetings, an applicant may submit a formal application to begin any necessary Planning process. Applications are submitted to the Planning Counter in rm 215 of the Salt Lake City & County Building.

More Information:

Appendix 1.2C - Specific Design Standards

Appendix 1.2D - Planning Processes

Appendix 1.2E - Planning Process Flow Charts

Applicant gathers and submits required information

Each application for a Planning process has a Submittal Requirements Checklist and provides details about the project plans (file exhibits) required for that process.

All required plans must be prepared by a professional designer, such as an architect, landscape architect, land planner, engineer, or drafting service.

Applications must be complete upon submission. Before submitting, ensure all required plans and other documents have been gathered and that all information on the submittal Requirements Checklist is included on the appropriate plan or document.

Project Planner assigned

Approximately 3 to 5 days after an application is filed with the city, the application will be assigned to a project planner. The project planner will review the application and be responsible for processing

the application through the planning stages and explaining the various steps in the review process to the applicant. Applicants may always call their assigned planner with any questions.

Application materials reviewed for completeness:

The project planner will review the application and advise the applicant as to whether information is missing or the application is complete. Incomplete or missing information on drawings and application forms will delay processing of the application.

1.2.3 Planning Processes

Staff Report prepared

After receiving the recommended conditions from the DRT and / or the Planning Pre-Submittal Review Meetings, the Project Planner will prepare the staff report and draft resolution recommending the decision-making body deny or approve the project, as conditioned, according to City codes, ordinances and master plans.

Applicant questions following issuance of the Staff Report

Prior to the public hearing, the project planner will try to answer any questions following issuance of the staff report, and refer the applicant to appropriate City staff with questions regarding conditions from other city divisions or departments. A meeting with appropriate staff representatives may be arranged if significant issues are involved.

Questions from consultants who are a part of the development team (i.e., engineer, architect, attorney, or broker) should be coordinated prior to contacting the Project Planner. Planning Commission policy requires Planning staff answer questions and resolve disputes as much as possible at the staff level so the Planning Commission may direct its attention to the overall land use proposal, rather than being concerned with resolving specific conditions, thereby expediting the public hearing process.

Community Council Participation / Open House

More Information:

Appendix 1.2B - Citizen Review Policies

Salt Lake City has an extensive Community Council program to encourage citizen participation in their city government. Depending on the type of project and the impacts that it may have on the neighborhood and adjoining neighborhoods, city staff



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will contact the respective Community Council so the applicant may present the project to the Community Council(s) early in the planning process. Community Councils and interested citizens can provide their input and comments to project planners.

Public Hearing

Once the staff report is complete, staff will schedule a hearing before one of the decision-making commissions, or an Administrative Hearing.

A public notice will be published in accordance with the notification requirements of the petition type. This typically includes posting on the city web site, mailings to neighboring property owners and residents and for amendments to zoning or master plans publishing in the local newspaper.

The respective decision-making body will hold a public hearing on the permit and render a decision. For certain categories of permits, the decision-making body's decision is final, unless appealed to the Appeals Hearing Officer within 10 days of decision. For other permit categories, the decision-making body's decision is advisory to the City Council, and a public hearing before the City Council will be required.

Final Approval

After the respective decision-making body has made a decision, the planning staff will send the applicant a copy of its findings. This includes all conditions of approval, unless the findings state otherwise.

After the decision-making body's findings are issued and any appeal period has expired, plans may be submitted for building permits.

1.2.4 Appendix A - Additional information About Boards and Commissions

Appeals Hearing Officer

The Appeals Hearing Officer has been established to hear and decide appeals from decisions made by:

- The Historic Landmark Commission.
- The Planning Commission - concerning subdivisions, subdivision amendments, conditional uses, or planned developments.
- Administrative decision by the Zoning Administrator or the Administrative Hearing Officer.

- And grants variances to the zoning ordinance.

Who can initiate the process?

Each commission or decision making bodies ruling can be appealed by the individuals listed below:

- The Historic Landmark Commission: The applicant, an abutting property owner, or other property owner within the same Historic Preservation Overlay District, any recognized or registered organization pursuant to Chapter 2.60 of the Salt Lake City Code, the Utah State Historical Society or the Utah Heritage Foundation.
- The Planning Commission: Any person adversely affected by a decision concerning subdivisions, subdivision amendments, conditional uses, or planned developments.
- Zoning Administrator or Administrative Hearing Officer: An applicant or any other person or entity adversely affected by the decision.
- Variances: Property owner or representative.

Standard of Review for Administrative Decisions

The Appeals Hearing Officer will review appeals to administrative decisions anew, based on applicable procedures and standards for approval, and shall give no deference to the previous decisions by the Zoning Administrator or the Administrative Hearing Officer. The Appeals Hearing Officer's ruling is binding upon all parties, unless overturned by appeal in the Third District Court.

Standard of Review for Commission Decisions

The Hearing Officer is to determine whether the originating Commission, in making its decision, committed a factual or legal error that may have resulted in a different decision had the error not been committed.

The review of the Appeals Hearing Officer will be limited to the record before the Historic Landmarks Commission or the Planning Commission. The record will include the min from the Historic Landmarks Commission or the Planning Commission, application or petition to the Historic Landmarks Commission or the Planning Commission, the staff report, and any other documents or evidence, including photographs, submitted to or

considered by the Historic Landmarks Commission or the Planning Commission. The record may also include a transcript of the Historic Landmarks Commission or Planning Commission public hearing.

The Appeals Hearing Officer will not accept or consider any evidence not presented to the Historic Landmarks Commission or the Planning Commission, unless the evidence was improperly excluded by the Historic Landmarks Commission or the Planning Commission.

Decisions

The Appeals Hearing Officer will presume that the decision of the Historic Landmarks Commission or the Planning Commission is valid. The presumption in favor of the deciding body's decision may be rebutted. If the Appeals Hearing Officer concludes that the decision was **illegal, arbitrary, or capricious**, then the Appeals Hearing Officer can reverse or remand the decision as appropriate. The Appeals Hearing Officer's ruling is binding upon all parties unless overturned by appeal in the Third District Court.

Illegal means failure to follow proper procedures, such as failure to notify involved parties or misinterpretation of the law. The Appeals Hearing Officer will defer to the Historic Landmarks Commission's or the Planning Commission's interpretation of the law where the ordinance or statute expressly or impliedly grants discretion to the deciding body.

The term **arbitrary and capricious** includes "not supported by substantial evidence."

Substantial evidence means that the record contains evidence sufficient for a reasonable person to make the findings. The Appeals Hearing Officer may not reweigh the evidence, but there shall be enough evidence supporting the lower body's findings. If inconsistent inferences may be drawn from the evidence, the Appeals Hearing Officer shall defer to the judgment of the Historic Landmarks Commission or the Planning Commission.

Variances

The Appeals Hearing Officer is the government body empowered to grant variances. The Officer acts like a judge, making decisions about individual properties that for one reason or another cannot meet a specific zoning regulation.



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What is a variance?

A variance grants a legal right to a property owner to develop property in a manner that deviates from a specific provision of the zoning ordinance and for which a special exception is not expressly allowed. In seeking relief from the restrictions in the zoning ordinance, the property owner applying for the variance must show that the strict application of the zoning ordinance would cause an unnecessary hardship. A hardship might be defined as a situation that approaches confiscation of the land. In addition, the circumstances that create this hardship must be unique to the property in question and must not be the property owner's own making. The Appeals Hearing Officer must also find that the variance request is not contrary to the public interest or the intent of the zoning ordinance. Variances are typically granted in extreme cases.

What are the standards to grant a variance?

- Literal enforcement of the zoning ordinance would cause an unreasonable hardship for the applicant that is not necessary to carry out the general purposes of the ordinance.
- There are special circumstances attached to the property that do not generally apply to other property in the same zoning district.
- Granting the variance is essential to the enjoyment of a substantial property right possessed by other property owners in the same district.
- The variance will not substantially affect the general plan of the city and will not be contrary to the public interest.
- The spirit of the zoning ordinance is preserved and substantial justice done.

What kind of process does the Appeals Hearing Officer follow when reviewing applications for variances?

Typically, each application for a variance will be reviewed and decided upon at a single public hearing. This makes it imperative for citizens, who wish to participate, to respond in a timely fashion, either in writing or in person at the hearing.

The Officer provides the opportunity for all interested parties, for or against an application, to provide evidence. However, in making a decision, the Officer may only consider testimony and documentary evidence relevant to the specific standards listed in the zoning ordinance. The Officer may not change existing zoning

regulations or make policy decisions. The Officer will approve, approve with conditions, or deny applications based on the facts presented in evidence at the hearing. In granting a variance, the Officer may impose conditions upon the applicant in order to minimize the impact upon the surrounding area or neighborhood.

The City's Planning Division assists the Appeals Hearing Officer by reviewing all applications and preparing reports for the Officer in advance of each hearing. The purpose of a report is to provide background information to the Officer; to inform him of the nature of the request; and to make a recommendation whether to approve or deny the request.

How can I learn about hearings?

Citizen input is important to the process; therefore, any request for a variance or special exception the public is notified by a number of means, such as the local newspaper or City website at slcgov.com.

How can I participate in the process?

The Appeals Hearing Officer generally meets on the first Wednesday of each month at 3:00 pm for appeals of administrative decisions, which do not allow for public comment, and 5:00 pm for variance requests and items which require a public hearing. The meets are held at the City & County building in rm 326. You can view agendas of all city boards and commissions at slcgov.com.

Citizen comments either in support of or against the application, are welcome. You can provide your comments in person or in writing. Written comments must be mailed or delivered to the Planning Division no later than 1 week before the hearing to ensure that they are included in the packet of information that the Officer reviews. All correspondence received after that time will be hand distributed to the Officer.

Planning Commission

slcgov.com/planning/pc

The Planning Commission consists of eleven members, appointed by the Mayor, to serve 4 year terms. The Planning Commission reviews and decides applications for commercial, residential, industrial, and other development projects. The Commission also makes recommendations to the City Council on matters related to the City's neighborhood master plans, zoning ordinance, and

other City planning policies and regulations. The actions and decisions of the Planning Commission are binding upon all parties, unless appealed to the city's Appeals Hearing Officer.

What does the Planning Commission Review?

Legislative Items

Annexation

In accordance with State Code Chapters 10-2, cities may annex properties which are contiguous, in general, with their boundaries. The City has adopted a Declaration of Annexation Map, which identifies areas adjacent to the corporate boundaries of the city that the city may desire to annex. Annexation may be required for an area to receive city services and utilities. Staff also works closely with the City Records Office to ensure the requirements of the State Code are met. All annexations shall be reviewed by the Planning Commission and City Council.

Master Plan

This process is used to develop, update or amend a master plan including Community Master Plans, Small Area Plans, or Block Plans. Chapter 10-9-3 of the State Code requires that every municipality adopt a comprehensive general plan. In 1967 the City decided to divide the geographic land into seven planning districts. The Northwest Quadrant was created in the 1980s when that property was annexed into the City, becoming the eighth district. A community master plan was adopted for each of the seven geographic planning communities. The 1993 City Strategic Plan identifies the goal of updating the community master plans every 10 years. All major plan amendments must go the Planning Commission and City Council for approval.

Zoning Map Amendment

This is a review undertaken whenever a request is made to change the zoning classification of a piece of property. Although amending the zoning ordinance is left to the discretion of the City Council, whom has final authority, certain criteria outlined in Chapter 21A.50 should be reviewed to determine the appropriateness of the amendment. The Planning Commission makes a recommendation to the City Council prior to its final decision.



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Zoning Text Amendment

This is a review undertaken whenever a request is made to change any text of the Zoning Ordinance. Although amending the Zoning Ordinance is left to the discretion of the City Council, whom has final authority, certain criteria outlined in Chapter 21A.50 should be reviewed to determine the appropriateness of the amendment. The Planning Commission makes a recommendation to the City Council prior to its final decision.

Administrative Items

Conditional Building and Site Design Review

The Site Plan Review Process is intended to help ensure that newly developed properties and redeveloped properties are compatible with adjacent development and that traffic, public safety, overcrowding, and environmental problems are minimized to the greatest extent possible.

Conditional use

This is a review undertaken for projects which are not allowed by right (permitted uses), but may be allowed by the Planning Commission based on specific criteria outlined in Chapter 21A.54 of the zoning ordinance. The Planning Commission may decide that the use at the specified location meets the conditional use criteria of the ordinance, or by placing certain conditions on the specific project it will make it compatible at the requested location.

Planned development

A planned development is a distinct category of conditional uses as outlined in Chapter 21A.54.150. The Planned Development is intended to encourage the efficient use of land and resources, promoting greater efficiency in public and utility services, and encouraging innovation in the planning and building of all types of development. The Planned Development Regulations authorize the Planning Commission some flexibility in its review and approval of Planned Developments to allow creative design solutions for specific projects.

What kind of process does the Commission follow when reviewing applications?

Typically, each application for a conditional use or planned development will be reviewed and decided upon at a single public hearing. This makes it imperative for citizens who wish to participate to respond in a timely fashion, either in writing or in person at the hearing.

The Commission provides the opportunity for all interested parties, for or against an application, to provide evidence. However, in making a decision, the Commission may only consider testimony and documentary evidence relevant to the specific standards listed in the zoning ordinance. In granting an approval, the Commission may impose conditions upon the applicant in order to minimize the impact upon the surrounding area or neighborhood.

The City's Planning Division assists the Planning Commission by reviewing all applications and preparing reports for the Commission in advance of each hearing. The purpose of a report is to provide background information to the Commission members; to inform them of the nature of the request; and to make recommendations whether to approve or deny the request.

How can I learn about hearings?

Citizen input is important to the process. When a Planning application is reviewed by the Commission, a public notice is placed in the Salt Lake Tribune, sign(s) are placed on the subject property, agendas are advertised on the city's web site, and on the city's listserv. This notice includes information about the request, a city staff contact, information, and a tentative date and the location of the Planning Commission hearing.

How can I participate in the process?

The Planning Commission generally meets on the 2nd and 4th Wednesday of each month at 5:45 pm at the City & County building in rm 326. You can view agendas of all city boards and commissions at slc.gov.com.

Citizen comments are welcome. You can provide your comments in person or in writing. Written comments must be mailed or delivered to the Planning Division no later than 1 week before

the hearing to ensure that they are included in the packet of information that the Commission reviews. All correspondence received after that time will be hand distributed to the Commission.

Historic Landmark Commission

slcgov.com/planning/planning-historic-landmark-commission

The Historic Landmark Commission (HLC) is charged with the responsibility of identifying and protecting the city's historic and architectural cultural resources identified by a H Historic Overlay, recommending their designation, and with the review of proposals which would affect the character and integrity of these sites and districts. The zoning ordinance sets out the purpose of the HLC in Ch.21A.06.050 and Ch.21A.34.020 the means by which this is accomplished.

A **Certificate of Appropriateness** (CoA) approval is required for any proposal which would alter the exterior of a landmark site or a structure in a local historic district, or for new construction in a local historic district. The Historic Landmark Commission has responsibility for the review of all Certificate of Appropriateness applications to ensure that proposals preserve or enhance the special character of the building and / or the district. The Planning staff reviews applications for minor projects and the HLC reviews applications for major projects in need of a CoA.

A proposal will be reviewed in relation to the criteria established by the design standards in Ch.21A.34.020 of the zoning ordinance, with the review being guided by the City's adopted design guidelines. Planning staff are also able to provide detailed advice to potential applicants in planning a project which would affect any of these cultural resources.

Approval of a Building Permit for such work will depend upon the approval of a Certificate of Appropriateness.

Ordinance & Design Guidelines: slcdocs.com/planning/projects/HistoricPreservationUpdates/residentialdesignguidelines_june12.pdf

City Code: sterlingcodifiers.com/codebook/getBookData.php?section_id=780546



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Types of Reviews

There are three alternative types of review for a Certificate of Appropriateness application, reflecting the complexity and / or impact of the proposal. (See accompanying Process Flow Chart) This may take the form of either an 'across the counter' review and approval, or, depending upon the complexity of the issues raised by the proposal, be referred to Planning staff for more detailed review and / or revision prior to approval. The Historic Landmark Commission directly reviews more complex applications, including new construction and any work carried out without prior approval, generally as defined in Ch. 21A.34.020.F.2 of the zoning ordinance. The majority (approximately 85%+) of day to day review and approval of CoA applications is carried out by Planning staff on behalf of the Commission.

sterlingcodifiers.com/codebook/getBookData.php?section_id=780546

Administrative Review

Across the Counter Review & Approval: This type of review and approval deals with over half of the Certificate of Appropriateness applications received, and can often be handled on a 'walk-in' / 'one stop' basis. Applications are reviewed at the Planning Counter by Planning staff in the City's Permit Center in rm 215 in the City & County Building, on a '1st come, 1st served' order. If the application includes all the necessary information for staff to conclude that the proposal meets the review criteria it can usually be approved there and then; having all the relevant information available as part of the application is therefore essential to avoid delays or a return visit. The type of proposal usually approved through this type of review might include re-roofing, various repairs to match the original in design and materials, and a range of minor alterations which would not affect the integrity or character of the site, building or district.

Members of Planning staff are also available to assist with pre-application inquiries, in person, by phone and via e-mail. This is usually important with historic preservation proposals, which can involve more detailed matters and particular expertise. Although staff may be immediately available to handle inquiries, arranging a prior appointment should ensure that time is used in the most efficient manner.

Staff Review & Approval: This type of Planning staff review and approval handles applications which will be slightly more involved; where there are more issues to consider, more research to be undertaken and / or a site visit or meeting might be beneficial, defining a proposal which can be approved. On occasion revisions might be appropriate to safeguard the historic architectural character of the building or district as established by the ordinance design review criteria. The City ensures Planning staff support to advise owners and applicants on options to achieve a proposal that can be approved. Again, complete application information will help to expedite staff review and approval.

Proposals reviewed through this process would be those which could affect the architectural integrity of the building, and might include windows, doors, porches and minor additions. Occasionally, where proposals appear to conflict with ordinance design standards, or where in the judgment of staff the matters are sufficiently complex, the application might be referred for review by the Historic Landmark Commission.

Time for the review and approval will be longer and will vary, but can usually be achieved within 5 days. Pre-application proposals can be discussed with, and applications are submitted to, the Planning Counter in rm 215. Other specialist members of Planning staff are also available to provide pre and post- application advice and guidance. Here especially early contact and discussion with Planning staff at the initial project planning stages should ensure that the CoA application is complete and the proposals are compatible to the special character of the building, site or district.

Building Permits One Stop Shop

Salt Lake City and County Building
451 E. State St., Room 215

Historic Landmark Commission

The Historic Landmark Commission reviews around 10% of the CoA applications. These include those specifically identified for HLC review in the zoning ordinance (Ch. 21A.34.020.F.2) such as major alterations, demolition proposals and new construction, as well as enforcement cases and those referred by staff because of their complexity or potential negative impact. The Commission normally meets on the first Thursday of the month, with the public agenda closing approximately two weeks

in advance. Staff will advise on the lead in times required for a CoA application for HLC review, as well as on the key issues to be addressed in the staff report to the Commission. A CoA application which is complete, with all necessary information, is required before it can be scheduled for a Commission meeting.

The HLC usually reaches a decision at the meeting, while items are reserved for further consideration by either staff or the full Commission. The majority of applications are approved, some with revisions which can be agreed with the applicant at the meeting. Occasionally, where design issues require additional consideration, the Commission may convene an Architectural Sub-Committee to work with the applicant to achieve a sensitive design solution. The conclusions and revisions are then referred back to the full Commission for a final decision. Again, Planning staff provides detailed specialist advice and support during the HLC review process and in the preparation of the application and material for Commission review.

Historic Landmark Commission

Salt Lake City and County Building
451 E. State St., Room 406
801-535-7708

The HLC meets the first Thursday of every month

1.2.5 Appendix B - Citizen Review Policies

Decision-making Bodies

The decision-making bodies have the responsibility of implementing and administering the requirements of the Zoning Ordinance. Decision-making bodies include:

- The City Council
- The Planning Commission
- Historic Landmark Commission
- Administrative Hearing Officer
- Appeals Hearing Officer

Administrative Decision (AD):

The zoning administrator, and Planning Director are delegated certain responsibilities by the Zoning Ordinance. Among those responsibilities is the approval or denial of administrative



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applications. These applications are those where the qualifying provisions of the use are codified, but confirmation of compliance is required. Responsibilities include:

- Administrative Interpretations
- Special Exceptions
- Home Day Care
- Certificate of Appropriateness for a Historic District Design Review
- Signs

Administrative Hearing (AH):

An administrative hearing is a process where an Administrative Hearing Officer, (either the Planning Director or his appointee) is granted review authority of applications that are categorized by the Zoning Ordinance as low impact. Types of low impact applications include:

Administrative Conditional Use

Subdivision Amendments, including lot line adjustments, condominium conversions and the like.

Special Exceptions

The process for these items generally begins with a staff review of the issue, review by the Planning Commission, or Historic Landmark Commission, followed by a decision which can be administratively approved through notice of application.

In cases where she declines to hear the application, the request is forwarded to the Planning Commission for their consideration. Situations where they are forwarded include determination that there is neighborhood opposition, or the applicant has failed to adequately address the required standards of approval.

Appeal (AP):

An individual or entity that has been adversely affected by the action of a decision making body may appeal the item pursuant to one of the following procedures:

- An administrative decision is appealed to the Appeals Hearing Officer. Appeals must be filed within 10 days of the decision.
- An appeal of an Appeals Hearing Officer decision is appealed to the district court. Appeal must be filed within 30 days of the decision.

- A Planning Commission decision is appealed to Appeals Hearing Officer. The appeal must be filed within 10 calendar days of the record of decision.
- A Historic Landmark Commission decision is appealed to the Appeals Hearing Officer. The appeal must be filed within 10 calendar days of the record of decision.

The appellant must submit the appeal in writing to the Planning Director, who then schedules it for a public hearing and review by the Appeals Hearing Officer. The Appeals Hearing Officer must weigh the evidence presented by the appellant and staff, and determine whether or not the previous decision was made in error. The Appeals Hearing Officer may reverse or affirm, wholly or in part, or may modify the decision.

Commission Decision (CD):

The zoning ordinance grants each commission rights to approve or deny certain projects. These decisions are made at public hearings, wherein the body reviews the project, takes public input, and makes a decision to approve, deny or table for further review.

Legislative Item (LI)

A legislative item is one that requires the approval of the City Council, as it will be creating some type of new regulation or law. Examples of legislative items include but are not limited to:

- Zoning Map Amendment
- Zoning Ordinance Amendment
- Master Plan Amendment
- Annexation

The process for these items generally begins with a staff review of the issue, review by the Planning Commission, or Historic Landmark Commission, who in turn make a recommendation to the City Council. The Council takes public input, and then votes on the item. Elected official review is necessary as the items affect policy direction in the City.

Citizen Involvement

Citizen involvement in the public process is encouraged, and welcomed. To ensure that the greatest numbers of impacted people are aware of an application the City utilizes the following methods to inform the public:

Notifications

- **Sign Postings:** The land subject to an application must be posted with a sign giving notice of a public hearing 10 days prior to the hearing. If the property has more than 500' of frontage on a public street, 1 sign shall be posted every 500'.
- **Mail Noticing:** A mailing notice must be sent to all land owners and tenants within a 300' radius of the subject site required for all public hearings. Certain administrative applications have been determined to be linked only to adjacent property owners. To ensure these property owners and tenants are aware of the application and its impacts, they are notified by mail before an administrative decision is made.
- **Newsletter:** The Planning staff publishes a quarterly newsletter called the "Planning Matters" it provides updates on projects, public hearings, open houses and profiles of staff and their foibles. A subscription to Planning Matters and other publications can be obtained through the following link: asp.slcgov.com/General/ListServer/userdata/subform.asp
- **Open House:** Each month, staff conducts a public open house in which projects, including conditional uses, master plan amendments, map amendments, and ordinance amendments are presented to the public for comment. These open houses are designed to give citizens an additional venue to comment on projects and have their voices heard prior to any hearing in front of the Planning Commission or City Council.
- **Community Council Review:** There are 20 registered community councils in Salt Lake City. They receive all agendas for the Planning Commission, Appeals Hearing Officer, and Historic Landmark Commission. In addition, they have the opportunity to review all applications to amend the zoning ordinance, conditional uses, and map amendments pertaining to the land located within, or within 600' of the boarder of the council.



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- **Task Force Meeting:** On occasion, because of the complexity of an item, a commission may find that additional time to discuss and review it is necessary. In this case, a task force meeting is scheduled, wherein various commissioners meet with staff, and if applicable, the applicant to discuss the project in further detail. The results of the task force meeting are then presented at a regularly scheduled public hearing.

It is hoped that the task force meeting affords decision makers with an opportunity to review the item in much more detail than would be allowed at a regular meeting, thereby enabling them to provide thoughtful and insightful commentary on the project.

Other Decision Making Bodies and Officials Briefings

Open City Hall

Open City Hall is an on-line forum for civic engagement, where citizens can read what others are saying about important Salt Lake City topics, then post their own statement. City officials will read the statements and incorporate them into their decision process.

Access the site at: slcgov.com/opencityhall

Web Pages

The Salt Lake City Planning Department web page is designed to provide information to the public, regarding all things planning.

slcgov.com/planning

1.2.6 Appendix C - Specific Design Standards by District or Master Plan Area

Zoning Districts

Each Zoning District outlines the base requirements such as height, setbacks, uses, façade articulations, required glazing, etc. In addition to these some districts have additional requirements, please refer to the Zoning Ordinance for the specific requirements of your district.

Overlay Districts

An overlay district is intended to provide supplemental regulations or standards pertaining to specific geographic features or land uses, wherever these are located, in addition to “base” or underlying zoning district regulations applicable

within a designated area. Whenever there is a conflict between the regulations of a base zoning district and those of an overlay district, the overlay district regulations shall control.

sterlingcodifiers.com/codebook/getBookData.php?id=&chapter_id=49078&keywords=

(H) Historic Preservation Overlay District

The zoning ordinance (Ch.21A.34.020.A) states that: In order to contribute to the welfare, prosperity and education of the people of Salt Lake City, the purpose of the H historic preservation overlay district is to:

- Provide the means to protect and preserve areas of the city and individual structures and sites having historic, architectural or cultural significance
- Encourage new development, redevelopment and the subdivision of lots in historic districts that is compatible with the character of existing development of historic districts or individual landmarks
- Abate the destruction and demolition of historic structures
- Implement adopted plans of the city related to historic preservation
- Foster civic pride in the history of Salt Lake City
- Protect and enhance the attraction of the city’s historic landmarks and districts for tourists and visitors
- Foster economic development consistent with historic preservation.

sterlingcodifiers.com/codebook/getBookData.php?section_id=780546

Criteria for Selection of a H Historic Overlay District or Landmark Site

The criteria for selection of an Overlay District or Landmark site and for defining or adjusting their boundaries are established in Ch.21A.34.020.C&D of the Zoning Ordinance.

sterlingcodifiers.com/codebook/index.php?book_id=672

Certificate of Appropriateness Required

The zoning ordinance (Ch.21A.34.020.E) confirms that before a building permit can be obtained for any alteration of the external appearance of a structure, site, object or work of art affecting a landmark site or a property within the H historic preservation overlay district, and before any alteration is made or permitted to be made,

a certificate of appropriateness application must be submitted to and approved by the Historic Landmark Commission or administratively by the Planning Director. The following activities undertaken in locally-designated historic districts or listed on the Salt Lake City Register of Cultural Resources require a certificate of appropriateness:

- Any construction needing a building permit
- Removal and replacement or alteration of architectural detailing, such as porch columns, railing, window moldings, cornices and siding
- Relocation of a structure or object on the same site or to another site
- Construction of additions or decks
- Alteration or construction of accessory structures, such as garages, etc.
- Alterations to windows and doors, including replacement or changes in fenestration patterns
- Construction or alteration of porches
- Masonry work including, but not limited to, tuck pointing, sandblasting and chemical cleaning
- The construction or alterations of site features including, but not limited to fencing, walls, paving and grading
- Installation or alteration of any exterior sign
- Any demolition
- New construction
- Installation of an awning over a window or door

sterlingcodifiers.com/codebook/index.php?book_id=672

The historic preservation design guidelines for Residential and Commercial Structures and Signs and the planning staff can provide valuable and tailored guidance at the early project planning stages and throughout the application process.

sterlingcodifiers.com/codebook/index.php?book_id=672

Design Standards for Alteration of a Landmark Site or Contributing Structure

The zoning ordinance (Ch.21A.34.020.G&H) sets out the design standards for a Certificate of Appropriateness for alteration of a Landmark Site or a Contributing Structure in a historic district. The Historic Landmark Commission, or the Planning Director, for



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administrative decisions, shall find that the project substantially complies with all of the following general standards that pertain to the application and that the decision is in the best interest of the city:

- A property shall be used for its historic purpose or be used for a purpose that requires minimal change to the defining characteristics of the building and its site and environment
- The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided
- All sites, structures and objects shall be recognized as products of their own time. Alterations that have no historical basis and which seek to create a false sense of history or architecture are not allowed
- Alterations or additions that have acquired historic significance in their own right shall be retained and preserved
- Distinctive features, finishes and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved
- Deteriorated architectural features shall be repaired rather than replaced wherever feasible. In the event replacement is necessary, the new material should match the material being replaced in composition, design, texture and other visual qualities. Repair or replacement of missing architectural features should be based on accurate duplications of features, substantiated by historic, physical or pictorial evidence rather than on conjectural designs or the availability of different architectural elements from other structures or objects.
- Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
- Contemporary design for alterations and additions to existing properties shall not be discouraged when such alterations and additions do not destroy significant cultural, historical, architectural or archaeological material, and such design is compatible with the size, scale, color, material and character of the property, neighborhood or environment.

- Additions or alterations to structures and objects shall be done in such a manner that if such additions or alterations were to be removed in the future, the essential form and integrity of the structure would be unimpaired. The new work shall be differentiated from the old and shall be compatible in massing, size, scale and architectural features to protect the historic integrity of the property and its environment.
- Certain building materials are prohibited including the following:
 1. Vinyl or aluminum cladding when applied directly to an original or historic material
 2. Any other imitation siding material designed to look like wood siding but fabricated from an imitation material or materials
- Any new sign and any change in the appearance of any existing sign located on a landmark site or within the H historic preservation overlay district, which is visible from any public way or open space shall be consistent with the historic character of the landmark site or H historic preservation overlay district and shall comply with the standards outlined in chapter 21A.46 of this title.
- Additional design standards adopted by the historic landmark commission and city council.

sterlingcodifiers.com/codebook/index.php?book_id=672

Design Standards for New Construction or Alteration of a Noncontributing Structure

The zoning ordinance (Ch.21A.34.020.H) also establishes the design standards for a Certificate of Appropriateness for New Construction or alteration of a Noncontributing Structure, addressing Scale and Form, Composition of Principal Facades, and Relationship to the Street.

sterlingcodifiers.com/codebook/index.php?book_id=672

While the Planning Division administers the Certificate of Appropriateness applications, BSCE administers the building permits required for work in a historic district. A Certificate of Appropriateness and building permit application can be submitted in rm 215 of the City and County Building at 451 S. State Street.

Specific Overlay District Codes

(DMSC) Downtown Main Street Core Overlay District:

The purpose of the DMSC downtown Main Street core overlay district is to encourage the concentration of large scale fashion retailing along the city's Main Street corridor. The DMSC downtown Main Street core overlay district is the area bounded by the centerlines of South Temple, State Street, 500 South and West Temple Streets.

sterlingcodifiers.com/codebook/getBookData.php?section_id=780555

(CHPA) Capitol Hill Protective Area Overlay District

The purpose of the CHPA Capitol Hill protective area overlay district is to protect the view corridor to the Utah state capitol building. In all zoning districts in the CHPA Capitol Hill protective area overlay district, no structure shall exceed in height the basic maximum height permitted in a particular zoning district in which the structure is located.

sterlingcodifiers.com/codebook/getBookData.php?section_id=780552

(SSSC) South State Street Corridor Overlay District:

The purpose of the SSSC South State Street corridor overlay district is to acknowledge and reinforce the historical land development patterns along South State Street between 900 South and 2100 South.

www.sterlingcodifiers.com/codebook/getBookData.php?section_id=780553

(YCI) Yalecrest Compatible Infill Overlay District

The purpose of the Yalecrest compatible infill (YCI) overlay district is to establish standards for new construction, additions and alterations of principal and accessory residential structures within the Yalecrest community. The goal is to encourage compatibility between new construction, additions or alterations and the existing character and scale of the surrounding neighborhood. The YCI overlay district promotes a desirable residential neighborhood by maintaining aesthetically pleasing environments, safety, privacy, and neighborhood character. The standards allow for flexibility of design while providing compatibility with existing



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development patterns within the Yalecrest community. The YCI overlay district applies to any residential property zoned residential R-1 / 5000 or R-1 / 7000 within the area defined by the intersecting center lines of 1300 East, 800 South, Sunnyside Avenue (840 South), 1900 East and 1300 South Streets.

sterlingcodifiers.com/codebook/getBookData.php?section_id=780556

(RCO) Riparian Corridor Overlay District

The purpose of the RCO riparian corridor overlay district is to minimize erosion and stabilize stream banks, improve water quality, preserve fish and wildlife habitat, moderate stream temperatures, reduce potential for flood damage, as well as preserve the natural aesthetic value of streams and wetland areas of the city. This overlay district applies to the Jordan River, City Creek, and open channel portions of Red Butte Creek, Emigration Creek and Parleys Creek. The RCO applies to areas within 100' (measured horizontally) from the edge of the bank. Basically, the 0-25' zone is a no new disturbance area. The 25-50' zone allows landscaping and some hardscaping. The 50-100' allows structures, but not commercial parking lots, septic drain fields or other particularly intense uses. Lots being developed that are within 100' of the river or creek bank require a riparian permit review. Contact SLCPU for additional information.

sterlingcodifiers.com/codebook/getBookData.php?section_id=780557

Master Plans

Our City Master Plans list desired and required urban design elements for developments within the respective community. The Urban Design element sections are intended to enhance the visual and aesthetic qualities of the community by implementing historic preservation principles, designing public facilities to enhance the established residential character of the community and encourage private property improvements that are visually compatible with the surrounding neighborhood.

Please review the applicable master plan document for your project and consider the Urban Design section when designing your project.

References

City Master Plans

slcgov.com/planning/planning-master-plans

City Ordinances

For the complete City Zoning Ordinance, City Subdivision Ordinance, Historical Preservation Ordinance:

sterlingcodifiers.com/codebook/index.php?book_id=672

Decision-making Bodies and Officers

Appeals Hearing Officer

slcgov.com/planning/planning-appeals-hearing-officer

Historic Landmark Commission

slcgov.com/planning/planning-historic-landmark-commission

Planning Commission

slcgov.com/planning

Master Plans

Our City Master Plans list desired and required urban design elements for developments within the respective community. The Urban Design element sections are intended to enhance the visual and aesthetic qualities of the community by implementing historic preservation principles, designing public facilities to enhance the established residential character of the community and encourage private property improvements that are visually compatible with the surrounding neighborhood.

Please review the applicable master plan document for your project and consider the Urban Design section when designing your project.

slcgov.com

References

City Master Plans

slcgov.com/planning/planning-maps-ordinances-and-master-plans

City Ordinances

For the complete City Zoning Ordinance, City Subdivision Ordinance, Historical Preservation Ordinance:

sterlingcodifiers.com/codebook/index.php?book_id=672

Decision-making Boards and Commissions

Board of Adjustment

slcgov.com/planning/planning-board-adjustment

Historic Landmark Commission

slcgov.com/planning/planning-historic-landmark-commission

slcgov.com/planning



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	Other Processes					Public Hearing Processes			
	CR	PA	SA	NA	AHO	PC	HLC	CC	AH
Planning Commission									
Amendment Zoning Text	LI	X				X		X	
Amendment Zoning Map	LI	X				X		X	
Amendment Master Plan	LI	X				X		X	
Annexation	LI	X				X		X	
Alley Vacation	LI	X				X		X	
Street Closure	LI	X				X		X	
Surplus Property	LI	X				X		X	
Street Name Change	LI					X		X	
Special Exception	CD, NA			X		X	X		X
Subdivisions									
Subdivision Minor	CD, AH					X ¹			X ¹
Subdivision Plat Amendment	CD, AH					X ²		X ²	X
Condominium New Construction	CD, AH					X ¹			X ¹
Condominium Conversion	CD, AH					X ¹			X ¹
Conditional Use	CD, AH					X			X ³
Building and Site Design Review	CD	X				X			
Planned Development	CD	X				X			
Appeals Hearing Officer									
Variance	CD				X				
Appeal of Administrative Decision	AP				X				
Administrative Interpretation	AD		X						
Determination of Non-Conforming Use	CD		X		X				
Home Day Care	AD		X						

	Other Processes					Public Hearing Processes			
	CR	PA	SA	NA	AHO	PC	HLC	CC	AH
Historic Landmark Commission									
Demolition Contributing Structure	AD	X					X		
Demolition Non-Contributing Structure / Accessory Structure	AD	X					X		
Determination of Non-Contributing	AD	X	X				X		
New Construction	CD	X					X		
Major Alterations / Minor Construction	CD						X		
Minor Alterations	AD		X						
Designation	LI	X					X		
New Construction - Minor	CD		X						
Relocation	CD	X					X		
Signs	CD		X						
Economic Hardship	CD						X		
Conditional Use City Registry	CD						X		
Boundary Adjustment	LI	X					X		
Revocation	CD	X							
AD=Administrative Review AH= Administrative Hearing AHO= Appeals Hearing Officer AP= Appeal CC = City Council X = Signifies a processes for which commissions / groups have responsibility									
*A pre-application meeting will determine what process will be required; in some instances a staff approval may be issued, in others a public hearing will be necessary. 1 Typically these applications are heard by an Administrative Hearing Officer, based upon the complexity of the project, protests from the community or findings of the Administrative hearing officer the project may be heard by the Planning Commission who is the final decision maker. 2 The final decision maker for Plat Amendments is the Planning Commission except when the amendment includes public streets. 3 See section 21A.54.155 for Administrative Consideration of Conditional Uses									



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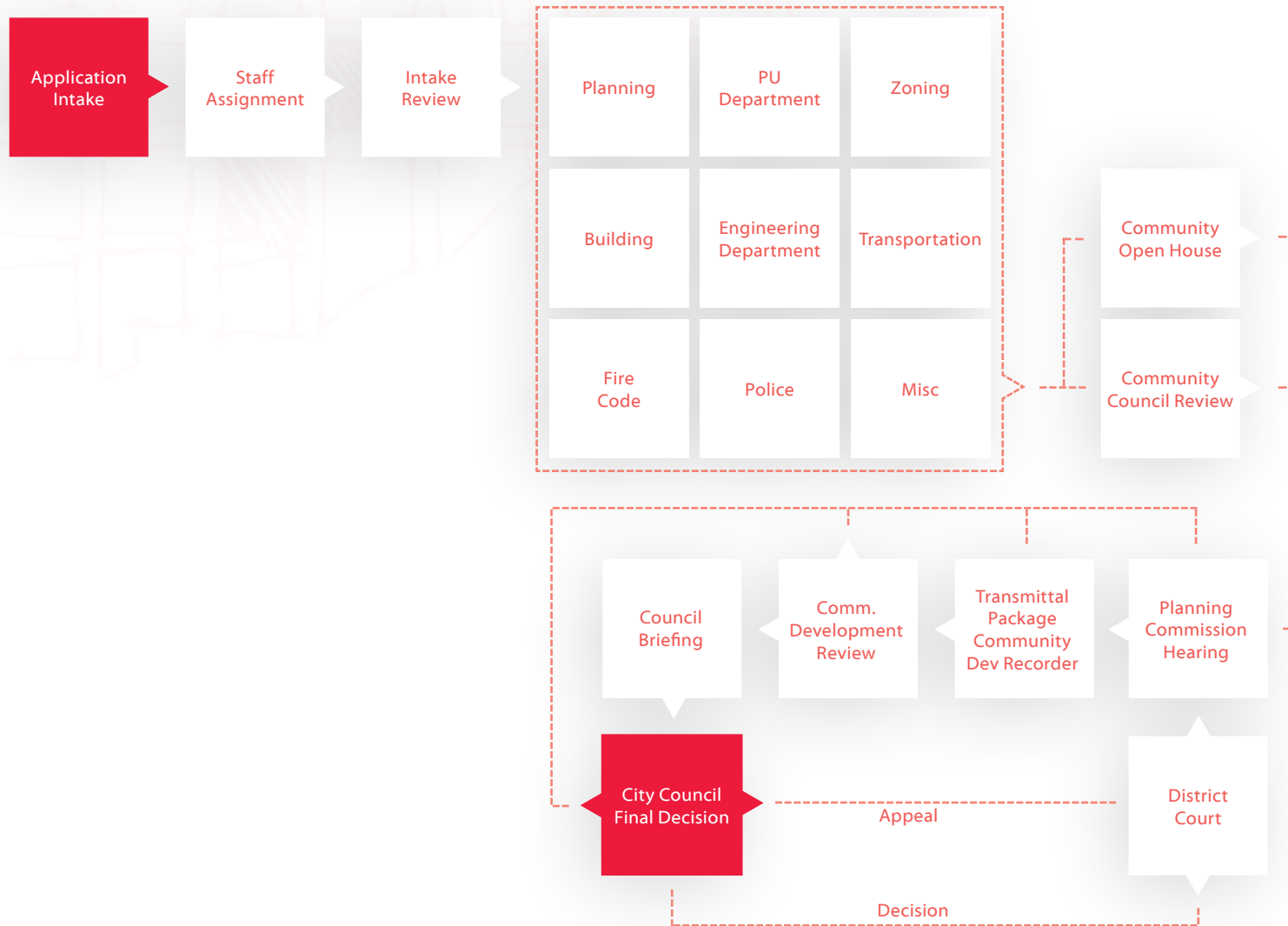
1.2.6 Appendix C - Specific Design Standards

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Chart 1: Zoning Text, Map, or Master Plan Amendment Legislative Process



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Chart 2: Board of Adjustment Decision

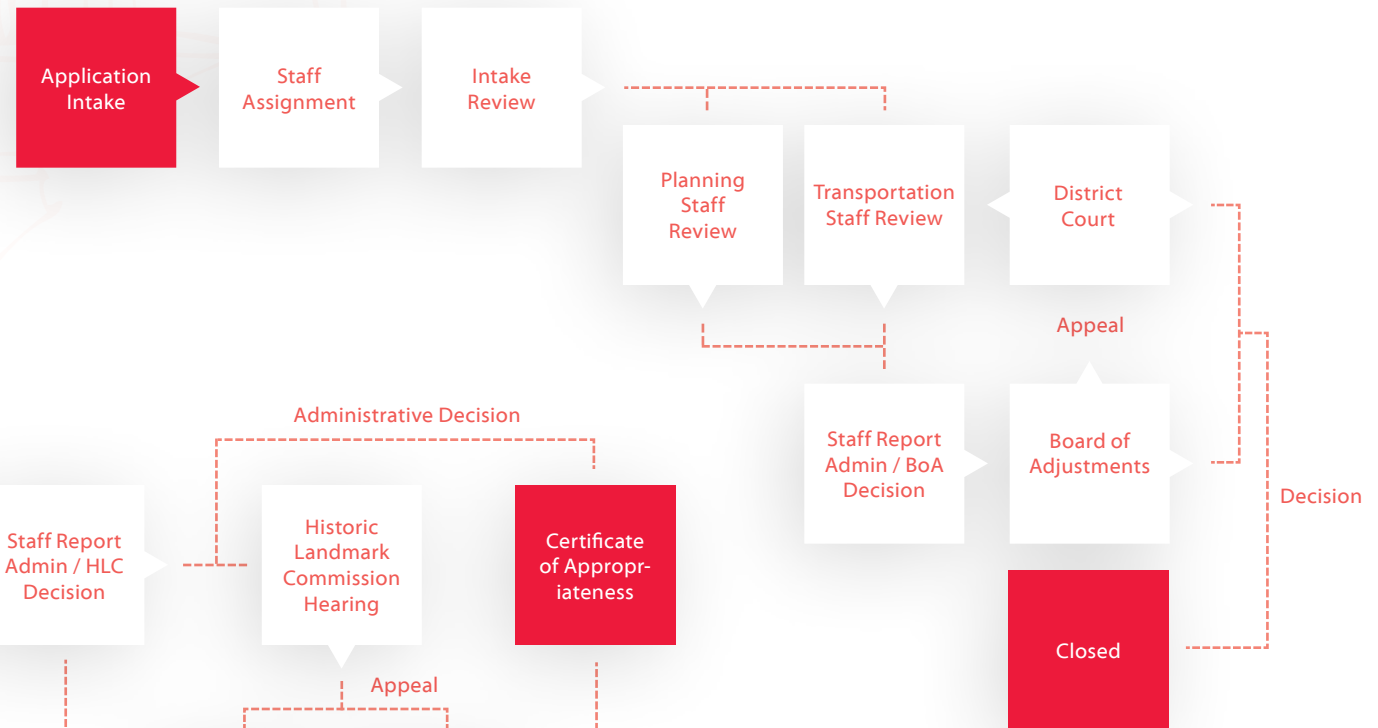
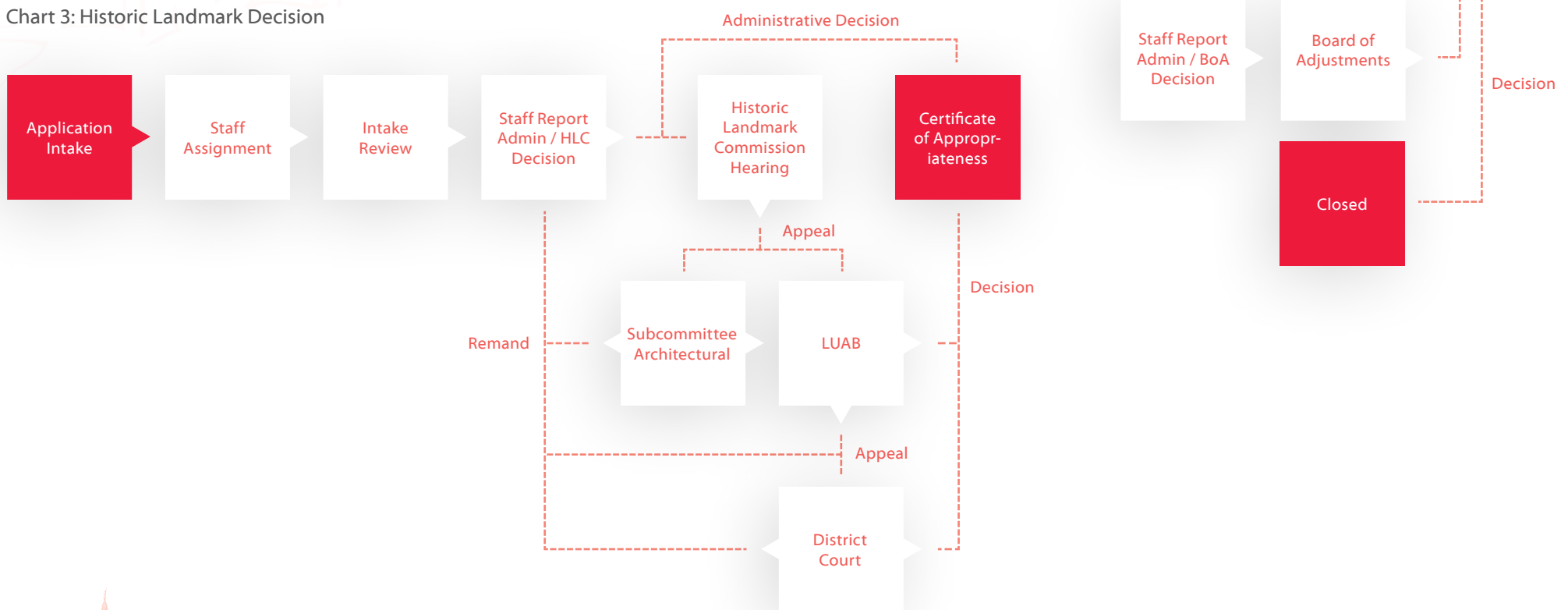


Chart 3: Historic Landmark Decision



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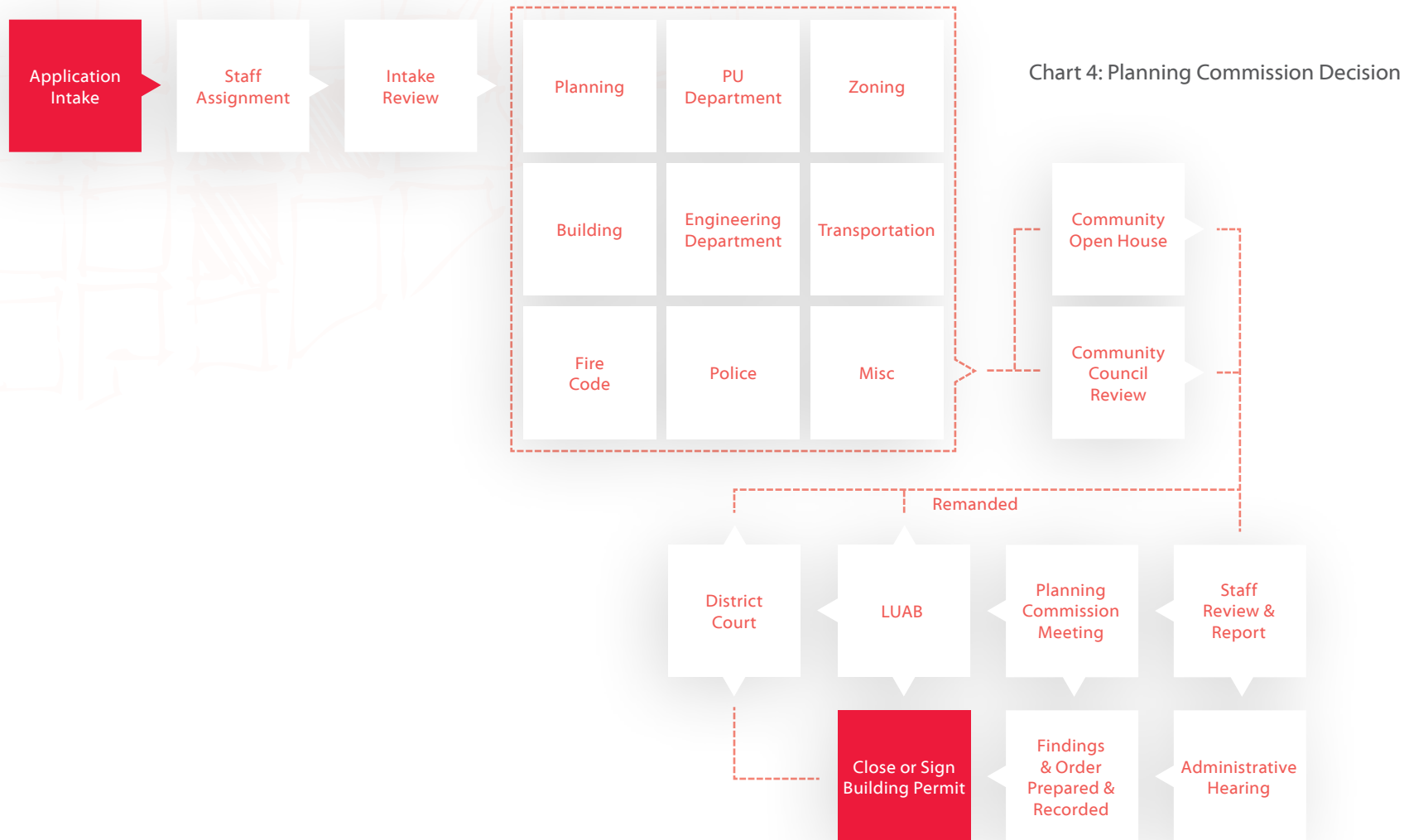
1.2.4 Appendix A - Additional Information

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Chart 5: Appeal of Administrative Decision

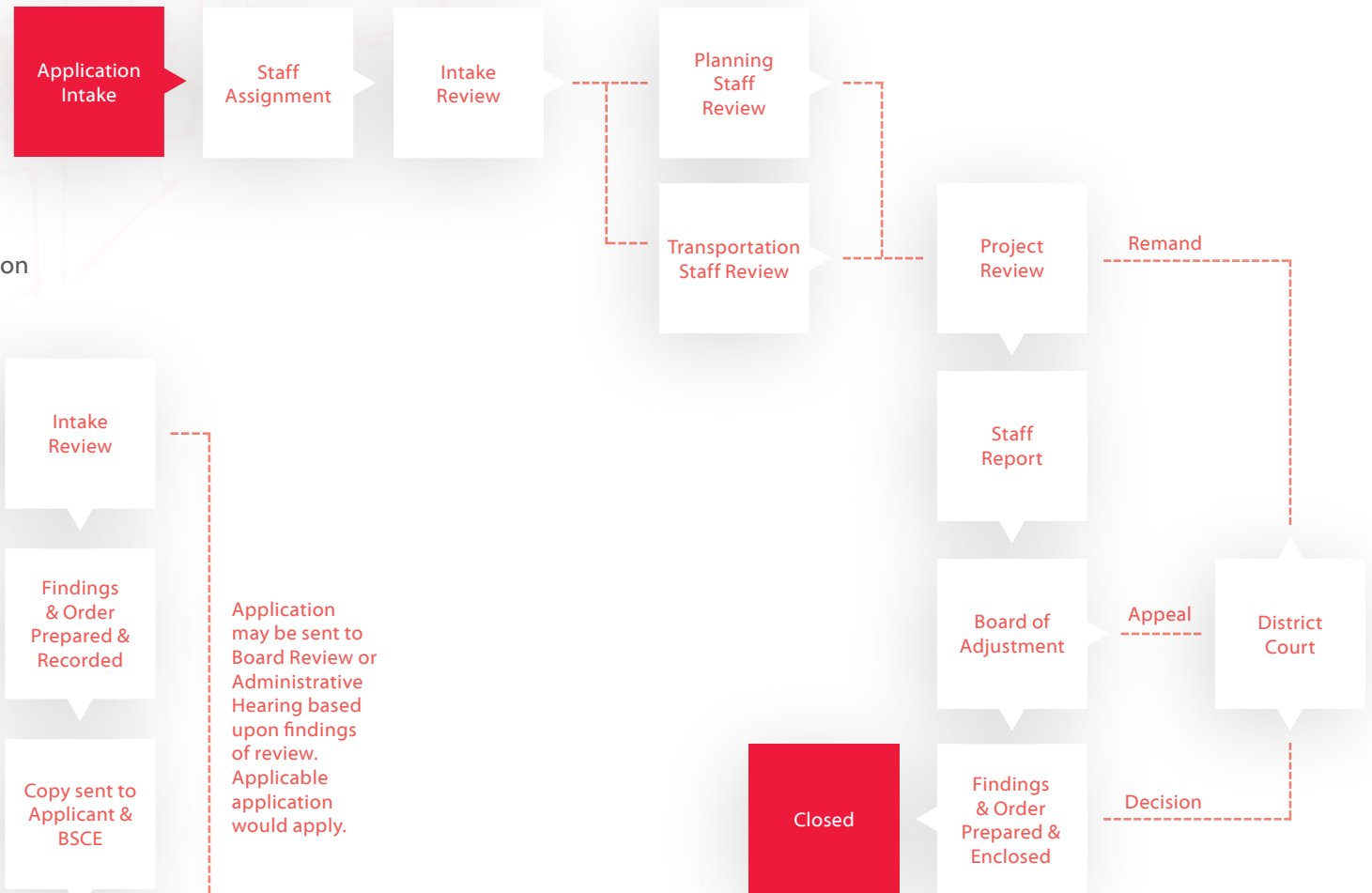
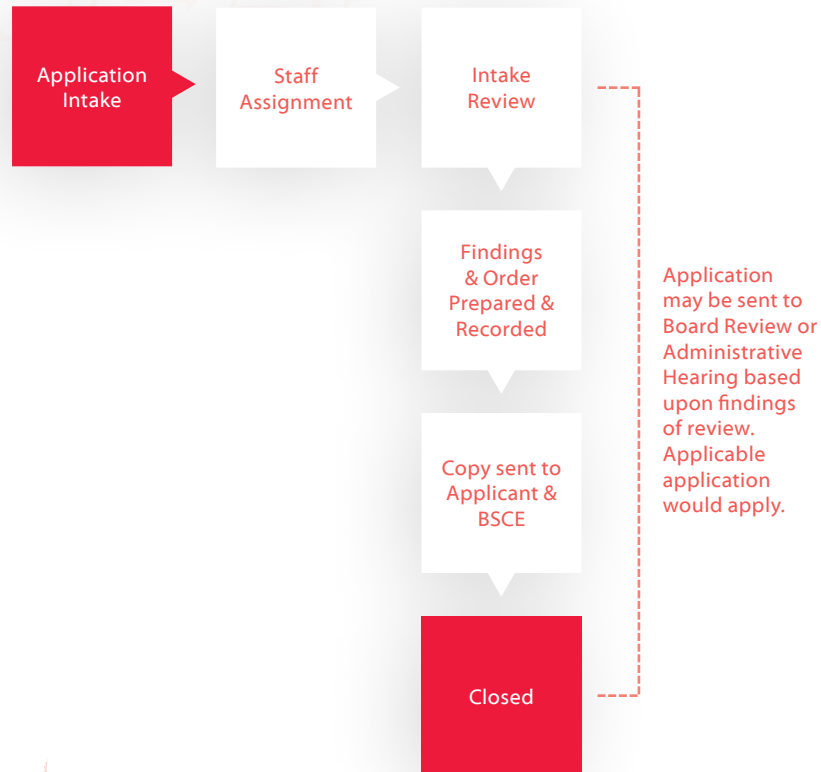


Chart 6: Administrative Decision



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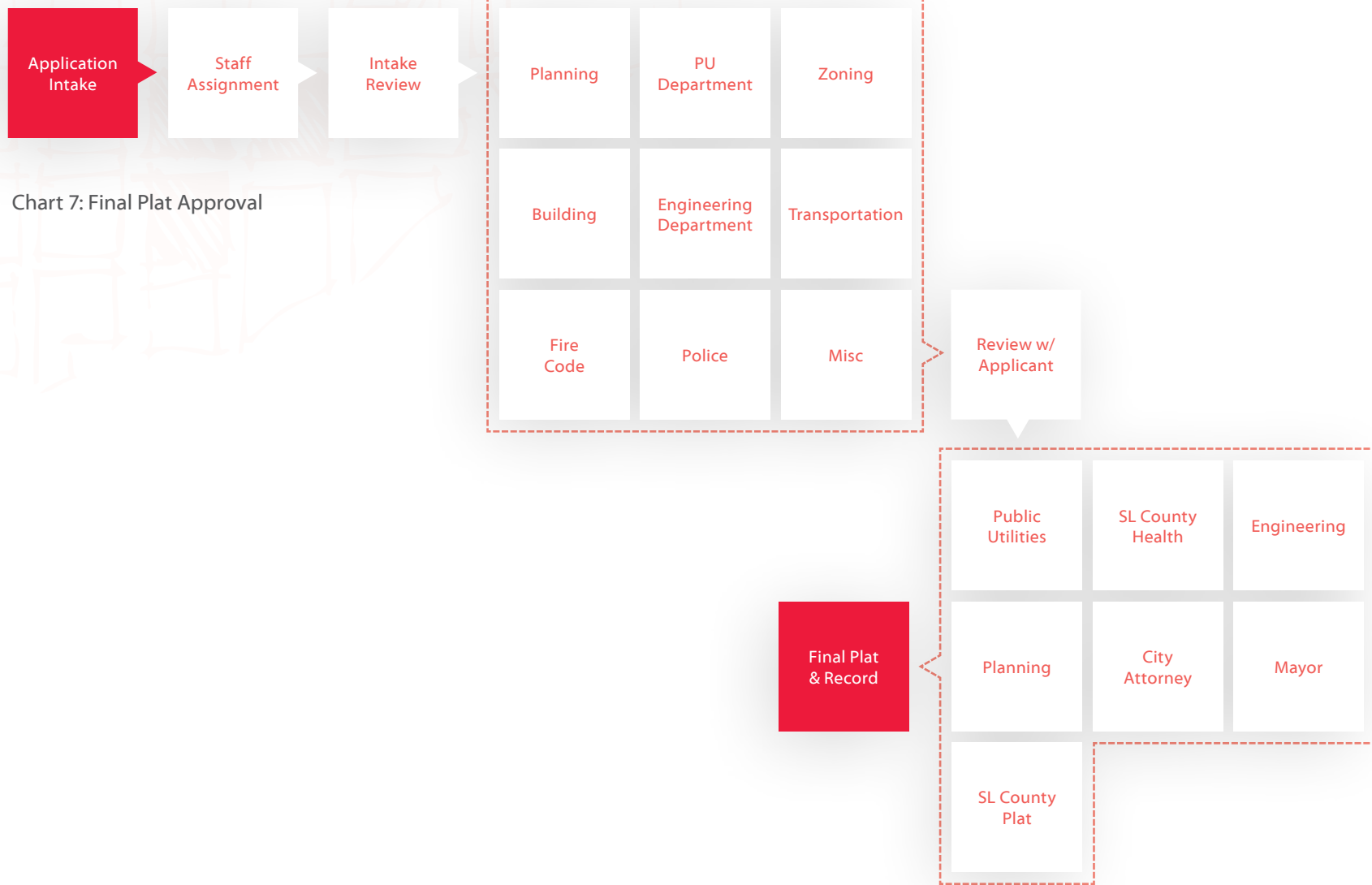


Chart 7: Final Plat Approval



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1.2.4 Appendix A - Additional Information

1.2.5 Appendix B - Citizen Review Policies

1.2.6 Appendix C - Specific Design Standards

1.2.7 Appendix D - Planning Process Chart

1.2.8 Appendix E - Process Flow Charts

1.3 Obtaining Construction Permits

1.3.1 Contact Information

Division / Department	Salt Lake City Address	Parking	Hours	Contact
Building Services & Code Enforcement (BSCE)	Salt Lake City & County Building 451 E. State St. Rm 251	Metered street parking, 30 min free parking east of building	M, T, Th, F 7:30 am - 4:30 pm W 9 am - 4:30 pm	801-535-6000 permits.mail@slcgov.com
Public Utilities (SLCPU) Contracts	1530 S. West Temple Rm 244	Park on West Temple or behind building	M-F 8 am - 5 pm	801-483-6727 slcpu@slcgov.com
Transportation Permit Counter	349 S. 200 E., Rm 450	Enter parking garage on South side of building	M-F 8 am - 5 pm	801-535-6630 techpermit@slcgov.com
Engineering Permit Counter	349 S. 200 E., Rm 100	Enter parking garage on South side of building	M-F 8 am - 5 pm	801-535-6396 or 7995 engpermit@slcgov.com

1.3.2 General Information

A variety of permits are required for most construction projects. Permits are issued to verify that construction projects in Salt Lake City are designed and built in compliance with Federal, State and local codes and ordinances.

Methods of Submitting Permit Applications

Online

Citizen Access Portal
aca.slcgov.com/citizen/

Online submission is a streamlined, simple way to submit documents for review to all City divisions and departments at once. The applicant and interested parties may track progress through a secure online account. This method is available for most permits.

On Paper

Applicants hand-deliver documents to appropriate permit desks.

Permit Fees

Permit fees will vary depending upon the nature of the construction project. See the following sections in the current Salt Lake City fee schedule: Community Development, Engineering, Fire, Impact Fees, Sanitary Sewer Utilities, Storm Water, Water, Zoning Fees.

(link to Consolidated Fee Schedules to be added soon)

Each department and division assesses Permit fees and Plan Review fees separately.

Types of City Permits

Most construction projects require permits. For guidance on whether a construction project requires a permit, contact a licensed construction professional.

- Building Permit
- Trade-specific and other building permits
- SLCPU Permits
- Permit to Work in the Public Way
- Construction-related permits

Process for all Permit applications

- Application Submission
- Pre-Screening
- Review
- Requirement Fulfillment
- Permit Issuance

Submittal Requirements for Permit applications

Building Permits

See Submittal Requirements under Building Permits, General Information, below

1.3.3 Building Permits

General Information

Building Permits are required for most construction projects.

Building Permit Review Processes

One of the following review processes will be assigned by City staff once an application has been screened.

Over the Counter

- Applies to routine projects requiring simple review from a single department or division
- On Paper submissions only (no Online submissions)

Same Day

- Applies to routine projects requiring simple reviews from multiple departments or divisions
- On Paper submissions only (no Online submissions)

Currently, there is no Online process for Over-the-Counter or Same-Day reviews.

General

- 1 Applies to complex projects requiring in-depth reviews, usually from multiple departments or divisions
- Applicants with projects requiring General Review are **highly encouraged to participate in the City Pre-Application Process prior to applying for permits**. This will limit the number of review cycles and mitigate time spent on redesign.
- 2 Online or On Paper submissions accepted
- **The Online submission method incorporates SLCPU, Engineering and Transportation reviews, although fee collection and issuance of permits from these departments will happen separately.**
- 3 Allow at least 4-6 weeks to receive initial comments for the first review cycle. While not all first review cycles require 4-6 weeks, planning for that period of time will ensure the project timeline is not compromised if unanticipated issues arise.
- Subsequent review cycles will require at least 2 weeks each.

Expedited General Review

Pay an Expedited Review Fee

- The fee is two times the standard building plan review fee
- The expedited building plan review will be conducted by a qualified third party.



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- Initial comments, including corrections to be made to the building plans, will be prepared within 10 business days of the application filing date.

Meet Sustainable Building Design Criteria

To qualify for Sustainable Building Design expedited plan review your project must meet the following criteria:

- Commercial:** Meet the design criteria for LEED (Leadership in Energy and Environmental Design) Silver or greater as established by the U.S. Green Building Council (USGBC)
- Residential:** Earn an Energy Star Home Energy Rating System (HERS) rating of 85 or better.

More Information:

slcgov.com/building/green-building

Submittal Requirements

Over the Counter, Same Day

Submittal requirements will vary depending upon the nature of the project. The licensed construction professional contracted to complete the work should know what is required.

General

See login checklists:

slcpermits.com

Application Submission & Pre-Screening

Over the Counter, Same Day

- Applicant brings submittal requirements to the Building Permitting Office.
- City staff determine whether the permit may be issued Over the Counter or Same Day and notify the applicant.

General

Online

- The applicant creates a login account on the Citizen Access portal and submits an online Building Permit Application and pays plan review fee.
- The applicant uploads all required documentation to ProjectDox.
- If initial submittal requirements are missing during pre-screening, permit technicians notify the applicant. All required documents must be submitted before review can begin.

On Paper

The building permit *application* may be submitted online through the Citizen Access Portal even if *documents* are submitted on paper.

- Applicant submits required documentation to the Building Permitting Office and pays plan review fee. City Staff assigns the project a BLD number and evaluates plans.
- The project is assigned an appropriate Review Process while the applicant is present.
- If Engineering, SLCPU, and / or Transportation permitting requirements are identified during pre-application or application pre-screening, applicant submits copies of plans to those division and department permitting offices.
- If initial submittal requirements are missing during pre-screening, permit technicians notify the applicant. All required documents must be submitted before review can begin.

Review & Requirement Fulfillment

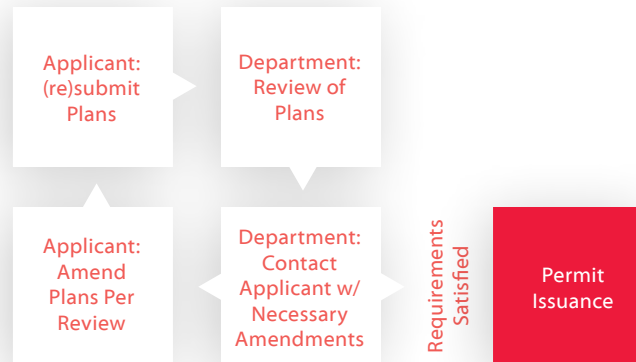
Over the Counter & Same Day

- All requirements must be fulfilled prior to review.

General (Online & On Paper)

Review Cycle

- Reviewers may contact the project applicant requesting clarification or additional information. The applicant may arrange to meet with the Reviewer by phone or in person at any time during regular business hours.



Online Only

- Applicants may not upload additions or changes during a review cycle.
- When each division or department review is complete, the reviewer will contact the applicant requesting changes, additional information or additional documents be submitted before a permit may be issued.

Online Only

- City Staff will notify the applicant when all Reviewers have finalized their comments. The applicant can then upload additions or changes to ProjectDox.
- Applicant makes and submits necessary changes
- This concludes one review cycle. Review cycles continue until all requirements are met.

Tracking Project Progress

- To see where a project is in the review cycle and what comments have been made by plans reviewers, the applicant and other interested parties can log into the Citizen Access Portal at any time using the BLD number.

Online Only

- Applicants may log into ProjectDox at any time to view Reviewers' comments and additional requirements.

Over the Counter & Same Day

Applicant may wait or return to the Building Permitting Office prior to closing to retrieve the permit.

General

When all requirements are met, City staff will contact the applicant with issuance of the Building Permit

Plan Review Expiration

If an applicant fails to submit corrections or additional information or fails to pay the required building permit within 180 days following instructions from the respective division to do so, the review will become null and void and the applicant must resubmit and pay a renewal fee.



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1.3.4 Trade-Specific & Other Building-Related Permits

Minor projects and projects requiring a Building Permit will require separate permits for specific work such as electrical, mechanical, plumbing, etc.

Application Submission

The applicant must be a professional contractor licensed in the State of Utah.

Submittal Requirements:

- Contractor license number
- Project BLD number, if applicable

Requirements for individual trade-specific permits are on the Building Services & Code Enforcement site. slcpermits.com.

Online

- Applicant creates an account and submits application through the Citizen Access Portal.

Citizen Access Portal aca.slcgov.com/citizen/Login.aspx

On Paper

- Applicant brings required information to the Building Permits office during regular business hours.

Pre-Screening

- City staff determine whether the permit may be issued Over the Counter or Same Day and notify the applicant.
- If a General review is required, the applicant completes a login sheet, and a General review for a Building Permit will apply.

Review & Requirement Fulfillment

- Applicant will fulfill all requirements prior to review.

Permit Issuance

- The appropriate permit will be issued when the review is complete, usually over the counter.

1.3.5 SLCPU Permits & Contracts

General Information

An SLCPU-issued permit is required to work on any public or private sewer connected to the SLC system. Proper contractor licensing is required. By state law, property owners may not work on sewer system beyond the building.

SLCPU Permits must be obtained before a Building Permit will be issued.

SLCPU encourages construction professionals to contact SLCPU Contracting discuss their wet utilities considerations with City engineers during the design phase to limit the number of review cycles and mitigate time spent on redesign.

Projects Other Than Those Requiring a Building Permit

Projects requiring SLCPU Permits that don't entail building construction, like large developments or utility repair, will require a slightly different review process.

Application Submission

- Application Submission for a Building Permit will initiate applicable SLCPU Permit applications.
- Fees for SLCPU plan review are not included in Building Permit plan review fees.
- Fees for SLCPU plan review are not paid upon application. They are paid when a permit is issued, with permit fees.

On Paper

Two complete sets of plans must be submitted in person to the SLCPU Contracting Office.

Pre-Screening, Review, Requirement Fulfillment

Permit Issuance

- SLCPU Contracts Office calculates fees, prepares permits and legal contracts, and notifies the applicant when everything is complete.
- Applicant pays fees and retrieves permits and contracts at the SLCPU Contracts Office.

1.3.6 Permit to Work in the Public Right of Way

General Information

Excavation deeper than 18" (excluding most landscaping, sprinkler installation, etc) or staging of equipment or materials in the public way requires a Permit to Work in the Public ROW from the Engineering Division.

Application Submission (Online or On Paper)

If a project requires a Building Permit or SLCPU permit, these permits must be obtained before Engineering will issue a Permit to Work in the Public ROW.

Submittal Requirements:

- Certificate of Insurance number
- State Contractor License number
- Bond number (for excavations only)

Additional Possible Requirements:

- **Traffic Control Plan:** Projects entailing construction activity on public streets require a Traffic Permit Number, obtained from Transportation.
- **Detailed construction schedule:** Required if excavation work that disrupts traffic will exceed 7 calendar days, or 3 calendar days on major or collector streets.

Permit Issuance

- Engineering Permits office reviews documents and calculates fees
- Applicant submits any missing items and pays fees
- Engineering Permits office staff issue permit

1.3.7 Construction Site-Related Permits

General Information

Salt Lake City departments and divisions issue Construction site-related Permits to ensure construction activities in the Public ROW do not impose an undue burden on the public.

There is no pre-screening step for Construction-related Permit applications. The applicant must fulfill all requirements prior to review.

Permits are issued over the counter, unless noted otherwise.

Compliance with all Federal, State and local construction site regulations is required. Failure to do so may result in permit revocation.



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Transportation Division

Construction Barricading Permit (Traffic Permit Number)

Submittal Requirements

- Traffic control plans detailing the use of barricades and signs necessary to temporarily close or alter the use of streets or sidewalks.
- Plans must be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD)

See the SLC Traffic Control Manual:

slcgov.com/transportation/transportation-permits-construction

- Applicants are encouraged to hire a professional barricading company to draw up plans.

Application Submission & Permit Issuance

Online & On Paper

- Applicant submits required documents to the Transportation Permitting Office. The permit is issued upon review of application and payment of fee.

Parking Permit

Required when it is necessary to occupy an on-street parking space in exception to city ordinance, posted regulation or to close off a parking meter space.

Submittal Requirements

Information demonstrating substantial need for the parking space.

Application Submission & Permit Issuance

Online & On Paper

- Applicant submits required documents to the Transportation Permitting Office. The permit is issued upon review of application and payment of fee.

SLCPU

Construction site-related permissions from SLCPU do not follow standard permitting processes, but are granted as follows.

Water

Water needed for construction activities on private property must come from a metered source. Typically a contractor will either re-use an existing metered service or install the water services at the front end of a project so that metered water is available.

Water may also be purchased by the tanker truck load from SLCPU shops:

For prices and to make arrangements for loading: SLCPU, 801-483-6700

Fire Hydrant meters are rarely allowed for use on private property.

Sewer

Contact SLCPU to open a manhole. Only SLCPU staff are allowed to open a public manhole. These lids need to be re-tarred after opening.

Storm water

Stormwater Pollution Prevention Plan (SWPPP)

In accordance with the NPDES and UPDES permitting processes, projects requiring disturbance more than 1 acre in size must have permits for storm water discharge. For such projects, a SWPPP and associated site plan must be in the bid documents to alert the contractor that Federal and State water quality standards will be applied to the project. Generally, details of strategies to comply with SLC's clean wheel ordinance are also found with the SWPPP. The contractor must properly maintain the construction site so as not to violate any of the clean water standards. Adjustments to the SWPPP must be made as necessary to meet the performance expectations. An Notice of Intent (NOI) must be submitted to the state and the SWPPP plan approved by SLCPU.

At the completion of the project a Notice of Termination (NOT) is required by the state.

Riparian Permit

Projects within 100' of City Creek, Red Butte Creek, Emigration Creek, Parleys Creek or the Jordan River must submit plans for a Riparian permit. Projects proposed along the Jordan River are also subject to a Lowlands Conservancy review through SLC Planning Department.

Projects within 100' of a canal must submit drawings to SLCPU for approval. No run-off or debris will be allowed into the canal.

Construction Activity Impacting General Welfare

Noise Ordinances

slvhealth.org/envRegs/reg21CommunNoisePolluCtl.html

Construction or demolition activities are not allowed as per the following:

- Outside between the hours of 10 pm and 7 am the following morning unless a waiver has been issued in accordance with section 5.0.
- Inside an enclosed structure between the hours of 10 pm and 7 am the following morning if the activities are plainly audible at the property line.
- In such a way as to create a nuisance.

Hazardous Materials

Waste Water Discharge Permit

Discharges proposed to the storm water system must be tested and approved by SLCPU. Contaminated discharges may be considered for discharge to the sanitary sewer if the characteristics of the waste water is shown to be within the local limits for discharge.

More Information: Salt Lake Valley Health Department Wastewater Disposal Regulation slvhealth.org

Solid Waste

Main contractors at any construction site must provide adequate toilet facilities for all workers at the site.

slvhealth.org/envRegs/pdf/01regSolidWasteMgn120309.pdf

General Cleanliness

Project worksites are required to be kept in a condition to safeguard public health and safety. Public streets and sidewalks are to be kept clean of any mud, dirt, or debris of any kind that may result from work authorized by permits.



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State and Federal Considerations

OSHA

le.utah.gov/~code/TITLE34A/34A06.htm

DEQ

deq.utah.gov/Construction/pre-construction_and_planning.htm

Special Requirements for Construction Near SLC Airports

Projects within the Salt Lake City Airports may have special requirements.

Information concerning FAA security access requirements: Salt Lake City Department of Airports Access Control Office, www.slairport.com/badging

1.3.8 Additional Information & Forms

Available at the Salt Lake City Building Services & Code Enforcement (BSCE) website.

slcpermits.com



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1.4 Inspections & Certificates

1.4.1 General Information

Inspections must always be scheduled at least 24 hours in advance of completion of the work to be inspected.

Work must be inspected before it is covered, otherwise it must be uncovered for inspection at the Contractor's expense.

Building Inspections

Construction inspections are required for all permitted work before it is covered by other work, and a final inspection is required when all work is complete.

Specific inspections are required for footing and foundation, concrete slab and under floor, framing, rough electrical, rough mechanical and rough plumbing, lath and gypsum board, fire and smoke resistant penetrations, insulation, shower pans, and construction work before it is covered. (IBC, Paragraph 110.3 Required inspections)

Inspections of Work in the Public Right of Way and Wet Utilities Connections

Inspections are required by City Engineering and SLCPU Inspectors for all permitted work.

These inspections must be arranged with the appropriate division or department.

1.4.2 Building Inspections

Scheduling

Gather Required Information:

- Permit Number (BLDXXXX-XXXX)
- 3-digit code for type of inspection

Look Up Code:

slcdocs.com/building/b-schedule-inspection.pdf

Schedule by phone:

Call: Permitting, 801-535-6000

Request an inspection date, and if necessary leave a phone message for the inspector. Follow all the prompts until a confirmation number is issued; if a confirmation number is not issued, the inspection is not scheduled.

Schedule online

Visit Citizen Access Portal aca.slcgov.com/citizen

Request an inspection date, and if necessary include a written comment. Inspection results and project inspection history are also available online for any permit. General Contractors with multiple construction projects in Salt Lake City can use this site to access all permits from one menu.

Scheduling a "Four Way Inspection"

A "four way inspection" is a construction inspection that includes building / structural, electrical, mechanical, and plumbing inspections. Most commonly, these include rough framing, electrical, mechanical and electrical prior to installation of drywall or siding, or final inspections for all these trades. Salt Lake City offers any combination of these inspections.

To schedule a four-way inspection, each permit (Building, Electrical, Mechanical, and Plumbing) will require an inspection to be scheduled separately. Simply schedule each inspection for the same day.

On-Site Consultations

Schedule like an inspection using IVR or online scheduling.

Determining When an Inspector Will Be On Site

Salt Lake City Building Inspectors are available for phone consultation from 7 to 8 am. Inspector phone numbers will be provided with your permit, or can be seen at online.

Inspection Scheduling Online Brochure

Construction Completed Without an Inspection

Any construction that it is concealed without inspection and approval may be required to be uncovered to reveal the construction for inspection.

Failure to ensure work is inspected and approved can result in criminal penalties, and a Certificate of Non Compliance may be filed with the County Recorder. This alerts the public, title companies, insurance companies and prospective purchasers that a portion of the building was constructed without proper inspection, and therefore may not be constructed according to the building code.

Re-Inspection Fees

Re-inspection fees cover added costs to the City for additional inspections under certain circumstances. Circumstances include: approved plans not provided to the inspector during inspection, inspector not provided access to the building or construction on the scheduled inspection date, construction deviates from plans approved by the building official.

1.4.3 Inspections of Work in the Public Right of Way

Upon entering into ROW construction contracts with the City during permitting, the project manager will be appraised of inspections required for work in the ROW.

1.4.4 Inspections of Wet Utilities Connections

When contracts and permits are issued, the SLCPU Contracts Office will inform the applicant of necessary inspections for the permitted work.

It is the permittee's responsibility to ensure all permitted work is inspected.

Scheduling

The contractor performing the work to be inspected must call to schedule the inspection at least:

- 24 hours in advance: work to be completed on weekdays
- 48 hours in advance: work to be completed on weekends or holidays

Schedule by Phone

Culinary Water: Ed Allen, 801-652-5467

Storm and Sewer: SLCPU Contracting Office, 801-483-6727

Work impacting City trees: Urban Forestry, 801-972-7818

With questions as to whether work requires inspection, prior to commencing work contact SLCPU for clarification.

1.4.5 Project Close Out

General Information

Building Close - Out

The City issues building certificates to indicate completion of all or some permitted construction when it has passed inspection.



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Close - Out of Work in the Public Right of Way

Upon receiving permits for work in the ROW, project owners enter into contracts with the City guaranteeing their work. Finalizing work in the ROW will include completion of all contractual agreements.

Building Close-Out

Certificate of Occupancy

A Certificate of Occupancy is issued upon the successful completion of new construction. The property owner, or at the owners request the building permit holder, may request a Certificate of Occupancy when all construction is complete.

The building permit card, or original copy of the permit, is used to document that all related permits in a new building are complete. The owner or general contractor must obtain signatures upon completion of the final inspection by the building inspector for each permit on the project.

It is unlawful to occupy a building until the certificate of occupancy is issued.

Temporary Certificate of Occupancy

When an owner wishes to occupy a portion or portions of the building before the rest of the building construction is complete, he may request a Temporary Certificate of Occupancy (TCO) at the final building inspection.

There is no fee for a Temporary Certificate of Occupancy for up to 30 days. After 30 days, the fee is \$300 per month for a period of up to 3 months.

Certificate of Completion

A Certificate of Completion may be requested upon successful completion of construction permitted for a project on an existing building, such as a remodel, tenant finish, or any other permit that does not result in a Certificate of Occupancy. There is no fee for a Certificate of Completion.

Close-Out of Work in the Public Right of Way

Work performed under a Permit for Work in the Public Way, such as pavement restoration following excavation activity or the installation of new concrete improvements, carries with it a standard 3-year warranty, guaranteed by the permittee's performance bond.

If the workmanship is defective, the permittee must correct the defective work or be subject to a claim upon the performance bond. The limitation of the duration of the bond to 3 years does not limit the obligations of the permittee, which extend beyond the 3- year period.

There is no additional fee or completion certificate associated with the warranty inspection.

1.4.6 Additional Information & Forms

Building Services & Code Enforcement (BSCE) website.
slcpermits.com



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Part 2

Design & Processes



2.1 General Row Considerations

2.1.1 Disability Access

Planning

Use the accessibility information in this manual and the links to resource documents. Should specialized situations occur, contact, _____, for compliance recommendations. Consultations regarding disability access can be granted at any stage of the process from design to inspections.

Plan Review

Identify on a plan sheet which accessibility standards were followed. For example: ADAAG 1991, or IBC 2006.

Ongoing Barrier Removal

The Attorney General and Department of Justice offices expect existing public facilities to engage in ongoing “readily achievable” barrier-removal whether making any other alterations.

For a discussion see this file on the ADA site:
[ada.gov/adata1.pdf](https://www.ada.gov/adata1.pdf)

The ADA prioritizes barrier-removal in the following manner:

- 1 Enabling individuals with disabilities to enter the facility.
- 2 Providing access to those areas where goods and services are made available to the public.
- 3 Providing access to restrooms, if restrooms are provided for use by customers or clients.
- 4 Removing any remaining barriers, such as lowering telephones.

Alterations

When alterations are made to improve the function of a business, accommodate a change or growth in services, or as part of a general renovation, the requirements for barrier-removal at that time are greater because the alteration is part of a larger construction or replacement effort. Any changes made to a facility shall include improved access within that element and may cause need for further accessibility improvements.

Up to 20% of the total cost of an alteration project shall be used towards barrier-removal as long as barriers still exist.

New Construction

Use IBC at iccsafe.org/e/prodshow.html?prodid=3000503 or ADAAG at access-board.gov/adaag/html/adaag.htm to guide design of new construction.

Universal access for people with any ability level is easily accomplished when planned for from the inception of the project.

Accessibility Checklist

The preferred method for identifying accessible elements in a plan is to follow a checklist. Use of the checklist assists the designer in identifying all of the accessible accessibility elements in the plan.

Site Plans

The site plan must include access symbols, such as a circle representing a 5' turning radius. Include profiles at all driveways, sidewalks, curb ramps and parking lots. Provide sufficient elevations on the plans for all parking areas, driveways, private property and proper ADA slopes and cross slopes.

Equivalent Facilitation

Nothing in these requirements prevents the use of designs, products, or technologies as alternatives to those prescribed, provided they result in substantially equivalent or greater accessibility and usability. When applying for a building variances which include an accessibility component, the variance will be reviewed by City staff for equivalent facilitation.

Construction Activity

Provide pedestrian access during construction according to a traffic control plan approved in advance by the City's transportation engineer. Replicate pedestrian paths through work zones as close as possible to the elements of the existing path and be accessible to people in wheelchairs.

When providing community notification of construction activity, consider methods to alert residents with possible sensory impairments. Such methods include additional signage, door hangers, community newsletters, and press releases. Important methods for auditory / electronic delivery include community meetings, phone message lines, and web site information.

Table 1: Accessibility Checklist

Accessible entrances to the building shall be identified by the international symbol of accessibility.

Exterior exits which are located adjacent to accessible areas and within 6' of adjacent ground level shall be accessible.

Accessible ramps required by ANSI shall not have slopes exceed 1' in 12'.

The surface of ramps and ground surfaces shall be roughened or shall be of slip resistant materials.

An accessible route of travel 3' wide min must be provided to all portions of the building, between the building and the public way. Accessible routes shall have a maximum slope of 1:20 and a maximum cross slope of 1:50.

Threshold must be 6" in height or less.

The primary entrance to the building must be accessible. All other required entrances must be accessible.

All accessible parking spaces shall have a slope not exceeding 1:50.

All accessible parking spaces shall be outlined on all 4 sides, have a contrasting color and the international wheelchair symbol on the ground within the space.

All accessible parking spaces shall have a sign (minimum 5' above finish grade in front of the space) which includes the international symbol of accessibility.

Signs designating permanent rooms and spaces shall meet accessibility requirements.

All electrical receptacles and controls shall be 18" minimum and 48" maximum above finished floor.

All alarms shall be audible and visual, meeting accessibility requirements.

Accessible route shall be without steps or changes in level greater than 6" without an approved ramp.

Accessible routes shall serve as exits or connect to areas of rescue assistance.



Building Design & Process Guide, Part 2: Design & Process

2.1 General ROW Considerations

- 2.2 Public Utilities
- 2.3 Transportation
- 2.4 Engineering

2.1.1 Disability Access

- 2.1.2 Infrastructure Plan Requirement
- 2.1.3 Land Divisions

If the project affects a bus stop, create a temporary bus stop, with comparable amenities, if feasible. The temporary bus stop should be as close as possible to the affected stop, be in a safe location, and be easily accessible. The location of the temporary bus stop is subject to the City's transportation engineer.

Site Access

At least one accessible route must be provided from the public right-of-way to, and throughout the site, that connects all facilities within the site.

For specific ADA requirements for accessible routes, refer here: access-board.gov/adaag/html/adaag.htm#4.3

Ground Surfaces

A. Surface Materials

ADA requires ground surfaces to be "firm, stable and slip resistant", and to have less than $\frac{1}{4}$ " level change or gap. Many pavers and stamped asphalt or concrete, particularly those that are domed-topped, do not meet these requirements. While they may appear compliant at the time of installation, this often changes with time. Pavers and surface imprints should not be located within a pedestrian access routes.

Pavers should be used only as a decorative element on the outside edges of a pedestrian walkway, to maintain at least a 48" smooth, vibration-free concrete or asphalt walking surface.

Where concrete or asphalt is not used, walkways must be surfaced with stone or equivalent.

B. Color & Contrast

Incorporate the needs of individuals with various disabilities when selecting the surface material color and its contrast with adjacent materials.

Sidewalk, Walkway & Multiuse Path Widths

The minimum widths of walkways that connect main building entrances to the public way is 6'. Multiuse path minimum width is 8'.

Curb Cut Assemblies

All site curb returns shall have curb ramps with a detectable warning surface (truncated domes), conforming to ADA standards. Refer to APWA Standard Plan No. 238.

Driveway Approaches

Driveway design shall use Standard Plans published in the Manual of Standard Drawing by APWA (Utah Chapter) to allow access for people with mobility disabilities.

utah.apwa.net

Accessible (Handicapped) Parking Spaces

Design accessible parking spaces on site to comply with requirements of the access board.

- 1 Accessible parking spaces shall be provided accessible routes to the pedestrian access route.
- 2 Universal size spaces (11' wide) may be used for all accessible spaces (preferred).
- 3 Distribute accessible parking through each type of parking available.
- 4 An accessible access aisle for van spaces is preferably located on passenger side.
- 5 Provide a 5' wide access aisle with cross-hatching (no parking area) adjacent to the accessible stall.
- 6 Any necessary ramps shall not encroach into the access aisle.
- 7 Accessible parking shall be on an accessible route to an accessible entrance.
- 8 Each space shall be clearly marked with the accessibility symbol on the ground at the rear of the space. The preferred marking is a white symbol with a blue background.

The following is an example of a preferred accessible parking space.

Drive-Through Facilities

Provide at least 98" of vertical clearance for drive-through facilities. Drive-through facilities that include a passenger loading zone must have a vertical clearance of 114".

Commercial Facilities

A. General Information

Salt Lake City requires commercial developers to comply with the Americans with Disabilities (ADA) Accessibility Guidelines (ADAAG) (1994), and the latest publication of the International Building Code (IBC).

B. Drinking Fountains

Ensure that drinking fountains installed meet ADA guidelines by having a wheelchair accessible fountain installed at 34" above finish floor, (measured to the deck), and a standard height drinking fountain installed at 40" above finish floor.

For facilities requesting a building code variance from the drinking fountain requirements, equal access must be provided for persons with disabilities via "equivalent facilitation", as required by the ICB 2003, Sec. 2901. Contact a City representative for more information.

C. Product Standards

Specifications for selecting and installing accessible features for the following are found in Section 9-3.

- 1 Plumbing Systems
- 2 Doors & Hardware Systems
- 3 Building Components

Alternate products for consideration shall meet the ADAAG Requirements for Controls & Operating Mechanisms, Space Allowance, & Reach Ranges"

access-board.gov/adaag/html/adaag.htm#4.2

Multifamily Residential Facilities

Salt Lake City requires multifamily residential developers to comply with the HUD Fair Housing Accessibility (FHA) Guidelines (FHAG) (1991), by requiring compliance with the International Building Code (IBC) (2006), which is a "safe harbor" FHA building standard.

References

Use the following standards and best practices when designing and constructing accessible facilities. Adhering to federal accessibility standards assures conformance with Salt Lake City standards.

Americans with Disabilities (ADA) Accessibility Guidelines (ADAAG) (1994): access-board.gov/adaag/html/adaag.htm

Any place of "public accommodation" (open to the public) or commercial facility where new construction or a significant remodeling commenced after January 26, 1992, shall be built in accordance with ADAAG standards.

HUD Fair Housing Accessibility (FHA) Guidelines (FHAG) (1991): fairhousingfirst.org/index.asp

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All “covered multifamily dwellings” designed and constructed for first occupancy after March 13, 1991 must be accessible to and usable by people with disabilities.

Accessibility

The chapter controls the design and construction of facilities for access by physically disabled persons. Accessibility requirements for the ADA and FHA are incorporated into the International Codes as the codes are updated. The Salt Lake City has amended Chapter 11 as follows:

A. 1101.2 Design:

Buildings and facilities shall be designed and constructed to be accessible in accordance with this code and ICC A117.1, and Utah Revised Statutes (URS) Section _____ (the Utahns with Disabilities Act), _____, which includes 28 CFR Part 35, and 28 CFR 36, and the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG). Where a conflict exists between ADAAG and the IBC / ICC A117.1, the ADAAG shall govern.

Section 1107 is amended to read as shown:

B. 1107.7 General Exceptions:

Where specifically permitted by Section 1107.5 or 1107.6, the required number of Type A and Type B units is permitted to be reduced in accordance with Sections 1107.7.1 through 1107.7.6.

C. 1107.7.6 Condominium Projects:

Type A units are required to be designed but not required to be constructed unless requested. When no Type A units are requested units shall be constructed as a Type B unit.

(Links to be added in later version)

ICC / ANSI A117.1 Accessible and Usable Buildings and Facilities (2003)

This is a nationally recognized standard of technical requirements for making buildings accessible. Published since 1961, it is referenced by federal documents and state accessibility laws. The IBC also references the ICC / ANSI A117.1.

(Links to be added in later version)

Salt Lake City Revised Codes and Ordinances

Chapter ____, Article ____ Building Code _____ adopts the UDA, ADAAG, and IBC as Salt Lake City’s building code. www._____

Zoning Ordinance Article _____. Mobility impaired accessible spaces – Stipulates slightly different accessible parking space requirements than federal requirements.

US Access Board Revised Draft Guidelines:
access-board.gov/prowac/draft.htm#Text

This document provides guidance for public rights-of-way, such as public sidewalks, curb ramps, accessible routes, ground and floor surfaces, and bus stops and shelters. These guidelines are considered “best practices” in this field and recommended for use.

2.1.2 Infrastructure Plan Requirements

Definitions

“Public way” means and includes all public rights of way, public easements, public pathways, public walkways, public sidewalks, public streets, public roads, public highways, public alleys, and public drainage ways including the surface, subsurface, and above-surface space, now or hereafter existing as such within the city. It does not, however, include utility easements not within public ways of the city.

Submittal Requirements

Submittal review is required by the City Design professional for surface improvements in the public way. Utility work in the public way and outside of the public way requires the review of the Chief Design professional for the City’s Public Utility Department. The following standards apply:

- 1 Prepare plans on standard ‘ANSI D-size’ 22” x 34” sheets and clearly reproduce them on print paper in a black line format. 24” x 36” may be used if first approved by City staff.
- 2 The city will furnish, upon request, electronic files in AutoCad base drawings. The design professional shall be responsible for the completion of the drawings as applicable to the project.
- 3 The design firm’s identification should be in the title block.

- 4 The minimum lettering size is $\frac{3}{16}$ ” for manually drafted or $\frac{1}{8}$ ” for mechanically produced lettering and is legible when reduced 50%. Reproductions of drawings must be legible when microfilmed or reduced to $\frac{1}{2}$ scale. Adhesive backed appliques for lettering or shading will not be permitted.
- 5 On all sheets that have maps or plans, North shall be oriented to the top of the sheet or to the left. Show a North arrow and bar scale on each sheet. Project stationing shall match City’s database.
- 6 Group construction keynotes under “reference keynotes” and “sheet keynotes”. Reference keynotes are circumscribed with a hexagon (6-sided polygon). Sheet keynotes are circumscribed with a circle.
- 7 All projects must comply with Section 404 of the Federal Clean Water Act. Before the city may issue development permits for a project, this 404 Certification Form must be completed and submitted with improvement plans. Design professionals are advised to apply to the Corps as early as possible for a Section 404 permit and allow for the necessary processing time to prevent delays in obtaining development permits from the city.
- 8 To help identify, preserve and protect archaeological sites, an archaeological survey and report by a qualified archaeologist is required to be submitted for all public and private developments in Salt Lake City. A qualified archaeologist is an individual or firm meeting the Utah State standards and professional qualifications for an archaeologist.
- 9 All projects submitted for review or further processing shall be complete and consist of plans, specifications, structural calculations, geotechnical report, drainage report, native plant information and other documentation as required for that project.
 - The design professional must submit for code review a minimum of 3 full size sets of plans, 2 sets of specifications, 1 set of structural calculations, drainage calculations and geotechnical report when applicable. In addition, the design professional will provide additional plans, specifications and other documentation as required for internal user group review purposes.



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10 A licensed professional responsible for the design must seal all plans and documents submitted for review and mark them with the following: “For Review Purposes, Not to Be Used for Bidding or Construction”. The registrant’s signature is required on all original plans submitted to the City.

11 Provide an electronic copy of the final drawings and specifications utilizing the Autocad and Microsoft Word formats, respectively. CAD drawings shall be saved in the version currently in use by the City. At the City’s request, a set of signed and sealed drawings in full-size PDF format on CD shall also be submitted.

12 After tentative approval of the final review package, the design professional shall submit a complete set of original drawings for City approval and signatures. The drawing set shall have the note “Not for construction or bidding purposes” removed.

Soil Testing

Provide soils boring logs at a minimum spacing of 1320’ along projects whose average trench depth exceeds 10’. Boring should extend to 24” below the proposed bottom of the trench and be of sufficient diameter to allow for laboratory testing and analysis. Locations of borings shall be identified on the plans. Soil boring logs shall be included on a geotechnical report along with a discussion of any particular bedding, shoring, excavating, or dewatering considerations.

Some projects may require separate environmental assessments, particularly if the site is suspected of having environmental contamination. If the project proposes temporary de-watering or permanent de-watering to a public drainage system ground water samples test results are required and a ground water discharge permit from SLCPU is required.

Cover Sheet

The City Engineer will furnish an electronic drawing file of the cover sheet upon request. (Mark – help me here. This sheet is for infrastructure extension or subdivision work but not for work that is primarily on private property with only incidental public ROW work. We need to coach the designers on when to use the official city cover sheet.)

The design professional shall add the following:

- Project title, City job number
- Vicinity map with section, township, range and parcel numbers
- Sheet index
- Design firm identification.
- Appropriate signature names in the signature block
- City benchmarks for project – a minimum of 2 required on NAVD 1988 datum.

Sheet Format

- 1 Single plan and profile sheet, scale: 1” = 20’ and not to exceed 500’ per sheet; separate profiles for each curb and gutter and crown line at 1” = 2’ vertical scale and 1” = 20’ horizontal, using 3” separation between profiles.
- 2 Removal, construction and other notes shall be categorically and numerically referenced and listed on the right-hand side of sheet. Use the same number for like work on all sheets. Upon request, the city will provide a sample format for the design professional to use.
- 3 In the area of match lines, portions of the same street are not to be repeated on separate sheets. Match lines shall show stationing and adjacent sheet number.
- 4 Do not cut intersections by match lines. Complete from BCR (beginning of curb return) to ECR (end of curb return) on same sheet. When intersecting streets are to be improved beyond ends of curb returns, additional plan and profile sheets should be used to detail the intersecting street. Fully show the intersections at the beginning and end of the project.

Horizontal Geometrics

- 1 City streets are typically centered along monument lines, from city monument to city monument. The monument system is tied into the state plane coordinate system and Salt Lake County section corners. Bearings need to be shown on plans; and all bearings of intersecting streets must be shown. All section corners, monuments, tangent points, points of intersection (PI) of curvilinear sections, beginning and ending taper points and monument lines of all intersecting streets shall be labeled and stationing. Survey markers shall be installed per City Surveyor standards.

- 2 Show centerline stationing on plan and profile. Stationing numbers should be chosen to prevent “negative” stationing. The project need not start with 0+00. On curved sections the stationing should be along the centerline of the curve and not the tangent lines.
- 3 Show curve data on the same sheet as the curve. Stationing shall run so the north arrow points to the top or left side of the drawing sheet.
- 4 On streets that are not centered on the monument line, the stationing shall be along the construction centerline, which shall also be the proposed crown line, unless super-elevation or other conditions dictate otherwise. On such streets, the rights-of-way shall be measured from the monument line. The offset between the monument line and construction centerline shall be shown and all offsets shown for new construction shall be from the construction centerline.
- 5 Care must be taken to ensure a smooth grade in all directions through intersections. Special design work sheets are required to show profiles on the intersecting street to ensure smooth grades in both directions. These work sheets are to be included with the grade and alignment submittals.
- 6 All curb radii shall be dimensioned on the plans to back of curb.
- 7 On all existing roadways and intersecting streets, the plans shall show dimensions from monument line to rights-of-way and to existing back-of-curb. Existing medians, sidewalks, curb ramps, etc. will be clearly dimensioned and labeled.
- 8 All new pavements should be fully dimensioned to the edge of pavement or back-of-curb and tied to horizontal control lines.

Topography & Notation

- 1 Show all subdivision names, block numbers, lot numbers, property splits, lot dimensions, addresses, names of major businesses, schools, fire stations and other public facilities.
- 2 Show final rights-of-way as a dark line. Show original rights-of-way, where it differs from the new rights-of-way line, with a lighter weight line.
- 3 Show all existing alleys and easements with proper designations and dimensioning. Show all new easements required for the project, including temporary or permanent.



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General Construction Notes For Work Involving Public Utility Facilities

1. General

All construction and material shall be in accordance with these contract documents, including the Manual of Standard Specifications 2007 Ed. and Manual of Standard Plans 2012 Ed. published by the Utah LTAP Center, Utah State University, 8205 Old Main Hill, Logan UT 84322-8205. Copyright 2006 Utah chapter American Public Works Association, The Associated General Contractors of America (AGD).

The design professional's designs on these plans have been reviewed by the City in scope but not in detail. If construction quantities are shown on these plans, the City has not verified them.

Based on the information submitted on the plans and associated documents, the City has reviewed and found them to be in accordance with the City Code and regulations and are acceptable for developer agreement issuance. This acceptance by the City does not authorize violations of any applicable City code, ordinance or standard.

2. Coordination 01 31 13
Notify affected agencies

3. Schedule 01 32 16
Provide and update a construction schedule showing affect on Salt Lake City, County, or any other municipality regulations for working in the public way prior to construction

4. Asphalt Concrete and Soil Testing 01 45 00
Provide Marshall and proctor test data 24 hours prior to use, certified in writing from a laboratory recognized and accepted by Salt Lake City, County, or other municipality as applicable. 31 05 13
32 11 23
33 05 20

5. Utility Location 01 31 13
Utility locations are approximate.
Contact Blue Stakes before starting project.

Verify depths of utilities in the field by keyholing. At least 2 weeks time or 3' ahead of pipeline construction. Avoid conflicts with designed pipeline grade and alignment. If a conflict arises resulting from neglect to keyhole, resolve conflict at no additional cost to Salt Lake City

6. Changes 01 31 13-1.2C
No changes in designing location or grade is allowed except by Chief Design professional's representative, SLCPU 00 72 00-.1

7. Survey Control 00 72 00-6.2
Provide a licensed surveyor or design professional. Protect stakes and markers until final measurements are completed by City surveyors. 01 71 23
Do not bury any pipe or fittings until the SLCPU inspectors have approved installation and SLCPU surveyor has completed the record survey of the installation. If necessary, expose buried utilities at no cost to the City. 00 72 00-4.4
01 71 34
00 72 00-13.5
Note: it takes at least 2 survey points to properly orient a storm drain inlet box.

8. Asphalt Concrete 33 05 25
Furnish and place permanent asphalt concrete meeting Salt Lake City, County or other municipality requirements. Permit
Match existing thickness. Minimum thickness is 3"
Guaranty installation and materials for 3 years from the date of acceptance by the City.

9. Temporary Asphalt Concrete 33 05 25
Replace temporarily installed asphalt concrete with hot mix at no cost to the City

10. Contractor Responsibilities 00 72 00-6
Seal end of installed pipe at the end of the working day. Do not allow debris or rodents to enter the pipeline. Standard Plan 382
01 57 00-3.2
Seal end of installed pipe at the end of the working day. Do not allow debris or rodents to enter the pipeline. 01 74 12

Use type B pipe zone backfill and on APWA plan # 382, substitute "nothing larger than 3/4" in the pipe zone.
Control dust and rubbish.
Repair damaged facilities at no cost to City.
Obtain easements when working outside of the site or public way

11. Water and Sanitary Sewer Separation Utah DEQ
Work with SLCPU for requirements for separation. Also follow the requirements of the Division of drinking water of the State of Utah Department of Environmental Quality. Regulation R309-5507
Horizontal distance between pressure water mains and sanitary sewer line crossings, the water main will be at least 18" above the sewer line.
Water lines and sewer lines shall not be installed in the same trench

Exceptions to these requirements must be approved by SLCPU

12. Water Services Standard Practices for SLCPU 5
Place meter boxes in the park strip or outside of any hard surface in the public way.
Extend service line perpendicular to water main.
Restore landscaped surfaces.
Fire connections require separate connection to water main.

13. Sanitary Sewer Standard Practices for SLCPU 11
Protect during construction or if damaged, remove and replace.
If tunneled under, provide video inspection to verify that the lateral's grade and conditions of pipe has not been compromised
Laterals to be abandoned must be plugged with concrete at the property line to prevent soil from entering the sewer main. Call for SLCPU inspection before backfilling.



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<p>14. Thrust Restraints Place as described in the specifications and shown on the standard drawings. Water lines are rated for a minimum 200 psi working pressure APWA Standard Plan No. 561 and 562</p>	<p>33 11 00-3.5 APWA Standard Plan No. 561 and 562</p>
<p>15. Corrosion Protection Coat all exposed nuts, bolts, and ancillaries with fm #1 non-oxide grease and wrap in 8-mil polyethylene wrap Epoxy coat and tape wrap all steel, cast iron, or ductile iron valves, fittings, bolts, tie rods, etc. according to AWWA C241 (with a 17-pound magnesium anode, cad welded to each fitting. Chuck – are we requiring sacrificial anodes on all fittings?</p>	<p>Chevron FM Alc Ep 0.1.2 food machine grease</p>
<p>16. Pipeline Stationing Stations and lengths shown on the drawings are centerline of pipe from center of manhole to center of manhole. Profile drawings are horizontal projections of the pipe centerline, unless noted otherwise</p>	
<p>17. Waterline Cover Provide at least 4' from the top of the water main to finished grade. If can't be done, then provide a special design for review and acceptance by the City (check other sections for consistency on bury depth.)</p>	<p>33 11 00-1.3</p>
<p>18. Water Shut-downs Contractors are to coordinate shut-downs with SLCPU inspector. Proper notification, to effected properties, is required. Only SLCPU personnel may operate existing valves on the public system. City does not guarantee water shut downs will completely stop water flow or eliminate pipeline pressure at the work site. Devise a plan for work stoppage as a result.</p>	

- 4 Show all underground utilities and appurtenances and their distances from the monument line and label size, type of material and type of utility. Utilities that are abandoned, or to be abandoned or removed should be indicated. Any utilities to be constructed prior to the project should be shown and so indicated. Underground electrical lines shall be denoted as direct burial cable or conduit-enclosed cable.
- 5 Show all buried fuel tanks. When the new rights-of-way is in an area where such tanks may exist, a special effort should be made to check for the possibility of their existence.
- 6 Show existing underground concrete pavements. Core borings should be utilized to determine the existence of such pavements when authorized by the city.
- 7 Show existing site conditions and topography to at least 10' beyond the new rights-of- way line or any required easements. Use standard legend symbols where applicable. Show all information for buildings, canopies, asphalt aprons and overhangs within 30' of the new rights-of-way. Existing site information should be screened approximately 40 to 60%.
- 8 Show all signs within the new rights-of-way and 20' beyond the rights-of-way. Electric signs shall be so noted and their source whether overhead or underground identified.
- 9 Show diameter and variety of trees and shrubs within 30' of the new rights-of-way and within temporary construction easements. The city will determine the disposition of all trees and shrubs. If slight changes in alignment could be made to save valuable trees or the sidewalk could be realigned by acquisition of additional rights-of-way, it should be brought to the attention of the City at the earliest time possible.
- 10 Show all utility poles. Differentiate between power poles with street lights and those without. Also show all traffic signal poles and their appurtenances.
- 11 Show all subdivision entrance structures and indicate any utility connections. When these interfere with new construction they should be relocated or reconstructed. At times it may be necessary to obtain rights-of-way for these structures.
- 12 As-built drawings or sufficient elevations must be obtained to indicate the direction of surface flow on all intersecting streets, frontage roads and parking lots. The direction is to be shown by a small arrow.
- 13 Where certain items such as monuments, water valves, water meters (sizes if relocation is indicated) etc., are shown on city utility maps or record drawings but are not located, they should be shown and labeled "not found" on the plans.
- 14 Show all existing sprinkler systems. Where new construction requires alterations, these sprinkler systems must be put back in operation by the contractor and shall be so noted on the paving plan sheets (or landscape plans).
- 15 Where new rights-of-way is required, the design professional must investigate if any disconnected water or sewer connections (stub-outs) are completed to the old rights-of-way line only. Where this occurs, show the service connection (size and material) to be extended to the new rights-of-way line. Galvanized services are to be replaced in their entirety. The city will furnish a new meter if the old meter is faulty.
- 16 Show all existing safety curbs. Call for relocation of existing safety curbs and the addition of new safety curbs where required.

Construction Plans' Profiles & Grades

- 1 Construction benchmarks shall be a maximum of 1,000' apart and each sheet shall refer to the nearest benchmark. All benchmarks must be based on the City datum and at least 2 benchmarks on a project shall be existing city monuments. Elevations of city benchmarks are available from the City Surveyor upon request. Some areas of the city have experienced ground movement. Report variations from recorded city benchmarks to the City Surveyor. Use NAVD 88 datum and label as such.
- 2 The proposed construction centerline profile shall show the profile of the existing surface at the construction centerline. The proposed curb and gutter profiles shall also show the existing surface line at the location of the new back of curb line. If the proposed curb and gutter is adjacent to the existing curb of a frontage road, the existing surface line shall be omitted and the top of the existing curb of the frontage road shall be shown.



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- 3 Top of embankments at ditches and bottom of ditches shall not be shown to express existing surface lines. They may be shown in addition to existing surface lines if properly labeled.
- 4 Existing ground elevations along the rights-of-way lines should be indicated by tick marks along the left and right gutter profile lines at approximately 100' intervals.
- 5 If the ditch bottom or banks occur at the property line, the elevation to be shown in the profile for the property line shall be taken beyond the ditch on "average" ground and the offset noted.
- 6 Existing roadway profiles shall be extended to a minimum of 300' past the ends of the project to assure a smooth transition between the existing and new roadway.
- 7 Elevations must also be shown in the profile at all driveways, sidewalks, curb cut assemblies and parking lots. Elevations of building floors within 30' of the property line shall also be shown in the profile and any other buildings that appear to be low compared to street grades. Sufficient elevations beyond the property line shall be recorded in the field notes at driveways that may require significant alterations beyond the property line.
- 8 Cross section sheets shall have a scale of 1" = 10' horizontal and vertical. 1" = 5' or 1" = 20' may be used where special conditions warrant their use. Cross sections shall be plotted at 25' intervals depicting the proposed street cross section, in areas where new curb and gutter is retrofitted into existing pavement and less than 1 lane of pavement adjacent to the curb is removed and replaced to insure smooth cross sectional transitions.
- 9 Sufficient elevations shall also be taken and recorded in the field notes of all parking areas, driveways and private property to be certain that the property ADA slopes and cross slopes are indicated.
- 10 Elevations of existing water valve nuts shall also be shown in the profile with the appropriate symbol. It is the responsibility of the design professional to uncover these valves, obtain the elevations and replace the cover and any excavated pavement.

- 11 Longitudinal and transverse grades shall be designed for proper drainage design criteria, standards and ordinances. Proposed curb grades shall be set to drain all paved adjacent property. Where this is not possible, catch basins may be required beyond the rights-of-way lines, but only where permanent rights-of-way or permanent drainage easements are obtained for the catch basin. In projects with flat longitudinal slopes, the grades shall be set to prevent sump conditions that may flood private property during large storms.
- 12 Where possible, grades should be set to reduce high crowns where they exist. This will assist the flow of floodwaters and prevent backup into houses. Care should be used in lowering existing streets since excavation to construct pavements may uncover existing utilities and possibly change drainage patterns.
- 13 Any streets with horizontal curves sufficient to require super-elevation should be designed in accordance with AASHTO guidelines. The design professional is advised to discuss this subject with the city prior to design of super-elevation.
- 14 All manholes rims and lids, valve covers, inlet grates must be restored to match the new elevation of streets that have been roto-milled or overlaid.

Storm Drain Design Sheet

Alternate storm drain piping materials should be summarized on a single sheet and refer to types of materials, design dimensions, material strengths, bedding conditions and soils information, etc.

Sheet Orientation

Sheets are to be oriented and have the same horizontal and vertical scale as the paving plans.

Topography & Notation

- 1 Storm drain drawings shall show all of the existing utilities and any new utilities proposed within a minimum of 30' of the centerline of the storm drain. It shall also show other existing topography as shown on the paving plans (or to within 30' of the drain centerline if not located within right-of-way) that is pertinent to drainage.

- 2 These drawings shall show, in plan, all proposed storm drain pipe, manholes, catch basins, connector pipes, pipe collars, ditches, swales, channels, and other drainage appurtenances. These items should be referenced to standard details and plan sheet quantity sheets. Add reference to sheets where details or sections are shown.
- 3 Storm drain main lines, connector pipe and catch basins shall also be shown, in plan, on the paving sheets. A reference to the appropriate sheet number for the storm drain plans shall be shown on each paving plan sheet.
- 4 If the storm drain main exists and no separate storm drain plans are required, the catch basins and their lines shall be called out on the paving plans. Details of catch basin with connecting pipes shall be included with paving details.
- 5 Conflicts with existing utilities shall be noted in both plan and profile.

Horizontal Alignment

The most satisfactory alignment is determined by the location of existing facilities. Desired location is near the centerline of the existing or proposed street. Existing utilities crossing under at an angle less than 45° may require special design considerations and should be avoided. Location of the storm drain should consider the interference of water main thrust blocks and the need to provide maintenance on either system.

Utility Profiles & Grades

- 1 An overall system profile sheet shall be included with the set and shall show the pipe sizes, grades and locations of manholes and lateral connections. The hydraulic grade lines shall be shown along with the existing and proposed finish grade over the pipe. Crossing utilities including sanitary sewer lines, water lines greater than 12", storm drain lines, and major electric and telephone feeds shall be indicated at their proper locations.
- 2 The storm drain pipe and manholes shall be shown in profile. The pipe size and the slope to 4 significant figures shall also be shown in the profile. The existing ground over the proposed pipe and the proposed grade shall be shown.



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- 3 Design of storm drain systems shall be per Public Utility Department design criteria and standards. The design professional shall obtain the applicable criteria and standards and arrange for a consultation with the Chief Design professional's floodplain administrator prior to starting design of the storm drain system. This is very important since the drainage areas to be considered in the design may vary.
- 4 Generally for maintenance reasons, the minimum pipe size required for the main is 24" and the lateral pipe shall be 18". Smaller diameter pipes require staff approval and will be considered by the city if utility conflicts may be avoided and the pipe has sufficient capacity to carry the design flows.
- 5 All existing or proposed utilities crossing the new storm drain shall be shown in the profile at their proper as-built, field-verified, or keyholed locations.
- 6 Prefabricated fittings shall be used for all new horizontal or vertical bends where feasible. Locations of bends or fittings shall be called out on plan and profile.

Profiles For Catch Basins & Connecting Pipe

1. Sheet Orientation

- These sheets are to be all cross-section sheets.
- Sheets should have the appropriate title blocks.
- Catch basins and their connecting lines shall be drawn facing North or facing East.

2. Profiles & Grades

Profiles should show the correct top of curb elevation at the catch basin and a cross section of the proposed catch basin. Invert elevations of the connector pipe shall be shown at the outlet from the catch basin and the inlet to the storm drain as well as any grade breaks. Show the size of the pipe and the percent of slope (to 4 significant digits). Also, show the catch basin type and size, the station and offset, and a cross reference to the storm drain plan and profile sheet where the catch basin is shown.

All existing utilities crossing the proposed pipe shall be shown at their proper location and elevation. Use as-built drawings to obtain the correct elevation. When elevations are available

from as-built plans, the elevation should be called out on the profiles. Where no elevations are available, the utility shall be located from the best available information.

A note should be included on each sheet stating that the elevation is unknown, unless noted on the profile. Where elevations of existing utilities are not known and their existence could be in conflict with the proposed pipe or catch basin, to determine exact elevations and horizontal locations, the design professional must coordinate digging keyholes with the respective utility company.

Utilities located in the field shall be shown in plan and profile at their correct location, and noted in profile with their exact elevation and the notation "keyholed elevation".

Minimum clearance between the proposed pipe and all existing utilities is 2' horizontal with underground utility lines, poles, fences, buildings, etc., and 1' vertical clearance with underground utilities. On special occasions 3" of horizontal clearance with catch basins may be allowed.

Utilities that will require relocation shall be noted in the cross sections and shown at the existing and new locations.

All required pipe collars and pipe supports shall be called out on the cross section. Prefabricated tees shall be utilized whenever possible.

Inlet spacing shall be designed to meet the design spread requirements from the FHA Urban Drainage Manual. Under no circumstances should storm inlets be spaced greater than 500'.

Irrigation Plans Return

Sheets shall have the same orientation as the paving plan sheets.

Topography & Notation

Paving removal items shall be called out on the paving sheets, not on the irrigation sheets.

Horizontal Alignment & Design

- 1 Private irrigation pipe, ditches and structures will be placed on private property using a temporary construction easement. The private irrigation pipelines may be placed under the proposed sidewalk if placing pipe on private property would result in the loss of existing trees or landscaping, or cutting of planters or buildings or concrete pavement parking areas, and if there is no conflict.

- 2 In locating private pipe, care should be used to allow space for utility poles, streetlights, or traffic signal pole bases along the property line, and sufficient horizontal clearance between any structures and the proposed pipe.
- 3 At the earliest opportunity, notify the irrigation company in writing, of the project and request design confirmation. A copy of this request must be sent to the city. The design professional will provide the irrigation company with all available information on the location of other utilities, street grades and street alignment. The design professional shall cooperate with the irrigation company so that the final design will meet their standards and be the most economical for the city.
- 4 At the same time they are submitted to the city for review, the design professional shall send a set of grade and alignment plans to irrigation company and request a determination of rights-of-way requirements for their facilities. It is essential in order to meet rights-of-way schedules that these rights-of-way requirements be submitted to the city as soon as possible.
- 5 A 2nd set of grade and alignment plans shall be sent to the irrigation company after approval by the city.
- 6 If existing private or irrigation company irrigation pipes are to remain as is, the design professional shall investigate the type of pipe and its condition to ensure it is fit to remain. The design professional shall also investigate the elevation of the pipe to be sure enough cover will be provided over the pipe even during the time of construction
- 7 On private irrigation lines and ditches, the design professional must obtain the delivery quantities and irrigation schedule from the water master. The design professional shall be completely responsible for the design of private irrigation systems. The determination of rights-of-way requirements at an early date is essential in maintaining the time schedule; submit these requirements to the city as soon as possible. Hydraulic computations on private irrigation shall be furnished to the city. All work involving private or irrigation company irrigation shall be coordinated with the city's project representative.



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- 8 If a private well or a secondary source of water is used for irrigation special back flow prevention devices may be required to protect the potable water supply. Check with SLCPU for additional information.

Profiles & Grades

Profiles shown for irrigation pipes must show the proposed surface grades over the centerline of the pipe as well as the invert profile of the pipe and the top of the pipe. Top elevations must also be shown for all irrigation structures. Grades of pipe shall be established which will provide sufficient cover over the pipe as well as be hydraulically efficient.

- Sanitary Sewer Plan
- Sheet Orientation
- Sheets shall have the same orientation as described in the paving plans section.

Topography & Notations

- 1 Provide the same site information as required for the paving plan base sheets for the sanitary sewer plan sheets.
- 2 If the sewer is located in an easement outside the rights-of-way, show all existing site conditions to 30' minimum along each side of the pipeline.

Horizontal & Vertical Control Return

- 1 Establish 1 construction benchmark for every 1000' minimum along the alignment of the pipeline. At least 2 city benchmarks should be referenced (NAVD 88).
- 2 Stationing shall be established along the pipeline, increasing from lower to higher invert elevations, and be referenced to street centerline or monument lines at manholes or angle points where possible. Where this is not possible, the use of bearings and distances along the pipe centerline shall be utilized. The beginning and end point of the sanitary sewer line shall be tied to the nearest monument point.

Profiles & Grades

- 1 Profiles shall indicate the existing and design grade line over the pipe and shall include the "as-built," "field-verified," or "keyholed" locations of all crossing utilities.

- 2 Vertical locations of storm drains and sanitary sewers should be interpolated from verifiable field elevations along accessible points. Locations of other pipes shall be taken from information on existing "as-built" drawings or actual field "keyhole" datum.
- 3 When existing "as-built" plans of a water line greater than 12" diameter, a high pressure gas line greater than 4" diameter, and telephone or electrical conduits do not indicate a depth of bury, the design professional must coordinate with the utility company for a "keyhole" location to be provided. When existing "as-built" plans of a water line, a gas line, or telephone or electrical conduits do not indicate a depth of bury, the design professional shall coordinate with the utility company to provide a "keyhole" location.
- 4 Identify existing utilities by name, size and type of pipe in the profile. If existing or proposed pipes are greater than 21" (inside) diameter, show top and bottom invert grade line and an indication of pipe wall thickness in the profile. For pipes 21" or smaller (inside) diameter, indicate only top and bottom invert grade.
- 5 Necessary water relocations shall be per City Standard. Coordinate requirements for shut-off and air release and vacuum valving with the SLCPU.
- 6 Show invert elevations on all manholes and pipeline invert elevations on all ends of stub-outs or at points of match sheet. Pipeline grades should be established to 4 decimal places.
- 7 Calculate invert elevations and lengths of pipe from center of manhole to center of manhole. Sections of pipe connected to manholes should be 5' maximum length to minimize the adverse affects of any settlement.

Water Line Plan

Sheet orientation, topography and notations, horizontal and vertical control, and soils testing should be similar to those criteria described for the previous section "Sanitary Sewer Plans".

Profiles & Grades

- 1 Profiles are required for all water mains lines 12" and greater. Generally, the minimum size water main is 12" in a commercial or industrial area and 8" minimum in residential subdivisions.

- 2 Profiles shall indicate the existing and design grade line over the pipe and shall include the "as-built," "field-verified," or "potholed" locations of all crossing utilities.
- 3 Vertical locations of storm drains and sanitary sewers shall be interpolated from verifiable field elevations along accessible points. Locations of other pipes shall be taken from information on existing "as-built" drawings or actual field "keyhole" datum.
- 4 When existing "as-built" plans of a water line, a gas line, fiber optics, or telephone or electrical conduits do not indicate a depth of bury, the design professional shall coordinate with the utility company to provide a "keyhole" location.
- 5 Identify existing utilities by name, size and type of pipe in the profile.
- 6 Existing water line relocations may be necessary.
- 7 Generally Construct all fire line services and hydrant connections are constructed with pipe type matching the main, ductile iron pipe (DIP) east of State Street and PVC C-900 west of State Street.
- 8 Water mains 12" in diameter shall have a minimum cover of 48" to finish 4.5' measured from the proposed finished grade to the top of the outside wall of the pipe. 5.0' of cover may be required in the higher bench locations and for fire lines. **(more info to be added in later version)** Grade; mains smaller than 12" in diameter shall have a minimum cover of 36" to finish grade; mains greater than 12" in diameter shall have a minimum cover of 60" to finish grade. Water mains in industrial areas or in major collectors and arterials shall have a minimum of 48" cover.
- 9 All bends, angle points, fittings shall be stationed. On water lines 12" or larger in diameter, show the design top of pipe elevation.
- 10 See SLCPU Water section for additional information.

Plan Sheet

See Section 5-4 "Traffic Signal Design", for specific information on plan sheet sets. Plan submittals and plan content are described therein.



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Notes & Schedules

Develop these as necessary to show the conductor schedules, controller and pole schedules, phasing details, etc., and general notes with cross references to items shown on the plan sheet. See Section 5-4 for further guidance.

Traffic Signing & Pavement Markings

- 1 Use double plan at 1" = 40' scale, with the same orientation as the paving plans.
- 2 Signing and striping shall conform to the requirements of the City's transportation Transportation engineer Division Director and the Manual of on Uniform Traffic Control Devices.
- 3 Existing striping shall be shown and dimensioned to a minimum of 300'-250' beyond where it ties into the new work. All new work shall be appropriately dimensioned from lip-of-gutterface of curb to center-of-stripe, etc. Overall dimensioning shall be provided across pavement widths and rights-of-way. See Section 5-4 for a list of applicable notes to place on plans.
- 4 All permanent pavement striping, including crosswalks, shall be hot sprayed 6 mil thermoplastic.SLC approved marking material. Temporary pavement markings and island noses should be reflectorized traffic paint. Legends and arrows to conform to UDOT Specifications and Standard Drawings the Manual on Traffic Control Devices.
- 5 Raised pavement markers are generally required for all new paving projects.

Sheet Format

Landscaping and irrigation may be combined on the same plan for simpler projects, but generally require separate plan sheets. In either case, the orientation and scale shall be the same as for paving plans, using a double plan on each sheet. The landscaping plan shall also show all street signs to avoid landscaping conflicts that interfere with street sign placement. The standards for sight lines below (9-1.1003-2)shall be considered for appropriate landscaping near street signs.

Note And Legends Sheet

This sheet may be combined for the landscaping and irrigation plans. It shall contain general notes, landscaping notes, irrigation notes, list of plants and shrubs used (noting common and botanical

names), list of irrigation components, legends of landscape and irrigation symbols, quantities, approval block, maintenance statement signature block and miscellaneous details.

Plan Sheets

- 1 Landscape plans shall show individual shrubs and trees plus types and areas of various groundcovers, including grass, pavers, exposed aggregate paving, etc., with quantities. Identify restoration work behind new sidewalks, or in other areas disturbed by construction work. Existing items to be removed or transplanted shall be shown with special attention to native plants that are required to be salvaged. The property owner will furnish guidance and assistance in identifying plants to be salvaged or transplanted. The city will select types of new plants that will conform to the city landscaping policy and requirements.
- 2 Sight lines shall be shown on the landscaping plans and shall conform to transportation criteria and standards. Design consideration should be given to placement of plants, size of plants at maturity, canopy widths and general maintenance. Planting density shall not exceed tree or shrub natural growth habits. Generally, shrubs should be kept a minimum of 4' away from the curb or sidewalk, and when within a sight line they should not exceed a maturity height of 18" above the curb.
- 3 Trees should be located so that the mature canopy will not overhang the curb or sidewalk line. Within a sight line, trees shall have a single trunk with a clear height of 8' to the canopy in the park strip and 12' in the first vehicular travel lane.
- 4 Irrigation plans shall provide detailed design from the service side of the meter. The irrigation service and meter size will be provided and noted on the civil plans.
- 5 Identify the detail and dimension, or station the locations and layout of the meter, backflow preventer, control valves, main and lateral lines, pressure regulator and emitters, etc. Diagrammatic layout plans will not be accepted by the city. The design professional shall clearly indicate with stations and dimension to the back of curb or sidewalk the proposed locations of the irrigation components. Valve flow rate, station number, size and description (tree, shrub, turf, etc.) shall be given for each valve.

- 6 Separate emitters shall be shown to each plant. Distribution tubing length shall not exceed 6'. Trees and shrubs are to valved separately. Separate emitters shall be shown to each plant. Number of multi-port emitters for trees shall be per Salt Lake City emitter layout details. Emitter flow rate shall be provided on the plans.
- 7 Show the electrical source plus the controller location and all wiring, including conduits and sleeves.
- 8 Upon request, the city will provide the design professional a listing of products that may be listed for performance and quality control. The drawings need to reference "or acceptable alternate" in all cases.
- 9 Salt Lake City maintained landscape and irrigation improvements shall be designed based upon Salt Lake City specifications and details along with other design criteria.

Bridge & Structural Plans

At the city's option, bridges on canals may be designed as a separate contract to be bid separately from the roadway plans, since the bridge must be built during the annual canal dryup. Bridges over washes may be included as part of the paving plans.

Required Sheets

The sheets required on a typical set of bridge plans, which are independent of the roadway plans, are.

- 1 City cover sheet with information as shown under paragraph A.
- 2 Typical section sheet to show sections of roadway work included.
- 3 Notes and legend sheet with information shown under paragraph B with additional bridge and structural notes.
- 4 Paving plans and profile sheet with additional information concerning bridge and structural details.
- 5 Detour plan and profile, if required, showing all details required for the detour in plan and profile.
- 6 Plan and profile for any water, sewer, or irrigation alterations to be included as part of the bridge contract.
- 7 Bridge location plan showing the bridge in plan and profile and the bridge quantities.
- 8 Soil boring log sheet showing all soils information obtained and the note concerning responsibility.



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- 9 Abutment Details
- 10 Pier Details
- 11 Deck Details
- 12 Miscellaneous details (approach ramps)
- 13 Handrail and Guard Details.

Additional Requirements

- 1 The design professional shall discuss the project with Salt Lake County Flood Control at an early date in order to obtain their requirements when designing a bridge over a canal or when any County flood control facilities are involved. Generally, the first step of a bridge design over an County canal will be to obtain a statement from County as to whether they consider the bridge a restriction in the canal. If they do consider it a restriction, it shall be necessary for the design professional to submit a hydraulic study to Salt Lake County Flood Control to assure that construction of the new bridge or bridge widening will not adversely affect hydraulic characteristics in the canal. Upon approval of that study by the County, the design professional shall proceed with preparation of preliminary plans. Following review and approval of such plans by the city and Salt Lake County Flood Control, the design professional shall proceed to drafting final plans. Throughout all stages of project design, the design professional shall coordinate all work with the County in order to minimize any possible conflicts. Bridges over Salt Lake County Flood Control canal facilities must conform to prevailing County standards and requirements.
- 2 Design professional shall consider sight distance requirements when designing the roadway portion of the contract.
- 3 At an early date, the design professional shall coordinate with other utilities such as Qwest, Rocky Mountain Power, Questar, cable TV and SLCPU in order to identify any necessary relocations of their facilities.
- 4 Bridges over the Jordan River, City Creek, Red Butte Creek, Emigration Creek and Parleys Creek will also require a Riparian Permit.

Plan Sheets By Others

- 1 Private electrical, gas, telephone and cable television facilities may need extension, upgrading, or relocation.

- 2 Where possible, reproducible copies of utility agency designs should be attached to the end of the plans that are set and labeled "For contractor reference and information only -work to be done by others".
- 3 There may be situations where the contractor is required to provide trenching and conduit installation for a utility company. Such work should be clearly described in the Specifications.

Right-Of-Way Plans

Strip Map

Strip maps shall be at a scale sufficient to differentiate the various easements, parcels and existing improvements. Show each parcel abutting the project site and indicate proposed and existing dimensioned rights-of-ways, easements, ownership and areas.

- Format: 24" x 36" per city
- Scale: 1" = 100' (or as required)
- Property addresses and occupants identified
- Property owners identified, including Sidwell parcel numbers
- Existing easements and ROW identified
- New easements and ROW to be acquired identified

Parcel Exhibits

One exhibit per parcel is required. One exhibit per ownership may be submitted with approval from the City property manager. Prepare parcel exhibit maps on individual sheets and include a legend indicating the type of acquisition. The plan view should show the parcel boundary dimensioned to section corners (non-subdivided lots), adjacent rights-of-way centerline and any on-site improvements, along with all existing and proposed easements and rights-of-ways clearly identified and dimensioned. The identification of existing rights-of-way and easements should include the appropriate county recording information.

- Format: 8 1/2" x 11"
- Title block at lower right identifying the city's project, project number, Sidwall parcel number and the property owners.
- North arrow and scale
- 1/4 section ties
- Property addresses and occupants identified
- Existing easements and ROW identified

- New easements and ROW to be acquired identified
- Individual areas noted
- Parcels dimensioned and bearings

Parcel Descriptions

The individual parcel descriptions for all new easements and rights-of-way shall be prepared by, or under the direct supervision of a land surveyor registered in the State of Utah, and shall be sealed by the same. All parcel descriptions shall be typed on separate 8 1/2" x 11" formats and shall be consistent with City Surveyor standards.

The description should be typed in single space format and double spaced between its various parts as outlined below:

1. Caption

- Brief introduction stating location of parcel, portion of a subdivision, aliquot portion of sectional breakdown, township and range.

2. Body

- Tie true point of beginning to an established section corner, identifying its character
- Metes and bounds courses
- Identify boundary lines of joiners, citing Salt Lake County Recorder's numbers and pages

3. Areas of easement or ROW stated to nearest square foot & 10,000th acre.

References

A. Standard Specifications & Details

The following publications or their current revisions, as adopted by the City, are to be used in conjunction with the infrastructure design criteria in this section.

- Standard Specifications and Standard Plans – APWA (Utah Chapter)
- Salt Lake City Supplemental Specifications and Drawings
- Standard Specifications for Road and Bridge Construction – Utah Department of Transportation (UDOT)
- Other governmental / utility agency specifications and details as specified by the city engineer



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B. Design Policies and Guidelines

The city's design policies and guidelines are based on the following:

- Project stipulations from regulations published by the City's design professional.
- A Policy on Geometric Design of Highways and Streets – American Association of State Highway and Transportation Officials (AASHTO)
- Roadside Design Guide – AASHTO
- Manual on Uniform Traffic Control Devices (MUTCD) – FHWA
- ASTM / AASHTO Standard Specifications
- United States Access Board Revised Draft Guidelines for Accessible Public Rights-of-Way: access-board.gov/prowac/draft.htm
- Other design standards, policies and guides as specified by city staff

C. CADD Standards

The City's CAD standards are based on the current version of the United States National CAD Standard.

(More information to be added in later version)

Through a common language of data classification and organization, this standard will improve communication and data transfer among design and construction professionals.

(Links to be added in later version)

E. Plan Sheet Numbering & Sequencing

Sheets shall be identified according to the format established by the City Design professional and supplemented by the Construction Specification Institute.

2.1.3 Land Divisions

Development Master Plan

When A Development Master Plan Is Required Return

The following guidelines establish the need for a development master plan:

- 1 The parcel is sufficiently large to comprise an entire neighborhood
- 2 The parcel is only a portion of a larger landholding of the subdivider

- 3 The parcel is part of a larger land area (which may not be under the subdivider's control), the development of which is complicated by unusual topographic, utility, land use, land ownership or other conditions.

What Is Shown In A Development Master Plan Return

A development master plan shall be prepared to scale and accuracy commensurate with its purpose and shall include:

- 1 General street pattern with particular attention to collector streets and future circulation throughout the neighborhood.
- 2 General location and size of school sites, parks or other public areas.
- 3 Location of shopping centers, multifamily residential or other proposed land uses.
- 4 Methods proposed for sewage disposal, water supply and storm drainage.

Development Master Plan Elements

A development master plan has several elements. A general list of these elements is provided below. Not all elements are required for every development master plan. City staff will determine which elements are required to process the plan.

Each element is explained in two parts:

- 1 Performance Standards outline the goals of each element
- 2 Plan Details specify what is to be shown on each plan
- 3 The details should illustrate how the goals will be met. Some plans may be combined as long as the information on the plan is clear

Master Design Guidelines

- 1 Performance Standards. The master design guidelines shall clearly show achievement of the following:
 - a Mixed-use development that integrates various uses and facilities.
 - b Adherence to the city's various character plans.
 - c Aesthetically-oriented design standards to create a definitive character for structures, site plans and streetscapes.
- 2 Plan Details. The master design guidelines shall include detailed information on the following:

- a Typical architectural design themes, styles, unifying elements and materials.
- b Typical design treatments and materials for details such as windows, entries, roofs, parapets and building forms.
- c Typical development walkway designs and treatments.
- d Such other information city staff determines is necessary to process the master plan.

Master Development Plan

- 1 Performance Standards. The master development plan shall clearly show achievement of the following goals:
 - a Related uses shall be located in close proximity. Larger separations or buffers shall be used when one activity may have an adverse impact on the health, safety and welfare of the users of an adjacent activity, either within or adjacent to the development.
 - b Uses shall be located where they will be most compatible and have the least negative impacts on the surrounding uses. The massing of buildings shall be designed to provide outdoor pedestrian areas, adequate light and air circulation, few obstructions to important views and a similar scale to adjacent uses.
 - c Scenic views and environmental features shall be incorporated into the plan. The plan shall preserve and capitalize on the physical amenities of the location. Physical amenities include: natural features which, if disturbed, may cause hazards or stress to life and property, e.g., floodplains; vegetation performing beneficial microclimatic functions such as abating noise and glare, entrapping dust and reducing energy costs; and land or water resource areas such as drainage ways, groundwater recharge zones, prime wildlife habitats and areas with high scenic or aesthetic value.



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- d The master development plan shall reflect the character of the surrounding area so that the development is reasonably compatible with adjacent property. Techniques to achieve reasonable compatibility may include: using building materials or an architectural style that relates to adjacent buildings; using a building scale or massing near the perimeter of the project that is similar to adjacent buildings; and using perimeter open space buffers.
- 2 Plan Details. The master development plan shall include detailed information on the following:
 - a Site dimensions and the size of all proposed parcels.
 - b Building and structure locations and the uses proposed for each building and structure (including building envelopes).
 - c Setbacks between buildings and other structures and setbacks from district boundaries.
 - d Projected building heights, building footprints, square footage of buildings for each building or structure.
 - e Total gross square footage on the site broken into the gross square feet for each use proposed.
 - f Total floor area ratio (FAR) for the site and for each proposed parcel.
 - g Such other information as is determined by city staff to be necessary to process the master plan.
- 3 Additional Submittal Requirement. If requested, submit a 3D model, photomontage or perspective drawings depicting the relationship between proposed buildings and existing buildings within 300' of the site.

Circulation Master Plan

- 1 Performance Standards. The circulation master plan shall clearly show achievement of the following goals:
 - a In no case shall the development result in traffic levels of service (LOS) be more than specified by city staff on any streets or intersections impacted by the development at all locations.
 - b The construction of the circulation facilities, including traffic signals, shall be concurrent with the creation of traffic demands by the development and with the maintenance of planned traffic operational conditions and proper safety.

- 2 Plan Details. The circulation master plan shall include detailed information on the following:
 - a A traffic impact study to determine the need for internal and external street and circulation improvements. The study shall be conducted by a traffic design professional and shall comply with the current policy for traffic studies available from the City Transportation Director.
 - b Programs for pedestrian circulation and when applicable, a program for internal transit.
 - c The locations, typical dimensions and design capacity for all external and internal streets and major driveways, bus bays, transit routes, bikeways, trails, pedestrian paths, intersection signalization, grade separations, park-and-ride lots and other such facility improvements.
 - d Any plans for phasing improvements or any plans for interim improvements necessitated by the construction timetable for major planned circulation improvements.
 - e Such other information city staff determines is necessary to process the master plan.

Phasing Master Plan

- 1 Performance Standards. The phasing master plan shall clearly show achievement of the following goals:
 - a The development shall proceed along with provisions for adequate capacity in the infrastructure systems.
 - b The development of ancillary commercial or other types of uses shall occur on a percentage based on the needs of the primary uses.
 - c Internal and external improvements shall be timed to be available before or concurrently with the phased development. The phasing master plan shall be consistent with the phasing described in traffic studies, infrastructure plans and other required studies.
 - d Each phase of the development shall be in compliance with the applicable zoning requirements including open space, parking, landscaping and lot coverage.
- 2 Plan Details. The phasing master plan shall include detailed information on the following:
 - a Location and conceptual size of the land uses.

- b The phasing and capacity needs of the local infrastructure necessary to serve each sequence.
- c A timetable for required dedications.
- d Such other information city staff determines is necessary to process the master plan.

Open Space Master Plan

- 1 Performance Standards. The open space master plan shall clearly show how the applicable goals will be achieved:
 - a Open spaces identified on the General Plan such as scenic corridors, vista corridors, major buffers, etc. shall be incorporated and shall be coordinated with open space identified on adjacent parcels.
 - b The defined open spaces along roadways, pedestrian walkways or between buildings shall capitalize on mountain views or other scenic views.
 - c The choice of open space locations should consider the vertical and horizontal dimensions of structures in meeting the objective of creating usable open space areas in a campus-style environment.
 - d In general, the plan should avoid allocating very generous quantities of open space to one parcel or building while providing little or no open space for other parcels or buildings.
- 2 Plan Details. The open space master plan shall include detailed information on the following:
 - a Typical locations, dimensions, functions and types of characteristics for general open space areas.
 - b A detailed description of the relationship of open space areas to proposed parcels or buildings. Calculations should demonstrate that the open space in proximity to individual buildings is adequate for that portion of the site.
 - c Such other information city staff determines is necessary to process the master plan.

Parking Master Plan

- 1 Performance Standards. The parking master plan shall clearly demonstrate the achievement of the purpose articulated in the zoning ordinance _____
- 2 Plan Details. A site plan shall be provided.



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- a The site data table shall include the total parking required calculations and the total parking provided.
- b A separate data table shall be provided on the site plan that includes the required parking calculations for each parcel and the provided parking on each parcel in the Master Development Plan.

Drainage Master Plan

- 1 Performance Standards. The drainage master plan shall clearly show achievement of the following goals:
 - a The development shall provide drainage facilities which protect the site and adjacent sites from excessive storm flows and associated erosion and sedimentation. Whenever a community-wide drainage solution is deemed desirable by Salt Lake City or County Flood Control Departments, the drainage master plan for the development shall provide for participation in a community drainage facility. The plan shall comply with city approved drainage plans for the area.
- 2 Plan Details. The drainage master plan shall include detailed information on the following:
 - a A plan which graphically depicts the location and capacity of all retention, detention or other drainage facilities and the proposed design character for the drainage facilities.
 - b A narrative technical report which shall demonstrate that everything shown on the plan complies with the performance standards and current administrative guidelines.
 - c Such other information city staff determines is necessary to process the master plan.
- 3 Additional Submittal Requirements. The applicant shall assure that both the plan and report elements of the drainage master plan shall be prepared by a design profession.

Infrastructure Master Plan

- 1 Performance Standards. The infrastructure master plan shall achieve the following goals:
 - a The development shall provide sufficient water, wastewater and utility systems capacity to serve the demands of the development.

- b The systems shall be consistent and compatible with the master plans of the city and current administrative guidelines.
 - c The infrastructure master plan shall be consistent with city policies to conserve water, to recharge the groundwater supply and to reuse wastewater.
- 2 Plan Details. The infrastructure master plan for water, wastewater and utility systems shall include detailed information on the following:
 - a A plan which graphically depicts the locations and sizes for each system, supported by a narrative technical report which shall demonstrate that everything shown on the plan complies with the performance standards and current city administrative guidelines.
 - b Such other information as is determined by the city staff to be necessary to process the master plan.
 - 3 Additional Submittal Requirements. The applicant shall assure that both the plan and report elements of the infrastructure master plan shall be prepared by a design professional.

Landscaping And Buffers Master Plan

- 1 Performance Standards. The landscaping and buffers master plan shall clearly show achievement of the following goals:
 - a Landscaping shall provide a lush setting, which includes the timely maturity of plant materials, strong consideration of water conservation and the needs for shade and functional landscaping of the different uses, facilities or spaces.
 - b Landscaping shall be compatible with applicable city's streetscape and character plans, current administrative guidelines and themes and character of neighboring developments.
 - c Open space shall be maintained which shows sensitivity to the specific existing characteristics and features of adjacent environmental and existing neighborhood conditions or as indicated on the General Plan. Open space buffers shall apply to buildings and above-ground parking deck structures.
- 2 Plan Details. The landscaping and buffers master plan shall include detailed information on the following:
 - a Typical locations, dimensions and treatments for any drainage swales, retention areas or utility corridors.

- b The uses, typical locations and dimensions of any common recreation, pedestrian or service open space areas.
- c The type of buffer being used, the location of the buffer zone, any setback and height limits and the location of adjacent land use categories.
- d A streetscape and general character landscape theme.
- e Maintenance provisions for all landscaping materials installed as part of the development.
- f Such other information city staff determines is necessary to process the master plan.

Master Sign Program

- 1 Performance Standard. The master sign program shall clearly show achievement of the goals articulated in the City's sign ordinance.
- 2 Plan Details. The master sign program shall include detailed information on the following:
 - a The master sign program shall be consistent with the current city guidelines.
 - b Such other information city staff determines is necessary to process the master plan.

Plat Sheet Format

The plat sheets shall contain a title, a vicinity map, a detail map, signature blocks, and all necessary certificates, affidavits, jurats and signature blocks for City and County Officials. The sheets shall be 24 x 36" or 22 x 34" Mylar material with upper case printing at least 1/8" high. The signature blocks shall be written along a 2" strip at the base of the sheet. The date of each sheet shall be shown along with 1) the seal and signature of a land surveyor who is registered in the State of Utah, and 2) the name and the complete address of the firm preparing the sheets. Annexations and subdivisions shall be shown only on 22 x 34" size sheets.

Title Of The Plat Sheet

At the top of the sheet in upper case print not less than 3/8" in size, provide the name and cadastral location description of the development.



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The Vicinity Map

Draw the vicinity map to a scale not less than 1" = 2,000' with north arrow in the same direction as shown in the detail map. Clearly illustrate the boundaries of the development.

The Detail Map Return

- 1 The preferred scale is 1" = 100'. A scale smaller than 1" = 300' is allowable only when conditions warrant.
- 2 In all plats, the top of the sheet shall face either north or east, whichever accommodates the drawing best. The north arrow will point to the top or the left of the sheet.
- 3 Accurately draw boundaries showing the correct bearings and dimensions of all boundary lines, lot lines, easements and right of way. Show also the names, width, lengths, bearings, curve data and monument lines of proposed streets. Show alleys, street rights-of-way and easements; the bearings and dimensions of all portions within the subdivision as intended to be dedicated to the use of the public; the lines, dimensions, bearings, square foot size, and numbers of all lots, block, and parts reserved for any reason within the subdivision; all lots and block numbered consecutively; all proposed streets named or numbered in accordance with and in conformity with the adopted street naming and numbering system.
- 4 Boundary surveys can be shown on the Record of Survey Plat, Subdivision Plat, Annexation Plat, Condominium Plat, or the Street Dedication Plat. State Plane Survey controls, however, shall always be shown on a Record of Survey Plat.
- 5 When state plane coordinates are computed on surveys shown on "record of survey plats, the plats shall show state plane bearings and grid distances in parenthesis, the adjustment and grid factors and a list of grid coordinates by point number.
- 6 A table is required on the plat showing all of the tract areas. Each tract, lot, easement and public right-of-way must have a note indicating its approximate area, the planned use and improvement, and the agency responsible for maintenance.

- 7 Private streets will be dedicated within tracts. A note on the plat will state that the property owners association is responsible for operation, maintenance, and liability of the tracts, including maintenance of all appurtenances, i.e. streetlights, signs, landscape, etc.
- 8 Propose street names are subject to city staff approval.
- 9 If the development has or requires a property owners association, indicate this on the plat with an appropriate statement as it relates to the responsibilities and requirements – such as the ownership and maintenance of all tracts.
- 10 Show proposed locations of multi-use public path or trail easements within the plat boundaries and the connections to existing and proposed path or trail easements. These locations must conform to the city's approved master plan.
- 11 Corner lots should be large enough to build a house comparable to others within the subdivision.
 - Shall have an 8' public utility easement adjacent to the property line in the front yard as well as the yard facing the side street. Mailboxes, fences and walls and other above ground non-utility structures should be located outside these easements.
 - May need to be larger if they have drainage easements or are located: (i) on adverse terrain, (ii) where substantial cuts or fills occur or (iii) along subdivision perimeters with street frontage.
- 12 Drainage
 - Show the street drainage pattern and direction by arrows and indicate those points where concentrated flow is added or removed from the street.
 - Indicate by arrows the location, direction and amount of flow of all natural washes and existing or planned man-made drainage channels which flow through, are adjacent to or begin within the proposed subdivision.
 - Identify areas to be used for surface drainage, storm drainage retention or detention. Sufficient dimensions and other information must be provided to describe the size of the area, the approximate depth and the slope of the sides. These areas will be identified as tracts, which will be owned and maintained by a property owners association. The developer will dedicate drainage easements over these tracts to the City.

- Indicate surface drainage easements which are not in tracts. These easements shall be dedicated to the City, but shall be maintained by the property owner.
- Submit supporting hydrologic and hydraulic calculations with the preliminary plat to demonstrate that the easement or tract set aside for drainage is of sufficient width to carry the peak 100 year flow without endangering life or property outside the easement or tract.

13 Utilities

- Show the proposed layout of water and sewer lines for the subdivision. Indicate the size of the lines and direction of flow.
- Provide utility easements at least 8' wide along the street frontage of lots and tracts.

14 Financing public way improvements

- The owner is responsible for preparing, constructing and financing all public improvements associated with the final plat. The owner must have a design professional prepare a complete set of engineering plans for constructing required improvements. Such plans shall be based on the approved preliminary plat, zoning case, and city staff approval stipulations. Engineering plans shall be subject to approval by the City Engineer prior to recordation of the final plat.
- If the developer intends to have one recorded plat for the entire development, but plans to construct the improvements in phases, the improvement plans for the entire development are subject to city approval before construction may be phased. The improvement plans for each phase shall indicate any temporary cul-de-sac, infrastructure lines and valves, etc., and are subject to city approval.

Bearing Equation

It is frequently convenient to choose or fix a reference line to which the directions of all lines of a survey are referred. The rather widespread adoption of the state plane coordinate system surveying in Utah necessitates the use of this system in Salt Lake City. The US Government Survey office (NGS) already has several geodetic control stations in our area with known state plane coordinates published, which establish the basic control network for state plane bearings of secondary control networks, the original government section lines and any proposed survey work.



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Eventually, bearing equations will not be needed for surveying in Salt Lake City. During the transition, however, the use of bearing equations in descriptions and on survey plats will be essential to an orderly conversion to the single basis of bearing provided in the state coordinate system.

Example No. 1: Example of a Bearing Equation: North (property description basis of bearing) equals North $0^{\circ} 09'55''$ West (state coordinate bearings). Both bearings represent the bearing of the same line using the two different basis for bearing methods.

Example No. 2: Example of the use of bearing equations along the same line adjoining two surveys of different basis of bearing. North $32^{\circ} 12'$ West (easterly boundary of Jones Property) equals: North $31^{\circ} 24'10''$ West (westerly boundary of Smith Subdivision).

The Use Of State Plane Coordinates In Descriptions Return

The purpose of the state plane description is to provide a state plane grid coordinate location for the point of beginning and a common state plane bearing base for each line of the description. To be mathematically equivalent, the old description and the new description must be consistently described. The old description used magnetic meridian to establish bearings, the new description should convert the old bearings to state plane coordinate bearings based on a field measurement of a common line to compute the difference between the magnetic meridian and the grid (state plane coordinate) meridian for the area. If the old description uses a bearing along the section line as a basis for bearing, the new description should show bearings calculated from new survey data using the old bearing base but corrected for the difference between the state plane bearing and the old bearing of the section line.

There should be included an explanation of the equivalence of the two descriptions. The statement the following description is the mathematical equivalent of the description with all bearings correctly converted to the description terms of the Utah State Plane Rectangular Coordinate System should be inserted between descriptions to explain the need for both descriptions. Subsequent descriptions can then use only the state plane coordinate description.

Only a licensed land surveyor should prepare these descriptions. There are only two state plane coordinate elements used in each state plane description.

- 1 The point of beginning is computed on a state plane grid coordinate.
- 2 Each line of the description is computed on state plane bearings from a measured or adjusted survey data.

In the state plane descriptions, use state plane bearings and ground distances.

Since all property descriptions must relate back through a chain of title to the original government patent for the property, the use of state plane coordinates in descriptions must be done in such a way that the title chain is not broken. The process of evolving state plane coordinate descriptions will be demonstrated in the following example for the beginning of the same description. Since the coordinate information is simple and easy to use, eventually when enough descriptions are written using state coordinates, apparent title overlaps, etc., can be quickly related in direct number of feet of error.

Example:

Commencing at a point located $660'$ North $89022'20''$ West along the section line from the south quarter corner of Section 26, Township 6 South, Range 2 East, Salt Lake Base and Meridian; thence North $89022'20''$ West 318.12 ; thence.

The following description is the mathematical equivalent to the preceding description with all bearings correctly converted to the description terms of the Utah State Plane Rectangular Coordinate System.

Commencing at a point with state plane rectangular coordinates of $X = 1,947,823.90$ and $Y = 702,057.89$ based on the Lambert Conformal Projection Utah Central Zone; thence North $89008'40''$ West 318.12 ; thence.

The above phrase, "with state plane rectangular coordinates of $X = 000$ and $Y = 000$, based on the Lambert Conformal Projection, Utah Central Zone", can be used to describe the coordinates of the point of beginning in a description. The use of state plane coordinates in a description also implies the use of state plane bearings in the description. State plane coordinates should never be used in any other system bearings other than state plane bearings. If existing descriptions contain bearings in

some other system of bearings, all the bearings in the existing description should be converted to state plane coordinate bearings. Bearing equations may be used to accomplish this.



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2.2.1 Culinary Water

General Information

This chapter provides ordinance, policy, and standards establishing design criteria for constructing and modifying water systems to be owned and operated by the city or making fire and service connections to the public water supply. It provides guidance on agreements, design preparation, transmission and distribution systems, inspection and commissioning new mains, fire protection, and final plans preparation.

Ordinance Requirements

Developers will install at their expense all improvements necessary to provide water service to their development. This will include upsizing water mains, pump stations, reservoirs, transmission mains, pressure reducing valves or other facilities.

Upon development of the property for which city water service is desired and available, the developer will submit a plan for the water system prepared by a professional engineer licensed in the State of Utah.

In order for culinary water to be furnished to any building or lot until, the owner must submit an application agreeing to pay for all connection impact and service fees.

Water System Design

A civil engineer registered in the State of Utah must design all water main extensions and related appurtenances for development.

Salt Lake City Public Utilities (SLCPU) is required to review and approve all public water main extensions and construction or relocation of water related facilities within the city's service area, prior to the city approving the final plans.

Before commencing construction, the contractor or developer must have a permit from SLCPU for a water service connection.

If a water main extension is needed, plans must be approved, a performance bond be in place, and a water extension agreement signed by the owner.

Water Easements See Common PU Section

Pressure Requirements

Pressure extremes in water systems result in the potential for contaminants to enter the network. Low pressures may allow polluted fluids to be forced into the system, and high pressures may cause ruptures or breaks in the network.

The static pressure in the distribution system should not exceed 140 psi, and the system shall be designed to maintain a minimum residual pressure of 40 psi at the highest, finished, floor level to be served by system pressure under normal daily operating conditions. The system will be designed to maintain 30 psi minimum pressure under design fire flow requirements. The 30 psi minimum pressure design requirement provides a 10 psi safety factor to account for aging infrastructure and flexibility in locating pressure zone boundaries.

(PU Graphic Water Pressure graphic to be added in later version)

All distribution water mains, appurtenances and service lines will be designed for a minimum normal internal working pressure of 150 psi plus allowance for water hammer. Working pressures for transmission lines will be verified with SLCPU.

Water hammer may produce momentary pressures greatly in excess of normal static pressures, thus increasing the probability of water main failure. Suitable provisions must be made to protect the system from water hammer pressures. The occurrence and severity of water hammer can be reduced by using slow-closing valves, pressure-release valves, surge tanks, variable frequency drives, soft start motor controllers and air chambers. In cases where pressures exceed 120 psi or water hammer conditions are developed, all elements of the system will be designed accordingly.

Fittings

No water line will be deflected, either vertically or horizontally, in excess of manufacturer recommendations without the appropriate use of bends or offsets. Fittings may be required where more than 2 pipe lengths are deflected. The SLCPU will not approve deflections exceeding 4°.

A minimum distance between fittings will be specified on the final plans for constructability. The engineer is responsible for verifying the minimum distance necessary for the type and diameter of pipe and related fittings specified for the project.

Existing tees, tapping sleeves and related appurtenances that are not utilized by a development shall be removed by the contractor. A minimum 3' section of pipe shall be removed, with no more than 6' remaining to the nearest joint. The removed pipe shall be replaced with DIP or PVC.

Site Plan

A civil site plan is required showing the location of all new water service connections. Also, show and call out any water services that are not in use and are to be abandoned. Final plans will show locations of service lines and meters to each unit referenced with stations and dimensions, or offsets, from the street centerline or monument line.

Service lines and meter boxes will be located within a public rights-of-way easement within a private street, or a utility easement.

Meters are to be accessible to city workers and be located as close as possible to the water main.

Service To Individual Buildings

Water pipes cannot be conducted across lots or buildings to adjoining premises, and each house abutting on a city water main must be supplied through its own separate service pipe running at right angles to the main.

If a building is condominimized or a lot is split creating multiple owners, water and sewer connections must be separated so that each owner has an exclusive connection. All fees associated with the new services must be paid before a permit is issued. In some cases the Owner's Association may become the "owner" signing for and becoming the responsible party.

No alteration, addition or disconnection in or about any water pipe or apparatus connected with the city's waterworks shall be made by any plumber or customer without written permission to do such work by SLCPU. All appropriate fees must be paid to SLCPU prior to the issuance of a building permit.

See SLC Ordinance 17.16.040 for water connection fees.

No other utility shall share a trench with a water service. A 3' horizontal separation is required between a water service line and another utility. The clear horizontal clearance is measured from the outside of the cable conduit to the outside of the



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water pipe. For perpendicular crossings, the vertical clearance requirement is 18" above the water main or 12" below. Sanitary sewer must have a 10' minimum horizontal separation (except within 3' of a building). If a water and sewer service must cross, the crossing is to be as nearly perpendicular as reasonable, with the sewer being at least 18" below the water service. Where conditions prohibit this standard alternatives must be approved by SLCPU. See Utah APWA 542 for alternatives.

In cases where these clearances cannot be met SLCPU Engineering staff is available to help find a resolution.

It is unlawful for any person, other than an authorized employee of SLCPU to open or close any municipal water valve. See SLC Ordinance 17.16.260.

Sizing Water Services and Meters

The water service line and meter will be sized based upon the total daily demands for the development and the peak needs of the development. An experienced civil or mechanical engineer should select the size of service. Water meter sizing is to follow the guidelines and principles found in AWWA's "Sizing Water Service Lines and Meters, M22". In the city, the service line size must match the water meter size. Requests for meters 4" and larger will require a calculation of the highest expected daily demand.

Plans shall accurately show meter vaults to scale, paying particular attention to access covers and vaults for meters 1.5" and larger. Do not place water service lines and meters in driveways, sidewalks, or detention basins.

Water services will be designed perpendicular to the main where possible. Lines shall be continuous from the main to the meter with no bends or welded joints. Water service lines will have 10' minimum horizontal separation from sanitary sewer service lines.

Irrigation Services

A separate service tap is required for culinary service and fire service to a property. Properties larger than ½ acre may also apply for an irrigation meter, which requires a separate tap to the main. "Bullnosing" or manifold of services is not allowed. See SLC Ordinance 17.16.190.

Connections From Mains

The service pipes and connections from the main to the water meter, including the meter box, a meter yoke and valve are to be placed within the parking strip by a licensed, bonded plumber, to city standards, and subject to city inspection and approval.

The plumber shall warrant the work and facilities installed against defects in workmanship or materials for a period of one year from date of acceptance thereof by the city.

Maintenance Responsibility

SLCPU shall maintain all water connections of ¾ and 1" in size within the city limits, from the point of connection with the water main up to the back side of the meter box. All maintenance and replacement of service lines greater than 1" is at the entire expense of the water customer.

Service to Individual Buildings

Shutoff Valve Locations

Shutoff valves will be installed on water mains at locations within the distribution system that allow sections of the system to be taken out of service for repairs or maintenance without significantly curtailing service in other areas. Special consideration should be given to the number of fire hydrants taken out of service. A sufficient number of valves should be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs. Valves will be located such that closing no more than 4 valves can isolate any section of the system.

Maximum spacing of water distribution main isolation valves shall be as follows:

- In commercial, multi-family, and industrial areas, valve spacing will not exceed 500' intervals.

In single-family residential and other areas, valve spacing cannot exceed 800' intervals, or 1 per block, whichever is less. Maximum spacing of water transmission main isolation valves will be as follows:

- Install all service tees, 2" diameter and greater, with a valve on the lateral line, so that the lateral can be taken out of service without interrupting the supply to other locations.
- Provide a valve on each hydrant branch and flange it to the tee. See UT APWA 511.

- Do not install valves in sidewalks, curbs, crosswalks, multi-use paths, driveways or bicycle lanes.
- Ensure that all valves 12" or smaller are resilient wedge type. Valves 16" or larger shall be butterfly type.
- Pressure rating on all valves will be equal to or greater than the pressure rating of adjacent pipe.
- All valves require valve covers installed per UT APWA 574.

Air Release Valves

Air release valves will be installed at all changes in slope of water lines 8" or larger in diameter, as follows:

- When water line changes from a positive slope to a zero slope, or a negative slope in the primary direction of flow
- When water line changes from a zero slope to a negative slope in a primary direction of flow
- Contact SLCPU for additional information. See "Air Relief Detail" in the PU Standard Practices Appendix

Thrust Restraint

Thrust on pipelines occurs wherever bends or lateral branches exist. The use of thrust blocks is typical for 4" diameter pipe and larger. Additional thrust restraint may also be required, such as:

- Welded joints in steel pipelines
- Mechanical joints in concrete and ductile iron pipelines

Thrust blocking is required for tees, valves, dead ends, and bends greater than 10% on all pipes and connections 4" in diameter and greater. Direct bearing or tie-down thrust restraint blocks are allowed. All thrust restraint systems are to be designed by a professional engineer licensed in the state of Utah and approved by SLCPU. See UT APWA 561 and 562.

Electronic Markers

Trace wire shall be installed on all non-ductile iron water mains and hydrant laterals. Access points to tracing wires are to be at water valves and fire hydrants. See SLC Standard 537.



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Pipe Cover

Cover or depth of bury for water mains will be measured from the proposed finished grade to the top of outside wall of the pipe. A minimum of 4.5' is required for all mains, service lines, and fire lines. 5.0' of cover may be required in the higher bench locations and for fire lines.

Fire Hydrant Spacing

Generally public fire hydrants along a public right-of-way will be spaced no more than 400' apart. Spacing requirements are a function of the location, type and use of buildings, the width of a street or traffic volume, and other factors. Design engineers should contact both SLCPU and SLCFD for specific requirements for each specific project.

System Layout

To provide appropriate water pressure, water circulation and redundancy, all new water mains must be designed in a looped configuration, providing a minimum of 2 sources that can be isolated by a gate valve. Any acceptations must be approved by SLCPU.

In general, water distribution lines will be on the north and east side of the street, 2.5' from the lip of curb or as otherwise approved by SLCPU. Water transmission lines (typically 16" diameter and greater) will be located under the roadway section unless otherwise approved by SLCPU.

Design joint deflection shall not exceed 4" for water lines 12" and smaller in diameter and 2½" for water lines greater than 12" in diameter. Curved water lines are permissible where the individual joint deflection does not exceed the above criteria.

The water main and sewer main will run parallel to each other with 10' of separation to the pipes' outside wall. Lines may cross the street centerline.

Water lines in Planned Unit Developments should be located under drive areas, and provided with an easement where permanent 20' minimum access for maintenance purposes is maintained. In developments where other dry utilities or private sewers are to occupy the same driveway SLCPU may require a greater width public water line easement.

Dry utilities and private sewer will be allowed to run parallel within the easement only with written approval of SLCPU. Water lines shall not be located within 10' of a building unless protection is provided to prevent structural damage in the event of a break in the line.

Hydrants, meters, blow-offs and valves shall not be located in detention areas, retention areas, driveways, or sidewalks. Hydrants must have depth of burial of 5'.

Hydrants that require adjustment as a result of improvements will be adjusted using the hydrant manufacturer's extension kits.

Existing water line stubs adjacent to a development that are not used will be abandoned and plugged at the main by the contractor.

Ordinance Requirements

Design Policy

Fire Flow Requirements

These are set by the International Fire Code. See SLC Fire Plans Reviewers for additional information. Public systems are to be designed to maintain velocities within ranges recommended by AWWA, generally less than 7 fps.

Fire Lines and Building Sprinkler Lines Systems require a separate connection to the main (see PU Graphic Water Connections)

Fire Hydrant Color Coding

The Salt Lake City standard for the color of fire hydrants indicates the size of the water main serving that particular hydrant. This standard applies to all public hydrants owned and operated by SLCPU.

- All fire hydrant barrels shall be painted in safety chrome yellow.
- The marking of the hydrant is not to be considered as in any way guaranteeing the capacity indicated by the color.

Fire Flow Testing

- Fire flow tests are required for all new commercial, industrial and residential, including single family homes. Additionally, some changes of use, expansions, and remodels may also require updated fire flow tests.

- SLCPU conducts fire flow tests. Public fire hydrants are to be operated only by SLCPU or SLC FD. To request a test provide SLCPU a completed "Fire Flow Test Request Form" with an attached civil site plan or remodel plan.
- After notification to SLCPU, private hydrants may be tested by design people hired by the property owner. Failure to notify SLCPU may result in damaging pressure fluctuations and detector check meter violations.
- Tests are generally performed weekly and are weather dependant, flow tests will not be performed when temperatures are below 40° F. At SLCPU discretion a fire flow model may be provided in lieu of field flow test.
- Do not use static pressures for design over 100 psi.
- Apply appropriate safety factor to adjust for daily and seasonal system fluctuations.

Specific Water Plan Requirements

For transmission and distribution lines, submit the following for city approval:

Scaled plan and profile drawings, prepared by a professional engineer in the State of Utah. Showing existing and finished grades, all water, sewer, storm drain, gas, electrical, and other underground utilities or obstructions. Show all valves, appurtenances. Identify all pipe types and sizes.

- Station water lines along the centerline of the street or the pipe.
- Identify water line service locations with a meter station and offset. Show meter locations to scale.

Transmission & Distribution System Materials

- Water distribution lines are either 8" or 12" in diameter and shall be ductile iron pipe (DIP) Class 52 or PVC SDR18 C-900 depending on the area. (add PU graphic Water Map PVC DIP)
- The city does not allow 10", 14" water lines for new construction.
- Water transmission lines are 16" and larger, and may be DIP, mortar lined steel, steel cylinder pretensioned pipe, or an approved equal by SLCPU. The pressure class will be verified by SLCPU.
- The use of AWWA C-900 SDR18 PVC is prohibited east of Main Street unless approved by SLCPU as a more appropriate pipe type based on soil corrosivity or other similar condition.



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- Fire line services 3" and larger shall be constructed of the same pipe type as the water main, ductile iron pipe, class 52, or PVC C-900. Fire line services smaller than 3" shall be constructed of type K, soft copper or other approved material meeting drinking water standards and proper pressure rating.
- Pipe wrap - In some locations ductile iron or steel pipe may be required to be wrapped with a polyethylene, or similar protective wrap. Determination is to be made by the design engineer and SLCPU engineer. Current standards require that all underground fittings and bolts are greased with a FM grease and the entire fitting is wrapped. This applies to all locations.
- Cathodic Protection – may be required in areas of concern such as corrosive soils, proximity to other utilities, or areas with stray currents, such as near light rail.

Locating Markers

Terminal or dead end water lines in the city will comply with the following requirements:

- The maximum length for a dead-end water distribution line, 8" diameter to 12" diameter, will be 1,200' in length.
- Dead-end lines for water transmission lines 16" and larger, exceeding 1,200' in length must be approved by SLCPU.
- Capped dead-end lines will be fitted with a flushing device as per APWA Standard Plan 571 or a fire hydrant to allow periodic flushing of the lines.
- Valves on dead-end lines that may be extended in the future shall be provided one pipe length between the valve and the plug.

Backflow Prevention & Cross Connection Control

All service connections to water mains require backflow prevention. Most residential and some businesses achieve the required backflow protections by following the IPC requirements for plumbing fixtures and irrigation systems. Industrial, business, or medical uses may require additional backflow prevention methods, particularly when there are devices attached to the culinary water system that are not drinking water approved. Fire sprinkling and standpipe systems also require specific backflow protection devices. Installation of backflow devices for specific uses must be approved by SLCPU. All devices and applications must provide protection throughout the facility or premises in accordance with the Utah

State Public Drinking Water Regulations R309-105-12 and the IPC as adopted by the State of Utah. Landscape and irrigation systems must be in accordance with the Landscape & Irrigation Manual referenced in SLC Ordinances, Chapter 21A.26.

Automatic fire sprinkler & standpipe systems must have either Reduced Pressure (RP) or double check valve assembly (DCV) backflow preventers installed at the service entrance inside the building for the supply side of each water based fire protection system. All water piping to the backflow preventer shall be of materials approved and suitable for culinary water.

All RP, DCV, Pressure Vacuum Breaker (PVB) or spill resistant pressure vacuum breaker (SVB) backflow preventers shall be tested upon installation and a copy of the test report should be submitted to the SLCPU within 10 days of the initial test. Failed test reports shall be submitted within 5 days of initial testing. All backflow preventers required shall be shown clearly marked on plans. All RP, DCV, PVB / SVB backflow preventers are also required to be tested annually or more often as required by SLCPU. All backflow preventers shall be installed in readily accessible locations for testing and maintenance. Backflow preventer installations shall be protected from vandalism, tampering, freezing, etc.

Facilities

Occasionally, very large developments may be required to expand the water infrastructure beyond upsizing or extending a water main extension. Water facilities (wells, reservoirs, and new pressure zones) are typically designed and constructed by SLCPU through its capital improvement program. Developers needing to construct water facilities should contact the SLCPU and request a meeting. The developer should be prepared to address how the proposed system will fit into the Water Master Plan and current infrastructure. The city will address design issues, the review process for facilities, and construction agreements for expansions to the existing infrastructure. Typically, new tanks and water pressure zones will not be accepted for only a few new homes.

Site Plan Requirements for Plan Submittal, Approval, Permits, Agreements

Plan and profile drawings must be submitted for review and approval.

Extension Agreements

Water main extension agreements will be necessary for public main replacement or extensions. An extension agreement will require a 12 month performance bond, or letter of credit, in an amount adequate to cover the cost estimate for the work. This bond will be held through the warranty period as outlined in the agreement.

- Reimbursement agreements for shared cost of upsizing line
- Reimbursement for new connections on developer initiated line
- Reimbursement from future connections
- Developers may request a line extension reimbursement agreement when they construct lines across frontages of parcels not currently receiving water service from the city. Line extension reimbursement agreements are set up through the SLCPU. For questions or details on procedures to initiate an agreement, contact the SLCPU Contracts office at 801-483-6727. Reimbursement agreements are effective for 15 years. Reimbursement is collected from properties requesting connection to the main extended under the reimbursement agreement.
- See SLC Engineering section on bonding and insurance requirements for contractors working in the Public Right-of-Way.
- All work on city drinking water systems is to be done by a licensed contractor. Accepted licenses include S210, S390, and E100. See SLC Ordinance 17.16.110.
- Home owners are allowed to do work on property side of the water meter.

Service Connection Permits

Where persons are obligated to convey water across properties conveyance shall be done with the least possible injury to property. Developer will be liable for damages caused by negligence in construction of ditches or management of water flowing therein.

When a crossing is desired, at a location other than a public crossing, it is the duty of the developer to obtain approval from the canal director. Such crossing must provide sufficient height and capacity so as not to interfere the flow in the ditch or canal.

Wrongful diversion of irrigation water is prohibited. It is unlawful to allow any obstruction in a ditch or canal for any purpose that interferes with the flow of water.



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Trenches & Backfill

Contractor to use the SLCPU Standard Practice #1 variation of the APWA specification on Trench Backfill.

Pavement Patches according to SLC Engineering standard

Inspections

Abandoning Unnecessary Services

Existing water service and fire lines not used by a development are to be abandoned at the main by the contractor. Abandoning service taps 3" are greater requires removing all tees and tapping sleeves and replacing with a sleeve and section of pipe. Smaller services may be abandoned by turning the main cock and cutting and crimping the pipe next to the main cock. Abandoned services require a permit from SLCPU and an inspection of the "kill" before the excavation is filled.

Construction Water

Fire Hydrant Meters: Use of Fire Hydrants for construction water and other purposes

Fire hydrants are for fire protection and system flushing, but not for construction or private uses. Issuance of fire hydrant meters is rare and generally only for dust control for state, county, and city projects within the public right of way. Contractors requesting hydrant meters must make application in writing using the SLCPU fire hydrant meter form and provide proof of award of a qualifying construction project. Hydrant meters will be tagged with job location and expiration date. If the tag expires or is lost the meter should be returned to SLCPU immediately. Conditions of use, rate and payments are determined by SLCPU.

Hydrant meters are not issued for private property projects. Metered water services must be used or water must be brought in from off site. Water may be purchased from SLCPU shops, 1530 South West Temple, for a modest fee. Call SLCPU dispatch, 801-483-6700, 24 hours in advance to make arrangements. The dispatch office is opened 24 hours 7 days a week. Hydrant meters are not allowed for filling swimming pools, hydro seeding, well drilling, saw cutting, cooling equipment, etc.

Violators of this policy are subject to a \$500.00 fine for the first offense and \$1,000.00 for the second offense and may be denied hydrant permits in the future.

Commissioning New Systems

Pressure Test

New water mains must be inspected, tested and approved before being put into service. Care must be taken during construction to prevent contamination from entering the pipe. The pipe must be pressure tested at 200 psi for 2 hours with negligible pressure bleed-off. Contact SLCPU Inspector for additional testing requirements.

Disinfection and bacterial testing

Disinfection is most commonly done by bringing chlorine level to 10 – 25 mg / L for 24 hours. A bacterial sample is taken by the SLCPU inspector for every 1,200 linear feet of pipe and any branches. If the test passes a second test is taken 24 hours later. If both tests pass the line is then flushed, see paragraph below. If either of the bacterial tests fail the line must be flushed and re-chlorinated and retested. See AWWA Standard C651-99.

Procedure for flushing new culinary water mains and disposal of chlorinated water.

Lines containing high levels of chlorine for disinfection prior to being put back are not to be flushed into any natural waterway or storm drain. Chlorine is harmful to wildlife, fish and other aquatic life. Such lines are to be discharged either by de-chlorinated or discharged to the sanitary sewer. Contact the SLCPU inspector for the project before flushing. See SLCPU Standard Practice #4 for more detail.

Follow requirements above for new systems, chlorination, flushing, bacterial testing and pressure testing when Commissioning new fire services or service connections, 3" and greater.

2.2.2 Storm Water

Drainage Law

Utah State Code is relatively silent on issues regarding storm runoff and drainage.

Authorization

The stormwater sewer utility has been established pursuant to section 2.08.100 of the Salt Lake City Municipal Code, and is operated as a separate enterprise fund within SLCPU. All portions of the stormwater sewer system (other than streets, curbs, gutters and sidewalks) shall be operated, managed and administered by the director within the stormwater sewer utility. (Ord. 53-07 § 11, 2007) (Ch 17.81.100)

City Drainage Law

Any development that proposes changes to the site grading and drainage should become familiar with Section 17.84 of the City code. In summary the section contains the following:

- It is unlawful to make any stormwater discharge without first obtaining a permit (17.84.100).
- BMPs shall be used to prevent accidental discharge (17.84.200).
- Requirements for a City Discharge Permit, including UPDES and NPDES permits (17.84.300).
- As a condition to the issuance of a city discharge permit, all applicants shall grant reasonable access for inspection (17.84.500).
- Requirement for use of BMPs (17.84.600).
- Owners of parcels that have a watercourse, which passes through the property shall keep and maintain that watercourse within the property (17.84.700).
- Requirements regarding accidental discharges (17.84.800).
- Release of stormwater or discharge onto other property is prohibited (17.84.900).

Application

The onsite grading of a project shall be designed to meet Building Codes, specifically to ensure that structures are designed to be reasonably safe from flooding, to meet all federal, state and local laws regarding storm runoff, and to ensure projects are properly designed to comply with federal and local codes regarding floodplain management.

City ordinance requires that anybody that wishes to release storm runoff from the parcel to a public conveyance system, first obtain a discharge permit. The process of that permit includes review against the building codes to ensure that the project is designed to ensure that all buildings on the project site and all neighboring



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buildings on offsite parcels would be built to be reasonably safe from flooding. The permit application is reviewed to ensure compliance with the federal Clean Water Act (CWA), NPDES and UPDES permits, and local drainage codes. Projects located in sensitive areas and have been identified as areas prone to flooding, or are in environmentally sensitive lands are reviewed to ensure public health, safety, and protection of natural resources.

This document is meant to clarify the City's design standards, referred to in the city ordinance for the purpose of obtaining a mitigation credit for storm drain fees.

Design Policy

A civil engineer licensed in the State of Utah shall design all grading and storm drain systems related to building and local code and to the principle of ensuring that all buildings are reasonably safe from flooding. The civil engineer is responsible for a design that accommodates potential offsite runoff and all state and federal regulations. The civil engineer is responsible for determining the FEMA designated floodzone and complying with regulations if the project is determined to lie in a FEMA designation Special Flood Hazard Area (SFHA).

The City incorporates a "no negative impact" policy (see SLC Code: 17.84.900). This means that it is unlawful to "release or direct the flow of stormwater (or make any discharge) into any conveyance facilities, or onto any property without the legal right to do so" unless there is a recorded drainage easement or the drainage situation complies with the requirements to claim prescriptive rights.

A landscape architect is responsible for finish grading of architectural elements of the project as long as they don't inhibit drainage paths as designed by the civil engineer. While the civil engineer is responsible for all grading and drainage on the project site, the landscape architect may, in coordination with the civil engineer, provide incidental grading or area drains to accommodate the landscape design.

Effective Date

The terms of this document are effective January 1, 1979, on all projects under review by the City Engineer prior to July, 1991 or SLCPU after July, 1991.

Revisions

The previous edition of this Drainage Handbook was last edited in 1996. Since that date many items that have been clarified or updated to accommodate the changes to design and modeling that has happened over the years. This edition, while still compatible with the older edition, adds a great deal more material and guidance for the design and construction of projects in Salt Lake City. This document supersedes previous editions.

The format and content of this document may be subject to revision periodically as a result of the need for clarification in policy. In all review proceedings however, the latest revision shall apply.

Drainage Policy

Purpose of the Salt Lake City Drainage Policy is to protect life and preserve property from damages that can result from flooding. The Policy further provides standards in accordance with the federal Clean Water Act that will protect the city from pollutants and erosion. The policies herein are designed to protect and enhance the quality of life for the city's residents.

Overview

To best protect the city from damages resulting from flooding, the city must address the sources of flooding from both peak runoff and from the volume of water released.

Typical undeveloped land will have both a low runoff rate and a low runoff volume. The development of the property has the potential to increase both the runoff and the volume. If both aren't equally addressed, the storm drain system and the receiving waters can be overwhelmed by increased runoff from development.

Application of Principles

The policy generally applies to any development proposing the installation of more than 15,000 ft² of impervious surface if either of the following property areas is exceeded:

- One gross aggregate acre if the project comprises of a commercial, industrial, institutional, governmental or utility construction project.
- 2 gross aggregate acres if the project is comprised of a subdivision (residential, non-residential, and minor), a group of planned unit development (PUD) or a residential construction project.

Principles include:

- All projects considered by SLCPU to be in sensitive areas.
- The gross aggregate area shall include streets and other dedicated lands, easements, and rights of way. If necessary, the SLCPU Director shall have the right to reduce the above area requirements.

Reduce Stormwater Runoff Rates (Restrictive Discharge Policy)

The control of the peak runoff is preventing storm water runoff from collecting quickly by lowering the time of concentration on the property. Rather than runoff sheet flowing across an undeveloped parcel, development causes storm runoff to reach collection channels, ditches, or storm drain systems quicker thus resulting in a high peak discharge. The Restrictive Discharge Policy has long been designed to restrict the peak runoff from impacting the public.

The Restrictive Discharge Policy requires the on-site concentration or collection of all surface and storm water runoff within the project area, and restricts the eventual discharge of this runoff to a maximum allowable discharge rate of (1/5 ft³ /sec) / acre or 0.20 cfs / acre of development. The requirements of collection and the restriction of the quantity of runoff discharge necessitates the engineering design of on-site storage facilities, and encourages water quality treatment, as well as practical runoff discharge through storm drain piping or groundwater recharge.

Reduce Stormwater Runoff Volume

Prior to development of most properties, storm runoff moves slowly. The undeveloped nature of the parcel typically has very little impervious coverage over the soil that might prevent the water from infiltrating back into the earth. After the installation of concrete or asphalt surfaces and the construction of structures, the ground has lost a lot of area where it can absorb the storm. Although the peak runoff may be controlled, as discussed in the previous section, the volume of runoff may greatly increase above the amount that existed prior to development. This approach is especially critical in areas that are known to be flat, sandy, gravelly, and / or arid where development can drastically reduce the capacity of the earth to absorb rainstorms.

As part of development, it is the responsibility of the engineer to study and evaluate the quantity of runoff that the parcel would generate and compare that to the quantity of runoff that the



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parcel would generate after development. Where site features allow, measures must be proposed to restrict the total volume of storm runoff to that which existed prior to development. For projects that redevelop previously developed parcels, this means that the civil engineer must analyze the site and model the site based upon best available information regarding the native conditions of the site prior to any previous development.

Reducing the volume of the storm runoff requires the consideration of possible implementation of Green Infrastructure (GI). Popular GIs span a wide horizon of volume-based hydrology. Some of these practices include sheet-flow runoff from impervious areas onto pervious areas, such as parking into landscape, filter strips, infiltration basins, design of small-scale wetlands, perforated pipes or cisterns, green roofs and vegetated swales. This policy supports those that seek for a form of accreditation for green development such as the LEED program.

Please note that the installation of GI does not necessarily mean that appropriate BMPs have been used to comply with the water quality guidelines. See Section 900 of this document regarding appropriate water quality considerations.

Reduce Pollutant & Sediment Load to Receiving Waters

In November 2002, the federal government amended the Clean Water Act to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” The stated goals of this act are to reduce pollutants, protect wildlife, eliminate toxic discharge and provide for safe and healthy recreation around the public waters.

SLCPU is required to comply with State and Federal requirements and local MS4 permit regarding pollutant and sediment load to creeks, rivers and stream. Please note that municipal storm drain drains to these natural bodies of water. Each property must address the problem at the source before it enters the storm drain or natural body of water.

Permitting details and BMPs are not included as part of this manual. Any questions regarding water quality treatment should be directed to SLCPU.

Situations of Greater Control

If hydrologic, hydraulic or topographic conditions warrant greater control than that provided by the minimum standards set forth in this section 302.1, the SLCPU Director may impose any and all additional requirements deemed necessary to control the volume, timing, and rate of runoff.

While more stringent requirements are not common, it may be necessary in situation where the typical standard would create a flood hazard situation. This has been known to occur where undersized culverts, which cross under railroad tracks or state highways, would not be able to accommodate a full 0.2 cfs / acre discharge from the project site.

Planning & Submittal

Submittal & Review Process

The purpose of the submittal and review process is to determine whether or not the specific drainage plan for a given project meets the state and local policy requirements for drainage design in the City. These requirements include overall facility planning to assure an integrated and coordinated design as well as design standards to assure consistent design and analysis. The submittal and review process requirements are tailored to provide the minimal amount of information necessary for each development process and size of development in order to minimize the cost of drainage report preparation as well as to minimize the time necessary for SLCPU review. The submittal and review process does not, however, relieve the design engineer of the responsibility to provide a correct and safe drainage design nor the developer to properly construct the designed drainage facilities.

By reviewing and approving drainage designs for given developments, neither the City nor any of the other local entities will assume liability for improper drainage design nor guarantee that the final drainage design review will absolve the developer or designer of future liability for improper design.

Technical Drainage Study

The Technical Drainage Study discusses at a detailed level the existing site hydrologic conditions and the proposed drainage plan to accommodate or modify these site drainage conditions in the final improvement plan for the site. The

Technical Drainage Study addresses both on-site and off-site drainage analysis and improvements necessary to mitigate the impact of the proposed development on adjacent properties in accordance with current Utah Drainage Law.

The Technical Drainage Study shall be in accordance with the following outline and contain the applicable information listed:

Study Contents

Title Page

- SLCPU Application for Review
- Project Name, Type of Study, Study Date
- Preparer’s Name, Stamp and Signature

General Location & Development Description

Location of Property

- City, State Highway and local streets within and adjacent to the subdivision
- Township, range, section, $\frac{1}{4}$ section
- Drainage basins encompassing the development
- Names of surrounding developments
- General location map (8 $\frac{1}{2}$ ” x 11” is suggested)

Description of Property

- Area in acres
- Existing site conditions (vegetation, buildings, drainage structures, etc.)
- General site topography
- Existing irrigation facilities such as ditches and canals
- General project description and proposed land use

Drainage Basin Description

Off-Site Drainage Description

- Discuss off-site flows which enter property at the following discrete points:
- Upstream Local Facilities runoff
- Upstream Regional / County Facilities runoff
- Discuss off-site flows which enter property at non-discrete points.
- Discuss existing and proposed land use types and level of development in upstream basin, as defined by the local entities.
- Hydrologic soil groups, vegetation, slope.



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- Natural and man-made conveyances in the watershed.

On-Site Drainage Description

- Discuss historic on-site drainage patterns of the property (flow directions through site and at property line).
- Discuss historic drainage patterns of upstream runoff.
- Discuss historic discharge points at downstream property lines.

Master Planning Information

- Identify currently adopted master plans which include the subject site.
- Discuss proposed Master Plan Flood Control Facilities on subject site (if applicable).
- Discuss upstream Master Plan Flood Control Facilities which would affect runoff on subject site (if applicable).
- Floodplain Information
- Identify all FEMA regulated floodplains which overlay on the subject site.
- Identify all calculated floodplains, including a proposed conditions or “with-project” floodplain.

Previous Drainage Studies

- Identify any previous drainage studies for the site.
- Identify any previous drainage studies which affect the site.

Proposed Drainage Facilities

General Description

- Discuss proposed Local (On-Site) Drainage System plan and layout.
- Discuss proposed local (off site) drainage system plan from the local (on-site) drainage system to the regional flood control system.
- Discuss proposed regional flood control system design (only where the regional flood control system passes through the subject site).
- Compliance with Regulations and Adopted Plans
- Discuss compliance with all Master Planned Flood Control Facilities (as applicable) and discuss all proposed deviations from the adopted Master Plans.
- Discuss compliance with FEMA floodplain regulations and all proposed modifications to or verifications of the FEMA regulated floodplain through the subject site.

- Discuss compliance with previously approved drainage studies for the subject site.
- Identify individually all requests for variances from the requirements of the drainage criteria and variances from the local entities’ development code.
- Discuss compliance with Uniform Regulations.
- Discuss compliance with the manual.

Hydrologic Analyses

Hydrologic analyses shall be completed for the following conditions. Calculations for all conditions shall be bound in the report:

- Existing off-site and on-site
- Existing off-site and developed on-site
- Developed off-site and on-site
- Design rainfall computation discussion.
- Design runoff computation discussion.
- Discuss peak flow rates from off-site areas and facilities.
- Discuss flow split areas and analysis.
- Hydrologic parameters.
- Routing schematic.

Facility Design Calculations

- Discuss design calculations for the Proposed Drainage System
- Street flow calculations
- Storm sewer, inlets, and ditch flow calculations
- Channel and culvert flow calculations
- Other hydraulic structure flow calculations
- Detention storage and outlet design calculations
- Discuss design calculations for the Local (Off-site) Drainage System
- Discuss Floodplain / Floodway calculations as related to FEMA requirements
- Discuss maintenance access and potential maintenance requirements. Provide maintenance procedures for privately maintained facilities, with projected annual maintenance costs for incorporation into homeowners association.
- Discuss easement requirements for the proposed drainage facilities
- Discuss phasing of all drainage facilities

Conclusions

- Compliance with Drainage Laws
- Compliance with Master Plans
- Compliance with FEMA requirements
- Compliance with this manual
- Compliance with applicable City Code
- Effectiveness of proposed drainage facilities to control storm runoff
- Impact of proposed development on off-site property and facilities

References

Provide references for all drainage reports, plans, and technical information used in preparing the drainage report.

Appendices

- Hydrologic Computations
- Watershed boundaries
- Soils information
- Land use information
- Design rainfall calculations
- Basin parameter calculations
- Routing schematic
- Runoff calculations at design points
- Minor and major storm flows
- Flows for historic and fully developed basin conditions
- Hydrographs at property line discharge points, when appropriate
- Input data listing for all computerized hydrologic calculations, maps with all parameters
- Hydraulic Calculations
- Street and ditch capacities
- Inlet and storm sewer capacities (including Hydraulic Grade Line (HGL) calculations), with inlet and outlet condition assumptions
- Channel and culvert capacities
- Floodplain / Floodway calculations
- Detention area / storage / discharge rating curves and calculations
- Input data listing for all computerized hydraulic calculations
- Plots of all cross sections



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- Map with cross section locations
- Drainage Plan

A detailed drainage plan for the subject site shall be submitted with the Technical Drainage Study. The plans shall be on a 24" x 36" drawing at an appropriate legible and scalable scale (a scale of 1" = 20' to 1" = 200' is recommended). A reference to all hydraulic calculations shall be a part of this plan. The following information shall be shown on this drawing, except that the off-site drainage basin boundaries may be shown at an appropriate legible scale on an exhibit.

- Property lines and streets (roads) including right-of-way (ROW) widths within 100' of the property
- Existing contours and proposed elevations sufficient to analyze drainage patterns extending 100' past property lines
- Existing drainage facilities and structures, including ditches, storm sewers, channels, street flow directions, and culverts
- All pertinent information such as material, size, shape, slope, and location shall also be included
- Limits of existing floodplains based on Flood Insurance Rate Maps (FIRM), if available
- Existing and proposed floodplains based on best available data (existing floodplain studies) if available
- Proposed on-site drainage basin boundaries and sub-boundaries. Include off-site boundary intersections with on-site boundaries and off-site boundaries if not shown elsewhere.
- Proposed future on-site and off-site flow concentration points, directions, and paths
- Proposed street and ditch flow paths and slopes
- Proposed storm sewer locations, type, size, and slope. Include inlet types, sizes and locations, and manhole locations.
- Proposed channel alignment with typical cross section. Include major storm flow limits.
- Proposed culvert locations, type, size, slope, and headwater pool.
- Proposed local (on-site) drainage system outlets to the local (off-site) drainage system.

- Alignment of local (off-site) drainage system from local (on-site) drainage system to regional flood control system. If extent of local (off-site) drainage system is too large to include on the Drainage Plan, include a separate drawing showing entire drainage path of the local (off-site) drainage system.
- Miscellaneous proposed drainage facilities (i.e., hydraulic structures, etc.).
- Table of minor and major storm peak flows including tributary area at critical design points.
- Maintenance easement widths and boundaries.
- Legend for all symbols used on drawing.
- Scale, North Arrow, and Title Block.

Calculations Exemption

The report requirements for a Technical Drainage Study may be reduced at the request of the applicant if there is uncertainty over the final characteristics of the proposed drainage facilities or at the request the City. The Technical Drainage Study shall identify all areas where the uncertainty exists. Hydrology and hydraulic calculations based upon assumptions may be provided with less detail. The areas where the assumptions and details are not provided must be identified so that they can be completed in the required detail as part of a future Hydrologic / Hydraulic Calculations Addendum, if required. However, no construction permits will be issued until these details are provided in an Addendum, if the calculations are deemed necessary for the project.

Areas where assumptions are made and where the level of detail is limited shall be identified so that they can be completed in full detail as part of the Hydrologic / Hydraulic Calculations Addendum, if required.

Improvement Plans

Where drainage improvements are to be constructed, the final construction plans (on 24" x 36" Paper or electronic ProjectDox upload) shall be submitted. Approval of the final construction plans (including details) by SLCPU / Salt Lake County Flood Control is a condition of issuing construction permits. The plans for the drainage improvements will include:

- Storm sewers, inlets, outlets and manholes with pertinent elevations, dimensions, type, and horizontal control indicated

- Culverts, end sections, and inlet / outlet protection with dimensions, type, elevations, and horizontal control indicated
- Channels, ditches, and swales (including side / rear yard swales) with lengths, widths, cross-sections, grades and erosion control (i.e., riprap, concrete, grout) indicated
- Checks, channel drops, erosion control facilities
- Detention pond grading, low-flow channels, outlets, and landscaping
- Other drainage related structures and facilities (including under-drains and sump pump lines)
- HGL's for minor (storm sewer) and major (channels) storm runoff including flow rates.
- Maintenance access considerations
- Onsite grading and erosion and sedimentation control facilities
- Drainage easements and ROW with horizontal distance to improvements

The information required for the plans shall be in accordance with sound engineering principles, this manual, and the current edition of the APWA Standard Drawings and Standard Specifications. Construction documents shall include geometric, dimensional, structural, foundation, bedding, hydraulic, landscaping, and other details as needed to construct the drainage facility. The approved drainage plan shall be included as part of the construction documents for all facilities affected by the drainage plan. Construction plans shall be signed and sealed by a registered professional civil engineer in the State of Utah as being in accordance with the approved drainage report / drawings.

Rainfall

Overview

Over the past 40 years, many different sources within the Salt Lake Valley have analyzed the precipitation values. One of the first studies performed, and occasionally still used, is the 208



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Report, prepared by WeatherBank, Inc. in January 1977. This study analyzed the historic rainfall data at five of the rain gages in the Salt Lake Valley. Of the five rain gages, only the gage at Salt Lake Airport had rain data for a period longer than 25 years. This study also references the original 1968 study by the National Weather Service and Soil Conservation Service.

In September 1999, Salt Lake County hired TRC North American Weather Consultants and Meteorological Solutions, Inc. to revisit the precipitation values for the valley. In general, the TRC report found that the values for short duration storms (15 min to 60 min duration) were comparable to the 208 Report, but also found that the longer duration storms (6 hour to 24 hour duration) were slightly lower than those published in the 208 Report. Salt Lake County continues to use the precipitation numbers published in the TRC report.

In the year 2004, the National Oceanic and Atmospheric Administration (NOAA) republished NOAA Atlas 14. This report studied and published precipitation-frequency data for the semiarid southwest, which includes Utah. This report was further revised in October 2006 (version 4.0). It is intended, by its publication, that NOAA Atlas 14 is “the official documentation of precipitation frequency estimates and associated information for the United States.” The Atlas is both an extensive and comprehensive study of the state of Utah and is fully supported by the various federal agencies, such as the EPA, FEMA and the Army Corp of Engineers. Review of the current Atlas precipitation values have found them to be comparable to the published values in the 208 Report, therefore, SLCPU will accept values from the NOAA Atlas 14 as the official source of precipitation frequency values.

Precipitation Data

Precipitation Data for the Salt Lake City area can be obtained from NOAA Atlas 14, through the NOAA Hydrometeorological Design Studies Center:

dipper.nws.noaa.gov/hdsc/pfds/sa/ut_pfds.html.

The NOAA Precipitation Frequency Data Server has available all of the rainfall data for areas across the state. To obtain the data necessary to complete a Technical Drainage Study, the website request would need to be set in Section 1:

Data type:	Precipitation depth
Units:	English
Time Series type:	Partial Duration

Section 2 of the website requires that you enter in location information. There are three different options to finding the data for the project site. The first is to simply select the site from the list. The list represents various NWS rain gages around the state. This may prove difficult, if the engineer isn't familiar with the locations of the various gages. The second option is to enter the location into the text boxes for the latitude and longitude of the site in decimal degrees. This information can be obtained from a licensed surveyor or can be obtained using various geo-referencing databases, such as a GIS software program. Another option is to use one of the online map websites. Copy the latitude and longitude to three decimal places and enter the value into the NOAA's website form. Remember that the longitude in the state of Utah is a negative number. The form will then access NOAA data server and return the precipitation frequency data for the location that you entered.

For Technical Drainage Studies in Salt Lake City, the data that should be entered into the precipitation model should come from the 3 hour storm event for the 10 and the 100 year recurrence interval.

Minor Event

Hereafter, in this manual the Minor Event refers to the 10 year flood event. Mitigation for the Minor Event shall include local storm drain systems, onsite swales, and onsite storage facilities.

Major Event

Hereafter, in this manual, the Major Event refers to the 100 year flood event. Mitigation for the Major Storm Event includes local and regional storm drain facilities, surface flow in public streets, and open channels.

Farmer Fletcher Unit Hydrograph

The Farmer Fletcher storm model was determined by E.E. Farmer and J.E. Fletcher in their publication “Rainfall Intensity-Duration-Frequency Relations for the Wasatch Mountains of Northern Utah” in 1972. The hydrograph was determined after analyzing historical precipitation data. Originally designed to represent a 1 hour storm event, Salt Lake City and Salt Lake County agreed that by adding a simple rising and tailing limb would convert the 1 hour hydrograph to a 3 hour hydrograph incorporating the difference between the 1 hour storm drain and the 3 hour storm data into the first 30 min and the final 90 min of the storm duration. For a 3 hour storm event using the Farmer Fletcher method, a unit hydrograph, for cumulative storm precipitation is represented in the table.

Understand that the values listed for the “15 min interval” are there only to help represent the intervals over a 3 hour time period and don't necessarily mean that the storm must be modeled between 1:00 and 4:00.

A unit hydrograph is a dimensionless hydrograph that represents the total storm precipitation value as 1” of rain. To take the unit hydrograph to the storm values for the site that you are analyzing, the engineer would need to multiply the Unit Hydrograph values for each of the time intervals by the precipitation value obtained from NOAA Atlas 14.

Hour Storm Distribution

15 min interval	Unit hydrograph
1:00 - 1:15	.019
1:15 - 1:30	.037
1:30 - 1:45	.605
1:45 - 2:00	.780
2:00 - 2:15	.848
2:15 - 2:30	.888
2:30 - 2:45	.907
2:45 - 3:00	.926
3:00 - 3:15	.944
3:15 - 3:30	.963
3:30 - 3:45	.981
3:45 - 4:00	1.000



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Example

As an example Engineering Firm XYZ has been hired to prepare the site improvement plans for the Salt Lake City Library, located in the block at the southeast corner of the 400 South and 200 East intersection. Engineer Smith has been asked to analyze the site and prepare a Technical Drainage Study for the project.

Engineer Smith has visited the site and is aware of the general grading and runoff conditions surrounding the project site. To prepare to model the rain storm event for the project site, Engineer Smith needs to acquire the precipitation data for the project site.

Engineer Smith opens up an online mapping website and searches for “400 S 200 E, Salt Lake City, UT.” He then locates the latitude and longitude for his project site. He copies down the latitude “40.760” and the longitude “-111.884” and saves those numbers.

He then opens the NOAA website for the Precipitation Frequency Data Server and after ensuring the Data Description values are correct, he enters his latitude and longitude values into the 2 boxes in Section 2.2 and clicks on the “Submit location” button. The website confirms his location in an OK box and then loads the Point Precipitation Frequency Estimates from NOAA Atlas 14. The 100 year, 3 hour storm event precipitation value is 1.96” of rain and 1.11” for the 10 year event. Engineer Smith, then prints the page from the website to include as reference material for his Technical Drainage Study.

To be able to generate the storm event hydrograph that he needs for Section 600 of this manual he enters and multiplies the precipitation value from NOAA’s website into the table.

Runoff

Introduction

SLCPU has traditionally used the HEC-1 program to determine storm runoff. The HEC-1 program with a SLC preprocessor was effective in being able to perform many different aspects of runoff modeling. Recently the Rational Method has become the predominate method for modeling storm runoff. The Rational Method however is much more limited in nature and cannot accommodate storm routing

or other associative hydraulic calculations. In addition, the hydrograph for the storm in the Rational Method doesn’t properly translate into proper detention sizing.

To be able to properly model storm runoff, better associate local studies to Master Plans and Flood Insurance Studies, and accommodate all of the various aspects of runoff routing, detention, and release, the Rational Method is being limited to projects that contain a single hydrologic sub-basin that has a total project size of less than one-acre. Projects more than one-acre should use the NRCS (SCS) Curve Number method along with the unit hydrograph described in the Rainfall Chapter of this manual. The NRCS (SCS) Curve Number method will provide more accurate results, in turn be able to provide more reliable detention basin and storm sewer sizing. This helps everybody be able to ensure that properties are safe from flooding.

Sample Calculation for 3-hr synthetic Hydrograph

15-Min Interval	Unit Hydrograph	100-Yr, 3-Hr Precip (inches)	Total Cumulative Rainfall (inches)
1:00 - 1:15	0.019	1.96	0.036
1:15 - 1:30	0.037	1.96	0.073
1:30 - 1:45	0.605	1.96	1.186
1:45 - 2:00	0.780	1.96	1.529
2:00 - 2:15	0.848	1.96	1.663
2:15 - 2:30	0.888	1.96	1.741
2:30 - 2:45	0.907	1.96	1.778
2:45 - 3:00	0.926	1.96	1.814
3:00 - 3:15	0.944	1.96	1.851
3:15 - 3:30	0.963	1.96	1.887
3:30 - 3:45	0.981	1.96	1.924
3:45 - 4:00	1.000	1.96	1.960

Projects more than one-acre in size are required to perform a more detailed hydrologic and hydraulic analysis. This analysis should be performed in accordance with the standards set in this document and should be performed in a hydrologic and hydraulic computer model approved by FEMA.

Hydrologic Models Meeting Minimum Requirement of NFIP

Despite the number of acceptable software models approved by FEMA for use, Salt Lake City accepts the following 3 hydrologic models. More models may be added in the future.

SWMM 5

HEC-HMS, version 1.1 and later

Rational Method

Please note that all of the software programs are available from their respective owners free of charge. SWMM 5 and HEC-HMS should use the NRCS (SCS) curve number method.

The Rational Method is the only model in the list that does not utilize a computer model. Calculations should be done by hand to show how results were achieved.

A table of values and results are not acceptable.

Time of Concentration

The curve number method requires the computation and use of the time of concentration. The definition of the time of concentration, t_c , for the purpose of this manual, is the time required for water to flow from the most remote part of the drainage area to the point under consideration. For the Rational Formula method, the time of concentration must be estimated so that the average rainfall rate for a corresponding duration can be determined from the rainfall intensity-duration frequency curves. For the NRCS Unit Hydrograph methods, the time of concentration is used to determine the time-to-peak, t_p , of the unit hydrograph and subsequently, the peak runoff.

Typically, many different times of concentration equations may be used with the various runoff methods discussed in the following sections. However, all these methods have the same definition of the time of concentration. Therefore, to obtain consistent results between all the runoff methods, the time of concentration equations presented in this section shall be used for all small watershed.

For urban areas, the time of concentration consists of an initial time or overland flow time, t_i , plus the time of travel, t_t , in the storm sewer, paved gutter, roadside drainage ditch, or drainage channel. For non-urban areas, the time of concentration consists of an overland flow time, t_i , plus the time of travel in a combined form, such as a small swale, channel, or wash. The latter portion, t_t , of the time of concentration can be estimated from the hydraulic properties of the storm sewer, gutter, swale, ditch, or wash. Initial time, on the



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other hand, will vary with surface slope, depression storage, surface cover, antecedent rainfall, and infiltration capacity of the soil, as well as distance of surface flow. Thus, the time of concentration for both urban and non-urban areas shall be calculated as follows:

$$\text{Equation 6.1} \quad tc = ti + tt$$

tc = Time of Concentration (min)

ti = Initial, Inlet, or Overland Flow Time (min)

tt = Travel Time in the Ditch, Channel, Gutter, Storm Sewer, etc. (min)

The time of concentration is then the sum of the initial flow time, ti and the travel time, tt. The minimum tc recommended for non-urban watersheds is 10 min. The initial or overland flow time, ti, may be calculated using the following equation:

$$\text{Equation 6.2} \quad ti = 1.8 (1.1 - K) Lo^{1/2} / S^{1/3}$$

ti = Initial or Overland Flow Time (min)

K = Flow Resistance Coefficient

Lo = Length of Overland Flow, (ft, 500' maximum)

S = Average Basin Slope (%)

This equation was originally developed by the Federal Aviation Administration (FAA, 1970) for use with the Rational Formula method. However, the equation is also valid for computation of the initial or overland flow time for the NRCS Unit Hydrograph methods using the appropriate flow resistance coefficient. For the NRCS Unit Hydrograph methods, K shall be calculated using the following equation:

$$\text{Equation 6.3} \quad K = 0.0132 CN - 0.39$$

Overland flow in urbanized basins can occur from the back of the lot to the street, in parking lots, in greenbelt areas, or within park areas. It can be calculated using the procedure described in the previous section except travel time, tt, to the first design point or an estimated velocity based on Manning's equation, which was used to derive formulas for estimating two travel time velocities. The equation is as follows:

$$\text{Equation 6.4} \quad V = CS^{1/2}$$

$$\text{Equation 6.5} \quad C = 1.49 / n R^{2/3}$$

$$\text{Equation 6.6} \quad R = A / P$$

V = Average Velocity (fps)

S = Average Slope (ft / ft)

n = Manning's Roughness Coefficient

R = Hydraulic Radius (ft)

P = Wetted Perimeter (ft)

A = Area of Flow (ft²)

The time of concentration for the first design point in an urbanized basin using this procedure should not exceed the time of concentration calculated using the following equation, which was developed using rainfall / runoff data collected in urbanized regions (USDCM, 1969).

$$\text{Equation 6.7} \quad tc = L / 180 + 10$$

tc = Time of Concentration at the First Design Point in an Urban Watershed (min)

L = Watershed Length (ft)

The above equation may result in a lesser time of concentration at the first design point and thus would govern in an urbanized watershed. For subsequent design points, the time of concentration is calculated by accumulating the travel times in downstream reaches. The minimum TC recommended for urbanized areas is 5 min.

A common mistake in calculating TC is to assume travel velocities (for TT) that are too small. Another common error is to not analyze the portion of basin which would result in the longest computed time of concentration. This error is most often encountered in long basins, or a basin where the upper portion contains grassy park land and the lower developed urban land.

When studying a tract of land proposed for subdivision, the overland flow path should not necessarily be taken perpendicular to the contours since the land will be graded and swales will often intercept the natural contour and conduct the water to the streets, thus increasing the time of concentration.

SCS Curve Number Method

The National Resources Conservation Service (NRCS), U.S. Department of Agriculture, has instituted a soil classification system for use in soil survey maps across the country. Based

on experimentation and experience, the agency has been able to relate the drainage characteristics of soil groups to a curve number, CN (SCS, 1985). The SCS provides information on relating soil group type to the curve number as a function of soil cover, land use type and antecedent moisture conditions.

Precipitation loss is calculated based on supplied values of CN and IA. CN and IA are related to a total runoff depth for a storm by the following relationships:

$$\text{Equation 6.8} \quad Q = (P - IA)^2 / ((P - IA) + S)$$

$$\text{Equation 6.9} \quad S = (1,000 / CN) - 10$$

Q = Accumulated Excess (in)

P = Accumulated Rainfall Depth (in)

IA = Initial Surface Moisture Storage Capacity (in)

S = Currently Available Soil Moisture Storage Deficit (in)

For the Salt Lake City area, IA is calculated by using the following equation:

$$\text{Equation 6.10} \quad IA = 0.2 S$$

This relation is based on empirical evidence established by the NRCS, and is the default value in HEC-1 Program (HEC, 1988).

Since the SCS method gives total excess for a storm, the incremental excess (the difference between rainfall and precipitation loss) for a time period is computed as the difference between the accumulated excess at the end of the current period and the accumulated excess at the end of the previous period.

CN Determination

The SCS Curve Number Method uses a soil cover complex number (CN) for computing excess precipitation and has a range between 30 and 100. The curve number CN is related to hydrologic soil group (A, B, C, or D), land use, treatment class (cover), and antecedent moisture condition. The soil group is determined from published soil maps for the area. These maps are usually published by the SCS.

A web-based application, along with helpful tutorials and instructions for searching the Web Soil Survey is available at the NRCS website:

websoilsurvey.nrcs.usda.gov/app/HomePage.htm.

Note that for many areas in the Soil Survey, Salt Lake City soils are defined as "UL" or "Urban Land." For these situations, assume the soil to have a 'C' Hydrologic Soil Group.



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Land use and treatment class are usually determined during field visits or from aerial photographs.

Having determined the soil group, land use and treatment class, CN values can be determined from the following NRCS tables.

NRCS (SCS) Curve Numbers

Cover Type	Ave %	Curve A	B	C	D
Open Space					
Poor Condition (grass < 50%)	68	79	86	89	
Fair Condition (grass 50-75%)	49	69	79	84	
Good Condition (grass >75%)	39	61	74	80	
Impervious Areas					
Paved parking, roofs, driveways, streets with curb and gutter and storm drain	98	98	98	98	
Streets and roads (no storm drain or C&G)	83	89	92	93	
Gravel streets	76	85	89	91	
Dirt road	72	82	87	89	
Landscaping					
Natural (pervious areas)	63	77	85	88	
Artificial (weed barrier, rock mulch)	96	96	96	96	
Urban Districts					
Commercial	85	89	92	94	95
Industrial	72	81	88	91	93
Residential					
Apartments / Condos	72	81	88	91	93
Townhouses / 6,000 ft ² lots	69	80	87	90	92
7,000 ft ² lots	63	76	84	89	91
8,000 ft ² lots	58	73	82	88	90
10,000 ft ² lots	38	61	75	83	87
14,000 ft ² lots	30	57	72	81	86
20,000 ft ² lots	25	54	70	80	84
40,000 ft ² lots	20	51	68	79	84
80,000 ft ² lots	12	46	65	77	82
Newly Graded Areas					
Natural (pre-development)					
Poor	63	77	85	88	
Fair	55	72	81	86	
Good	49	68	79	84	

For Urban Districts and Residential areas, the cover type is to be used to help estimate the required curve number. Actual curve numbers

selected should be representative of the percentage of impervious area on the lot. For example, a 20,000 ft² lot with a large house, driveway, and patio may have a percent impervious of about 40% rather than 25%. In this case, curve numbers for 10,000 ft² lots should be used because they better represent the 40% impervious cover.

The engineer should attempt to use the NRCS Curve Number tables to the greatest extent possible, however there are situations where a customized number, or a composite number would be appropriate. The engineer should study the soil type, site conditions, and proposed improvements in determining whether a site specific / custom curve number should be used. Any variation from the NRCS tables should include discussion in the text of the Drainage Study.

Lag Time

The SCS Unit Hydrograph transform method shall be used in hydrologic modeling. This method requires the input of the variable, lag time.

For small urban basins it is assumed that the lag time equals the time of concentration described above in Section 603.

Upstream and Downstream Analysis

For projects that discharge to curb or to storm drain, an analysis needs to be done to assure that capacity exists for new discharge connections.

Minimum Slopes

For design the following minimum slopes should be considered:

- 0.50% for flow through a concrete waterway. For situations where 0.50% cannot be obtained, a slope of 0.40% can be used but the contractor must water test the structure to ensure that positive drainage can be obtained without creating ponding.
- 1.0% for flow through an earthen ditch or waterway.
- 1.0% for sheet, or overland, flow where the surface is hardened with concrete or asphalt.
- 2.0% for sheet, or overland, flow where the surface is natural or landscaped.

Minimum Manning's Roughness Coefficients

For design the following minimum coefficients should be used:

- ADS, DWV Schedule 40, other PVC or HDPE pipe – 0.012
- RCP (precast) – 0.013
- RCP (cast in place) – 0.016

Concentrated Flow Across Public Sidewalks

Salt Lake City does not allow storm runoff to pass from private or public property across a public sidewalk to drain into the right-of-way during non-storm conditions. This means, that measures must be taken to capture or collect fugitive or nuisance water from crossing the public sidewalk in weather conditions where the sidewalk should be dry.

Sources of fugitive water could include, but is not limited to, landscape irrigation, car washing, onsite water features, etcetera. Measures such as a dry sump, area drain, or depressed landscaping can be used to prevent nuisance runoff from crossing the public sidewalk during non-storm conditions.

2.2.3 Street Inlets

Manageability of Storm Water

- Storm drain catch basins or inlets shall generally be located on both sides of the street.
- Inlet spacing and configuration shall be designed to collect runoff from the 10 year (or minor) storm event.
- Inlet spacing shall be designed to meet the design spread requirements from the FHA Urban Drainage Manual, shown below in Table 4.
- Under no circumstances should storm inlets be spaced greater than 500'.
- Storm drain extensions may be required from the nearest public storm drain up to the subject site to provide for the above design criteria.
- Berms or other controls may be required to contain public stormwater within the right-of-way.



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Design Gutter Spread

Street Classification	Design Frequency	Design Gutter Spread
High Volume		
< 45 mph	10-year	Shoulder +3'
> 45 mph	10-year	Shoulder Only
Sag Point	50-year	Shoulder +3'
Collector		
< 45 mph	10-year	½ Outer-most drive lane
> 45 mph	10-year	Shoulder Only
Sag Point	10-year	½ Outer-most drive lane
Local Streets	10-year	½ Outer-most drive lane

Major Drainage / Open Channels

From time to time, it becomes necessary for properties that are located near Major Drainage Corridors (MDC) to make connections for discharge. Several examples of a MDC would include the Jordan River, the Surplus Canal, the Lee Drain, the CWA Drain, or any of the major creeks or associated storm drain systems related to the conveyance of a creek. Any questions about whether a certain facility is determined to be a Major Drainage Corridor should be directed to SLCPU.

In an effort to minimize new connections and disturbances to these MDCs and before any connection to a major drainage corridor is allowed, the engineer must first investigate and analyze all possible options for utilizing an existing storm drain connection. Certain connections may require the concurrence and approval from Salt Lake County Flood Control before permits can be issued.

Stormwater Pollution Prevention Plan (SWPPP)

In accordance with the NPDES and UPDES permitting processes, all persons that are disturbing more than one acre in size are required to file for permits for storm water discharge. There is a requirement for all properties that disturb more than one acre (of point?) to get a permit for stormwater discharge. The federal government has allowed the state of Utah to be able to handle the permitting process for the NPDES program and in turn, the State has authorized Salt Lake City to manage the program for projects between 1 to 5 acres.

There are two aspects of the program that apply to new development projects: Industrial and New Construction. Both aspects require extensive reports be produced. If the project involves an industrial type of use, then an Industrial permit will be needed. All projects between 1 and 5 acres in new construction need to have a Construction permit.

There are two different paths that can be taken to obtain a permit. There is the individual permit and there is a general permit. The general permit process was created to accommodate several like projects. If the project meets the requirements of the general permit, then only an NOI is needed to be filed, stating that the general permit is to be used. Note that all requirements of the General Permit must be completed before the NOI is submitted.

SLC may also require SWPPPs for properties under one acre that are in environmentally sensitive areas or other unique site characteristics, such as steep slopes or proximity to a riparian protection area.

Detention & Retention

Storm Detention and Retention

Salt Lake City relies heavily on individual storm detention systems (controlled offsite discharge) and retention systems (no offsite discharge) to control flooding within the City. The City's policy is to allow for an open design approach to capture innovative and creative ways to address the individual systems. To assure that the fundamental goals are met and that public safety remains a high priority, the following items must be met or adequately addressed in design:

- Detention basins must be assessable for maintenance. Side slopes on surface detention basins shall be no steeper than a 1:3, rise over run. Needs for vehicular access to both surface and subterranean systems need to be considered.
- Surface detention basins with an inlet or outlet pipe larger than 12" should be grated or screened to prohibit unintended animal or human access to the pipe system.
- Detention basins that have a surface design depth of more than 3' shall have security fencing to prohibit unintended animal or human access to the detention / retention pond.

- Detention basins that are designed within parking areas or drive isles shall be no more than 12" deep, as measured at the deepest point to prevent vehicle stall or flooding.
- Detention basins that are landscaped should be designed to minimize irrigation needs and runoff to prevent a base flow situation in the outlet pipes.
- Detention basins shall be designed with a material that limits erosion conveying materials into the outlet pipes and public storm systems.
- Surface detention and retention systems shall be designed to discharge or infiltrate the detention system contents within 72 hours following the end of the storm event. This shall be done to minimize health risks to the public. Appropriate calculations and supporting percolation data shall be required to document the compliance of the detention / retention system.
- Detention systems shall include a water quality device on the outlet pipes. The water quality device shall comply with all federal, state and local clean water requirements.
- Underground detention basins that includes the voids in gravel or crushed rock as a storage area cannot use a void ratio greater than .30. The design professional should consider the angular nature and size of the rock when determining void ratio. Batch reports from the gravel or rock crushing companies can be used to determine void ratio. In no situation will a void ratio greater than .30 be accepted.
- Storm detention and retention facilities shall have a minimum of 1' of freeboard.

Storm detention and retention facilities shall be clearly identified on the Drainage Plan and on the Civil Improvement Plans to include dimensions, side slopes, depth, design volume of the basin, and all other pertinent detail necessary to accurately construct the basin.

The outlet of all detention basins to storm drain must have a trash rack installed to prevent debris from entering the public storm drain.

Additional Hydraulic Structures

Erosion Control

Erosion control is the primary goal of the National Pollutant Discharge Elimination System (NPDES) program. Erosion leads to the loss of top soil and helps contribute to increased



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flooding from runoff. Millions of dollars every year is spent in the Salt Lake valley to clean and maintain storm drain culvert and drainage channels do to sedimentation and plant growth that results from the sediment. As a participant of the NPDES program and to help control the loss from erosion, Salt Lake City has established the following development guidelines.

Erosion control measures are required for any overland flow that is calculated to run at 3 ft / s (fps) or faster during the 100 year storm event. As a guideline, the following measures are to be considered as acceptable measures and the limits of each measure:

Maximum Allowable Velocities

Natural and Improved Unlined Channels	Maximum Permissible Mean Velocity (fps)
Gravel	2.5
Silty clay	2.5
Clay	6.0
Unreinforced vegetation	5.0
Loose riprap	10.0
Grouted riprap	15.0
Gabions	15.0
Soil-concrete	15.0
Concrete	35.0

For composite lined channels, use the lowest of the maximum mean velocities for the materials used in the composite lining.

Deviations from the above values are only allowed with appropriate engineering analysis and / or suitable agreements for maintenance responsibilities.

Equation 11.1 $d50 = 0.010 V^{2.44}$

V = Mean Channel Velocity, in fps

d50 = Rock Size, in ft, for which 50% of the Riprap by Weight is smaller

Stormwater Pretreatment for Parking Areas

Stormwater treatment for oil and grease shall be provided for all sites in Salt Lake City with more than 6 parking stalls.

Engineer shall evaluate the effectiveness of proposed water quality device and provide all necessary discussion and calculations as part of the Technical Drainage Study.

A maintenance plan shall be provided to both the City and to the Owner detailing the level of attention, maintenance, and frequency of maintenance for all proposed water quality devices.

All proposed devices shall comply with applicable local, state, and federal clean water requirements for TSS and TDS.

Stormwater Lift Stations

Occasionally a subdivision or storm drain extension may require a lift station to be able to drain the subdivision to a public storm drain system. The designer for such a lift station must design based upon a flow rate for current and future demands. In addition, impacts on downstream channels and conduits must be taken into account. The cost for required modifications or upgrades to any downstream conveyance shall be borne by the development generating the increased flows. Public lift stations must be approved by SLCPU. Work with SLCPU engineers on equipment selection and additional design criteria.

Storm drain lift station site selection is dependent on a number of factors, including: topography, access, availability of power supply, floodplain, site drainage, land use, aesthetic and odor concerns, overflow potential and impact to the environment. The design professional should carefully consider all necessary aspects prior to selecting a site for a storm drain lift station.

Pressurized Stormwater Mains

From time to time, it becomes necessary to install a pressurized storm drain main to be able to discharge storm runoff from the site into the public storm sewer system. Note that a pressurized storm drain system is only allowed in private storm drain and may not be installed on public storm drain systems. For public storm drain applications, see 1102: Stormwater Lift Stations. In private applications, a pressurized main may be installed, but must connect into a private manhole or cleanout box and then gravity drain into a public system. A pressurized line may not connect directly to a public manhole, cleanout box, or inlet.

Special Areas of Concern

Riparian Corridors

Salt Lake City has adopted a Riparian Corridor Overlay (RCO) district to minimize erosion and stabilize stream banks, improve water quality, preserve fish and wildlife habitat, moderate stream temperatures, reduce potential for flood damage, as well as preserve the natural aesthetic value of streams and wetland areas of the City. This overlay district applies to the above-ground streams, stream corridors and associated wetlands along City Creek, Red Butte Creek, Emigration Creek, Parleys Creek, and Jordan River.

The RCO applies to land that is within 100' from the annual high water level (AWHL) of an open channel creek or river. Canals and irrigation ditches are not part of the RCO.

Generally, the maintenance and replacement of existing structures and improvements within these zones are allowed.

See SLC Ordinance 21A.34.30. Use or development within the RCO district must be reviewed and approved by SLCPU. The Riparian Permit is a no fee permit. Contact SLCPU for additional information. Other permits may also be required by federal, state, and SL County jurisdictions.

Easements

When it is determined that an easement is required for the construction, repair or maintenance of any element of the proposed project construction, a legal easement agreement is required between the property owners or representative and Salt Lake City Corporation. Easement agreement procedures may be defined by contacting the property manager for SLCPU.

In some circumstances, it may be necessary to record a "Private Drainage Easement" between two property owners. In this situation you would have drainage from one property that must pass through another property before reaching a public conveyance system. Prior to discharging storm runoff onto the neighboring parcel, the owner shall obtain an easement from the neighboring parcel for the discharge and conveyance of storm water across private property. The easement must be sized such that all the private storm water would be contained in the easement.



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Blanket drainage easement, or easements that have been proposed over entire parcels, are strongly discouraged if they are not absolutely necessary. Easements must be defined legally by either a meets and bounds description or a legal description based upon a bearing and length of a known pipe.

City-Wide Easements Requirements

Public storm drain mains should be placed in public rights-of-way to service upstream properties. In unusual cases where storm drain lines are outside the public rights-of-way recorded easements will be required. Easements to SLCPU are required for public storm drain mains in private streets or across private property. Easements for public storm drain mains are to be exclusive and granted to SLCPU, the minimum width is 30'. All legal descriptions are prepared by applicant and will be required to be submitted to SLCPU for review and approval in a WORD format. All easement documents deeding the easement to SLCPU will be prepared by SLCPU in a form approved by the SLC Attorney's office. Pipelines are generally required to be placed in the center of the easement; however, on a case by case basis deviation from this standard can be addressed. At all times a horizontal minimum of 10' is required between the storm drain line and the edge of the easement. The easement shall be accessible from public rights-of-way and will free of obstructions (including trees), no fencing or permanent structures will be allowed within the easement area. The easement area will allow unrestricted 24 hour / day, 365 days per year access for all purposes related to the ownership, operation, maintenance, alteration, repair, inspection and replacement of the water main. In situations where encroachment into the easement with improvements cannot be avoided a shared utility agreement is required from the property owner.

Storm drain line easements, outside of paved areas, shall have a 10' wide hardened path with a cross-sectional slope not greater than 10% and a longitudinal slope greater than 20%. The hardened path shall consist of gravel or road base to a depth of 1' from the existing or design surface, or as approved by SLCPU. Any re-vegetation within the easement will consist of plant material acceptable to the SLCPU. Trees may not be located within the easement without specific approval from SLCPU.

If private storm drain facilities must cross property lines SLCPU will require a copy of an County recorded easement between the property owners for the service lines, prior to final approval.

Easement Abandonment Requirements

When an applicant believes a water line easement or portion thereof, is no longer required by the city, an abandonment for the water main and the easement may be requested through SLCPU. The developer must provide:

- 1 A detailed map highlighting the easement to be abandoned
- 2 Locations of existing water lines shown in reference to the easement
- 3 Legal description of area to be abandoned

Compensation to SLCPU for the asset (pipe) and the easement property value will be required from the applicant per Salt Lake City Ordinance.

Drainage approval from other governing authorities

In the event that proposed construction projects shall direct surface and / or storm water runoff to properties or facilities owned and maintained by agents other than Salt Lake City Corporation, written proof or permission or approval from these agents must be provided prior to acceptance of drainage concepts and subsequent issuance of City drainage approval.

Construction Dewatering

Based upon the situation, it may become necessary for a project to use construction dewatering to be able to construct improvements. Construction dewatering is the discharge of clean subsurface water from construction sites to the curb or public storm drain.

Any need for construction dewatering requires the approval from SLCPU prior to release from the property. As is with other forms of discharge, the water that is released to the curb and gutter, or the storm drain must be tested for contaminants to ensure they are free from groundwater pollutants that would violate the City's individual storm water permit with the State. In addition to water quality tests, the quantity of the water must be known to be able to enter into an agreement with the City to

discharge to public facilities. With tests, showing clean water and the estimated quantity of water, legal agreements can then be made to allow for temporary dewatering of construction sites.

Note that permanent groundwater discharge to curb and gutter is not allowed. Permanent groundwater discharge requires connection to a public storm drain system.

Other Connections to Storm Drain

Note that various other types of connections to the storm drain system are limited in nature. Drains that are found in covered parking garages, drains around water features, ponds, and pools must all be directed to the sanitary sewer system and are not allowed in the storm drain system. Contact SLCPU for additional clarification, if needed, regarding what may connect to storm drain systems.

Storm Drain Extension

If a storm drain extension is needed then plan and profile drawings, designed by a Utah professional engineer, must be submitted for review and approval. A storm drain extension agreement, prepared by SLCPU, must be signed by the owner or developer. A performance bond or letter of credit is required for the cost of the project. The bond or letter of credit will be held through the warranty period as outlined in the agreement.

City Participation in Costs Associated With Up-Sizing Storm Drain

Developers are required to pay all of the costs associated with a new development, including extensions to existing storm drain or other improvements to the existing system if it is required. Occasionally, it may be desirable, to the city, to have a conveyance system up-sized beyond the capacity needed to accommodate a particular development. Often these needs are identified in the master plan, but there will also be occasions when up-sizing is warranted to accommodate future demands on the system. In these cases the developer will be required to design and construct the up-sized pipeline. "Betterment" language may be included in the "Public Storm Drain Line Extension Agreement" for reimbursement from SLCPU to the developer for the incremental cost above what would have been paid by the developer to do work necessary for the development. The city can only participate in the cost of over-sizing when there are sufficient funds in the



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Capital Improvement Budget (CIP). If sufficient funds do not exist, the oversized lines will be installed at the developer's cost. If funds are available the reimbursement amount will be the cost differential between the pipe size required for the project and the large pipe size chosen. Reimbursement may include increase in pipe material, excavation, backfill and compaction and other costs specifically related to the increased pipe size. There must be a written agreement for city participation prior to construction if developer is to re-coop portion of costs. Reimbursement will occur after the successful completion of the 12 month warranty period.

Maintenance of Dikes & Levees

Any dikes or levees, public or private, certified or uncertified, located in the City must be maintained in good condition. This includes following the Army Corps of Engineer standards that prohibits woody vegetation from growing on or within 15' of a levee or dike. The owner must also regularly inspect the flood structure for signs of stress, rodent or utility penetrations that may compromise the integrity of the structure. Dikes and levees are often important structures that protect life and property from flood damage and must be maintained in the highest standards.

FEMA Designated Floodzones & Special Flood Hazard Areas

Salt Lake City is a participant in the National Flood Insurance Program (NFIP) and as such is bound to comply with the minimum requirements set forth in Title 44 of the Code of Federal Regulations, Section 60 (44 CFR, Section 60). Many of these requirements have been codified on the local level in the Salt Lake City Municipal Code 18.68 Floodplain Hazard Protection.

For projects that proposed new construction or substantial improvement (more than 50% market value) to an existing structure must identify on the improvement plans the FEMA designated floodzone for the subject property, the official definition of the particular zone, the map reference, and the effective date. The following example would represent the type of note that would be needed on the plans:

In the past, there have been instances where the property owner and / or design team had assumed the project was not located in one of the FEMA designated Special Flood Hazard Areas (SFHA). The FEMA SFHAs are not always intuitive.

Failing to verify the floodzone designation could result in a costly re-design process to create improvement plans that comply with local and federal floodplain requirements.

Floodzone Definitions

FEMA has defined various floodzone definitions, not all of which are located in the maps printed for the Salt Lake Valley. The following are the definitions for applicable floodzones. For a full list of floodzone definitions, please contact FEMA or refer to 44 CFR, Section 59, or call SLCPU for more information.

Table 6: FEMA Floodzone Definitions

Floodzone	Definition
X Unshaded)	Area determined to not be impacted by the 0.2% annual chance flood event
X (Shaded)	1) Area impacted by the 0.2% annual chance flood event 2) Area of 1% annual chance flooding with average depths of less than 1' or with drainage areas less than 1 mi ² 3) Area protected by levees from 1% annual chance flood
A	Area subject to inundation by the 1% annual chance flood event where base flood elevations have not been determined
AE	Area subject to inundation by the 1% annual chance flood event where base flood elevations have been determined
AH	Area subject to inundation by the 1% annual chance flood event with flood depths of 1 to 3' (usually areas of ponding); base flood elevations determined

Special Flood Hazard Areas

Note that the "A" areas (A, AE, AH) are determined to be Special Flood Hazard Areas (SFHA) as determined by FEMA. These areas are subject to specific design criteria to be able to construct in these areas. Federal and local law requires that properties build the lowest habitable floor elevation, along with all associated mechanical equipment, above the base flood elevation.

Floodproofing

Floodproofing of non-residential buildings may be allowed within a SFHA. The engineer should consult and refer to FEMA Technical Bulletin 3-93 for applicability and design constraints regarding floodproofing.

Definitions

Best Management Practices (BMP): Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Green Infrastructure (GI): Items or devices installed or constructed as part of a construction activity that uses the natural characteristics of the earth to perform a desired function (e.g. bio-swales, filter strips, small wetlands, infiltration basins, bio-retention, green roof, etc.).

Sensitive Areas: Sites that have a significant impact on waterways (e.g. located near streams, wetlands, etc.) or other natural or geological structures (e.g. slope, rock and boulder substrate, etc.) that require additional efforts to control runoff regardless of the size of the project.

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U.S. Department of the Interior, Bureau of Reclamation, 1989, Flood Hydrology Manual.

U.S. Department of the Interior, Geological Survey, March 1982. Interagency Advisory Committee on Water Data, Office of Water Data Coordination, Hydrology

Subcommittee, Bulletin No. 17B.

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WRC Engineering, Inc., October 1990. Hydrologic Criteria and Drainage Design Manual, Clark County Regional Flood Control District, Las Vegas, Nevada.

2.2.4 Wastewater

Ordinance Requirements

Developers must install, at their expense, all improvements necessary to provide wastewater service to their development. This includes any new sanitary sewer lines, replacement of existing sewer lines for additional capacity, lift stations, or other facilities. Extension agreements and bonds may be required.

Developers must adhere to the city's requirements for extension of the city's wastewater system to re-developed or newly developed areas inside the city's service area.

(More Information on "Land Development" to be added in later version)

A civil engineer registered in the State of Utah is required to analyze the wastewater generation from a proposed development and determine its impact on the city's wastewater collection system.

Due Diligence Required of Developer

Developers must comply with the 2010 SLC Wastewater Master Plan.

Developers and property owners need to identify the need for any sewer extensions or collection pipe upgrades to accommodate the new flows generated by development. SLCPU can assist with estimating the existing base flow data. The design capacity of a sewer pipe is considered to be the flow at a depth / diameter of 75%.

(PU Graphic SS Q to be added in later version)

For preliminary design use the "Contribution of Indoor Water Demands" from the SLC Master Plan for expected sewer flows based on land use.

See Table 2.1-1

The US Environmental Protection Agency (EPA) requires the city to develop and implement a program to control discharges that might harm the Publicly Owned Treatment Works (POTW). The program establishes local discharge limits for non-residential users and provides a permitting process based on the users' discharges and types of businesses.

Table 2.1-1: Contribution of Indoor Waste Demands

Component	Demand Contribution
Population (Permanent Residents)	76.0 gpcd
Employment Population	33.4 gpcd
Industrial Development	784 gpd / acre

(SLC Ordinance 17.32.070530, 17.36,17.52,17.64, 17.68,17.69, and 17.78)

Local Limits section of this chapter

Sewer line extension required when: A property being developed is within 300' of a public sewer main (SLC Ordinance 17.36.130).

Approval of new on-site treatment (septic systems) is extremely rare. Such devices are not allowed in environmentally sensitive areas such as primary and secondary recharge areas for drinking water aquifers, within 100' of a drinking water well, within 250 day, 3 year or 15 year well recharge zones (also known as SLVHD Zones 1 -4), watersheds draining to a water treatment plant, etc. (SLC Ordinance 17.36.140).

Approval of on-site treatment devices must be approved by SLVHD.

More Information: Recharge Map

General Information

Sewer Capacity Issues

Sewer capacity issues must be identified and addressed prior to building permit approval. Public sewer extensions are to be designed by the developer's engineer and approved by SLCPU.

Prior to issuance of permits, a bond for the cost of construction or an engineer's estimate is required and the owner must enter into a "Public Sewer Main Extension Agreement". The bond during the warranty period which is generally 12 months after substantial completion. The substantial completion date is determined by a SLCPU inspector.

Service Area

SLC cannot provide sanitary sewer service outside of SLC corporate boundaries without written approval that requires agreement with neighboring sewer districts. Properties outside of corporate limits desiring connection to the SLC sewer system must annex into the city.

More Information: Service Area Map

Reimbursement

Costs associated with up-sizing pipeline

Developers are required to pay all costs associated with a new development, including improvements to the existing sewer system if it is required. Occasionally, it may be desirable to the city to have a pipeline up-sized beyond the capacity needed to accommodate a particular development.

Often these needs are identified in the master plan, but there will also be occasions when up-sizing is warranted to accommodate future demands on the system. In these cases, the developer will be required to design and construct the up-sized pipeline. Language may be included in the "Public Sewer Main Extension Agreement" for reimbursement from SLCPU to the developer for the incremental cost above what would have been paid by the developer to do work necessary for the development.

The city can only participate in the cost of over-sizing when there are sufficient funds in the Capital Improvement Budget. If sufficient funds do not exist, the oversized lines will be installed



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at the developer's cost. If funds are available the reimbursement amount will be the cost differential between the pipe size required for the project and the large pipe size chosen.

Reimbursement may include increase in pipe material, excavation, backfill and compaction and other costs specifically related to the increased pipe size. There must be a written agreement for city participation prior to construction if developer is to recoup a portion of the costs. Reimbursement will occur after the successful completion of the 12 month warranty period.

Future Line Extensions

Developers may request a line extension reimbursement agreement when they construct lines across frontages of parcels not currently receiving sewer service from the city. Line extension reimbursement agreements are set up through the SLCPU.

More Information: SLCPU Contracts office, 801-483-6727

The agreement is effective for 15 years. Reimbursement is collected from properties requesting connection to the main extended under the reimbursement agreement. Reimbursement is based on the connecting lot's front footage to the Right of Way multiplied by half of the linear footage cost of the pipeline, accounting for both sides of a street. Future developers extending the line are not required to provide reimbursement.

Public Sewer Main Extension

Developers may request a main extension reimbursement agreement when they construct sewer mains across frontages of parcels not currently connected to the city's sewage collection system. Sewer extension reimbursement agreements are set up through the SLCPU.

More Information: SLCPU Contracts office, 801-483-6727

The agreement is effective for 15 years. Reimbursement is collected from properties requesting connection to the sewer extended under the reimbursement agreement. Reimbursement is based on the connecting lot's front footage.

(Table of Sewer Applications, Permits & Agreements to be added in later version)

Extension Agreements

Extension agreements sewer main extension agreements will be necessary for public main replacement or extensions. A performance bond, or letter of credit, will be required for the approved cost estimate for the work. This bond will be held through the warranty period as outlined in the agreement.

Pretreatment - Industrial User Permitting

General Pretreatment Program Information

SLCPU administers the Pretreatment Program which regulates all Significant Industrial Users (SIUs) and Categorical Users that are connected to the Salt Lake City Wastewater Collection System. This program, mandated by the federal government and authorized by the state of Utah, was implemented in 20xx and is managed by SLCPU.

SIUs, in accordance with the Code of Federal Regulations 40 CFR 403.3, are defined as:

- 1 Any industrial users that are subject to Categorical Pretreatment Standards
- 2 Any other user that has any 1 or more of the following characteristics:
 - a Has an average discharge flow of equal to or greater than 25,000 gal per day of process wastewater to the Wastewater Treatment Plan (WWTP)
 - b Contributes a process waste stream which is 5% or more of the average dry weather hydraulic or organic capacity of the WWTP
 - c Has a reasonable potential to adversely affect the WWTP operations,
 - d Violates any pretreatment standard or requirement (in accordance with 40 CFR 403.8 (f)(6))

The pretreatment program consists of the permitting, inspecting, monitoring, and sampling of all applicable industries and businesses to ensure compliance with the applicable local, state, and federal requirements.

The Pretreatment Program is in place to control any pollutants originating from the industrial users that are connected to the Salt Lake City Collection System and encompasses industries and businesses located in Salt Lake City.

The objectives of the Pretreatment Program include:

- 1 To protect water and biosolids quality, the Salt Lake City Reclamation Systems, the Salt Lake City Collection System, and the operations and maintenance staff of the Salt Lake City.
- 2 The promotion and implementation of pollution prevention initiatives and best management practices with local industries.

Industrial Users Wastewater Discharge Permit Applications

Industrial users are required to complete a Business Information Form to determine the business type, use, and waste discharge potential. If a business is identified as a potential Categorical or Significant Industrial User by NAICS code or after review of the Business Information Form, completion of a Wastewater Discharge Permit Application will be required.

Completion of the Wastewater Discharge Permit Application does not imply that the Industrial User will be permitted, but that more detailed information is required to make the final determination that a permit is or is not required. If a permit is to be issued, an inspection of the Industrial User's facility will be conducted.

Applications: Business Information Form and Wastewater Discharge Application

Fat, Oil & Grease (FOG)

Fat, oil and grease (FOG) are a major cause of preventable sanitary sewer blockages and overflows that can cause health hazards, damage homes and businesses and threaten the environment. Fat, oil and grease also contribute to damage and corrosion to the Salt Lake City collection system.

Program overview

Establishments that contribute FOG include all restaurants, fast food, caterers, bakeries, donut shops, commercial kitchens, and any other businesses that do commercial cooking or food preparation.

SLCPU Pretreatment Program regulates, inspects and reviews all FOG establishments within Salt Lake city. The FOG program is one of the elements of the Sanitary Sewer Master plan and regulated by the National Pollution Discharge Elimination System (NPDES) with administration by the State of Utah.



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Businesses having the potential to release fats, oils or greases (FOG) into the publicly owned treatment works (POTW) are required to install appropriate pretreatment Best Management Practices (BMPs). Generally businesses classified as food service establishments (NAICS codes starting with 311 or 722), and other businesses handling fats, oils, greases or waxes, will be required to install grease interceptors. (Ordinance 17.36.100)

SLCPU Pretreatment, 801-799-4004

BSCE, 801-535-6000

Grease Removal Devices

All food service and production establishments that discharge wastewater into the City collection system are required to have a City-approved and properly sized grease removal device.

Both “grease traps” or “grease interceptors” are primary grease removal devices that are designed and work and work in the same way, by separating and retaining free-floating FOG. The difference between the 2 types of grease removal devices is basically the size and physical location of the unit. Grease interceptors are larger units (with a capacity of 800 gal and larger) that are typically located in ground and outside of the building. These outside devices are also known as Gravity Grease Interceptors (GGI). Grease traps are much smaller units, typically located inside the kitchen directly under the sink. These are also referred to as Hydromechanical Grease Interceptors (HGI).

Grease removal devices are installed and maintained by the owner and made accessible to the city. Each business, restaurant or establishment shall discharge to a separate device. Each device shall be shown to scale on civil site plans. The civil engineer shall coordinate with the mechanical engineer to assure proper design and compliance with the city adopted version of the International Plumbing Code (IPC).

Any sink, fixture, or related equipment that is used for food preparation, cooking, and clean-up or has the potential to discharge fats, oils, and grease shall be connected to the grease removal system. Typical fixtures include but are not limited to scullery sinks, pots and pan sinks, pre-rinse sink stations, soup kettles, wok stove drain,

and chicken rotisserie drains. Vegetable prep sinks, floor drains in kitchen areas, mat wash areas, and mop sinks may be required to be connected to a grease removal device at the discretion of SLCPU.

Location

Location of grease interceptors must be approved by SLCPU. The application must include a proposed site plan showing the proposed location of the grease removal device. Interceptors are to be located on private property and not in the public right-of-way. In no instance, shall toilets, urinals, hand sinks, condensate waste lines, or other similar fixtures be connected to a grease removal device.

Sizing

In all cases of redevelopment and new construction, SLCPU staff will review and approve the type and sizing of any proposed grease removal devices during the plan review and approval process, before a plumbing or SLCPU permit will be issued. An approved grease removal device complying with this policy shall be properly sized and installed. The attached spreadsheets shall be used to determine the size of the grease removal device.

(Sample sizing spreadsheets to be added in later version)

Grease Interceptor or Gravity Grease Interceptor (GGI)

In Salt Lake City, GGI's are generally 800 gal or larger. External Grease Interceptors use gravity and detention time to remove the FOG out of the waste stream entering the POTW. Typical maintenance schedules are 30 - 90 days. Dishwashers or water in excess of 140° F must pass through a GGI no less than 1,000 gal.

Kitchen garbage grinders should be avoided, but if installed must be routed through the interceptor.

An assessable sampling point downstream of the device is required.

(800 gal grease interceptor plan to be added in later version)

Grease Trap (“Under the Sink”) or Hydromechanical Grease Interceptor (HGI)

An HGI is generally 100 gal or smaller and is located indoors. An HGI uses hydraulic principles to remove FOG from the waste stream including a vented flow control device. Proper sizing and application is critical. Extra care must be taken to operate HGI's properly. Hot water and chemicals can disrupt the operation and put the facility out of compliance.

HGI's typically require maintenance on a weekly or monthly basis. Permits allowing HGI's are rare and are considered on a case by case basis where property related hardships or other compelling reasons exists not allowing the installation of a grease interceptor. Extra engineering is required for HGI's to ensure proper device selection for the application. Kitchens with food grinders, dishwashers, or water hotter than 140 deg Fahrenheit are not allowed to have HGI's.

(Sample Grease Trap plans to be added in later version)

Cleaning & Inspection

Inspect and clean all waste removal devices (grease trap or grease interceptor) often enough to keep them functioning properly and efficiently. Grease removal devices must be inspected and cleaned every 3 months. A grease trap with 3” or more of grease and / or solids is a violation. Cleaning logs must be kept up to date and readily available for inspection by City Staff.

(Sample Grease Trap Cleaning Log to be added in later version)

Sand Oil Separators

Floor drains from laundries, car washes, auto maintenance shops, garages, machine shop, or warehouse facility must be connected to the sanitary sewer system through an appropriate sand / oil separator.

Biological Pretreatment Used in Interceptors

Enzymes, solvents, emulsifiers and other treatments, intended to supplement or replace regular grease interceptor maintenance, are prohibited without prior written authorization from the City. The concern with these additives / treatments is that they can harm or interfere with the POTW's biological processes or they can cause/contribute to pass-through of fats, oils and grease (FOG) out of the grease interceptor or trap, which gets deposited in the downstream collection system. It is the responsibility of the user and supplier of these products to demonstrate, to the City's satisfaction, that they pose no harm to the collection system or POTW. Authorization of the use of a grease interceptor additive / treatment does not relieve the user of meeting all City FOG standards. Fines for noncompliance with the City's FOG standards will be imposed on businesses using these treatments if tests show the facility is out of compliance with these standards.



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Other Pretreatment Devices

Other manufacturing and industrial activities may require additional pretreatment devices to ensure that discharges are in compliance with applicable regulations. Devices for buffering temperature, pH, and other sewage characteristics are to be discussed with SLCPU. Industrial Waste Discharge Permits may be required.

Local Limit Characteristics

No user of the Salt Lake City public sewer system shall contribute waste water into the system which would interfere with or cause damage to the collection system or the sewage treatment facility. Industrial users in particular should be aware of National Categorical Standards as well as State, Health Department, and local requirements. Local rules exclude wastes with characteristic listed below:

- 1 A pH less than 6.0 or greater than 10.5
- 2 Temperature generally greater than 120° Fahrenheit
- 3 Explosives
- 4 Solid or viscous substances which may cause obstruction to the flow
- 5 Toxic pollutants that may constitute a hazard to humans or animals
- 6 High concentrations of fats, oils and greases
- 7 Substances that have a high oxygen demand
- 8 Materials that are untreatable or interfere with the reclamation process.

(SLC Ordinance 17.36.080 and 090)

More Information: SLCPU Reclamation, 801-799-4000

Billing Adjustments

The City has a 3-part formula for calculating monthly sewer bills. Rates are based on total flow, total suspended solids (TSS), and biological oxygen demand (BOD). Certain types of businesses have sewer strength rates higher than typical domestic waste.

For example, restaurants and food production facilities typically have higher concentrations of fats, oil, and greases, and therefore will have a higher billing rate. Business owners may want to

carefully consider various forms of pretreatment, not only to avoid being out of compliance with discharge limits, but also to potentially reduce surcharges for sewage strength.

In rare cases where significant water is consumed in an industrial process, sewer metering may be allowed to help establish a more accurate sewer flow that may be used to establish the flow based part of the monthly sewer bill. The property owner will be responsible to install a sewer flow meter and all expenses associated with sewer flow monitoring. Owner must petition, in writing, the SLCPU for alternative sewer billing consideration. (SLC Ordinance 17.72.030)

Wastewater Facilities

Design Policy

All waste water facilities, including pipes, manholes, lift stations, laterals, etc., must be designed and stamped by a Utah licensed professional engineer.

Septic Systems / On-Site Treatment Facilities

Septic Systems and On-site Treatment Facilities not allowed within 300' of public sewer. Properties within 300' may be required to extend public sewer to the property. Public extensions are required to be extended full length of the frontage on right of way unless it can be demonstrated that no other properties would benefit in the future, then extension is required to only to half way into property. Salt Lake Valley Health Department has jurisdiction over the approval and replacement of on-site treatment devices.

Wastewater Lift Stations

Occasionally a subdivision or sewer main extension may require a lift station, particularly if the sewer main is approaching 4' of cover or less.

Design Flow Rate for Current & Future Demands

Use sewer master plan for anticipated design flows. Impacts on downstream lift stations must also be taken into account. The cost for required modifications or upgrades to any downstream lift stations shall be borne by the development generating the increased flows. Public lift stations must be approved by SLCPU. Design shall include a minimum of 3 pumps, with any 2 of the pumps taking the design load. The wet well must be designed with detention time in mind. A back up power source is required and

a generator connection point. Lift station must have telemetry and a water service connection. Work with SLCPU engineers on equipment selection and additional design criteria.

Site Selection for Lift Station

Waste water lift station site selection is dependent on a number of factors, including: topography, access, availability of power supply, flood plain, site drainage, land use, aesthetic and odor concerns, overflow potential and impact to the environment.

Bypass Pumping

Wastewater lift stations shall have additional pipe, valves, fittings and couplings as necessary to permit bypassing of the lift station including the wet well and pumps. The provisions shall include the approach manhole, a valve on the gravity inlet line to the wet well to shut off flow to the wet well, and bypass piping including an isolation valve, check valve and quick connect fitting enabling the temporary connection to the downstream sewer pipe.

Backwater Valves

A backwater valve shall be provided on service connections to major sewer lines, at manholes where there is potential for the migration of sewer gas into the service line, and at locations where the finish floor is not 12" higher than the upstream manhole. Backwater valves shall be located on private property and shall be accessible for maintenance by the property owner.

If lowest plumbing fixture is above the nearest upstream manhole, backwater valves are discouraged, as they may cause cleaning and maintenance problems for the property owner in the future.

(Graphics from "PU Graphic SS Backwater Valve.pdf" & "PU Graphic No Backwater Valve.pdf" to be added in later version)

Collection System

Minimum public sewer size is 8"

Design Policies

Subdivision, PUD & Easement Requirements (Note)

If a building is condo minimized or a lot is split creating multiple owners, it may be required to provide separate sewer connections so that each owner has an exclusive connection. All fees associated



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with the new services must be paid before a permit is issued. If it is necessary to cross property lines, approval is needed from SLCPU and easements must be recorded against effected properties.

Individual Building Services

No consumer shall be permitted to conduct sewer pipes across lots or buildings to adjoining premises, and each house abutting on a city sewer main must be supplied through its own separate service lateral. Exceptions are rare and must be approved by the SLCPU Director. Easements would be required. (SLC Ordinance 17.48.030)

Requirements for Working on Sewer

Permit Required

No alteration, addition or disconnection in or about any sewer shall be made by any owner, contractor, or plumber without written permission to do such work by SLCPU. All appropriate fees must be paid to SLCPU prior to the issuance of a building permit.

Properly Licensed Contractor

All work on sanitary sewer laterals must be done by a properly licensed and bonded contractor. Home and business owners are not allowed by state law to work on sewer piping systems.

Application for permits for sewer connections must be made in writing by a licensed and bonded contractor or plumber. Permits are good for 60 days.

It is unlawful for any person, other than an authorized employee of SLCPU to open any sewer manhole. (Ordinance 17.36.170)

Make arrangements for SLCPU staff to open manhole lids: SLCPU, 801-483-6727

Location of Private Sewers in PUD

Sewers in Planned Unit Developments (PUD) should be located under drive areas, and provided with an easement where permanent 20' minimum access for maintenance purposes is maintained. Deeper sewers may require wider easements. In developments where other dry utilities or water lines are to occupy the same driveway SLCPU may require a greater width public easement.

Easements for public sewer mains are generally exclusively for sewer pipes. If other utilities are to run parallel or there are structural encroachments into the easement, a shared utility easement agreement issued by SLCPU, is required.

Waste Water Easement Requirements

Public waste water mains should be placed in public rights-of-way to service abutting properties. In unusual cases where sewer lines are outside the public rights-of-way, recorded easements will be required. Easements to SLCPU are required for sewer mains in private streets or across private property. Easements for public sewer mains are to be exclusive and granted to SLCPU, the minimum width is 30'. All legal descriptions are prepared by applicant and will be required to be submitted to SLCPU for review and approval in a WORD format. All easement documents deeding the easement to SLCPU will be prepared by SLCPU in a form approved by the SLC Attorney's office. Pipelines are generally required to be placed in the center of the easement, however, on a case by case basis deviation from this standard can be addressed. At all times a horizontal minimum of 10' is required between the water line and the edge of the easement. The easement shall be accessible from public rights-of-way and will free of obstructions (including trees), no fencing or permanent structures will be allowed within the easement area. The easement area will allow the City completely unrestricted access for all purposes related to the ownership, operation, maintenance, alteration, repair, inspection and replacement of the sewer main. In situations where encroachment into the easement with improvements cannot be avoided, a shared utility agreement is required from the property owner.

Sewer line easements, outside of paved areas, shall have a 10' wide hardened path with a cross-sectional slope not greater than 10% and a longitudinal slope greater than 20%. The hardened path shall consist of gravel or road base to a depth of 1' from the existing or design surface, or as approved by SLCPU. Any re-vegetation within the easement will comply with the SLC Landscape Manual. Trees may not be located within the easement without specific approval from SLCPU.

More Information: SLC Landscape Manual

If private sewer facilities must cross property lines SLCPU will require a copy of an County recorded easement between the property owners for the service lines, prior to final approval.

Easement Abandonment Requirements

When an applicant believes a sewer pipeline easement or portion thereof, is no longer required by the city, an abandonment for the sewer main and the easement may be requested through SLCPU. The developer must provide 1) a detailed map highlighting the easement to be abandoned 2) locations of existing sewer lines shown in reference to the easement and; 3) legal description of area to be abandoned.

Compensation to SLCPU for the asset (pipe) and the easement property value will be required from the applicant per City Ordinance.

More Information: Salt Lake City Fee Schedule

Performance Bonds & Letters of Credit

SLCPU-required performance bonds or letters of credit for sewer main extensions are held for the warranty period as written in the extension agreement, generally 12 months after the date of substantial completion.

Substantial completion is defined as the date in which the work or project is sufficiently complete, in accordance with the construction and contract agreements, so that the system may be put into service.

All significant punch list items will have been resolved. Some items may remain, such as waiting for weather conducive to laying hot mix asphalt. Utility bonds require that 100% of the bond, or letter of credit, amount be held for the entire length of the warranty period. At the end of the warranty period, if the work is found to be satisfactory, the bond or letter of credit is released.

If a project required multiple bonds, such as for utility work and new road construction, the bonds may be rolled into 1 subdivision bond issued by SLC Engineering. If the utility bond becomes part of the subdivision bond rules for the subdivision bond will be used.

Additional Policies

Force mains are not allowed in Salt Lake City.



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Site Plan

A civil site plan is required showing the location of all existing and proposed sewer service connections. Sanitary sewer connections that are not needed are to be called out to be abandoned by filling with concrete at the property line.

Sewer Plan Requirements

For approval of public sewer main extensions or improvements, submit the following for city approval:

Scaled plan and profile drawings, prepared by a professional engineer in the State of Utah, showing existing and finished grades, alla, sewer, storm drain, gas, electrical, and other underground utilities or obstructions. Show all manholes, pipe types and sizes.

- Station sewer lines along the centerline of the street or the pipe.
- Identify sewer lateral locations to scale and station.

Materials

In selecting pipe material for sanitary sewer lines, give consideration to chemical characteristics of wastewater, especially industrial wastes. Also consider the corrosivity of the soil and other site conditions. Consider velocity; the possibility of septicity, hydrogen sulfide gas production; external and internal pipeline forces and preventing infiltration, abrasion and similar type problems.

Appropriate pipe materials for sanitary sewer mains includes, concrete, vitrified clay pipe (VCP), and PVC SDR 35. Submit in writing SLCPU any requests for consideration of alternative materials. Outside diameter of PVC pipe dimension shall be manufactured to cast iron pipe equivalent.

Joints

No glued joints are to be used outside of 3' of building except for grease interceptor.

Joints – PVC pipe shall have integral wall thickened bell ends designed for joint assembly using elastomeric-gasket seals. The minimum wall thickness of the integral wall-thickened bell, at any point between the ring groove and the pipe barrel, shall conform with the DR requirements for the pipe barrel. The minimum wall thickness in the ring-groove and bell entry sections shall equal or exceed the minimum wall thickness of the pipe barrel. The elastomeric-gasket seals shall conform to ASTM F477. The pipe

shall have a pipe stop indicated on the barrel that will accurately position the pipe end within the joint. The pipe in place shall permit thermal expansion and contraction of the pipe ends.

Clearances

Water Well Clearance – No sanitary sewer interceptor, trunk line, lateral, or service shall be placed nearer than 100' to any water well, public or private, unless the well has been abandoned in full accord with the State Engineer's office.

Laterals / Service Lines

The engineer will make every effort to use existing sanitary sewer lines that have been stubbed out to a property by previous construction.

Additional information: Standard Practices #11

Where the use of stubbed out lines are not feasible, the existing line will be abandoned by plugging with concrete at the property line.

("PU Graphic SS Abandoning Lateral.pdf" to be added in later version)

Inspection by SLCPU is required.

Acceptable materials are:

- 1 Vitrified clay (tile)
- 2 Concrete over 4" diameter
- 3 Minimum SDR 35 PVC
- 4 Cast iron
- 5 Cement lined ductile iron

Pipe alignment of the building sewer must be approved by SLCPU. 4" and 6" sewer connections (sewer laterals) are not allowed in manholes. Wyes will be installed by SLCPU crews. A properly licensed contractor with the proper permits excavates to the sewer main and calls SLCPU, at least 24 hours in advance, for wye installation. The contractor connects to "wye" and lays lateral.

A cleanout "wye" must be located between the building and the sewer line. Additional cleanouts shall be at changes in direction. Cleanouts are to be located to avoid driveways, sidewalks, detention basins, etc. If cleanouts must be located in pavement or driveways

they are to be ductile iron. Cleanouts on property may be PVC. No waste or soil shall enter cleanout pipes. A test tee shall be required at or near the property line or wye as required by inspector.

In cases where slope and cover cannot be provided to allow for gravity flow to the sewer, contact SLCPU to discuss the use of a sewage pump. Generally, only plumbing fixtures without the ability to provide gravity flow are allowed to discharge through the pump.

In cases where an entire building must be on a pumped sewage system, wet wells, designed for detention time, redundant pumps and power sources may be required. Contact BSCE for applicable IPC rules.

Add graphic "PU Graphic SS Ejector Pump.pdf"

System Layout

Generally, sanitary sewer lines must be constructed along a street grid near to the centerline of the ROW. Public sanitary sewer lines within commercial, industrial or multi-family developments must be located within drive aisles a minimum of 6' from any structure. Outside of tire path. Public sanitary sewer lines will be located within tracts and / or public utility easements. No private utilities are allowed longitudinally within a dedicated wet utility easement or row.

Sanitary sewer manholes, in PUD's are to be located at the approximate center of the drive lane.

Separation from Other Utilities

Sanitary sewer lines must maintain a minimum of 6' horizontal clearance to dry utilities.

No other utility shall share a trench with a sewer service, a 6' horizontal separation is required between a sewer lateral and another utility. The clear horizontal clearance is measured from the outside of the cable conduit to the outside of the sewer pipe. For perpendicular crossings the vertical clearance requirement is 18" above the sewer lateral or 12" below.

Separation of Water and Sanitary Sewer lines

A water line must have a 10' minimum horizontal separation (except within 3' of a building). If a water and sewer service must cross, the crossing is to be as nearly perpendicular as reasonable, with the sewer being at least 18" below the water service.



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Sanitary sewer must have a 10' minimum horizontal separation from a water main or service line (except within 3' of a building). If a water and sewer service must cross, the crossing is to be as nearly perpendicular as reasonable, with the sewer being at least 18" below the water service. In cases where these clearances cannot be met SLCPU engineering staff is available to help find a resolution.

("PU Graphic W SS Separation.pdf" to be added in later version)

Separation from Structures Sewer lines are to be a minimum of 6' from structures. Deeper sewers may require additional horizontal separation.

Placement of trees and hardscaping over sewer pipe are discouraged. Work with SLCPU reviewers for guidelines.

Hydraulic Design

Any deviation from these minimum slopes will require a justification with calculations from a licensed engineer showing that a 2 ft / s (fps) velocity can be maintained even in a low flow condition. Minimum manning's "n" value is .012. Or generally accepted value based on pipe type and condition.

Keep design velocities below 12 ft / s (fps), or provide mitigation for odor, wear, and separation of flow.

Vertical pipe deflection through a manhole cannot exceed 5%.

Manhole Requirements

If the horizontal direction, slope, material or size of the sanitary sewer line changes, a manhole must be constructed. The horizontal angle formed between the 2 lines cannot be less than 90°. In sanitary sewer lines that are 22" or larger, angles formed must be between 120° and 150° to the downstream pipe for odor control purposes.

Manholes in city streets should be located near the center of the inside traffic lane, rather than on or near the line separating traffic lanes. Manholes should not be located in bike trails, equestrian trails, sidewalks, crosswalks or wash crossings. Manholes are required at all pipe intersections, changes of grade, pipe size, pipe material or alignment and at distances not to exceed 350'.

Manhole Base

Manhole bases are to be cast in place. The flow channel through the manhole should be steel trowel finished to conform in shape and slope to that of the sanitary sewer pipe. The manhole shelf

should be brush or broom finished, while maintaining the slope of the pipe through the manhole. The manhole bottom should be clean and smooth to prevent solids depositions and channeled to ensure satisfactory flow to the lower invert. The shelf is to be at least 3" above top of pipe. Intersecting flows are to be channeled so as to direct the flow to the downstream pipe.

(Graphic to be added in later version)

Manhole Sections & Cones

Concentric only, 5' diameter, no steps.

Drop Manholes

Generally not allowed

Manholes in Drainages & Flood Prone Areas

Manholes must be protected from storm drainage and flooding conditions. MH lids not to be in gutter or drainage channels. Manholes should be located as to prevent the inflow of storm water into the sanitary sewer. The top of manhole rim shall be set a minimum of 6" above the surrounding finished grade when the manhole is not in a paved roadway. Sealed lids are required on all newly constructed manholes within the 100 year flood plain manholes must be water tight. The elevation of the top of rim of a sanitary sewer manhole is not to be below the 100 year base flood elevation for the area it is being built in.

Service Connections

Service to Individual Buildings:

No consumer shall be permitted to conduct sewer pipes across lots or buildings to adjoining premises, and each house abutting on a city sewer main must be supplied through its own separate service lateral. (SLC Ordinance 17.48.030)

Petition for Large Connections

Sewer laterals are generally limited to 4" and 6" diameter pipes. Some larger developments may require larger diameter laterals. A petition, by the property owner or a professional engineer, is required for review by SLCPU. The petition must show need, such as based on peak flows, for the petition for a larger lateral to be granted. A review of existing sewer line capacity will likely also be required. If granted these larger diameter laterals will be private and the property owner will have responsibility for the maintenance, operation and

repair of these lines. Lateral connections 8" and larger will require connection to a manhole on the public sewer main. The base of the manhole will have to be re-configured to accommodate the new flow.

Other Design Considerations

Do not change pipe material between manholes.

Where standard strength pipe is not structurally sufficient due to external loading, or 4' of pipe cover cannot be maintained, submit a written request with supporting calculations to SLCPU for permission to use extra-strength pipe, special bedding specifications, or alternative construction methods. The SLCPU must accept the request in writing prior to Plan Review approval of the final plans. Ensure that all types of pipe material used in design have established ASTM, ANSI, AWWA or NSF standards of manufacture or seals of approval, and are designated for use with wastewater.

Reviews & Approvals

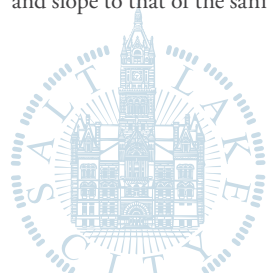
All plans for sewer main extensions and connections must be submitted and approved by SLCPU. If plan revisions are required plans must be re-drafted and stamped. "Penciled in" changes are not allowed on plans for approval. Fees and connection charges will be calculated and assessed upon approval of plans. After all associated fees are paid and agreements (if any) are signed permits will be issued for the work to begin. If changes are required during the process of construction revised engineered drawings may be required. Simple incidental field changes may not require re-engineering. The SLCPU inspector makes the determination if a change requires re-engineering.

Construction Standards

Pipe Bedding

Use stabilization as necessary, particularly when excavation is below ground water elevation. Stabilization material is to start 6" below pipe. Use 2" minus material, per APWA 02060. Note that stabilization material is to be free of slag and recycled asphalt. In all cases, ample bell holes shall be dug to insure that the bells are completely free and do not carry any load.

See Utah APWA Standard 382 and modifications shown in SLCPU Standard Practice #1



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Trench Safety

Safety for all trench excavation and restoration is the responsibility of the person making the excavation and the property owner. Barricades and covers must adequately protect the public from hazards. Work in the public right of way that blocks pedestrian or vehicular use must obtain the appropriate permits from SLC transportation and Engineering divisions.

Connection Permit Required

No connection to the sanitary sewer system shall be allowed to any building or lot until an application for sewer shall be made in writing, signed by the owner, in which application the owner agree to pay for all connection and service fees. Before commencing construction, the contractor or developer must have a permit from SLCPU for sewer service.

Rough Plumbing First

Do rough inside plumbing prior to laying sewer lateral. No building lateral inspection, or acceptance, will be done until the inside rough plumbing has been accepted by building and housing services (Ordinance 17.48.200)

Construction & System Operations

Inspection

The inspection of sewer lines between the sewer main and within 3' of the building foundation shall be under the direction of the SLCPU. Inside the building and certain appurtenances such as a grease interceptor will be inspected by a City plumbing inspector.

Contractors need to notify SLCPU of the need for a wye, inspection and survey, on a regular working day, at least 24 hours in advance of the time the permittee requests inspection. SLCPU crews will install the wye on sewer main for new lateral connection. After a wye appointment is made the contractor excavates to the sewer main. The contractor also must call for a survey and inspection to check the lateral, 24 hr advance notice is required. Appointments for yes, surveys, and inspections are subject to availability of SLCPU staff. The survey and inspection can be scheduled for the same time.

The entire length of the sewer lateral, including the junction at the sewer main, shall be fully exposed. Any portion of the work not done in accordance with requirements and the instruction of SLCPU inspectors, shall be corrected promptly. There shall be no backfilling until the inspection is made and the work accepted.

In addition to inspecting for proper materials and proper installation of pipe a pressure test will be performed to check for tightness of joints and fittings. Generally, 4 lb or air or water pressure must be held for 10 min without any pressure or head loss.

Use road base or well graded gravels for pipe zone and trench backfill. Pea gravel and squeegee sand are not acceptable backfill materials for sewer laterals.

Pavement Cuts & Patches

Responsibility for Maintenance & Repair of Sewer Laterals

All laterals, residential or commercial and regardless of size, are the maintenance responsibility of the property owner, from the building to the sewer main.

Ejector Pumps

Pressurized connections are not allowed because they cause a decrease in pressure on property and gravity flow to the public system.



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General Information

Geometric requirements for each street classification within the city include guidance for sight distance, access, sidewalks, roundabouts, bridges, retaining walls and structural clearances, side slopes, partial street improvements, pavement transitions, frontage roads, and subdivision streets.

Use of National Standards

See the American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, and AASHTO's Roadside Design Guide for clear zones, roadside obstacles, barriers and curb use.

All traffic control devices must comply with the Manual on Uniform Traffic Control Devices (MUTCD) prepared by the U.S. Department of Transportation as well as Section 5-4 Traffic Signal Design and Section 5-5 Signs & Markings of this manual. See the Transportation Research Board's Access Management Manual, Section 3.103 for access control guidelines.

Other references include: Site Development Regulations of Salt Lake City, Title 18.28.010 Section 47-3-3 Street Design Standards; the NCHRP Report 659 Guide for the Geometric Design of Driveways; the guide for the Planning, Design and Operation of Pedestrian Facilities (AASHTO, July 2004); the Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians (FHWA, 2001); and the Highway Decision Handbook for Older Drivers and Pedestrians (FHWA, 2001).

Street Types

Freeways

Freeways will be designed to safely handle very large volumes of through traffic. Direct access will be limited to widely spaced interchanges. Design, construction and operations will be provided by the Utah Department of Transportation (UDOT).

Arterial Streets

Arterial streets facilitate through traffic movement over relatively long distances such as from one end of the city to the other and from neighborhood to neighborhood. Arterials are generally multi-lane streets carrying high traffic volumes at relatively high speed limits. These are commuter streets and typically offer controlled access to abutting property.

Collector Streets

Collector streets provide the connection between Arterial and Local streets. Collectors can be Multi-Lane, but are meant to carry less traffic at lower speeds and for shorter distances than Arterials. They provide direct access to abutting property and carry a mix of local traffic and commuter traffic headed for nearby destinations.

Local Streets

Local streets provide direct access to and from abutting property. Local streets are usually one lane in each direction meant to carry traffic over short distances and at low speeds.

Private Streets

No private street shall be incorporated into the City's public street system at a future date unless they are constructed, inspected, maintained, and approved in conformance with the City's public street standards and approved by the City Council.

Street Classifications

Street classifications are based upon the type and level of use for which streets are intended. Deciding the location of new local, collector, and arterial streets is done during the development site planning process. Planning for local streets is influenced by the plans for adjacent existing developments or developments that have recently been approved. The Transportation Division Director will review each preliminary proposal for development and will specify any changes needed to conform to previously planned and approved street alignments. The Transportation Division Director will also specify the classification for each street involved in the plan.

Design Standards

About Street Rights-Of-Way Requirements

Rights-of-way requirements are based on the space needed for the street type and to meet ultimate development requirements. Rights-of-way provide space for utilities, cut or fill slopes, sidewalks, bicycle land and paths, trails, traffic control devices, information signs, fire hydrants, landscaping, transit facilities and other public facilities that must be located adjacent to street pavements. Additional rights-of-way may be required to provide for turn lanes and at locations where special circumstances exist.

Lane Widths

The lane widths of a roadway greatly influence the safety and comfort of driving. Lane widths of 10' to 13' are generally used, with a 12' lane predominant on most streets. Where unequal-width lanes are used on multi-lane streets, locating the wider lane on the outside (right) provides more space for large vehicles that usually occupy that lane, provides more space for shared bicycle / auto lanes, and allows drivers to keep their vehicles at a greater distance from the right edge. Auxiliary lanes at intersections and interchanges often help to facilitate traffic movements. Such added lanes should be as wide as the through-traffic lanes, but not less than 12' from face of curb. Where continuous 2-way left-turn lanes are provided, a lane width of 10' to 14' provides the optimum design.

Typical Street Cross-Sections

Undivided streets should have a normal crown that is a 2-way cross-slope with the cross-section high point on the street centerline. Divided streets should have cross-slope on each pavement section. The high point of each slope on each pavement section must occur on the edge of the pavement nearest to the median. Unusual conditions may cause cross-slope requirements to vary, but normally, the desirable cross-slope is 2%, with a maximum cross-slope of 4%. Any deviation from the desirable cross-slope is subject to review by the City Engineer.

Cross-Gutters

Cross-gutters convey drainage water on the surface through intersections. Even though cross-gutters are discouraged, when drainage water must cross the street, they are required. The pavement surface through the cross-gutter section should have a 1-way slope



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(no crown), curbing and medians must not be raised. Where necessary, cut-off walls must be installed. Transitions back to normal street cross-slopes must be created at both ends of the cross-gutter.

Medians

Collector and arterial streets can be considered for median treatments, where practical. Median openings should be provided where needed for left turn access and should be situated only where there is adequate sight distance. The shape and length of the median openings depend on the width of the median and the vehicle types that are to be accommodated.

Median Widths

Median widths are measured from back-of-median curb to back-of-median curb. Where there is no curb, width is measured from the centers of the continuous, painted median stripes. In special circumstances, the Transportation Engineer may approve other widths.

For general types of median treatments the following widths may be considered:

- 1 paint-striped separation, 2' to 4' wide
- 2 narrow raised-curbed sections, 2' to 8' wide
- 3 raised curbed sections, 10' to 16' wide, providing space for left-turn lanes.

Wider medians may be considered where space is available.

Paved Medians

A median 4' wide or less should be paved. The paved surface should be crowned and have the same cross-slope as the street pavement. Typical median paving materials are Portland cement concrete or concrete pavers.

Unpaved and Landscaped Medians

Medians that are 5' or more in width are normally not paved. The grading of the unpaved areas should be as discussed in AASHTO, Chapter 4. If a median is to be landscaped, it shall be at least 4' wide. In the vicinity of intersections, landscaping and other median features must not restrict sight distance for left turning vehicles on the through street or for vehicles entering from the side street.

Curbs

Vertical Curb

Vertical curb and gutter is generally required for all streets. Vertical curb and gutter provides positive access control and protection of pedestrians, and signs and other roadside items. Vertical curb and gutter is to be constructed in accordance with Salt Lake City Standard adoption of American Public Works Association (APWA) construction details, matching the adjacent pavement slope to the gutter cross slope direction. The curb height shown in the APWA Manual of Standard Drawings is 6", but the following variations may be used where appropriate.

- 1 Where fire lane or public maintenance vehicle access to abutting property must be provided over the curb, use the APWA mountable curb and gutter.
- 2 If special drainage requirements make a higher curb necessary, the curb may be increased to 8" maximum. Curbs higher than 8" are considered non-mountable and are subject to roadside barrier issues.

Roll Curb

Use of roll curbs must be approved by the City Engineer. A roll curb is not recommended in that it does not direct traffic away from the park strip, especially where streets sidewalk is adjacent to the back of the curb. When allowed, rolled curb are to be constructed in accordance with APWA Standard Drawings.

Roll curbs are not allowed on collector and arterial streets. Roll curbs are not an acceptable substitute for curb ramps.

Median Curb

In locations where raised medians are constructed, provide vertical curbs. Do not use mountable curb around medians except for maintaining adequate width for emergency vehicles.

Curb Returns

Vertical curb should be used through the curb return from PC to PT regardless of whether the tangent curb sections are vertical or roll curb. All curb returns must be provided with sidewalk from PC to PT of the same width as that provided for the sidewalk behind the tangent curb sections. If no sidewalk is provided behind the tangent curb sections, the curb return sidewalk may be omitted.

Curb Return Radii

The radii for curb returns measured to the back of curb will be 25' for local street intersections - those that involve either a local collector street or local residential street. The radii for curb returns measured to the back of curb shall be 35' for all other major street intersections. Smaller radii may be approved by the Transportation Engineer in urban areas with higher pedestrian activity.

Sidewalk Ramp at Curb Return

Curb cut assemblies will be constructed at all curb returns (on all street classifications) in accordance with APWA Standard Plans No. 235 or 236. Truncated domes will be installed on all curb cut assemblies per APWA plan. If a traffic signal exists or is planned, the assembly must provide access to the pedestrian push button. These standards apply to both public and private streets; see Section 5-4.104 Pedestrian Signals for more information.

Selection Of A Design Speed

The design of geometric features such as horizontal and vertical curves will depend upon the design speed selected for the street. The choice of the design speed is primarily determined by the street classification. The design speed is the maximum speed for the safe operation of a vehicle. The Transportation Division Director will determine the design speed that is to be used for each street.

Super-Elevation In Curves

Unless indicated otherwise by the Transportation Division Director, super-elevation design is not used in the City.

A. 0.02' Super-Elevation Rate

A super-elevation rate of 0.02 ft / ft may be used when the standard radius cannot be provided due to circumstances beyond the control of the design professional, and the roadway alignment cannot be changed (as determined by the City Transportation Engineer).

B. Super-Elevation Rate Greater than 0.02 ft / ft

A super-elevation rate greater than 0.02 ft / ft may not be used except when approved by the City Transportation Engineer. In no case shall a super-elevation exceed 0.06 ft / ft



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C. Transition for Super-Elevation

The length of super-elevation transition is based on the super-elevation rate and the width of rotation. The axis of rotation is generally the pavement centerline. The transition lengths for a super-elevation rate of 0.02 ft / ft are provided in the AASHTO's Policy on Geometric Design.

In designing the beginning or ending of a horizontal curve, $\frac{1}{3}$ of the transition is on the curve and $\frac{2}{3}$ of the transition is on the tangent pavement section.

D. Drainage on Super-elevated Curves

Whenever super-elevation is allowed on a divided street, a storm drainage system must be provided to collect the runoff along the median curb. Nuisance water from the higher traveled area is not allowed to cross the lower traveled area.

Horizontal Curves

Horizontal alignments need to provide safe and continuous operation of motor vehicles at a uniform design speed for substantial lengths of street. A horizontal curve is required when the angle of change in horizontal alignment is equal to or greater than 5°. The nature of the surrounding development and topography, and the street classification will establish the factors that determine the radius of a curve.

Minimum Radii of Curves

The minimum radius of curvature is determined by the design speed or by the stopping sight distance. Select the worst case.

1. Minimum Radii Based on Design Speed

AASHTO Chapter 3 contains the minimum radius of curvature for each street classification with and without a super-elevation rate of 0.02 ft / ft. Wherever possible, the radii used in design needs to be larger. If stopping sight distance conditions require a larger radius than that shown in these appendices, then that larger radius becomes the minimum radius for the curve.

The minimum curve center line radii for local streets (using a 30 mph design speed) and for collector street (using a 40 mph design speed), shall be 150' respectively.

2. Minimum Radii Based on Stopping Sight Distance

When walls, buildings, bridge piers, cut slopes, vegetation, or other obstructions are near the roadway on the inside of a curve, they can block a driver's view of the road ahead. If they are too close, the driver will not have sufficient distance along the curved roadway to stop when a hazardous condition comes into view. For design, the driver's eye is 3.5' above the center of the inside lane (the driving lane closest to the inside of the curve) and a hazardous condition is an object 2' high in the center of the inside lane, or per currently accepted AASHTO standards. The clear distance, "M" is measured from the center of the inside lane to the view obstruction.

AASHTO reference Exhibit 3-58 "Components for Determining Horizontal Sight Distance" depicts these relationships.

If the stopping sight distance, S, and the radius to the center of the inside lane, R, are known, the distance, M, is found by the following equation:

$$M = R [1 - \cos (28.65 S / R)]$$

If the radius, R, and the distance, M, are tentatively selected, then the length, L, of the arc in the middle of the inside lane may be found by the following equation:

$$L = (R / 28.65) \arccos [(R - M) / R]$$

If the length, L, is less than the stopping sight distance for the desired speed, either the radius, R, or the distance, M, must be increased.

View Obstructions & Horizontal Curves

Design Speed / mph	Stopping Sight / s(ft)
20	125
25	150
30	200
30	225
30	300
45	365
50	440
50	500
60	590
65	640

A. Design Speed Reduction on Curves

The reduction of a street design speed on a curve should be avoided; however, where physical restrictions prohibit increasing the radius of the curve or the clear distance, "M" the design speed for the curved section may be reduced. In such circumstances, appropriate signage in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) is required. The difference between the design speed for the roadway approaching the curve and the design speed for the curve cannot be greater than 10 mph. The design speed for a curved roadway section must not be reduced if the reduction occurs at the end of a long tangent or at any location where high approach speeds may be expected.

B. Compound Curves

Compound curves should be avoided; however, if site conditions make the use of compound curves unavoidable, the shorter radius needs to be at least $\frac{2}{3}$ the length of the longer radius. Compound curves are not permitted when design speeds require the shorter radius to be greater than 1,000'.

C. Tangent Sections Between Curves in the Same Direction

On 2-lane roads, tangent sections are needed between two curves in the same direction. If the pavement cross-sections throughout the curves do not have super-elevation then the minimum lengths for tangent sections are 100' for local roadways, 200' for collector roadways, and 300' for arterial roadways. If super-elevation is provided in the curved portions of the roadway, then the super-elevation transition lengths indicated will determine the tangent lengths.

E. Tangent Sections Between Reverse Curves

Generally a tangent section must be provided between two curves that curve in the opposite direction. Minimum lengths for tangent sections between reverse curves without super-elevation are 100' for local roadways, 200' for collector roadways, and 300' for arterial roadways. If the curve radii are at least 50% greater than the radii required by the design speed, a tangent section may not be required depending on grades, topography and vegetation. If super-elevation is provided for the curves, then the super-elevation transition lengths indicated will determine the minimum length of tangent sections between reverse curves.



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F. Tangent Sections Approaching Intersections

A tangent section must be provided between a street intersection and a curve unless allowed otherwise by the Transportation Engineer. The minimum tangent length are 100' for local roadways, 200' for collector roadways, and 300' for arterial roadways, and shall be measured from the end of the curve to the edge of the intersecting roadway.

Vertical Curves

A vertical curve is required when grade changes are equal to or greater than 1.5%. All sections of a street's vertical alignment must meet passing and stopping sight distance requirements for the design speed established for the street. For specific details, see the AASHTO's Policy on Geometric Design.

Longitudinal Street Grades

For arterial streets, the maximum longitudinal grade is 6%. The minimum longitudinal grade in all travel lanes is 0.00% with a minimum longitudinal grade at the curb and gutter flow-line of 0.5%. Variance from this requirement requires the City Engineer's approval.

For collector streets, the maximum grade is 9%. The minimum longitudinal grade in all travel lanes is 0.00% if a minimum longitudinal grade of 0.5% is provided at the curb and gutter flow-line. The minimum longitudinal grade in all travel lanes may be increase to 0.5% with the approval of the City Engineer.

For local streets, the maximum grade is 9%. Short runs up to 12% may be permitted up to 100' with approval from the Transportation Engineer. The minimum longitudinal street grade for all streets is 0.5%. unless City Engineer allows otherwise.

Vertical Curves

Provide properly designed vertical curves with adequate sight distance, safety and effective drainage.

1. Type of Curve

A parabolic vertical curve is to be used. The following Figure 5.3-8 provides all necessary mathematical relations for computing a vertical curve, either crests or sags.

The following equations are for parabolic vertical curves. The grades g_1 and g_2 must be used with their algebraic signs (+ or -). If g_1 and g_2 are expressed as percentages, L and X must be expressed in stations. If g_1 and g_2 are expressed as feet per foot, L and X must be expressed in feet. These symbols are defined by the following diagrams.

The equation below provides the location, XT, of the curve turning point -- the high point or low point on the curve. This equation is only applicable when g_1 and g_2 are not of the same sign, algebraically.

$$XT = (g_1 L) / (g_1 - g_2)$$

2. Sight Distance Requirements

Sight distance is the continuous length of street ahead visible to the driver. For vertical alignment design, two sight distances are considered: passing sight distance and stopping sight distance. Stopping sight distance is the minimum sight distance to be provided at all points on multi-lane streets and on 2-lane streets when passing sight distance is not economically obtainable as approved by city staff. Stopping sight distance needs to be provided in the vicinity of intersections.

A. Stopping Sight Distance

The minimum stopping sight distance is the distance required by the driver of a vehicle, traveling at a given speed, to bring the vehicle to a stop after an object on the road becomes visible. Stopping sight distance is measured from the driver's eyes, 3.5' above the pavement surface, to an object 2.0' high on the roadway, or per currently accepted AASHTO standards.

B. Passing Sight Distance

Passing sight is the minimum sight distance that must be available to enable the driver of one vehicle to pass another vehicle safely, without interfering with the speed of an oncoming vehicle. The sight distance available for passing at any one place is the distance at which a driver, whose eyes are 3.5' above the roadway surface, can see the top 0.8' of an object 4.35' high on the road (corresponding to an object height of 3.5' high), or per currently accepted AASHTO standards.

Minimum Vertical Curve Lengths

Minimum vertical curve lengths are determined by sight distance requirements for a given design speed.

A. Crest Vertical Curve Lengths

Minimum crest curve lengths are determined by either the stopping sight distance or the passing sight distance, whichever provides the greatest curve length.

B. Minimum Crest Vertical Curve Length Determined by Stopping Sight Distance

The following equations are to be used to determine the minimum crest vertical curve lengths based upon stopping distance requirements, or per currently accepted AASHTO standards:

$$\text{When } S_s < L, L = (AS_s^2) / 2158$$

$$\text{When } S_s > L, L = (2S_s) - (2158 / A)$$

L = Length of curve in feet.

S_s = Stopping sight distance in feet for a given design speed.

A = Algebraic grade difference in percent.

C. Minimum Crest Vertical Curve Length Determined by Passing Sight Distance

The following equations are to be used to determine the minimum crest vertical curve lengths based upon sight distance requirements.

$$\text{When } S_p < L, L = (AS_p^2) / 2800$$

$$\text{When } S_p > L, L = (2S_p) - (2800 / A)$$

S_p = Passing sight distance in feet for a given design speed.

L = Length of curve in feet.

A = Algebraic grade difference in percent.

Sag Vertical Curve Lengths

Minimum sag vertical curve lengths are determined by either the stopping sight distance or comfort factors. The longer of the two possible minimum curve lengths will be used.



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A. Minimum Sag Vertical Curve Length Determined by Stopping Sight Distance

The following equations are to be used to determine the minimum sag vertical curve length based upon stopping sight distance requirements.

$$\text{When } Ss < L, L = (ASS^2) / (400 + 3.5Ss)$$

$$\text{When } Ss > L, L = (2SS) - \{(400 + 3.5Ss) / A\}$$

Ss = Stopping sight distance in feet for a given design speed.

L = Length of curve in feet.

A = Algebraic grade difference in percent

B. Minimum Sag Vertical Curve Length Determined by Comfort Factors

The following equation is to be used to determine the minimum sag vertical curve length based upon comfort factors:

$$L = (AV^2) / 46.5$$

L = Curve length in feet.

A = Algebraic grade difference in percent.

V = Design speed in mph.

Combined Horizontal And Vertical Curves

When horizontal and vertical curves are combined, the horizontal curve needs to lead and follow the vertical curve, and not be introduced near the top or bottom of a crest vertical curve or bottom of a sag vertical curve. For additional information on this topic, see the AASHTO's Policy on Geometric Design.

Intersections

Although all intersections share certain common elements, they are not subject to generalized treatment. To minimize conflicts and provide for anticipated traffic movements, each intersection must be evaluated based on individual characteristics and designed based on the following factors:

- 1 Traffic factors such as capacities, turning movements, vehicle size and operating characteristics, vehicle speed, pedestrian and bicycle movements, transit operations and accident history.
- 2 Physical factors such as topography, existing conditions, channelization requirements and
- 3 Available sight distance.

- 4 Human factors such as driving habits, reaction to surprises, decision and reaction time, and

Intersection Spacing

Intersections along major streets should be kept to a minimum. Where practical, the minimum intersection spacing on arterial streets should be $\frac{1}{4}$ mi (1320') and on collector streets $\frac{1}{8}$ mi (660'). Space of intersections less than indicated must be approved by the Transportation Division Director. New intersections on collector and arterial streets should be located to align with planned median openings. New intersections on local streets should be located to avoid creating conflicting turning movements with existing intersections or driveways. Offset intersections shall be offset a minimum of 150' between center lines of the intersecting local roadways, 200' between center lines of the intersecting collector roadways, and 400' between center lines of intersecting arterial roadways.

Angle of Intersection

Proposed streets shall intersect one another as nearly at right angles as topography and other limiting factors of good design permit. "T" intersections rather than "cross" intersection shall be used where possible for local streets. A right-angle intersection provides the shortest crossing distance for intersecting traffic streams. It also provides the most favorable condition for drivers to judge the relative position and speed of intersecting vehicles.

Where special conditions exist, arterial and collector intersection angles may diverge from a right-angle by a maximum of 2° (up to 4° with approval of the Transportation Engineer).

On local streets, intersections angles may diverge from a right-angle by a maximum of 4° (up to 15° with approval of the Transportation Engineer).

Alignment and Profile

Intersections occurring on horizontal or crest vertical curves are undesirable. When there is latitude in the selection of intersection locations, vertical or horizontal curvature should be avoided. A line or grade change is frequently warranted when major intersections are involved. If a curve is unavoidable, it should be as flat as site conditions permit. Where the grade of the through roadway is steep, flattening through the intersection is desirable as a safety measure.

The maximum profile grade through an intersection (from curb face to curb face) is 4% for arterials and collector streets and 6% for local streets.

A minimum of 35' of not more than 2% grade from the right-angle curb line in the intersection and extended to the point of vertical curvature on the approaching street shall be required to provide smooth transitions of road grade for ADA access and smooth roadway transition grade.

For road grades approaching intersections, the minimum vertical curve length shall be determined by the following formula.

$$L = 10a$$

L = the length of the curve in feet

a = the algebraic difference in grades.

Example: There will be a vertical curve in a local street as it approaches an intersection. The approaching street slope is 9%. The allowable slope at least 35' out from the intersection is 2% maximum. The minimum vertical curve distance required between these two street slopes is.

$$L = 10(a) = 10(9 - 2) = 70'$$

Vertical grade breaks in tangents

A vertical curve will be required if the change in centerline grade exceeds 0.5% on collector and arterial streets, and 0.7% on local streets.

Sight Distance for Intersection and Driveways

In order to provide the opportunity for vehicles at an intersection to safely cross or make left or right turns onto a through street, adequate sight distance must be provided. Sight distance must also be provided for left turning traffic turning from the main street as described in AASHTO Intersection Sight Distance Case F. If opposing left turn lanes are present, the opposing left turns must be aligned or off-set in a positive way to allow for sight distance when opposing vehicles are present.

See SLC Division of Transportation Policy Figure E1.e1 and Figure E4.a1 for options.

Sight distance should be based on the design speed for the roadway. Design speeds for new roadways should conform to those identified in Section 5-3.101 thru 5-3.107. Typically design speeds are 10 m.p.h. higher than the anticipated posted speed limit. The sight



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distance requirements outlined below are required for all private and public street intersections and at all intersections of driveways onto public or private streets. Internal driveway intersections on private property are excluded from these requirements.

Figure 5.3-26 depicts the technique used to determine the driver's eye location and an approaching vehicle; a line is then drawn to connect these 2 points. Continuous unobstructed line of sight must be provided along this line and throughout the approach to the intersection, providing an unobstructed sight triangle to the side street driver. Sight lines are to be drawn on roadway and landscaping plans to represent the areas that must be free of all objects and topography in excess of 18" above the roadway surface, however, certain vegetation will be allowed. Vegetation placed within the sight triangle will be of a low variety that remains below 18" when mature. Trees can be considered within the triangle as long as the canopies are above 8', they are a single trunk variety, and they are not spaced in a configuration that creates a "picket fence" effect.

1. Right-Angle Intersections

Right-angle intersections are those whose legs meet at an angle of 88 to 90°. The intersection sight distances for all street classifications are determined assuming passenger car traffic. Sight distances for vehicles turning left from the main street should also be considered and calculated based on the AASHTO Geometric Design of Highways and Streets.

2. Skewed Intersections

For skewed intersections where the intersection angles are less than 88°, sight distances must be calculated in accordance with the procedures described in AASHTO's Geometric Design of Highways and Streets. Skewed intersection design must include appropriate design for pedestrian crossings and the location of curb cut assemblies.

3. Traffic Safety Triangles

Traffic Safety Triangles should be used as a means to limit the height of structures, vegetation and other improvements on corner properties immediately adjacent to intersections. Safety triangles are not to be used as a substitute for intersection sight distance! Safety triangles provide additional visibility around corners for all intersection approaches and should be applied to the design of

perimeter walls and landscape features. Items within the safety triangle cannot be higher than 18" measured from the roadway surface. The following figure depicts the method used to determine the safety triangle location. The sight distance requirements and traffic safety triangles are applied at all corner lots.

4. Right-of-Way at Corners

A minimum of 10' radius rights-of-way shall be dedicated for residential streets at street intersections to provide room for traffic control and sight distance. A greater curve radius may be required if streets intersect at other than right angles or in particular cases at intersections with arterials and / or collectors streets. At commercial or industrial streets intersections, the lot line at each corner shall be a triangular area from the PT to the PC of the curb return as required by the Transportation Division Director for the installation of traffic control devices.

Auxiliary Lanes

An exclusive turning lane permits separation of conflicting traffic movements and removes turning vehicles from the flow of through traffic. Transportation Division Policy Standards E1.b1, E1.c1, E1.d1, E1.e1, & E2.a1 depict the design standards for auxiliary lanes. These standards apply for right and left turn lanes at street intersections and for deceleration lanes at mid-block driveways. The requirement for an auxiliary lane may necessitate additional rights-of-way. Modifications to the storage and transition lengths may be allowed by the Transportation Division where the conditions do not allow the full design standard to be met.

Right-Turn Lanes

Right-turn lanes are required at all street intersections on arterial streets. Right-turn lanes may be required by the Transportation Division on and collector street intersections. The lane lengths should be determined based on the anticipated turning volume and whether there is signalized or unsignalized traffic control. The vehicle storage lengths and taper lengths for right-turn lanes is Transportation Division Policy Standards E1.b1, E1.c1, E1.d1, E1.e1, & E2.a1

Left-Turn Lanes

Left-turn lanes are required at all street intersections on collectors and arterials. Left-turn lanes may also be required at street intersections on minor collectors based on the projected left-

turn volume and conflicting through volume. The lane lengths should be determined based on the anticipated turning volume and whether there is signalized or unsignalized traffic control. For left turn lanes at signalized intersections, dual turn lanes should be considered when the turn volume exceeds 300 vehicles per hour, the opposing through volume exceeds 1,000 vehicles per hour, or the delay to left turning vehicles exceeds 45 sec. Sight distance must be considered and calculated for these movements based on the AASHTO Policy on Geometric Design in order to determine the allowance of permitted left turns.

Median Design

Raised medians may be required on arterial streets and some major collector streets to separate traffic flows, channelize left turns and reduce conflicts. On most collector streets, flush or painted medians provide space between the through traffic lanes for left turning vehicles. Standard median widths are listed for each street classification in SLC TRANSPORTATION POLICY SECTION E1. Variations to these standards may be approved through the master plan process or by the Transportation Division Director.

Raised Medians

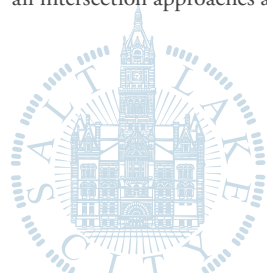
Raised medians, where required, must be provided in accordance with the applicable Salt Lake City standard details, with the appropriate median width as noted above.

Spacing and Location of Median Openings

If a street has a raised median, it is not possible to provide an opening in the median for every street intersection or driveway location. Full median openings should occur at not less than $\frac{1}{4}$ mi intervals 1320' on major arterial streets. Partial median openings, which allow only left turns off the major street, are acceptable at $\frac{1}{8}$ mi spacing (660'). On minor arterials, full median breaks should be no closer than $\frac{1}{8}$ mi intervals with preferable $\frac{1}{4}$ mi spacing. In built up areas, where reasonable alternate access is not available, median openings may be provided at smaller intervals with the approval of the Transportation Department.

Configuration of Median Openings

If the street intersection legs intersect at an angle of 88 to 90°, the configuration of the median opening will be determined by the information shown below on Figure 5.3-30.



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If the streets intersect at an angle less than 88°, the median opening configuration will have to be determined to the satisfaction of the Transportation department.

Cross-Slope

The cross-slope in the median opening is limited to 0.02 ft / ft. Median openings on curves with superelevation exceeding 0.02 ft / ft will not be permitted.

Flush Medians

Flush, painted medians are required on major and minor collector streets without raised medians.

Traffic Control

Traffic control at all new intersections should initially be stop controlled on the minor street. Any higher means of traffic control, 4-way stop, or a traffic signal will require approval by the Transportation Division Director based on an approved engineering study. Guidelines for 4-way stop and traffic signal controlled intersections are outlined below. Intersections of local residential streets within subdivisions are assumed to be stop controlled and will typically not need signage.

Four-Way Stop Controlled Intersections

Four-way (or multi-way) stop controlled intersections are allowed only when based on an engineering study approved by the Transportation Division Director based on the criteria contained in the MUTCD. Four-way stop control is generally utilized for the intersections of two similar classification streets where volumes are approximately equal or at intersections where there is a safety concern (such as limited sight distance).

Traffic Signal Controlled Intersections

Traffic Signal Warrants

New traffic signal controlled intersections are allowed only when based on an engineering study approved by the Transportation Division Director using standard industry criteria. Traffic signals warrants are generally based on existing traffic volumes, but may be allowed based on projected traffic volumes with approval of the Transportation Division Director. New intersections

where a traffic signal is anticipated will require a preliminary traffic signal design to determine the proper location for the installation of underground conduit and pull boxes.

Traffic Signal Spacing

Traffic signals should be spaced no closer than $\frac{1}{2}$ mi on major arterials and minor arterials, with 1 mi spacing desirable. Traffic signals should be spaced no closer than $\frac{1}{4}$ mi on collector streets, with $\frac{1}{2}$ mi spacing desirable. Closer spacing will interfere with traffic progression and signal coordination. Any deviation from these standards requires approval from the Transportation Department based on an approved study that indicates no significant deterioration in traffic progression.

Intersections with an Unpaved Leg

If an intersection has a leg that is unpaved, the paving needs to extend to the end of the normal curb return location on the unpaved leg (at a minimum) with a desired length of 50' from the edge of the roadway.

Waterways at Street Intersections

Waterways may only be used across local residential streets and must be approved by the City engineer. Waterways are constructed in accordance with APWA Standard Plan details.

Driveway Approaches

Driveway approaches are a multidisciplinary issue with concerns based on Public Safety. The first issue is the impact on the public way, roadway vehicular traffic and pedestrian conflicts. These are based on location and related uses. The second is the site function and fire access issues.

Transportation, Fire, Zoning, & Engineering are involved. There are no set numbers to rubber stamp an answer.

The City uses two basic driveway types, residential and commercial, with multiple layouts. The standards for each are based upon thickness and width.

Thickness

Residential: approaches are 6" thick.

Commercial: approaches are 8" thick.

Flare and radius type driveways are shown in the APWA standards and detail E2.a1 for Major Driveways, along with variations due to site conditions. Driveway grade standards are noted as an average of 16% grade from property line to parking stall with a 6% change in grade over a 11' run, SLC standard E2.b1.

Coordinate selection of driveway type with the Transportation Division Director and the City Engineer.

Spacing

Minimum spacing applies to proposed site driveway separation, as well as separation from existing or planned driveways on adjacent parcels. Minimum driveway spacing will generally conform to the following standards, subject to DRT review:

- 1 This minimum spacing applies to proposed site driveway separation as well as separation from existing or planned driveways on adjacent parcels. Shared driveway approaches are encouraged.
- 2 A pedestrian refuge area of 12' is required between drive approaches.
- 3 For abutting properties must have a 6' buffer ($\frac{1}{2}$ the separation) is required for each property. This may be waved subject to the DRT review.

Width

Driveway width standards are generally governed by zoning ordinances.

General width guidelines:

- Maximum: 30'
- Exceptions
 - a Industrial area: 40' maximum
 - b Residential area: 22' maximum
- Standard
 - c Residential single lane: 12'
 - d Commercial: 16' per lane
 - e Truck: 18' per lane, 24' entry and exit drives, 20' minimum fire access

Widths can be adjusted to the site conditions per a geometric study submitted to the City Transportation Division Director for review.



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The combination of these is used for various application along with a DRT (design review team) evaluation to suit the specific site needs and the roadway impact. Another issue is the overlap in jurisdiction, UDOT road & city site zoning.

There are other zoning criteria such as the Main Street Core restriction on all driveways and a 80' setback from intersections. The Community Shopping (CS) district limits driveway approaches to 150' of frontage per driveway on arterials etc.

Other considerations

Frontage on Two Streets

For sites that have frontage on two streets, the driveway, primary access should be must provide onto access to the minor street frontage.

Adjoining property with an existing driveway

Where new development adjoins other similarly zoned property or compatible land uses, a cross access easement may be required to permit vehicular movement between the parcels and reduce the number of access points required onto the adjacent public street. This is subject to coordination with the abutting property owner.

Driveway Location Limitations

Exceptions must be approved by the Transportation Division

New access driveway approaches: Restricted to 10' from the corner property line or 5' from the point of tangency of the curb return, whichever is greater.

If the driveway is located within a designated right turn lane, it must be located a minimum of 50' from an intersection.

If a driveway designated for truck use is located on the down-stream traffic lane: it must be located a minimum of 100' from the intersection.

Neighboring driveways: Must have a 12' separation for pedestrian refuge or a 6' buffer from a shared property line.

Opposing driveways: Comply with site development intersection criteria. Align at 90° to the roadway to facilitate left turns and reduce conflict. Centered as practical, or offset a minimum of 50'.

Additional restrictions: RR Crossings, Fire stations, etc.

Driveways are to have a 12' separation for pedestrian refuge or a 6' buffer from a shared property line. Exceptions must be approved by the Transportation Division. Opposing driveway approaches should comply with site development intersection criteria and aligned at 90° to the roadway to facilitate left turns and reduce conflict. Driveway approaches should be centered as near a practical or offset a minimum of 50'.

A. Single Family Residential Development

Minimum Width of Approach

Driveway approaches serving single-family residential units should be a minimum of 12' wide unless located in a historical district, which many be approved at 10'. Widening may be approved or required.

Minimum length of driveway

The minimum driveway length is 17.5' measured from the face of the garage opening to the back of sidewalk or the back of curb if no sidewalk is provided. For driveways less than 17.5', "No Parking" signage is required to be posted on the garage door.

B. Multifamily Residential Development

Minimum width of approach

- 2-way: Driveways serving multi-family residential units should be 24' wide or 2-way designation, a minimum of 18'
- 1-way: One way drive approaches are recommended to be 12' wide
- Over 14': Discouraged, to restrict parking along the driveway

Minimum length of driveway

Passenger designated approaches: The minimum length for a commercial or industrial driveway is 25' for passenger designated approaches.

Truck designation: the minimum length is 75' measured from the entrance to the off-street parking area from the back of sidewalk or the property line.

Other considerations

Driveway designs must include a level path of travel across the driveway for pedestrians, in conformance with ADA requirements as indicated in the APWA standards.

Sidewalk

A. Sidewalk Standards

Sidewalks will be provided on all streets. Sidewalks are required to meet the standard cross sections shown in APWA standards plans.

Separation of the sidewalk from the curb is required along all local streets (local residential, local collector, local commercial / industrial). Sidewalks may be located at the back of curb in urban areas where additional sidewalk width is provided or along arterial and collector streets.

Sidewalk widths are to be a minimum of 5' wide. Sidewalks within a commercial area are to be a minimum of 6' width and within the CBD area are to maintain an 8' minimum pedestrian corridor width and a 10' minimum pedestrian corridor on Main street.

Exceptions must be approved by the Transportation Division Director.

B. Sidewalk Locations

Unless conditions require a change the Sidewalks should be located parallel to the street. Sidewalk may be located within adjacent easements, such as scenic corridors or public access, where available. In Under no circumstances shall sidewalk be located within the AASHTO clear zone for arterials streets without vertical curb. Sidewalk widths are to be a minimum of 5' wide. Sidewalks within a commercial area are to be a minimum of 6' width and within the CBD area are to maintain an 8' minimum pedestrian corridor width and a 10' minimum pedestrian corridor on Main street.

C. Sidewalk Exemptions

Project-specific requests for Sidewalks will be provided on all streets. Exemptions must be submitted to the Transportation Division Director and City Engineer for approval.

Retaining Walls

A. Types and Uses

Recommended types of retaining walls include reinforced concrete and structural masonry. Heavy timber construction is not encouraged except when approved by the City engineer. The walls need to include integral attachments for railings and weep drainage where applicable.



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B. Aesthetic Considerations

In general, the materials and design of retaining walls need to match or blend with the adjacent natural features, landscaping and buildings. The surface of the retaining wall should have a low light reflectance. Suggested surface treatments include exposed aggregate, stucco or mortar wash and native stone, or other surfaces as approved by the Transportation engineer.

The height of retaining walls within city rights-of-way cannot exceed 6' except when approved by the City engineer. If approved to retain above 6', terracing is encouraged and the length of the alignment of the retaining walls should be foreshortened by vertical grooves, periodic offsets and height changes, or other configurations as approved by the City Engineer.

C. Safety Railings

A safety railing is required on or adjacent to vertical faces such as retaining walls, wing-walls and abutments, etc., and where the vertical fall is 2' or more. The safety railing needs to be constructed on top of the vertical face structure of the vertical drop.

Structural Clearances

A. Horizontal Clearance

- 1 A fixed object other than street lights, signal poles and utility poles and traffic control devices should not be located within 10' of the traveled way unless approved by the Transportation engineer and a safety barrier is provided. A lesser clearance may only be allowed in more urban areas on streets with slower speeds or when other controls make the desired clearance unreasonable and appropriate traffic barriers are installed. In no case shall a fixed object be allowed within 2' of a vehicular travel way.
- 2 The horizontal clearance to bridge piers, abutments, headwalls and retaining walls on all streets can be no less than 10' from the edge of the vehicular traveled way.
- 3 Drainage structures (pipes, box culverts, etc.) are to be extended to a distance of 10' from the edge of the vehicular travel way. A lesser clearance may only be allowed when rights-of-way limitations make the desired clearance unreasonable and appropriate traffic barriers are installed.

B. Vertical Clearance

Minimum vertical clearance shall be 17.5' over the entire width of the traveled way of an feet street or major collector street. On other streets, the minimum shall be 16.5'. The transportation engineer must approve exceptions.

Side Slopes

A. Side Slope Standards

Side slopes should be designed for functional effectiveness, ease of maintenance and pleasing appearance. For areas greater than 10'. back of curb, slopes of 1:4 or flatter will be provided. Steeper slopes may be approved in areas more than 30' back-of-curb when soils are not highly susceptible to erosion, or when a cut is not more than 4'. Consult the AASHTO publication, Roadside Design Guide for further details. The City engineer must review cuts or fills greater than 4'.

B. Slope Rounding

The tops of all cut slopes need to be rounded where the material is other than solid rock. A layer of earth overlaying a rock cut also will be rounded. The top and bottoms of all fill slopes for, or adjacent to, a vehicular travel way, sidewalk, or bicycle path also need to be rounded.

Partial Street Improvement

A full street cross-section is required for interior streets of a development and a complete half-street cross-section for perimeter streets. However, if the street is a major arterial, 4 of the 6 lanes of the full street, or 2 of the 3 lanes of the half-street, may be required subject to rights-of-way availability. The determination as to whether the unimproved lanes will be on the outer edge of the cross-section or adjacent to the median location will be made on a case-by-case basis and approved by the transportation engineer.

Construction Of Half-Streets

A. Design of Cross-Section for Half-Streets

Half-street construction needs to consist of a minimum 30' wide pavement section for major streets (collector classification or higher) and a 24' wide pavement section for local streets. In the event half-street construction is to be provided, the design professional needs to design the full cross-section of the street. The

plans need to include the half-street which will be constructed in the future. The half street construction needs to provide adequate transitions and tapers to the adjoining roadways.

B. Joining Existing Street Pavement

The half-street is to be designed to match existing construction as much as possible unless doing so is likely to create an unsatisfactory condition. If changes are needed to correct conditions on an existing half-street in order to properly construct the other half of the street, solutions must be developed with the City Engineer on a case-by-case basis. The plans for the new half-street must contain sufficient information on the profile and cross-sections of the existing street to demonstrate that the new construction will match the old construction and result in a full street with proper cross-sections.

C. Culverts Under Half-Streets

A culvert to be provided in conjunction with half-street construction must extend a minimum of 10' beyond the edge of the vehicular travel way into the area where the other half of the street will be constructed in the future (subject to rights-of-way availability). The 10' distance is measured perpendicular to the street alignment. The culvert capacity, flow line slope and alignment must be based upon the ultimate design requirements for the culvert if it were to be built under the full cross-section where it could be considerably longer.

Pavement Transitions

When development causes the widening of a portion of the pavement of an existing road, pavement transitions are required at each end of the widened portion. Design of the various features of the transition between pavements of different widths should be consistent with the design standards of the superior facility. The transitions should be made on a tangent section whenever possible. Locations with horizontal and vertical sight distance restrictions should be avoided. Whenever feasible, the entire transition should be visible to the driver of a vehicle approaching the narrower section. Intersections at grade within the transition area should be avoided.

A. Transition to a Wider Pavement Section

A transition from a narrower thoroughfare cross-section to a wider thoroughfare cross-section needs to be a length that is a minimum of a 15 to 1 taper rate.



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B. Transition to a Narrower Pavement Section

A transition from a wider thoroughfare cross-section to a narrower thoroughfare cross-section needs to be in compliance with the latest addition of the MUTCD.

Subdivision Street Planning

Subdivision street plans should be per the Salt Lake City “Site Development Regulations” contained in title 18, chapter 18.28 to produce the minimum number of intersections and drainage swale crossings and discourage through traffic. The following drawing shows a number of concepts associated with desired subdivision street design. The following paragraphs describe certain other concepts and requirements.

The street pattern in the subdivision shall be in general conformity with a plan for the most advantageous development of adjoining areas and the entire neighborhood or district. The following principles shall be observed:

- 1 Where appropriate to the design and terrain, proposed streets shall be continuous and in alignment with existing planned or platted streets, or if offset, streets shall be offset a minimum of 100’ between center lines of intersecting residential streets and a minimum of 400’ between center lines of intersecting major streets.
- 2 Proposed streets shall be extended to the boundary lines of the land to be subdivided or proposed as part of a subdivision master plan, unless prevented by topography or other physical conditions, or unless, in the opinion of the Planning Commission such extension is not desirable for the coordination of the subdivision with the existing layout or the most advantageous future development of adjacent tracts.
- 3 Where streets extend to the boundary of the property, resulting dead end streets may be approved with a temporary turn-around of a minimum 45’ radius. In all other cases, a permanent turnaround shall conform to specifications in section C. Cul-de-Sac Street Lengths below or have the design approved by the Transportation Division Director.

- 4 Proposed streets shall intersect one another as nearly at right angles as topography and other limiting factors of good design permit. “T” intersections rather than “cross” intersections shall be used wherever possible for local streets.
- 5 Straight local residential streets, conducive to high speed traffic, longer than the standard 600’ block, shall be prohibited unless approved by the Planning Commission.
- 6 Alleys shall not normally be permitted in residential subdivisions, but may be permitted in nonresidential subdivisions.

A. Existing and Proposed Streets

Existing streets and proposed streets must be approved by the City Transportation Director in compliance with the Salt Lake City Transportation Master Plan Map.

B. Street Vacation

Street vacations must follow the procedures as outlined in City Ordinance.

C. Cul-de-Sac Street Lengths

A cul-de-sac street is a street that serves more than one property owner and has only one direct access to the public street system. The following requirements apply to both public and private streets. Cul-de-sacs in residential areas should be no longer than 400’ (measured from centerline of intersecting street to radius point of turn-around) and shall have a minimum of 45’ curb radius and 55’ property line radius. Cul-de-sacs in commercial or industrial areas should be no longer than 650’ and should have a minimum of a 60’ curb radius, and 70’ property line radius. Other Cul-De-Sac lengths or turn around configurations may be approved by the Transportation Division Director upon his favorable recommendation that the alternative provides equal or better convenience, access and service in coordination with the City Fire & Life Safety Examiner and the Fire department for emergency services. Cul-de-sac radii are the same for private streets.

D. Dead-End Streets

Dead-end streets are required where a street connection is necessary to serve adjacent properties that will develop at a future date. When a dead-end street is required, a temporary cul-de-sac needs to be provided if it exceeds 150’.

E. Bubbles

Bubbles are areas on the roadway expanded to provide a turn-around and additional access or lot frontage on minor collector and local streets. Bubbles are required at intersections where each street extends in only 1 direction from the intersection. Bubbles are permitted between intersections to improve accessibility to odd-shaped sites. The bubble radii for local residential streets are shown in the cul-de-sac drawing. Radii for other street classifications are shown in the following drawing.

The use of bubbles (except for on a cul-de-sac) on other than local residential streets must be approved by the Transportation Division Director. Radii appropriate for these bubbles will be established as part of that approval.

The bubble radii shown on the drawing are for local residential streets. Radii for cul-de-sac bubbles for other street classifications are shown on the cul-de-sac drawing above. The use of bubbles (except for a cul-de-sac) on other than local residential streets must be approved by the Transportation Division Director. Radii appropriate for these bubbles will be established as part of that approval.

G. Offset Intersections

Street jogs with centerline offsets less than 400’ are not permitted along arterial and collector streets where interlocking left turns will occur. Offsets as small as 100’ are allowed on local residential streets.

H. Intersecting Tangents

A tangent section of roadway is desirable prior to an intersection on a curvilinear street. Minor street intersections with major streets need to have a minimum tangent outside the intersecting rights-of-way.

Special Standards

A development may desire a special set of standards that differs from the city standards contained in this document. This request is typically made for master planned communities as part of their associated master circulation plan. In such a case, a qualified traffic



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engineer, registered in the State of Utah, must prepare a preliminary and final traffic design report and secure City Transportation Director engineer approval of the reports before plans incorporating the special standards can be submitted for review and approval.

A. Preliminary Design Report

A preliminary design report needs to be submitted prior to or at the time of preliminary plat submittal. At a minimum, the preliminary report must address the following subjects:

- Vehicle Trip Generation
- Design Speeds
- Traffic Control Device Requirements
- Roadway Classification
- Bicycle and Equestrian Requirements
- Parking Requirements
- Auxiliary and Additional Lane Requirements
- ADA Requirements
- Special Features & their Influence
- Pavement Design
- Transit Facility Requirements
- Pedestrian Requirements
- Fire & Emergency services reviews

B. Final Design Report

A final design report needs to be submitted prior to or concurrently with the improvement plan submittal. The report must include a refinement of the preliminary design report and address the following subjects as a minimum:

- Horizontal & Vertical Alignment
- Intersection Location
- Traffic Control Devices
- Treatment of Special Features

C. City Review and Approval of Special Standards

The following factors will be considered by the city in its review of the report:

- Relationship of the proposed standards to National, State and City standards
- Similarity of the proposed standards to standards utilized in other communities

- Comparison of the proposed standards with alternatives
- Sensitivity of the proposed standards to safety, environmental and law enforcement concerns

Cul-de-Sac Classification	Bubble Radii (ft)	
	R1 (B.C.)	R2 (P.L.)
Local Residential	40.5	50
Local Commercial / Multi-family Residential	60.5	70
Local Industrial	60.5	70
Minimum Length = 2R		
Maximum Length = 1500'		
ADT = 250 vpd maximum		
Maximum number of units served = 25		

2.3.2 Off-Street Trails

Salt Lake City's off-street trails accommodate a wide variety of non-motorized users that provide both inter-city and intra-city connections. Trailheads are provided for access in key locations and neighborhood connections are encouraged. Bicyclists, joggers, walkers, and other recreational users frequent these trails.

Major existing and proposed trails in Salt Lake City include the Bonneville Shoreline Trail, Jordan River Parkway Trail, City Creek, Parley's Trail, Airport Trail, Jordan & Salt Lake City Canal Trail, 900 South Rail Corridor Trail and Surplus Canal Trail.

Planning, Design & Maintenance

Planning, design and maintenance of trails in Salt Lake City is shared between different city departments. Planning of shared use trails located west of the Bonneville Shoreline Trail (in the Salt Lake Valley) is handled by the Transportation Division and design is generally shared between the Transportation and Engineering Divisions. Planning, design and maintenance of trails east of the Bonneville Shoreline Trail (in the foothills or watershed) is handled by the SLCPU Watershed Division. Maintenance of trails within city parks or open space is handled by the Parks and Open Lands Division (Parks) of Salt Lake City Department of Public Services. It should also be noted that all issues related to the Airport Trail are handled by the Salt Lake City International Airport.

Developers planning or designing public off-street trails in the Salt Lake Valley need to consult with the Transportation Division to determine trail design requirements. Trail groups or others wishing to create, modify or maintain a trail within the foothills or watershed need to consult with the Watershed Division. In general, Salt Lake City will attempt to conform to guidelines set forth in documents generally accepted as the best current practice for trail design. These documents provide a good starting point for design, construction and maintenance and can provide a basis for estimating trail costs. However, since all trails are unique and often require special design considerations, consultation with the Transportation Division or Watershed is required to further define and confirm trail requirements. The following documents are considered by Salt Lake City staff to provide the best current guidelines for trails:

- AASHTO Guide for the Development of Bicycle Facilities: 1999
- Trail Construction and Maintenance Notebook: 2007 Ed.
- Trail Solutions: IMBA's Guide to Building Sweet Singletrack

The only trail within the city which receives snow plowing during the winter is the Jordan River Parkway Trail. During warmer months, paved city trails are swept by Parks, or in the case of the Airport Trail, by the Airport. Parks also provides weed control along paved city trails. Volunteer groups are encouraged to assist the city to control the growth and spread of the puncturvine weed (goathead) as it is so debilitating to trail use. This weed favors growing along the edge of trails in disturbed soil and produces a sharp spiny seed which swiftly punctures bicycle tires, dogs' paws and bare feet. Volunteer groups are also sought to help maintain the city's unpaved trails. Over the years, it has been through the work of many dedicated volunteers that the city's unpaved trails have received most of their maintenance.

2.3.3 Pedestrian Facilities

General

In general, people will choose to walk a 10 min trip or $\frac{1}{4}$ mi to a destination, and even longer, up to 20 min or a $\frac{1}{2}$ mi, if the route is comfortable and safe or if the need is great. Site planning should consider walking distance of pedestrians



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from nearby transit routes or other adjacent locations, such as employment centers or residences. Like all transportation users, pedestrians seek direct, convenient travel routes.

Pedestrian facilities should provide accommodations for a wide array of users including but not limited to walkers, joggers, wheelchair users, strollers, in-line skaters and bicyclists. These pedestrian facilities need to be universally accessible, safe, convenient, direct and designed to encourage use by this wide variety of potential users.

Minimizing curb cuts and consolidating driveways helps to maintain continuity of pedestrian routes and helps to ensure pedestrian comfort and safety. In addition, pedestrians like to be separated from moving traffic with a buffer, such as on-street parking, landscaping, or bicycle lanes. The parkstrip landscape area should be a minimum of 4' wide, with 8' or more desired based on available rights-of-way or easements.

Installation

Salt Lake City Ordinance 14.06, Accommodation of Bicyclists and Pedestrians at all City Owned Transportation Facilities in the Public Right of Way, requires that sidewalks be installed on both sides of all City streets. For additional information please refer to the ordinance.

The minimum unobstructed width of public way sidewalks along Main Street within the Central Traffic District is 10'. In the remainder of the Central Traffic District the minimum unobstructed width of public way sidewalks is 8'. In the remainder of the city the minimum unobstructed width of public way sidewalks is 5' to 6'.

Maintenance & Repair

Sidewalks provide a safe and level walkway and provide separation between motor vehicles and pedestrians. They also provide a safer place, as opposed to the street, for children to walk and play. Sidewalk maintenance and repairs are the responsibility of the adjacent property owner, occupant, lesser or agent.

Snow Removal

Section 14.20.070 of the Salt Lake City Code requires that hail, snow or sleet on the sidewalk abutting your property be removed within 24 hours after such hail, snow or sleet has ceased falling.

Enforcement Information: Parking Enforcement, 801-535-6628

Frequently Asked Questions

Landscape Encroachments

Section 14.20.010 of the Salt Lake City Code prohibits residents from allowing sidewalks adjacent to their premises to be obstructed. This includes allowing landscaping to grow into the sidewalk area such that it inhibits free passage of pedestrians. For enforcement information contact the Engineering Division.

Curb Ramps

Curb ramps shall be placed wherever pedestrian travel continues onto a roadway. Curb ramps shall be wholly contained within the crosswalk or crosswalk markings, if they exist. Curb ramps should be flush with the street surface without "lips".

Alterations in retrofit development areas shall follow guidelines for new construction unless technically infeasible as determined by the City Engineer.

The city, to improve pedestrian access and safety, prefers the use of APWA standard plans for ramp construction at all corners and tangents.

Detectable warning devices (truncated domes) consist of red unit concrete pavers.

Pedestrian Signals

Pedestrian signals are required on the legs of all intersections with marked crosswalks where traffic signals are installed. The countdown style pedestrian signal is the city standard pedestrian signal. See Chapter 4E of the MUTCD for a discussion regarding pedestrian signals, pedestrian pushbuttons and pushbutton locations. A pushbutton with a latching LED actuation indicator is the city standard for pedestrian pushbuttons (See MUTCD 4E.08 paragraph 16).

Crosswalks

Marked or painted crosswalks are typically installed on all 4 legs of signalized intersections. Crosswalks are generally (length to be added in later version) wide. Requests for the installation of new marked crosswalks are handled as follows: Double ladder crosswalks are installed at crosswalks in the Central Business District and at all designated school crosswalks. At all other locations standard crosswalk lines are utilized as discussed in Section 3B.18 of the MUTCD.

Supplemental safety devices at marked crosswalks include any safety device installed in addition to the stripes on the roadway surface. Salt Lake City Transportation Division Policy explains the process for determining when different types of supplemental safety devices are warranted at a crosswalk.

slcgov.com/transportation

Medians

Medians constructed to act as a Pedestrian Refuge shall have detectable warnings on both sides of the median at the point of entry into the crosswalk. See APWA Standard Plan No.237.

Transit Stops

The Utah Transit Authority is responsible for all transit stop improvements and maintenance of those improvements.

2.3.4 Signing & Marking

General Information

The following current publications are to be used in conjunction with the design criteria in this manual for traffic signs and markings design work:

Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) - USDOT / FHA, Current Revision.

Design is to be in accordance with the MUTCD, unless modified by the city as noted.

Signing

This section is under development. Please call the Transportation Division at 801-535-6630 with any questions regarding signing.

Striping

All permanent and temporary longitudinal pavement striping (centerlines, lane lines, bay lines) shall be SLC approved marking material. Special striping situations are shown below in (figures to be added in later version).

Application Requirements

Signing and pavement marking design should be shown in the same plan view on the same plan sheet if practical.

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- 1 Plan sheets are to be complete and to scale, no smaller than 1" = 40' unless otherwise approved by the Transportation Division Director.
- 2 Entire length of project is to be shown in plan view. Typical Sections representative of striping and / or signing will not be accepted.
- 3 Signing and pavement marking plans need to include all existing signing and pavement markings for a minimum of 250' past the limits of construction (except those devices that are to be removed), and include adequate transitions and tapers to existing pavement markings to maintain traffic at the design speed.
- 4 Drawings near intersections shall show intersection and striping on opposite side of street for lane alignment.
- 5 Rights-of-way lines are to be clearly identified.

Striping

- 1 All existing striping that is to remain shall be fully shown (as screened lines or lightly inked pen lines), identified by type and width, and completely dimensioned across roadway.
- 2 All new striping shall be clearly identified noting color, line width, beginning station, ending station and intermediate stations at all directional changes.
- 3 Striping to be removed needs to be identified as such on the plans.
- 4 All striping shall be fully dimensioned across roadway.
- 5 All pavement arrows, legends and crosswalks, etc., shall be located by station or dimension lines.

Standard Plan Sheet Notes

These notes along with any additional project specific notes are to be placed on the lead signing and pavement marking plan sheet.

All pavement markings, signing and work zone traffic control type and layout need to conform to the latest edition of the Manual on Uniform Traffic Control Devices (mutcd.fhwa.dot.gov/index.htm) unless directed otherwise by the Transportation Division Director.

Work zone traffic control needs to conform to the Manual on Uniform Traffic Control Devices, the Utah APWA Workzone Traffic control Guide, and / or as directed by the Transportation Division Director.

Signs are to be installed on telespar prepunched square steel tubing posts per COS Standard Detail No. 2131

Dimensions to signs need to include the sign post, or in the case of multiple posts, the plan view center of the sign.

All plan view striping dimensions are measured to the center of the line or center of the double line.

All existing pavement markings that conflict with proposed markings shall be removed by sandblasting, hydroblasting, or grinding prior to the installation of new pavement markings. Removal method shall be approved by the City Engineer.

The contractor is responsible for layout of all pavement markings. The pavement marking layout shall be approved by the Transportation Division prior to the application of the final product.

2.3.5 Traffic Impact Studies

General Information

Major Issues Addressed in Traffic Impact Study

The Traffic Impact Study (TIS) document should contain the following information:

- 1 A description of the land uses in the proposed development,
- 2 A description of the existing transportation system and its capabilities of meeting area demands,
- 3 An estimate of the additional total daily and peak hour traffic anticipated to be generated by the new development for the opening year of the project and a horizon year as determined by the Transportation Division Director. Regional traffic growth should also be included,
- 4 Distribution and assignment of the daily traffic and peak hour traffic onto the existing transportation system that would be added by the development project,
- 5 Potential measures that are needed to mitigate the impacts of the project on the transportation system,

- 6 An evaluation of the measures needed to mitigate the impacts of the new development, and
- 7 An analysis for large developments that addresses issues such as truck routing to / from loading docks and the vehicle storage needed for drive-through facilities

Study Timing

TIS may be required for general plan amendment, rezoning, and use permit applications. The need for, and extent of, the study shall be based on the criteria described in this guide and any analysis provided in previous applications. All studies shall be submitted in final form prior to scheduling a development proposal for public hearing.

Study Preparation Process

The study preparation process should include open discussions between the applicant, study consultant, and City staff. Therefore, project discussion should begin when the application for the development is initiated, not after a development plan is finalized and a traffic study completed. This will ensure that the objectives of both the land owner / developer and the city can be met.

After a pre-application meeting, issues and process will be determined and discussed at a joint meeting with staff members from the city's Planning and Transportation Divisions. Members from these divisions will determine if any at-large issues are affected by the proposal. The Transportation Division staff and the Project Coordination Manager will establish a timetable and oversee the TIS document preparation process. A meeting will be arranged to review the scope of the work and the proposed timetable for completion.

After the TIS document is completed, it will be submitted to the city for review. The document will be reviewed for completeness and compliance with TIS Guidelines within 10 working days. This completeness review will only determine if all required information and analysis has been provided. It will not assess the quality of the submitted report or its findings. If the document is determined to be complete, a meeting will be scheduled to review the report and findings with the applicant. Transportation staff will conduct a thorough review of the document and prepare a summary report of the findings. This summary will be sent the



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Planning Division staff member working on this project through the development process. Minor revisions may be required before the project will be scheduled for the requested hearing.

Initiating Impact Study

Pre-application Meeting

The procedures outlined herein present the minimum information required to determine if a traffic impact study is required.

The purpose of the pre-application conference is to provide guidance and direction to the applicant concerning the nature and extent of the study. Failure by the applicant to provide these items may result in delay in initiating the TIS process. At a minimum, the following items must be provided for review:

- 1 Vicinity map
- 2 Current aerial map
- 3 Summary of existing building or development on the site – examples: existing building area and land use, current zoning, approved site plan, previous zoning history, etc.
- 4 Preliminary summary of proposed development by land use – examples: building area, number of employees, leasable tenant space, acreage, etc.
- 5 Proposed site plan

Using industry information, standards, and practices, if a proposed development is projected to generate less than 100 vehicle trips per hour in the “peak period on the adjacent street system”, a traffic impact study is may not be necessary. The following sizes of different land use classifications are examples deemed to generate less than 100 trips in the peak hour and therefore would may not require a study be done:

- < 100 residential dwelling units
- < 6,000 ft² gross retail
- < 25,000 ft² gross office
- < 100,000 ft² gross industrial / employment
- < 160 hotel / motel / resort rooms
- < 30,000 ft² gross medical office

Using industry information, standards, and practices, if a proposed development is anticipated to generate more than 100 vehicle trips per hour in the “peak period on the adjacent street system,”

then a traffic impact study is required to determine the extent of the transportation impacts of the proposed development. For those situations where it is questionable as to whether a traffic impact study is required, the Transportation Division Director, or designee, will make the final determination. The Transportation Division Director, or designee, also has the authority to waive the requirement for a traffic impact analysis for unusual situations that fall outside of the guidelines or where the analysis is deemed to be unnecessary based on previous studies or current traffic conditions.

For a general development application that requires a traffic study, the following information is required:

- 1 Site plan
- 2 Adjacent street volumes
- 3 Accident history
- 4 Trip generation comparison to the existing land use
- 5 Level of service analysis of roadway segments and intersections adjacent and in the vicinity of the site as determined by the Transportation Division Director or designee.

The following considerations are some of the development and transportation system characteristics that will be evaluated in determining the extent of the study area and the need for whether an additional or expanded analysis such as a traffic signal warrant analysis is necessary will be determined based on the following:

- 1 Current traffic volumes and level of service on the adjacent streets
- 2 Driveway location and volume
- 3 Special conditions and circumstances particular to the development or the transportation system

A traffic impact study will include the following:

- 1 A site plan with proposed access points
- 2 An area map showing the surrounding transportation system, including the locations of the signalized intersections within 2 mi of the nearest signalized intersection on adjacent streets in all directions
- 3 Current traffic volumes on the street system within the study area
- 4 Trip generation
- 5 Trip distribution

- 6 Traffic assignment
- 7 Existing levels of service on adjacent roadways, including signalized intersections within the study area
- 8 Horizon-year levels of service with and without the proposed development

The Category 2 study need not be a detailed analysis of the present and future conditions. No elaborate data collection effort or extensive computer modeling is usually necessary for such a study. Its purpose is to provide an analysis of existing and anticipated traffic conditions on the adjacent transportation system and identify potential concerns that may need additional analysis.

Study Area

The study area for a traffic impact study will be the roadway segments and intersections located adjacent to the site and in the vicinity of the site, as determined by the Transportation Division Director or designee.

Existing Conditions

The reports for a traffic impact study will provide current approach volumes for 24 hours of a typical weekday, and turning movement volumes in 15 min intervals for the time periods of 7:00 to 9:00 am and 4:00 to 6:00 pm, for all intersections of streets that are classified as collector (rural, suburban, or urban) or arterial (rural, suburban, or urban) 24 hour typical weekday volumes should also be provided for adjacent roadway segments. The results of a level-of-service analysis, for the peak, 15 min periods in the morning and in the evening for the existing conditions, will be included in the report.

Horizon Years

The traffic analysis will be based on traffic conditions for the build-out or completion year of the development, and a minimum 5-year projection from the anticipated build-out date, which may be rounded up to the closest 5-year increment (2015, 2020, and 2025, etc.) If the project is a large, multi-phased development, the initial horizon year will be the date that corresponds to the opening of the first major phase of development. In some cases staff may require an additional horizon year for multi-phase projects or projects with significant changes anticipated to the surrounding infrastructure or traffic volumes.



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The study will provide morning and evening peak hour approach and turning movement volumes for each intersection in the study area for the required horizon years. Level-of-service analyses for these peak hour conditions, without the site traffic and with the site traffic, will be included in the report.

Peak Traffic Hours

The report will analyze the peak traffic periods on the adjacent street system during the morning and evening, peak periods. The report will also analyze the peak traffic periods for the development, should these periods occur at different times or on different days from the peak periods of the adjacent street system. Based on project location, project type, and traffic conditions, The Transportation Division Director or designee may determine if only the morning peak, or evening peak period or other times and days are to be analyzed.

Background Study Area Data

The Salt Lake Transportation Division periodically obtains traffic volume information at various locations. This information will be available to the consultant to supplement their study. The consultant may not use traffic volume data older than 24 months as current information. However, it may be utilized for supplemental purposes. If traffic volume data more recent than 24 months is not available, then the developer is responsible for obtaining the information directly.

Review of Anticipated Off-Site Changes

The consultant may be required to review information from Transportation Division will provide copies of TISs prepared for previously-proposed developments that may be pertinent to a current analysis. The city will also provide other transportation-related reports that may be of assistance. The consultant will be responsible for reviewing these reports and incorporating their data, conclusions, and recommendations where appropriate.

Field Reconnaissance and Data Collection

If current traffic volume data is not available, the consultant will be responsible for obtaining traffic volume data in accordance with the requirements of the study, as stated previously. The consultant must also obtain speed limit information and analyze sight distance availability and requirements. The Transportation Division will provide information regarding bicycle and pedestrian facilities

in the vicinity of the site of the proposed development. Transit facility information in the vicinity of the site should be obtained from the local transit agency. The consultant will be responsible for incorporating the needs of these facilities into the analysis and report.

Non-Site Traffic Forecasts

Components of Non-Site Traffic Section

Estimates of non-site traffic are required for a complete analysis of horizon-year conditions. These estimates represent the “base” conditions, that is, without the site development.

Methodology

There are two principle methods of projecting off-site traffic that are acceptable: use of area-wide modeled data and trends or growth rates. Each method has its appropriate use depending on the availability of data and the size of the proposed development.

Analysis of Future Conditions

Future traffic demand estimates are developed by adding the estimated site generated traffic, all approved (or potential) development in the area, and current traffic volumes adjusted for general growth in the area. The consultant will determine the levels of service in the study area based on the non-site traffic for the horizon year.

Site Traffic Generation

General Procedure

The potential traffic impacts of a planned development are forecast for the projected conditions in the horizon years of the project. The first step in the process is trip generation. The trip generation process provides an estimate of the number of trips that will be generated due to the new development. Generally, the trip generation process consists of applying trip rates or equations for different types and sizes of land use development to the proposed land uses in the development to determine the total number of new trips added to the system. Trip generation will be calculated for the higher of the am or pm peak hour. Other hours and / or days for trip generation may be required due to specific project conditions.

Sources

The sources from which trip generation rates are taken are extremely important in assuring an accurate estimate of the impacts of a proposed development. In general, whatever the source, it is important to establish that the trip rate for a given land use is representative of the proposed development land use. Such items as size, location, services, and number of studies should be considered before using any data source.

State and Local Data Sources

In most cases, assuming a similar number of studies, local trip generation rates will be more accurate for predicting the trip generation of the development proposal. If such data is available, it should be reviewed with city staff to determine its applicability to the site.

National Data Sources

Several national data sources are available. The most widely used is Trip Generation, published by the Institute of Transportation Engineers (ITE). Other sources include: NCHRP Report 187, Transportation Research Board, 1978 and Development and Application of Trip Generation Rates, Federal Highway Administration, 1985.

National sources can be used as starting points in estimating the amount of traffic that may be generated by a specific building or land use. Whenever possible, or when the number of studies on which the rate is based is limited, these national rates should be adjusted to reflect local conditions. National sources should not be used without the application of sound judgment.

Collection of Additional Data

If it is determined that a local rate is most appropriate, but existing local data samples are limited, the consultant will be required to collect additional local data to provide a credible sample size on which to base the trip generation estimate. Local trip generation data should be collected at sites that exhibit similar characteristics to the development being studied and that are self-contained, with adequate parking not shared by other activities. The consultant should follow the guidelines contained in Trip Generation Handbook: An ITE Recommended Practice, ITE, 2000.



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Choosing Appropriate Time Periods

The range of average rates for different time periods will be examined to determine when the generator peaks in traffic flow and to define the relationship between the peak generation and the peaking characteristics of the adjacent street system.

When the peak hour of the generator does not correspond to either the am or pm peak hours of the adjacent street system, coordinate with the Transportation Division Director or designee to determine if additional time periods must be analyzed to determine site-specific design requirements.

Daily and Seasonal Variations

Trip generation estimates for the average weekday are appropriate analyses for most, but not all, land uses. For some land uses, more trips are generated on Friday or Saturday than on the average weekday. Those days, rather than the average weekday, may be the most appropriate design or analysis period for those uses.

Seasonal variations are also important to consider for some land uses. Coordinate with the Transportation Division Director or designee to determine if seasonal variations need to be applied.

Driveway Traffic vs. Traffic Added to Adjacent Streets

It is usually assumed that all trips entering and exiting a new development are new trips that were not made to or through the area prior to the development being completed. However, for some non-residential developments, a portion of these trips may be “captured” from trips already being made to other existing developments on the adjacent street system, or they may be merely passing by on the way from one place to another. The driveway volume for a new development may, therefore, be significantly different from the amount of traffic added to the adjacent street system. For example, retail establishments, restaurants, banks, service stations, and convenience markets attract people from the passing stream of traffic; these are known as pass-by trips.

ITE's Trip Generation Handbook contains discussions and references on the issue of pass-by trips. Because of the limited data available, adjustments for pass-by trips should be applied carefully and in coordination with the Transportation Division Director or designee.

Multi-use Projects

Most trip generation rates and equations have been gathered at and apply to isolated single-use developments. When multiple uses are combined into one development, simply adding the single-use estimates together can result in a total trip generation estimate that is too high.

While trip rates and equations are available for shopping centers, little data exists for other multi-use projects such as downtowns, suburban mixed-use centers, or planned unit developments. Some national publications, such as NCHRP Reports, may provide data that can be useful in some cases.

Multi-use projects are another case in which any adjustments should be applied carefully because of the limited amount of data available. If this is a major consideration for the proposed development, an analysis should be performed to determine the amount of trips that would be external for single uses, but which would be internal in a proposed mixed-use development. Trip Generation Handbook provides some information on this subject.

Special or Unusual Generators

Occasionally, a development proposal will consist of special or unusual land uses for which typical trip generation rates or equations are not available, or simply do not apply. Judgment must be applied to identify a land use or combination of land uses that best represent the trip-making characteristics of the site. The reasoning and data used by the consultant in developing a trip generation estimate for a special or unusual generator must be justified, explained, and approved by the Transportation Division or designee before it is used in the report.

Site Traffic Distribution and Assignment

Distribution Methods

The directions from which traffic will access the site can vary depending on many factors, including:

- 1 The type of proposed development and the area from which it will attract traffic,
- 2 The presence or absence of competing developments within the same market area,
- 3 The size of the proposed development, and

- 4 The conditions on the surrounding street system. The influence area of the development needs to be identified for the site.

Trip Assignment and Pass-by Trips

After trip distribution is completed, trip assignment is used to determine the amount of traffic that will use certain roadway links within the influence area. The product of the trip assignment process is the total project-generated trips, by direction and turning movement.

Trip assignment should be made considering logical routings, available roadway capacities, left turns at critical intersections, and travel times. The assignment should also reflect the horizon years, roadway, and land use conditions at that time.

As discussed in Section 5-1.600, many land uses do not generate only vehicle trips that are entirely new to the roadway network. A portion of their trips may simply be diverted from trips already on adjacent or nearby streets. Because of limited data and research in the area of pass-by trips, a thorough analysis is required if pass-by trips are to be accounted for in the study.

Redevelopment Projects

Since the purpose of the impact study is to evaluate a development proposal's impact on the transportation system, redevelopment projects require some special analysis. In the case of redevelopment projects, existing site-generated trips should be subtracted from existing and horizon year off-site traffic. The traffic generated by the proposed development is then added to the adjusted off-site traffic according to the above procedures to determine the impacts on the transportation system.

Total Traffic Estimate

For each analysis period being studied, a projected total traffic volume must be estimated for each segment of the roadway system being analyzed. These projected total traffic volumes (consisting of site and non-site traffic) will be used in the capacity analyses. The traffic impact report must clearly depict the total traffic estimate and its components. Projected daily traffic volumes must be determined for all major streets within the study area as well.



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Identification of Impacts, Needs & Common Deficiencies

The analysis is intended to show the relationship between the operations and geometry and to assess deficiencies, as well as to identify alternatives for further consideration. This requires the identification of impacts, needs, and deficiencies.

The analysis of internal circulation, parking, off-site circulation, and capacity analyses will provide the basis for identifying transportation deficiencies and needs related to the proposed development. The analyses shall be conducted for conditions both with and without the proposed project in order to establish the incremental impacts of the project and the incremental needs it generates.

Level of Service and Capacity Analysis

The evaluation of traffic operating conditions is referred to as level of service (LOS). The assessment of LOS is based on the quantitative effect of factors, such as speed and volume of traffic, geometric features of the roadway or intersection, traffic interruptions and delay, and freedom to maneuver.

Signalized Intersections

Signalized intersection level of service will be determined utilizing the methods contained in the Highway Capacity Manual (HCM), 2000 or most recent edition. Two methods (operational and planning) are provided for the analysis of signalized.

Unsignalized Intersections

Unsignalized intersection level of service will be determined utilizing the methods contained in the Highway Capacity Manual (HCM), 2000 or most recent edition.

Safety Vehicles

The initial review of existing data within the study area shall include the accident experience for the past 3 years. This review should identify locations where roadways serving the site must be analyzed, and measures to alleviate accident hazards must be considered. Accident rates vary, but any intersection with more than one accident per million entering vehicles is worthy of additional analysis. Accident information can be obtained from the Transportation Division.

Pedestrians and Bicycles

The site plan should be reviewed to ensure that the internal circulation system and external access points are designed for pedestrian safety and to minimize vehicle / pedestrian conflicts. Locations for transit stops and their associated pedestrian flows to building access points require thorough assessment to ensure safety. Similarly, pedestrian flows to and from parking facilities need careful consideration during site planning, which often requires detailed information on the project's use and layout.

These considerations should also be addressed for projects expected to generate significant bicycle traffic.

Formulation of Mitigation Alternatives

When the analyses indicate that a particular location is projected to operate at an acceptable level of service, no improvements are required. If, however, deficiencies are recognized, then improvements in access, geometry, or operations must be investigated. When reasonable improvements cannot sufficiently accommodate projected traffic, more detailed assessments of project size, land use, or development phasing may be required. Projects may necessitate improvements to the area's roadway infrastructure. The nature of these improvements and their timing must be related to the anticipated phasing of the development, as well as the changes within the study area as a whole.

Project mitigation alternatives may include transportation demand management measures, including, but not limited to transit, bicycle, and pedestrian improvements.

Site Access and Off-Site Improvements

Study recommendations and conclusions are intended to provide safe and efficient movement of traffic to and from, within and past, the proposed development, while minimizing the impact to non-site trips.

The following levels of service are required after the completion of each phase of the development, as well as completion of the entire project:

All intersections and arterials must operate at LOS D (or better) during the peak traffic hours of the roadway system. All intersection approaches, and intersection turning movements should operate

at LOS D (or better) and must operate at LOS E (or better) during the peak traffic hour of the roadway system. When the planning analysis is performed, the requirement will be that all intersections operate at "near capacity" or "under capacity."

In areas where current levels of service, or future levels of service without the development, are E or worse, the delay or v/c ratio may not be significantly increased by the development traffic.

Recommendations

During the final phase of the study, all analyses are reviewed and re-assessed to best respond to the actual transportation needs of the project and the adjacent area. Results must be placed in logical perspective and sequence.

In high-growth areas, particularly when large developments are being analyzed, it is important to determine the impact of individual phases of the development. This procedure becomes necessary in situations requiring assessments to fund improvements. In such cases, the following analyses should be completed:

Levels of service under existing conditions

Levels of service for future horizon dates, with anticipated non-site generated traffic growth. Committed improvements should be included for each horizon year in the analyses. Additional improvements necessary to attain LOS D for base conditions should be identified.

Levels of service including site generated traffic for horizon years, both with and without proposed additional improvements to local and regional roadways beyond those identified in step 2.

Network Improvements

Network improvements recognize that individual developments and increasing traffic volumes are part of the long-term growth of an area. Therefore, a section of the traffic impact study will address compatibility with the existing and planned infrastructure.

Localized Improvements

Localized improvements consist of modification, expansion, and in some cases addition of roadway facilities in the immediate vicinity of the proposed development. The scope of these improvements



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will be consistent with the LOS criteria established above. They will address specific site and through traffic needs, and will be compatible with the city's long-term improvement plans.

On-Site Circulation

An integral part of an overall traffic impact study relates to basic site planning principles. It is extremely important that off-site roadway improvements be fully integrated with on-site recommendations.

Approach to Site Planning

Internal design will have a direct affect on the adequacy of site access points. The identification of access points between the site and the external roadway system, and subsequent recommendations concerning the design of those access points, is directly related to both the directional distribution of site traffic and the internal circulation system configuration. It is clear that driveway traffic volumes of varying sizes need to be accommodated on the site in terms of both providing sufficient capacity and queuing space, and of distributing automobiles to and from parking spaces, pick-up / drop-off points, and drive-through lanes. An integrated system should deliver vehicles from the external roadway system in a manner that is easily understood by drivers, maximizes efficiency, accommodates anticipated traffic patterns, and ensures public safety. Pedestrian linkages should conveniently and safely connect transit stops and parking facilities with building entrances. Similar linkages should be provided between buildings. It must be understood that simply providing access to a site by means of curb cuts does not necessarily mean that access to the development has been adequately addressed. The quality of access as it relates to the internal site circulation and design will have a direct relationship on the quality of traffic flow in and around the site development, as well as a direct impact on public safety.

On-Site Planning Principles

Access Points

Access to the public street system should comply with SLC standards. Exceptions will only be granted when there are demonstrable extenuating circumstances.

Joint access (the sharing of a driveway by two or more properties) is desirable; particularly where property frontages are short and driveway volumes will be low. Such driveways should be located on joint property lines or be accessible via cross-access easements on the private property being served by the joint driveway.

Vehicular Queuing Storage

Adequate internal and external vehicle queuing storage is essential to providing safe and efficient access and circulation. Queuing analyses must be included to demonstrate the adequacy of the proposed storage lanes.

Drive-in and drive-through establishments should be provided with adequate queue storage capacity to accommodate normal peak queues. Since many of these businesses have major daily or seasonal variations in activity, peaking characteristics should be carefully evaluated.

Internal Vehicular Circulation

Internal circulation is the means by which vehicular traffic is delivered between entry points and parking areas, pick-up / drop-off points, and service areas. Internal circulation roadways should permit access between all areas. These roads should be designed to safely and efficiently deliver vehicles and pedestrians to their respective destinations.

Service and Delivery Vehicles

Service and delivery vehicles require separate criteria for movement to and from the site. Of particular interest is that adequate turning paths are provided for large service vehicles to allow entry and exit without encroaching upon opposing lanes or curbed areas. In addition, sufficient storage areas must be provided so that service vehicles do not hinder the use of parking and circulation routes for other visitors to the site.

Pedestrian, Transit, Bicycles, and Accessible

Facilities

The overall site plans should also consider public transportation, pedestrians, bicyclists and those with disabilities. Adequate facilities for parking bicycles should be included. Transit facilities, car pool parking, and shuttle bus staging areas should be provided as appropriate for the development. Where provided, these

facilities should be located adjacent to service drive and entrance locations, at key locations along circulation drives, or at major pedestrian focal points along the external roadway system.

Pedestrian connections between these facilities and the site's buildings must be integrated into the overall project design and provide maximum accessibility through the use of sidewalk ramps, etc. These connections must also be provided to the public sidewalk and path or trail systems surrounding the site. See Section 5-6.000 Transit, Section 5-7.000 Bikeways, Section 5-8.000 Pedestrian Facilities, and Section 5-9.000 Neighborhood Traffic Management.

TIS Report

Purpose and End Uses

The purpose of the impact and mitigation analysis is to identify and measure the effects of a proposed development on the surrounding transportation system, and determine appropriate measures necessary to mitigate those impacts. The developer will be able to utilize the report to evaluate their development proposal and site plan. The city will also utilize the report in reviewing the attributes of proposed developments in conjunction with requests for annexation, land subdivision, zoning changes, building permits, or other development reviews.

Presentation

The study report will include at a minimum:

- 1 Study purpose and objectives
- 2 A description of the site and study area
- 3 Existing conditions in the area of the development
- 4 Anticipated nearby development
- 5 Trip generation
- 6 Trip distribution
- 7 Modal split
- 8 Traffic assignment resulting from the development
- 9 Projected future traffic volumes
- 10 An assessment of the change in roadway operating conditions resulting from the development traffic



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- 11 Recommendations for site access and transportation improvements needed to maintain traffic flow to, from, within, and past the site at an acceptable and safe level of service

If the assumptions made in the analysis are based on published sources, then those sources should be specifically referenced.

If other, less readily available sources are used, a more detailed explanation must be provided and a copy of the relevant information provided in an appendix. Please follow the sample report outline provided below and the instructions provided by the Transportation Department staff and / or the Project Coordination Manager when completing the analysis and report. Incomplete reports will be returned to the consultant for revisions or completion prior to a full review of the analysis.



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Definitions

In this document certain words and phrases are defined as follows unless it is apparent from the context that a different meaning is intended.

Address: A unique alphanumeric description that identifies the property location of a parcel of land, a building, or other structure on the Salt Lake City Lyman grid system.

Address suffix: The last component of a location address which is an alpha or numeric code used to identify a one-to-one correspondence between a building and high density occupancy structure within the buildings such as suites, rooms, apartments, condominium units, etc.

Alley: A right-of-way branching from other rights-of-way used primarily for access to the back lot lines.

Avenue: A type of right-of-way designator identifying an east / west thoroughfare similar to a road.

Bay: A type of right-of-way designator identifying a permanent dead end thoroughfare.

Base Line: The north right-of-way line for South Temple Street which benchmark the permanent origins of the Salt Lake City Lyman Grid System and provides a level datum from which the coordinates of all other streets and location addresses are calculated.

Boulevard: A type of right-of-way designator identifying, generally a major thoroughfare which acts as a collector street usually containing a planted, raised, or striped median. In residential areas, it is usually a wide thoroughfare with shade trees.

Circle: A type of right-of-way designator identifying a permanent dead end thoroughfare.

Court: A type of right-of-way designator identifying a reduced right-of-way thoroughfare.

Cove: A type of right-of-way designator identifying a permanent dead end thoroughfare.

Cul de Sac: The bulbous end of a dead end thoroughfare. The term is never used as a type of right-of-way designator.

Director: Director of the Department of Community and Economic Development.

Drive: A type of right-of-way designator identifying a winding thoroughfare.

Expressway: A type of right-of-way designator identifying an arterial thoroughfare with limited access and limited traffic control devices. Usually no access is allowed to private property.

Highway: A type of right-of-way designator identifying designated State or Federal thoroughfare.

Interstate: A type of right-of-way designator indicating roads of the highest order, characterized by limited access, wide right-of-way, prohibited to adjacent development and with through traffic preference.

Lane: A type of right-of-way designator identifying secondary roads or sometimes reduced rights-of-way branching from Courts, Places, Etc.

Loop: A type of right-of-way designator identifying a thoroughfare that loops or returns to itself.

Lyman Street Grid System: The Salt Lake City coordinate system developed by Richard E. Lyman of Salt Lake City which is presently implemented and used to establish location of streets and addresses.

Meridian Line: The west right-of-way line of Main Street which benchmark the permanent origins of Salt Lake City's Lyman grid system and provides a level datum from which the coordinates of all other streets and location addresses are calculated.

Parkway: A type of right-of-way designator that identifies a special scenic route. (See Boulevard).

Place: A type of right-of-way designator indicating a permanent dead-end thoroughfare.

Right-of-Way: Property over which a public road passes established by common or statutory law. Ownership of the underlying property may be either public or private.

Road: A type of right-of-way designator indicating a thoroughfare that is frequently used, has heavy traffic volume, runs in any direction and is not a Street or an Avenue.

Row: A type of right-of-way designator indicating a permanent dead-end thoroughfare.

Street: A type of right-of-way designator indicating a north / south thoroughfare similar to a road.

Thoroughfare: Any public rights-of-way, under public or private ownership, designed for the travel of pedestrian and motorized vehicles to enter and exit through passage.

Way: A type of right-of-way designator indicating a winding thoroughfare. (See also Drive).

Policies

Criteria for Eliminating Duplicate Numbers

The City Engineer is solely responsible for eliminating duplicate and non-sequential address numbers. All errors are to be resolved by the Engineering Division.

Criteria for Eliminating Duplicate Name Designator

City Council may change duplicate name designator (street names) without petition or hearing when it is determined that the change is in the public interest. Existing street names may be changed by petition or on the recommendation of the Director of the Department of Community and Economic Development. In either case, a public hearing before City Council is required unless 100% of the property owners adjacent to the right-of-way endorse the proposed street name change.

- The following criteria is used when considering name changes.
- Name designator with historical significance should be retained, whenever possible, over other street names when considering elimination.
- The number and types of buildings which will have their addresses changed.
- The length of time the name has been in use.
- The length of the street and the amount of traffic.
- Compatibility with adjacent streets.

Criteria for Eliminating Inappropriate Type of Right-of-Way Designator

The Director of the Community and Economic Development Department may change types of right-of-way designator with or without petition in accordance with the following criteria.



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The street changes character either by extension, vacation, or otherwise and the designator becomes non-descriptive of the type of right-of-way.

- City Engineer must recommend the change to the Director.
- No public hearing is required.

Street Name Conventions to be Disallowed

In accordance with the goal of minimizing confusion in street names containing local and other characteristics, the following criteria shall apply.

Either of the four compass directions shall not be used as part of the street name (i.e., Eastwood). This is to eliminate the occurrence of double directional in assigning the addresses (i.e., 1229 W. Eastwood Drive).

Either of the standard street types or suffix designations shall not be used as part of the street name (i.e., Springlane Rd). This is to eliminate the occurrence of double street type designator.

Abbreviations of part or all of the street name shall not be allowed.

Building Without Public Frontage Return

Buildings that are hidden behind other buildings or do not have public frontage shall be assigned an address number measured to the centerline of the principal roadway access. Since address numbers are assigned according to footage formula for public frontage, if more buildings exist than the amount of numbers allowed in the principal access frontage, the principal access shall become a named right-of-way of private ownership and address numbers shall be assigned to that right-of-way in accordance with procedures used for numbering publicly owned rights-of-way.

The Planning Director of the Department of Community and Economic Development shall be responsible to control the naming of all public rights-of-way in private ownership. Application through the petition process is required to create a private street and street name.

Creation of Public Right-of-Way in Private Ownership

The Planning Director of the Department of Community and Economic Development shall be responsible to coordinate the naming of all public rights-of-way in private ownership.

Application through the petition process is required to create a private street and street name. Each application must be accompanied with a title insurance report.

All property addresses, (interval numbers) both public and private, shall be identified with an “official house number certificate” on file with the City Engineer.

Most addresses are composed of four designators and occasionally a suffix is included.

Address Certificate Format

Address Number Designator	600, 445
Direction Designator	S, E
Name of Right-of-Way Designator	300 West, Comm. St.
Type of Right-of-Way Designator	Street, Avenue

Address Number (House Number Designator)

A geographic indicator identifying the relationship of the distance of the structure to either Salt Lake Meridian line or Salt Lake Base line.

Direction Designator

A direction component referencing the structure’s compass direction relationship to the Meridian or Base Line. The direction is always abbreviated with the first letter of the direction, (e.g., E, N, S, W).

Name of Right-of-Way Designator

A name distinguishing the location of one thoroughfare from another. The street name is never abbreviated. In some cases, numerals are used in the name designator, (e.g., 300 West, 2100 South, 1825 West, 1300 North).

Type of Right-of-Way Designator

A component of the address which modifies the name designator to distinguish physical characteristics of the right-of-way. This designator is always abbreviated as follows:

Abbreviations for Right-of-Way Designator

Street Type	Abbreviation	Street Type	Abbreviation
Avenue	Ave	Lane	Ln
Bay	Bay	Loop	Loop
Boulevard	Blvd	Parkway	Pkwy
Circle	Cir	Place	Pl
Court	Ct	Road	Rd
Cove	Cv	Row	Row
Drive	Dr	Street	St
Expressway	Exp	Way	Wy

Address Suffix

Some addresses contain a suffix locating parts of a high density area. These suffixes, however, are modifiers of the address.

10 S. Main Street, Suite 1000

5225 W. Wiley Post Way, Lakeside Plaza 2, Suite 500.

Some addresses use only the name of a building or location

401 City and County Building

722 Judge Bldg.

Address Number Designator

The junction of Main Street and South Temple Street is the initial point and the address numbers extend thence east, west, north, south; odd numbers commencing with one on the left and even numbers commencing with 2 on the right.

Procedures in assigning address numbers

Check the atlas plat to determine axis value of intersecting streets. The intersecting street axis values determine the numerical range of the address numbers in the block being examined.

In areas lacking intersecting streets (such as west North Temple Street) before determining address numbers, determine location of future street axis values. Record the axis value in pencil on the Atlas Plat. Make distance measurements from that axis value.

Make all measurements from the nearest right-of-way line of the lower value street intersection. Never make measurements from high valued street intersections.



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When determine an address value for approximately 1650 North, make all distance measurements from the north right-of-way lie of 1600 North Street. Do not make distance measurements from the south right-of-way line of 1700 North Street.

For non-axial straight streets, ratio address numbers by measuring parallel to the base and meridian lines. For serpentine Streets, ratio the number between intersection axis values.

Use the following formulas when making measurements for address numbers.

- 2 numbers = 16.5' on all north / south streets and all east/west streets to 3200 West axis
- 2 numbers = 13.2' on all east / west streets west of 3200 west axis

Check the official address index file to determine the relationship of the proposed address number to the existing numbers. Address numbers shall be in consecutive order and comparable to parallel streets (except in serpentine streets).

Principles in assigning address numbers

Do not assign numbers to any portion of intersecting public rights-of-way.

On streets that do not conform to the four compass directions, address numbers shall be assigned from the axis that most nearly matches the principle direction of the thoroughfare.

Direction Designator

In assigning direction designators relating to the Salt Lake Base Line (north right-of-way line of South Temple Street) use either the North or the South designation.

Use the East or West designation relating to the meridian line (west right-of-way line of Main Street).

Duplicate Street Names

Proposed street names that duplicate existing street names used in the City or elsewhere in the County shall not be allowed.

Phonetic Duplications

Phonetic duplications of street names are not allowed. Theses are duplications of street names that have duplicate or similar pronunciations but are spelled differently.

Subsidiary Duplications

Subsidiary duplication of street names is allowed only under the following conditions:

- only one subsidiary name is allowed
- it must be an intersecting dead-end right-of-way, relatively perpendicular to the parent street from which it is named
- it must not have the same range or overlapping range of frontage interval numbers as those along the entire length of the parent street, regardless of the street direction

Numerical Street Names

Numerical street names are allowed only on straight major thoroughfares. The use of numerical street names is otherwise discouraged.

Confusion

Avoid proposed street names that sound very similar to existing names, street names that have unconventional spellings, long names, and names with uncommon spelling.

Neighborhood Characteristics

Neighborhood street names are encouraged to have characteristics such as: historic, local color and sense of place, overall theme and compatibility with adjacent street names.

Names Change at Meridian and Base Line

Names of proposed streets change where thoroughfare cross Main Street or South Temple Street except numerically named right-of-way or State Highways, or street names approved by City Council.

Intermittent Street Names

Maintain the continuity of a street name along the entire length of the right-of-way overcoming barriers such as rivers, canals, railroad tracks and undeveloped voids except:

- 1 As defined in paragraph "Name Change at Meridian or Base Line" above, or
- 2 If the numerical axis value of the right-of-way shifts more than 100 in either direction.
- 3 In the 10 acre City Blocks, where streets do not or will not extend through the blocks, use individual right-of-way names rather than intermittent names.

Curvilinear Thoroughfares

Do Not Use Numerical Names

Type of Right-of-Way Designator

Continuous or intermittent straight axial thoroughfares Return East / West thoroughfares are designated Avenues, and North / South thoroughfares are designated Streets. These designators are always applicable except as follows:

Axial straight major thoroughfares: Type designators of major thoroughfares whether east / west or north / south may be designated as a "street" or some other designator type.

Curvilinear thoroughfares: Type designators of Curvilinear thoroughfares describe the characteristic of the right-of-way (i.e., Circle, Road, Boulevard, Way, etc.).

Non-axial thoroughfares: Whether straight or Curvilinear, use type of right-of-way designators which describe the characteristic of the thoroughfare (e.g., Street, Avenue, Boulevard, Etc.).

Address Suffixes

Address suffixes are not a part of the official address and the City Engineer does not issue an "Official House Numbers Certificate" for them. They are modifiers used to assist in the location of the portions of property already addressed.

Numbering High Density Structures

Some buildings in Salt Lake City have their own street address (e.g., City and County Bldg., Kearns Bldg., Judge Bldg., etc.). Numbers used therein apply to the floor and office number. Each structure, however, shall have an "Official House Number Certificate" on file with the City Engineer.

2.4.2 Controlling Construction in the Public Way

General

For work in the public way, the Engineer has adopted the latest edition of the Manual of Standard Plans and the Manual of Standard Specifications published by the Utah Chapter of the American Public Works Association. In the event of an inconsistency between this document and the Standard Plans and Standard Specifications, this document shall govern.



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Definitions

AASHTO: American Association of State Highway and Transportation Officials.

ACI: American Concrete Institute.

APWA: American Public Works Association.

Arterial street: A street that is shown as an “arterial street” on the “Major Street Plan” produced by the Traffic Engineer.

ASTM: American Society for Testing and Materials.

CBD: Central Business District includes the area bounded by North Temple Street, 200 East Street, 400 South Street and 400 West Street (including the entire rights-of-way of these streets).

City: Salt Lake City Corporation.

Clean Wheel Ordinance: Ordinance 18.20.210 entitled Cleanup and protection of public rights-of-way in the City Code.

Collector street: A street that is shown as a “collector street” on the “Major Street Plan” produced by the Traffic Engineer.

Emergency: Any unforeseen circumstance or occurrence, the existence of which constitutes a clear and immediate danger to persons and / or property, or which causes interruption of utility services.

Engineer: The City Engineer or his / her authorized representative such as a Public Way Enforcement Officer (inspector).

Industrial street: A street that serves primarily industrial property.

Local street: A street that is shown as a “local street” on the “Major Street Plan” produced by the Traffic Engineer.

Major street: A street that is shown as an “arterial street” or “collector street” on the “Major Street Plan” produced by the Traffic Engineer.

Obstruction: Any object, thing or substance which may interfere with or obstruct the free use or view of the public way by travelers, destroy or render unsightly the surface of a public way, or cause or tend to cause such public way to become restricted in its intended uses or be unsafe or dangerous for travelers thereon.

OSHA: Occupational Safety and Health Administration.

Park Strip: Area between the back of curb and the sidewalk.

Parkway: Area between the edge of the road (or back of curb) and the right-of-way line. Any public sidewalk or other surface feature is a part of the parkway.

Permit: A “Permit to Work in the Public Way”, issued by the Engineer, which allows for construction, excavation or other work in, or obstruction of, the public way.

Permittee: Person or entity of any kind that has been issued a “Permit to Work in the Public Way”.

Proctor Density: For A-1 soils, test method C of ASTM D 1557 or ASSHTO T-180 (Modified Proctor). For all other soils, test method C of ASTM D 698 or ASSHTO T-99 (Standard Proctor).

Public Utility Company: Any company subject to the jurisdiction of the Utah State Public Service Commission, or any corporation providing gas, electricity, water, telephone, cable television, or other utility product or services for use by the general public.

Public Way: All streets, roads, alleys, walkways, sidewalks, parkways and unpaved areas within the public right-of-way. It does not include utility easements outside the public right-of-way, private streets or private alleys.

SBD: Sugarhouse Business District (SBD) comprised of property abutting the following street segments.

- 2100 South Street from 900 East Street to 1300 East Street
- 1100 East Street from Ramona Avenue to 2100 South Street.
- Highland Drive from 2100 South Street to Interstate-80.

State of Utah

Traffic Engineer: The City Transportation Director or his or her authorized representative.

Traffic Control Permit: A permit specific to traffic control that is issued by the Salt Lake City Transportation Division.

UDOT: Utah Department of Transportation

General Requirements

Permit Requirement

A permit to work in the public way must be obtained prior to performing any construction, excavation or other work in or obstruction of the public way.

Persons Eligible for Permit

- 1 Those eligible to apply for and receive a permit include:
- 2 Contractors licensed by the State as general contractors
- 3 Utility companies
- 4 Governmental entities
- 5 Residents installing, replacing, or maintaining less than 500 ft² or 100 linear feet of sidewalk, curb and gutter, or driveway approach, or other work approved by the Engineer, upon a portion of the public way adjacent to their residence
- 6 Persons performing work that requires the use and occupation of the public way, such as the construction or use of a temporary structure, the installation or maintenance of electric signs, glass, or awnings, or the painting or cleaning of buildings or sign boards or other structures.

Permit Application Requirements

To apply for a permit, the applicant shall provide the following information.

- 1 The name, address and telephone number of the applicant. If the applicant is not the owner of the facility, the name, address and telephone number of the owner is also required
- 2 The purpose and method of the proposed work
- 3 A plan showing the proposed location of the work, the dimensions of excavations, the facilities to be installed, maintained, or repaired in connection with the work, surface area affected by the work, and such other details as the Engineer may require, such as elevations of affected improvements
- 4 The proposed start date of the work
- 5 The proposed duration of the work, including the restoration of the public way
- 6 Evidence of insurance as required by Section 14.32.065 of The City Code
- 7 A performance bond of \$15,000.00 (14.32.070)
- 8 Any other information that may reasonably be required by the Engineer.



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Occupation of Public Way with Building Materials

A permit is required to occupy or use any portion of a public way for the storage of construction or landscaping materials, or equipment, unless waived by the Engineer (see next paragraph). Erection of scaffolding, fencing or any temporary structure, or the placement of dumpsters, in the public way requires a permit.

Permit Waivers

The Engineer has the authority to waive a permit. This does not preclude the requirement of a traffic control plan or Traffic Control Permit if vehicular or pedestrian traffic is affected by the work. Waivers may be granted for the following:

- 1 Routine maintenance work done by the City, State or public utility company personnel when the work does not involve excavation in the public way. Routine maintenance work may consist of crack sealing, patching, street resurfacing, snow plowing, sanding, sweeping, garbage collection, storm drain cleaning, leaf pickup, above-grade work, lane striping, etc.
- 2 Landscape maintenance (including paving materials) or landscaping (21A.48.060). This includes planting trees in the park strip.
- 3 Installation or repair of a sprinkler irrigation system as long as the work does not result in damage to any public way facilities such as sidewalk or landscaping outside of the work area.
- 4 Minor adjustment to utility meters, valves, or manholes in the parkway provided said adjustment does not result in:
- 5 Excavation in the parkway in excess of 42" in depth or 16 ft² in area,
- 6 Use of heavy equipment (as determined by Engineer),
- 7 Alterations or damage to public facilities.
- 8 When a permittee allows other contractors or utility companies to perform work in the permitted trench limits.
- 9 Work occurring within the property boundary of the Salt Lake City International Airport. This work must be approved and inspected under the direction of the Salt Lake City Airport Authority.

- 10 Storage of materials in the public way when authorized by the Engineer, in compliance with the provisions of the City's Traffic Control Manual and "Clean Wheel Ordinance" (18.20.210).
- 11 Installation of street improvements by the developer, including drive approaches and sidewalks, within a new subdivision prior to final bond release of the subdivision.
- 12 Street reconstruction or rehabilitation accomplished as a City capital improvement project under the direction of the Engineer.
- 13 Frames and lids for underground structures are raised or lowered.

Permit Fees / Fee Waivers

The city engineer may waive permit fees or penalties or a portion thereof, provided for in this chapter, when he / she determines that such permit fee or penalty:

- a pertains to construction or rehabilitation of housing for persons whose income is below the median income level for the city
- b pertains to an encroachment on the public way involving a beautification project which furthers specific goals and objectives set forth in the city's strategic plan, master plans, or other official documents, including decorative street lighting, building facade lighting, flower and planter boxes, and landscaping.

Emergency Work

Maintenance or repair of pipelines or facilities in the public way may proceed without a permit when emergency circumstances demand the work be done immediately and a permit could not reasonably have been obtained beforehand. Anyone performing emergency work in the public way during regular office hours of the Engineer shall notify the Engineer within 1 hour after commencing the work. If the emergency occurs on a weekend or between 5:00 pm and 7:00 am on a weekday, permittee shall notify the Engineer by 9:00 am of the next workday. All necessary safety precautions for the protection of the public and control of traffic shall be taken.

Job Site Permittee Identification

During construction and any other period of time that the public way remains obstructed, identification signs shall be posted at the site with minimum 2" high letters indicating permittee's

name, or company name, telephone number, and both daytime and after-hours telephone numbers. At least one sign shall be posted for each block face affected by the construction.

Parking Meter Removal or Occupation

If any of the activities permitted by this document require the removal or bagging of parking meters or the occupation of a freight zone, permittee shall obtain a parking meter permit from the SLC Transportation Division (349 S. 200 East Street, Suite 450, 801-535-6630) and pay the required fee.

State Highway Permits

A UDOT encroachment permit is required on the work within the portion of the state highway located between the back of curb on either side of the highway including street pavement cuts and curb and gutter, as well as drive approaches and sidewalk ramps extending behind the back of curb. A City permit is required for any work behind the curb, including park strip utility trenches and sidewalks, but excluding drive approaches and sidewalk ramps. New sidewalk installed abutting the curb adjacent to a state highway must be at least 6' in width. Less width may be permitted by Engineer if there is not room in the public way.

Timing of Work Progress

Permit work shall be completed within 30 calendar days from the starting date written on the permit or within a time frame approved by the Engineer. (14.32.135)

In the Business Districts and on major streets, backfilling and paving shall be done on a daily basis, paving immediately after backfilling, unless otherwise authorized by the Engineer. Special care shall be taken in the Business Districts to minimize traffic impact and to honor peak hour traffic prohibitions.

Excavations in parkways shall be completed and backfilled within 5 working days. To prevent loss of vegetation, irrigation systems shall not be out of service for more than 5 days. Disturbed grass areas shall be replaced with sod as soon as possible.



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Unpaved and open trench lengths shall not exceed 2 city blocks. Manholes or other appurtenances requiring added construction and cure time may be left unpaved for the additional time needed if they are properly barricaded. The Engineer may change these requirements as conditions warrant.

Inspection Services & Notification

The Engineer provides inspection services, the cost of which is included in the permit fee. Notify the Engineer at least 24 hours prior to commencing work of any kind in the public way and again at least 24 hours prior to installing pavement (asphalt or concrete) or a sidewalk ramp. Permittee shall also notify SLCPU 24 hours prior to commencing work on a sewer, water or storm drain line in the public way. Additional inspections fees could be included by the Engineer.

Work Hour Restrictions

Except for emergency work or unless authorized by the Engineer, construction operations such as excavation, backfill and pavement restoration on major streets and the streets within the business districts are prohibited during the peak traffic hours of 7:00 am to 9:00 am and 4:00 pm to 6:00 pm. The Engineer may impose additional work hour restrictions.

Business Access

Access to all existing businesses must be maintained at all times unless otherwise authorized by the business owner in writing. Special care shall be taken to maintain business access, minimize traffic impact and honor peak traffic hour prohibitions in the business districts.

Noise Restrictions

Construction operations in residential or commercial land use districts are prohibited during nighttime hours from 9:00 pm to 7:00 am (and before 9:00 am on a Sunday or legal holiday) (9.28.040.B.7.a). The Salt Lake Valley Health Department has primary, but not exclusive, enforcement responsibility for noise from stationary sources, and shared enforcement responsibility with appropriate law enforcement agencies for vehicular sources.

Winter Moratorium

Excavation in the public way during the winter months, herein defined as November 16 to March 31, will be allowed only if the work is a new service connection, required maintenance or emergency, or otherwise approved by the Engineer. Permanent restoration in the winter shall be accomplished as soon as weather conditions allow. This restriction will be strictly enforced in the business districts during the holiday shopping season (November 25 to January 1).

Job Site Safety

Protection of the workers and the public are imperative. All excavation, shoring, trenching, stockpiling of excavated materials, etc. shall comply with the OSHA Construction Industry Standards as well as all applicable Federal and State regulations.

Vehicular and Pedestrian Traffic Barricading

Construction operations shall be conducted in a manner to promote the safety of the workers and the public and to minimize the interference or interruption of roadway and pedestrian traffic. If, as a result of the work, vehicular or pedestrian traffic is to be obstructed, the following requirements apply:

- 1 Traffic Control Permit: Permittee shall contact the City's Transportation Division whenever traffic is to be obstructed by construction operations or storage of materials to determine if a Traffic Control Permit (distinct from the "Permit to Work in the Public Way") is required. A Traffic Control Permit may be required for partial or complete closure of any public right-of-way, street, sidewalk or alley.
- 2 Workzone Traffic Control Guide: Permittee shall comply with all provisions of the guide whether or not a Traffic Control Permit is required. The guide provides regulations on traffic control, construction barricades, road and sidewalk closures, traffic control signs and devices, and typical application diagrams.

- 3 Traffic control devices: Traffic control devices, including barricades, must be in place before excavation begins and must be well maintained and kept clean to be visible throughout the construction period until all of the permittee's equipment is removed from the site, restoration of the public way has been completed and the work site has been cleaned. Signs and devices shall be removed promptly after the work ends to minimize traffic disruption. Signs and channelizing devices (barricades) shall be removed in the reverse direction of traffic.
- 4 Warning lights: From sunset to sunrise, all excavations must be clearly outlined by adequate reflective panel barricades and warning lights. Only steady burn lights shall be used to delineate the edge of the travel way or to channelize traffic at night.
- 5 Signs not in use: To avoid driver deception and disrespect of other work zones, signs shall be covered or temporarily turned aside when the message does not apply. If the sign itself creates a hazard, it must be removed. Signs must be removed promptly when no longer needed.
- 6 Pedestrian Access: When an existing sidewalk is removed or inaccessible, the permittee must post sidewalk closed signs as defined by the Traffic Control Permit, or provide an accessible hard surface pedestrian access through or around the construction zone. Where feasible, the permittee must provide the minimum grade and safety standards as outlined in the Americans with Disabilities Act (ADA) and must provide adequate protective barricading for visually impaired pedestrians.
- 7 Worksite Traffic Supervisor: On projects involving extensive traffic control, the Engineer may require a worksite traffic supervisor (Traffic Control Technician), employed by the permittee and approved by the Engineer to be present on-site while work is underway.
- 8 Notification: In addition to notifying the Salt Lake City Transportation Division, permittee shall notify the Salt Lake City Police Department, the Salt Lake City Fire Department and the Salt Lake City Streets Division at least 24 hours in advance of any planned excavation requiring street closure or traffic detour.



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Environmental Control

Permittee shall control dust and debris at the work site at all times. If necessary, wet down dusty areas with water and provide containers for debris. The Engineer reserves the right to stop work or issue a citation if dust and debris are not controlled.

- 1 Clean Wheel Ordinance (18.20.210). The permittee shall install a suitable process to clean the wheels of the equipment prior to its leaving the job site and entering City streets.” A violation of the ordinance is punishable as a Class B misdemeanor.
- 2 Discharge of Pollutants: Permittee shall make available at the jobsite the “Storm Water Pollution Prevention Plan” for examination by the Engineer. For sites over 1 acre, a permit issued by SLCPU and by the Utah Division of Water Quality is required. Permittee shall prevent erosion of soil and the discharge of soil or other pollutants to any storm drainage facilities and shall prevent the contamination of downstream waterways. If the discharge of pollutants, including soil, from the jobsite occurs, permittee shall immediately take action to clean up the discharged soil, pollutants, etc. and to implement corrective measures to prevent further occurrences.
- 3 Dewatering: Permittee shall not discharge groundwater into storm drainage facilities except as authorized by SLCPU.
- 4 Drainage Channels: Existing drainage channels, ditches, pipes or gutters shall be kept free of dirt, construction materials or other debris. When it is necessary to block or otherwise impede flow, a proposed method to convey drainage around the obstruction must be submitted to the Engineer for approval prior to blocking the channel. (14.32.130)
- 5 Cleanup: Permittee shall remove all equipment, material, barricades and similar items and clean dirt, mud or other material from the work zone as soon as possible after completing the work. Permittee shall properly dispose of lubricants, drilling fluids, etc., to prevent contamination of the soil and the groundwater.

- 6 Hazardous Material: If hazardous material is spilled or discovered, permittee shall immediately contact the Salt Lake City Fire Department by calling 911 for a HAZ MAT crew. If the material exceeds 25 gal, permittee shall also contact the Utah State Department of Environmental Quality - Division of Solid and Hazardous Waste (538-9407) and the Engineer. Permittee shall follow OSHA and EPA requirements in cleaning up and disposing of the material.

Unsafe or Unsatisfactory Work Performance

If the work is unsatisfactory or if unsafe construction practices are observed, the Engineer may take the following actions in order of increasing magnitude:

- 1 Issue a verbal warning regarding an unsafe or unsatisfactory practice
- 2 Issue a written warning notice identifying the problem and the amount of time the permittee is allowed to correct the problem
- 3 Issue a “stop work order” (verbal or written)
- 4 Issue a citation
- 5 Suspend the privilege of obtaining future permits.

Tree Protection and Removal

Any tree located in the public way in the immediate vicinity of any excavation, demolition, or construction activity shall be protected from injury. Permittee shall contact the City Urban Forester to receive authorization to excavate adjacent to a tree, remove a tree or plant a tree in the public way. Permittee shall follow instructions provided by the Forester for cutting tree roots.

Protection of the Public and Existing Facilities

Public Access: Permittee shall provide free and unobstructed access to all driveways, mail boxes, trash receptacles, fire hydrants, water valves, manholes, drainage structures and other public service structures and property. Permittee shall not remove or relocate public service facilities without proper coordination with the authorities charged with their control and maintenance.

Private Access: When required, the permittee shall construct and continuously maintain temporary, all-weather roadways, driveways, walks, and private rights-of-way for vehicles and pedestrians. If residential driveway access can't be maintained, permittee shall notify the property owner prior to commencing work.

Traffic Control Devices: The permittee shall not obstruct the view of traffic control devices such as signal lights, traffic control signs, etc. All disturbed traffic control devices, including traffic signal loops, shall be repaired or replaced by the permittee.

Survey Monuments: When work may disturb or damage a City survey monument, permittee shall notify the City Surveyor (801-535-7973) in advance. Work shall not proceed until the monument has been referenced. When referencing or replacing a monument, comply with APWA Section 01 71 24 entitled Survey Referencing and APWA Plans 272, 273, 274 & 275.

Pre-construction Photographs: Prior to commencing the work, the permittee is encouraged to secure photographs which show the condition of the existing public way improvements such as curb and gutter, sidewalk, asphalt surfaces, fences, landscaping, sprinkler systems, etc.

Restoration: The permittee shall restore all public way facilities that become modified, damaged or removed as part of the permit, including landscaping, to a condition that is comparable to or better than the condition that existed prior to the commencement of the work. Permittee shall take extra care to protect sidewalk beautification features from damage. Crosswalk and sidewalk pavers and sidewalk beautification features that are removed must be restored by personnel qualified to ensure their proper replacement.

Warranty

Work performed under a permit, such as pavement restoration following excavation activity or the installation of new concrete improvements, carries with it a standard 3 year warranty, guaranteed by the permittee's performance bond. If the workmanship is defective, the permittee must correct the defective work or be subject to a claim upon the performance bond. The limitation of the duration of the bond to 3 years does



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not limit the obligations of the permittee, which extend beyond the 3- year period. There is no additional fee or completion certificate associated with the warranty inspection.

Design

Whenever the work involves the placement, extension or the relocation of a utility facility, a copy of the design drawings shall be submitted to the Engineer and to SLCPU detailing the location and type of the proposed facility.

Drawing Standards

Drawings shall be submitted clearly showing a north arrow, street names, right-of-way lines, monument line and street centerline, accurate location of existing roadway improvements and underground facilities.

The proposed facilities shall be shown in solid bold lines with dimensions to establish their location. The drawing scale (not greater than 1" = 40' shall show the required detail. Installation of over 30' of new curb & gutter where none previously existed requires the submittal and approval of an engineered plan and profile drawing. Existing elevations along the edge of roadway and proposed cross slopes into the new curb and gutter shall be shown.

Work involving in kind pavement surface replacement or repair of existing facilities in the public way does not require a drawing unless new facilities are relocated either horizontally or vertically from the previous location.

Minimum Clearances with Existing Utilities

For existing storm drain and water lines, the minimum clear horizontal separation from the new facility is 3'. For existing sanitary sewer lines, the minimum clear horizontal separation from the new facility is 5'. The minimum vertical separation on perpendicular crossings of sewer, water and storm drain mains is 18" above and 6" below the existing line. Any deviation from these minimum standards must be approved by the SLCPU prior to construction. Non-perpendicular crossings may require more vertical separation.

For other utilities, such as gas, power and telecommunication facilities, the permittee shall contact the owner of each utility within the project limits to obtain minimum clearance requirements.

A designer may contact Blue Stakes to obtain information on the location of existing facilities. Member utilities will respond within 14 days of the request in one of the following ways:

- 1 Request a meeting at the location of the job site.
- 2 Provide prints of the location of the facilities at the proposed job site.
- 3 Locate and mark the underground facilities.

A Subsurface Utility Engineering (SUE) survey may be required using geophysical methods (Level B) and / or non-destructive vacuum excavating (Level A) to examine the feasibility of a project or to avoid conflicts where underground facilities are congested.

Minimum Cover

The minimum cover over a pipe, conduit, duct, cable or vault is 36" in streets and 24" in unpaved areas, including park strips. This is intended to provide enough depth to allow for future roadway paving without damaging the buried facility.

Flowable fill that encases a buried conduit or duct may occupy the space within 36" of finish grade if approved by the Engineer. Storm drain pipes may be installed with 24" cover in streets. Any deviation from these minimum depths requires approval from the Engineer. Traffic signal detector loops are exempt from this minimum cover requirement.

Construction Details

Preparation

Excavating shall not begin until the permittee has located all underground utilities in the area and established appropriate traffic control measures.

Keyholes (small test holes) are prohibited in wheel paths or within 2' of the edge of pavement or joint. Where less than 1 ft² of asphalt or concrete is removed, it is not necessary to remove additional pavement beyond the limits of the excavation. Test holes shall be filled and resurfaced with material matching the surrounding pavement, and in the case of asphalt, the material must be adequately compacted.

Blue Stakes Notification

In accordance with Section 54-8a of the Utah State Code, the excavator (permittee) must notify Blue Stakes at least 2 working days prior to commencing work.

Trenchless Technology

Directional boring and other methods of trenchless utility installation are encouraged, and may be required by the Engineer, to minimize the disturbance to street improvements and traffic flow.

- 1 Preparation: Submittal of a subsurface investigation may be required by the Engineer. Investigation of the horizontal and vertical location of existing buried facilities prior to commencement of the work is required to avoid conflicts.
- 2 Installation: Permittee shall use extreme caution to avoid conflict, contact or damage to existing utilities and appurtenances, and ensure minimum depth requirements are met during the course of construction. If damage occurs, the permittee shall immediately notify the owner of the utility and make any repairs required by the owner.
- 3 Restoration: Any voids between the finish grade and the conduit or utility shall be filled prior to backfilling the bore pits. All entrance and exit bore pits and other areas used shall be cleaned of all objectionable material, properly backfilled and restored to the original contour and surface material.

Cutting Pavement

All pavement shall be cut in neat, straight, and vertical lines prior to excavation unless otherwise authorized by the Engineer.

- 1 Asphalt streets: Details relative to cutting asphalt streets are shown in APWA Plan 255 entitled Asphalt Concrete T-Patch. Two cuts on each side of the trench are required unless otherwise approved by the Engineer. Approved methods for the second cut (full depth) include saw cutting and rotomilling. A mechanical hammer shall not be used for the second cut except under unusual conditions when authorized by the Engineer.



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- Concrete streets and drive approaches: Details relative to cutting and removing concrete in concrete streets are shown in APWA Plans 256 entitled Concrete Pavement Patch and APWA Plan 261 entitled Concrete Pavement Joints. Replacement of the entire panel is required if the area affected by the work exceeds $\frac{1}{2}$ the panel area. Replacement of anything less than $\frac{1}{2}$ the panel requires approval from the Engineer.

Excavating

Execution

Permittee shall use extreme caution to avoid conflict, contact or damage to existing utilities and appurtenances during the course of construction. In case accidental contact with another facility occurs, the permittee shall immediately notify the utility owner or company involved and make repairs as required by the owner. Excavated material that does not meet backfill material specifications shall be removed from the job site as soon as possible.

Blasting

If blasting is required, follow Section 18.44.105 of the Salt Lake City Code.

Excavation Restrictions

Except as provided in the City Code (14.32.090), the Engineer shall not issue a permit to work in any portion of the public way subject to an excavation restriction. Excavation restrictions shall be imposed by the Engineer for 7 years following the completion of new streets, and for 3 years following the resurfacing of streets. Following the completion of any work in the public way pursuant to a permit, the Engineer shall impose excavation restrictions of 5 years either solely on the owner performing such work or on such owner and on such other prospective permittees or class of prospective permittees as the Engineer shall determine.

Trench Plates

Trench plates are used to allow a travel lane to be opened over an open trench, to protect flowable fill while it cures, or for other special circumstances.

Permittee shall provide the Engineer with a 24-hour contact person for immediate response in case a plate moves or must be replaced.

Each trench plate shall overlap the open excavation by at least 12" on all sides. Each plate shall be pinned to the pavement on all sides or otherwise fastened to the pavement sufficient to prevent it from moving under heavy traffic loads. Each plate shall be seated properly to avoid rocking and unreasonable jolts to traffic crossing the plate. Asphalt may be installed to smooth the lip at the edge of the plate but not as a substitute for pinning. Permittee shall monitor each plate, at least daily, even if no other construction activity is underway.

To avoid potential problems with snowplows, the use of trench plates between November 15 and April 1 is not allowed, unless authorized by the Engineer.

Backfilling and Compacting

Compaction Equipment

The permittee shall not commence backfilling until approved compaction equipment is on-site. Should backfilling commence without having approved equipment on site, Engineer shall have the option to require the permittee to remove and replace the backfill materials. Approved compaction equipment shall be capable of providing required compaction as outlined in APWA Section 33 05 20 entitled Backfilling Trenches, APWA Section 32 05 10 entitled Backfilling Roadways, and APWA Section 31 23 26 entitled Compaction. Backhoe buckets shall not be considered approved compaction equipment. Jetting will not be allowed unless written permission is obtained from the Engineer.

Foundation Stabilization

Use sewer rock (2" minus) or get The Engineer's permission before installing common fill to stabilize foundations or pipe zones. Vibrate to stabilize. Installation of stabilization-separation geotextile will be required to separate backfill material and native subgrade materials if common fill or sewer rock cannot provide a working surface.

Backfilling in Pipe Zone

For the type of pipe material, follow backfilling requirements as indicated in APWA Plan 382 entitled Pipe zone backfill. Pipe zone extends from 6" below the pipe to 12" above the pipe.

In "dry" installations, use Grade $\frac{3}{4}$ untreated base course material (APWA Section 32 11 23).

In "wet" installations (below the water table when approved in advance by the SLCPU Chief Engineer) use 2" minus sewer rock.

Backfilling Pipe Above Trench Zone

Trenches less than 18" wide:

- Street pavements (includes to 1' beyond the edge of pavement or back of curb): Cement Treated Flowable Fill: as defined in the APWA Specification Section 31 05 15 entitled Cement Treated Fill (also known as "controlled low-strength material" or "flowable fill") containing 42 lb. of cement per cubic yard and having a design strength of 60 psi at 28 days. The flowable fill supplier must be approved by the Engineer prior to use. If installed up to the pavement surface as a temporary patch, the top portion of the flowable fill shall be replaced with road base and/or pavement as soon as possible. Flowable fill shall be tested for maximum compressive strength at the rate of one test per day or one test per 50 yd³, whichever is greater. If test results exceed 120 psi at 28 days, permittee must remove the flowable fill as directed by the Engineer. If it is in the best interest of the City, the Engineer may waive the removal until it becomes necessary to do so.
- Park strips and road shoulders: Either or both of the following.
 - Granular Backfill Borrow (2" minus): as defined in APWA Section 31 05 13 entitled Common Fill
 - Untreated Base Course (UTBC): as defined in APWA Section 32 11 23 entitled Crushed Aggregate Base.

Trenches 18" wide or greater:

- State roadways.
 - Under street pavement: As required by UDOT.
 - Not under street pavement but within State right-of-way: as defined in Park strips and road shoulders, above.
- City streets:
 - Granular Backfill Borrow (2" minus): as defined in APWA Section 31 05 13 entitled Common Fill. Native soil free of slag, asphalt, squeegee sand, pea gravel, sewer rock, organic or other deleterious material, and meeting the gradation for Granular Backfill Borrow may be used if it can be compacted to 95% of the proctor density.



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Trenches less than 30" wide in travel lanes of City arterial streets; Flowable fill as defined above, unless waived by the Engineer.

Unacceptable materials in the trench zone: Squeegee sand, pea gravel and sewer rock are not allowed as backfill in the trench zone due to their free flowing nature when undermined. Concrete mixes with more than 42 lb of cement per cubic yard are not acceptable except when used for concrete thrust blocks. Any exceptions must be approved by the Engineer prior to placement.

Geotextile Fabric: The Engineer may require the permittee to install geotextile fabric if it was removed during trenching or where the potential for migration of fines from one backfill material to another exists.

T- Patch backfilling: APWA Plan 255 specifies additional backfilling and compacting requirements for "untreated base course" at the top of the trench when the resurfacing is done with asphalt.

Compaction: Permittee shall use caution to avoid damaging underground facilities and adjacent structures during compaction operations. Proper compaction requires that backfill be placed in lifts not thicker than 8" before compaction and compacted to 95% relative to a standard proctor for common backfill material or modified proctor for select backfill materials.

- 1 Proof rolling: Where feasible, the permittee shall proof roll the compacted backfill material to determine if any soft, yielding or otherwise unacceptable areas exist. Any such areas shall be replaced and recompacted.
- 2 Testing: Permittee shall employ an independent testing agency to perform nuclear density testing (and a proctor density determination if one is not already available) when the scope of work involves more than 200 lineal feet of trench. Tests shall be taken on each lift at the rate of 1 test per 200 lineal feet of trench. Permittee shall replace or recompact the material in areas tested below 95% of the proctor density, and retest until at least 95% has been achieved. The Engineer may require nuclear density testing on permits with less than 200 lineal feet of trench if the following is observed:
 - a High or low moisture content of the backfill material,
 - b Inadequate compaction equipment at the jobsite,
 - c Inadequate compaction effort,

- d Lifts exceeding 8" were placed before compaction,
- e Other indications of inadequate compaction of the material.

Resurfacing

Asphalt, Concrete, Pavement

All materials shall comply with the APWA standard specifications. The mix design must be approved by the Engineer prior to use. A list of the approved batch plants is posted at the office of the Engineer and is updated regularly. Unless required by the Engineer, a separate submittal is not required if an approved batch plant is used.

Marshall Mix: AC-20 or PG58-22 are the minimum asphalt binders allowed.

- 1 Collector and arterial streets that are being patched shall be resurfaced with Grade DM- $\frac{3}{4}$ aggregate as specified in APWA Section 32 12 05 entitled Asphalt Concrete. Local (residential) streets that are being patched shall be resurfaced with Grade DM- $\frac{1}{2}$ aggregate.
- 2 As a minimum DM- $\frac{3}{4}$ aggregate shall be provided for new streets surfaces such as in new subdivisions.

Superpave Mix: PG 58-22 is the minimum asphalt binder allowed.

- 1 Collector and arterial streets that are being patched shall be resurfaced with Grade 12.5 aggregate as specified in APWA Section 32 12 06 entitled Superpave. Local (residential) streets that are being patched shall be resurfaced with Grade 9.5 aggregate.
- 2 As a minimum Grade 12.5 aggregate shall be provided for new street surfaces such as in new subdivisions.

Temporary Asphalt Patching: When permanent surfacing is not feasible due to weather conditions or material availability, temporary asphalt shall be installed where vehicular or pedestrian access is required. The temporary asphalt shall be continuously maintained and repaired while in place and shall be replaced with permanent material as soon as favorable conditions allow. The minimum thickness of the temporary asphalt is 2" in streets and 1" in sidewalks. Additional thickness may be required.

Maximum length of unpaved trench: Unless otherwise approved by the Engineer, no more than the equivalent length of 2 City blocks may be unpaved at any time.

Permanent Asphalt Patching: (14.32.135). Individual lift thickness under Marshall design or Superpave design shall not exceed 4". Installation and compaction requirements are indicated on APWA Plan 255 entitled Asphalt Concrete T-Patch. For patches over 8' wide and over 50' long, a self-propelled paving machine shall be used.

- 1 Minimum thickness: The patch thickness shall be 1" thicker than the surrounding asphalt but not less than 4".
- 2 Concrete Substrate Replacement: In some cases, the Engineer may require replacement of the existing concrete substrate with concrete.
- 3 Maximum thickness: If allowed by the Engineer, existing combined concrete substrate-asphalt overlay pavement thickness may be replaced with only asphalt concrete. If the existing thickness exceeds 8", the maximum pavement replacement thickness shall be 10" of asphalt concrete.

Asphalt Testing

Permittee shall employ an independent testing agency to perform nuclear density tests for resurfacing exceeding 1,000 yd². The Engineer may require testing on projects with less than 1,000 yd². The compaction requirement relative to a maximum Rice density (ASTM D 2041) is 94% \pm 2%.

Cover Collars

After permanent resurfacing has been installed, permittee shall cut and remove the asphalt around each survey monument, water valve, storm drain box and sewer manhole encompassed by permittee's work and shall install a 6" wide concrete collar around survey monuments and water valves and a 12" wide concrete collar around sewer manholes and storm drain boxes. If other utility boxes are affected, permittee shall contact the owner of the facility to coordinate collar replacement. The concrete collar shall be set $\frac{1}{4}$ " to $\frac{1}{2}$ " below the surrounding asphalt surface.



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Bituminous Seal Coat

Excavation of a street which has been paved or reconstructed within the past two years requires authorization by the Engineer. If permittee is allowed to do work Engineer may require a seal coat conforming to APWA Section 32.01.13 entitled Slurry Seal. The seal coat shall have a uniform level surface with feathered edges extending from lip of gutter to lip of gutter.

Portland cement concrete pavement

All concrete materials shall comply with APWA standard specifications. The concrete mix design must be approved by the Engineer prior to use. A list of the approved batch plants is posted at the office of the Engineer and is updated regularly. Unless required by the Engineer, a separate submittal is not required if an approved batch plant is used.

Concrete Design Mix

Unless indicated otherwise, concrete for streets, sidewalks, drive approaches and curb & gutter shall be APWA Class 4000 concrete. Between October 1 and March 1 concrete will be APWA Class 5000. Concrete installed on Major streets shall be a quick cure concrete mix designed to reach 3000 psi within 48 hours. Use of color dye is not allowed, unless approved by the Engineer.

Streets

Concrete pavement patching and jointing requirements in City streets are shown in APWA Plan 256 and 261. Rebar or dowels must be epoxy coated. Permittee shall finish the surface to match the adjacent surface finish and apply a membrane forming curing compound indicated in APWA Section 03.39.00 entitled Concrete Curing or use an approved alternate curing method. If joint sealant exists in the adjacent concrete pavement joints, the new joints shall be saw cut and sealed to match the material and appearance of the existing joints. The new concrete shall reach a field compressive strength of 3000 psi prior to opening a street to traffic. The thickness of the concrete patch shall match the thickness of the surrounding concrete.

Driveway Approaches

The concrete material and curing requirements described in the preceding paragraphs apply to driveway approaches. Rebar and joint sealant are not typically required in the joints of residential, commercial and industrial driveway approaches. Rebar at the cold joint is required if the drive approach is not monolithic. APWA Plans 215, 216, 221 Drawing 1, 222 & 225 provide examples of acceptable driveway approach principles. The driveway approaches shown by APWA Standard Plan 221 Drawing 2 and APWA Standard Plan 229 require special approval from the Engineer prior to installation. (14.32.350) Stamped or artificially colored concrete is not allowed, unless approved by the Engineer. Width requirements are as follows.

- 1 Residential: 12' minimum, 22' maximum.
- 2 Commercial: 12' minimum, 40' maximum.

Sidewalks

Sidewalks shall be constructed of concrete conforming to the material and curing requirements described in the preceding paragraphs. An exception to this is for those portions of sidewalks in the CBD or SBD requiring pavers. Asphalt is not approved except as a temporary surface. Removal of existing sidewalk panels shall be to existing joints. Saw cutting is required unless a panel can be cleanly removed without damage to the adjacent panel. Rebar and dowel bars are not used in sidewalks except under unusual circumstances and as directed by the Engineer. Sidewalks shall be 4" thick except those expected to carry vehicular traffic, such as a sidewalk adjacent to a drive approach or to a Type C, D, F, or G curb & gutter (see APWA Plan 205). Those sidewalks shall be at least 6" thick in a residential zone and 8" thick in a commercial or industrial zone. (14.32.350) Stamped or artificially colored concrete is not allowed in a sidewalk, unless approved by the Engineer.

Park Strip Concrete

Poured concrete shall not be used in park strips except for carriageways (walkways between the curb and sidewalk) or park strips less than 24" in width containing no trees. Where it is installed in park strips less than 24" in width, the concrete must be finished with a stamped pattern resembling brick or natural stone or scored with another decorative pattern to distinguish it from the adjacent sidewalk. (21A.48.060)

Curb Cut Assemblies

Curb cut assemblies (sidewalk ramps) shall be installed according to APWA Standard Plans 235, 236, 237 and 238. Trip hazards in the pedestrian access route at the flow line or at the pavement tie-in are not allowed. All new sidewalk ramps shall include a landing area, (2% max. slope) or a blended transition, and a detectable warning surface comprised of truncated domes. Permittee shall notify the Engineer at least 24 hours prior to installing a curb cut assembly.

Street Name Imprints

Three inch (3") high lettering giving the name of the adjacent street shall be imprinted in a sidewalk surface in historic districts or where Engineer determines their installation is required. The location of the lettering shall be 3" from the detectable warning surface and it must be readable to the pedestrian as the pedestrian approaches the named street.

Concrete Testing

Permittee shall employ an independent testing agency to sample concrete installed on Major or Local street pavements or when installing more than 8 cubic yards of concrete (130 linear feet. of curb & gutter, 650 ft² of 4" thick sidewalk, 325 ft² of 8" driveway approach). The testing shall include slump, air entrainment and compressive strength. Additional tests shall be performed at the rate of one test per 50 yd³.

Pavement Patching Quality

Excavations and their associated street repairs, even well constructed street repairs, shorten a pavement's life. Street resurfacing should be performed with the goal of leaving the pavement in the best possible condition to minimize the loss of its service life. Ride quality and appearance are important characteristics of patch quality.

- 1 Ride Quality: Bumps from uneven joints increase the impact loads on the pavement and accelerate its deterioration. The objective is to not "feel" the patch under normal driving conditions. Adherence to the following principles will help meet this objective:
 - a Asphalt patches: Remove additional pavement to a painted lane stripe, a lip of gutter, a curb, an existing pavement patch, or an edge of the pavement if such feature is within 2' of the second saw cut.



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- b Concrete patches: Removal of the entire slab is required unless the area affected by the work is less than $\frac{1}{2}$ the slab area and is limited to one end of the slab. In such cases, removal to the midpoint of the slab is required.
 - c Finish Surface: The finish surface of the patch shall be flush with the adjacent surface except cover collars shall be set $\frac{1}{4}$ " to $\frac{1}{2}$ " below the surrounding asphalt surface. The patch shall have a cross slope and longitudinal grade consistent with the existing roadway cross slope and profile. Deviations in the finish surface of the patch joint with the adjacent surface and in the patch itself shall not exceed $\frac{1}{4}$ " in 10'. For patches over 300' in length, the Engineer may require a profilograph as the basis for acceptance, in accordance with APWA Sections 32 12 16 entitled Plant Mix – Asphalt Paving.
- 2 Appearance of Asphalt Streets: Appearance is an important part of the public perception of the quality of a street. Adherence to the following principles will enhance the appearance of the patch and produce better overall quality of the final asphalt surface.
- a Avoid frequent changes in the width of patches.
 - b Cut the pavement in straight lines parallel and perpendicular to the flow of traffic.
 - c Avoid patches within existing patches. If this cannot be avoided, make the boundaries of the patch coincide.
 - d Avoid breaking away the edges of the existing pavement or damaging the remaining pavement. If the pavement is cracked or unstable where the second saw cut is to be made, or if damage occurs to the adjacent pavement during the course of the work, additional pavement may have to be removed as directed by the Engineer.
 - e When multiple lateral street cuts are made less than 20' apart, the asphalt shall be milled or replaced between the cuts to provide a single patch.



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