

PROVO CITY  
PUBLIC WORKS DEPARTMENT  
DEVELOPMENT GUIDELINES

2018



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## INTRODUCTION

**T**his document has been prepared and compiled by the Engineering Staff of the Public Works Department. This document is to assist developers in understanding the current procedures for the review and approval, by the Public Works Department, for developments within the City.

The review process may require multiple reviews and approvals. These include the Concept Plan Approval, Preliminary Plan Approval, and Final Plan Approval.

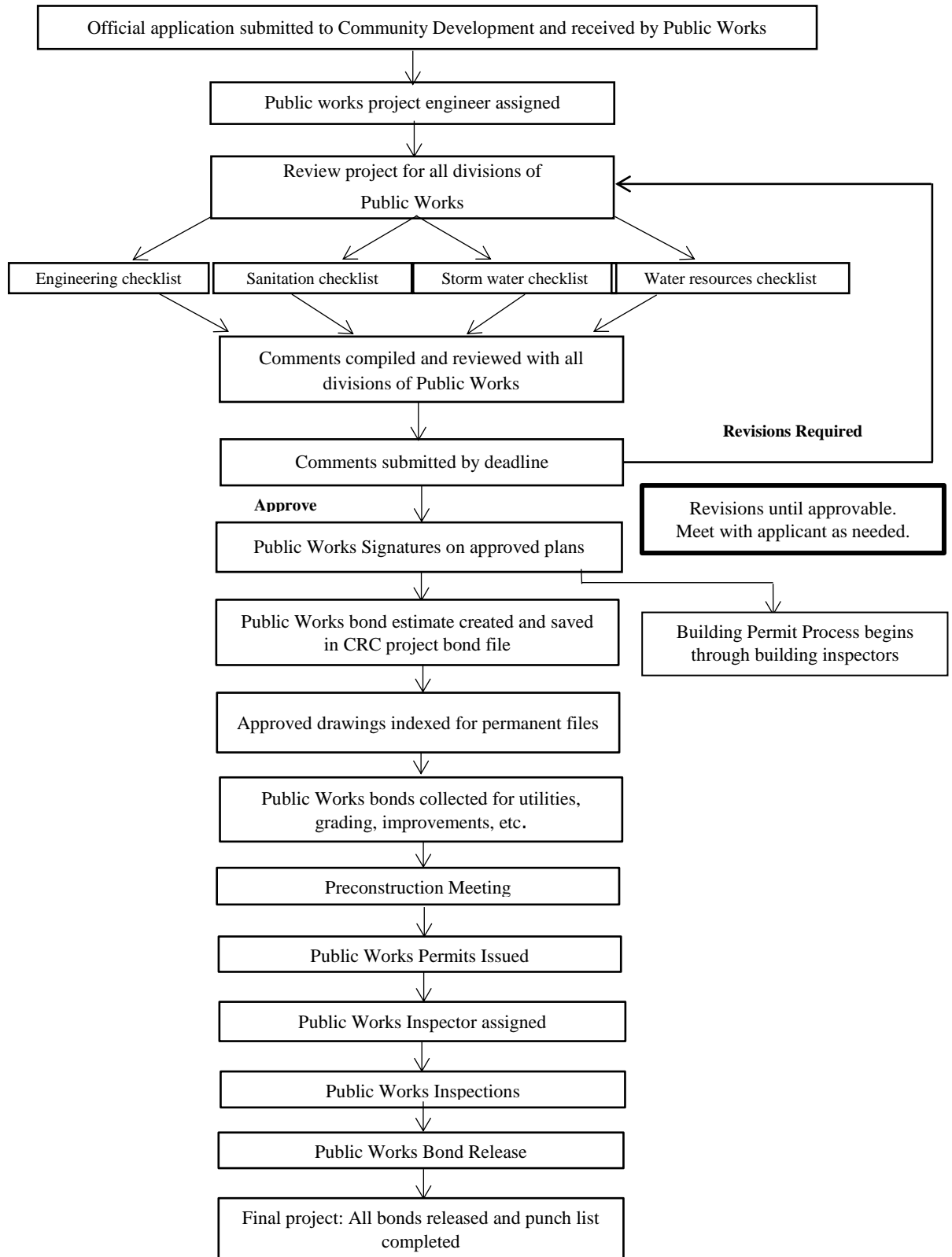
In addition to the previously mentioned reviews and approvals, developments may also require review and approvals for annexation and rezone requests.

This document includes a TABLE OF CONTENTS which directs the user to a specific topic and page; a process to guide the developer through the review and approval process; and information required to be included in the submittal process. All drawings shall be saved in the datum NAD 83, Utah State Plane, Central Zone, US Survey Foot, NAVD 88.

The items contained in the document have been prepared as a supplement to the adopted subdivision ordinances and standards, and are provided as an aid to the Developer. Through the use of this document, the Developer will be able to more closely comply with adopted standards.

This document is not intended to fully represent the current adopted subdivision ordinance, construction standards and drawings, master plans, or other City requirements. The Developer shall be responsible to comply with all of the adopted ordinances and standards of Provo City

# PUBLIC WORKS DEVELOPMENT REVIEW PROCESS



## CONCEPT PLAN CHECKLIST

This type of application must first be reviewed by the Coordinator's Review Committee (CRC) consisting of Provo City Staff. All submittals shall be submitted to Community Development. The City staff will make a recommendation to the Provo City Planning Commission for consideration. The Planning Commission has the authority to either approve or deny the request.

Below is a list of information that is required to be submitted with the application in order for City staff to process the request. If any of the required information is not submitted, the application will be considered incomplete and will not be accepted.

In compliance with the Provo City Code a concept plan application shall include:

1. Application form submitted it to the City
2. Receipt of all paid application fees
3. Plan submitted electronically showing the proposed development layout with the following information:
  - a. Total acreage of the site and the percentages designated for various uses
  - b. Proposed traffic circulation pattern
  - c. Proposed recreation facilities and improvements
  - d. General location of all dwellings and other structures
  - e. Indication of proposed population and building densities (units per net acre).
  - f. Preliminary elevations or perspectives of all building types including floor plans.
  - g. A workable infrastructure plan for providing necessary streets, water, sewer, storm drainage, and electrical distribution for the entire tract.

Based on the size or complexity of the development proposal, staff may require any or all of the following additional information in order to obtain concept plan approval:

1. Complete and accurate legal description of the property
2. Preliminary title search showing legal ownership of the property.
3. Grading plan of the entire site
4. Preliminary subdivision layout
5. Phasing plan with a construction timetable for all phases

Staff will review the application and record that the information has been submitted. Upon receipt of a complete application with all necessary supporting drawings and documents, the plan shall be distributed to the various City departments for review, comments and approval. After each City department reviews the plan, they shall either request revisions to the submittal or approve the project as submitted. If the plan must be revised, then a revised concept plan shall be prepared which addresses the matters raised by City staff and then shall be resubmitted to the Community Development Department for review and approval.

## PRELIMINARY PLAN CHECKLIST

This type of application must first be reviewed by the Coordinator's Review Committee (CRC) consisting of Provo City Staff. The City staff will make a recommendation to the Provo City Planning Commission for consideration. The Planning Commission has the authority to either approve or deny the request.

Applicant submits the preliminary project plan with a completed application, required fees and all supporting documents as required. Upon receipt of a complete application with all necessary supporting drawings and documents, the plan shall be distributed to the various City departments for review, comments and approval. After each City department review the plan, they shall either request revisions to the submittal or approve the project as submitted. If the plan must be revised, then a revised preliminary project plan shall be prepared which addresses the matters raised by City staff and then shall be resubmitted to the Community Development Department for review and approval. A preliminary project plan shall demonstrate compliance with application provisions of the Provo City Code. Concurrent with any request to rezone or annex property, a preliminary project development plan shall be submitted to the Community Development Department.

Any development plan that includes a preliminary subdivision greater than three (3) acres shall comply with Section 15.03.300 and Section 15.04.130, Provo City Code.

The preliminary project plan shall be submitted in a pdf electronic format.

Below is a list of information that is required to be submitted with the application in order for City staff to process the request. If any of the required information is not submitted, the application will be considered incomplete and will not be accepted.

Staff will review the application and check the boxes if the information has been submitted. As part of the application provide the following.

1. A complete and accurate legal description of the real property which is the subject of development.
2. A preliminary title search showing legal ownership of the property. If the applicant is not the property owner, the applicant shall also provide written proof that the applicant has sufficient legal claim on the property, and each parcel therein, to proceed with development plans. Such proof may be in the form of options, deeds, or contracts on which the developer shall be entitled to black out confidential information such as the amount of consideration paid or periodic payment amounts.
3. Topographic maps of the entire site, including contour intervals no greater than two (2) feet.
4. A tabulation of the total acreage of the site and the percentages thereof to be designated for various uses, i.e. parking, residential units, open space, public streets, private streets, landscaping, etc.
5. Proposed traffic circulation pattern including private driveways, public and private streets, pedestrian paths, location of parking spaces and ingress or egress.
6. Parks, common opens spaces, playgrounds, school sites, and other public or private recreation facilities and improvements proposed within the planned development.

7. General location of all dwellings and other structures in the planned development, and an indication of proposed population densities and building densities (units per net acre).
8. A general landscaping plan showing what areas are to be landscaped and what types of plants and materials are to be used together with their numbers and sizes.
9. Preliminary elevations or perspectives of all building types proposed within the development including floor plans.
10. Preliminary subdivision plat, if the site is being divided, showing a general layout of all proposed lots.
11. A workable infrastructure plan for providing necessary streets, water, sewer, storm drainage, and electrical distribution for the entire tract including the point from which said services are to be extended.
12. If applicable, a draft of the declaration of covenants, conditions, and restrictions.
13. If applicable, a phasing plan which including a construction timetable for all phases.
14. An existing features site analysis plan which shows the location of severely constraining elements such as steep slopes thirty percent (30%) or greater, wetlands, watercourses, drainage channels, one hundred (100) year flood plains, potential landslide areas, fault lines, rock fall areas, or any other sensitive land area. The site analyses plan shall also show the location of significant features such as but not limited to woodlands, tree lines, open fields or meadows, scenic views, rock outcrops, roads, tracks, underground utilities, power lines, trails, etc.
15. If applicable, a development agreement.
16. For all developments three (3) acres or greater or ten (10) housing units or greater, and as may be required for other developments as reasonably determined by the City Engineer, a traffic study addressing key traffic issues identified by the Provo City Traffic Engineer. In determining whether to require a traffic study the City Engineer shall consider existing and projected traffic patterns and volume, and whether a traffic study will yield information useful for undertaking review of a proposed project plan or other development plan. Items to be addressed in a traffic study shall include but not be limited to the following:
  17. Trip generation rates for the development.
  18. Threshold volumes and percent of threshold for the surrounding street system.
  19. A local area street plan.

## **PLAT APPROVAL**

### **1. INFORMATION TO BE INCLUDED**

- A. The name of the subdivision in bold heading at the top of the drawing.
- B. Section, Township and Range
- C. City and County name
- D. Signature blocks for the Community Development Director, City Engineer, Mayor, and City Recorder.
- E. Signature blocks for owner dedication with proper attest blocks.
- F. Owners dedication narrative
- G. Boundary description narrative
  - a. Must include the point of beginning tied to a found PLSS monument.
  - b. Must have a tie to a second found PLSS monument for the establishment of the basis of bearing. Two found Provo City Centerline monuments may be used in the Provo City Block System.
- H. Boundary description as a drawing, matching the narrative.
- I. Dedication plat restrictions i.e. utility restrictions, setback restrictions, access restrictions, or other are required as part of development.
- J. Types and locations of all existing and proposed easements.
- K. Public utility and drainage easements are required in all subdivisions. The minimum width of easements shall be:
  - a. On rear lot lines; eight feet on each side
  - b. On front lot lines; eight feet
  - c. On side lot lines; eight feet.
- L. In circumstances where a City utility traverses a lot or parcel to be developed the easement width shall be provided as required by the City Engineer.
- M. Slope easements shall be shown where required.
- N. Easements on street frontages shall be labeled as sidewalk and public utility easements.
- O. The placement/location of Public Utility Easements, Drainage Easements, and Sidewalk Easements may be adjusted with the approval from the City Engineer.

### **2. DESCRIPTION CLOSURE REQUIREMENTS**

- A. The boundary must close to within 0.04 feet.
  - a. The boundary description shall be traversed in a clockwise direction around the subdivision boundary.
  - b. The street centerline must close to the boundary within 0.04 feet. The centerline is placed using the boundary information.
  - c. Individual lot boundaries must close to within 0.04 feet to the street boundary and to the subdivision boundary.
  - d. The boundary to conform with adjacent parcels.

### **3. CENTERLINE INFORMATION**

- A. Distances from monument to monument.



- B. Distance from PC to PT.
- C. Curve data to include
  - a. Delta
  - b. Radius
  - c. Arc Length
  - d. Chord bearing and distance
    - i. Non-tangent curves to the approach and departure segments must also show the bearing to the center of the curve or the bearing for a tangent approach line.
  - e. Prepare a table for numerous curves

#### 4. PROPERTY AND LOT INFORMATION

- A. The square footage of the lot shall be shown.
- B. Addresses will be assigned by the Provo City Engineering Department

#### 5. TITLE REPORT INFORMATION

- A. The title report is used to determine the proper owner's signature blocks; the location of existing easements; and to determine that the dedication plat and the property owned are the same parcel.
  - a. The Title Report and the Dedication Plat must match exactly or include the entire subdivision and additional property. The report cannot be smaller than the subdivision.
  - b. All easements shown on the Title Report must be shown on the Dedication Plat AND the easement owner must sign the Dedication Plat.
  - c. The City Surveyor will review the Title Report and may direct the owner to remove specific easements or other encumbrances.

#### 6. UTAH COUNTY RECORDER STANDARDS

- A. The plat shall have a border no larger than 24" X 36"
- B. The notary seal or lettering must be clear and legible.
- C. The subdivision title or heading must be consistent throughout all narratives.
- D. The owner(s)' signatures must be exactly as found on the Title Report.
- E. The scale must be clearly shown and must conform to the accepted standard, i.e. 1"=20', 30', 40', 50', 60' or 100'.
- F. All names shall be consistent on all narratives.

#### 7. MONUMENT PLACEMENT

- A. Monuments shall be installed at all street intersections.
- B. Monuments shall be installed at the PI of all curves, or where the PI is outside
- C. All monuments installed to Provo City Standards

#### 8. PLAT REVIEW CHECKLIST

All plats will be reviewed according to the current plat review checklist

## **FINAL PROJECT PLAN CHECKLIST**

Final project plans must be submitted if the proposed project includes an industrial, commercial, institutional or multiple-family residential building, structure or use.

The following plans shall be submitted in an electronic pdf format.

### **Site Plan**

1. Legal description of property.
2. Dimensions of existing and proposed property lines.
3. Distances from buildings to property lines.
4. Square footage of existing and proposed structures.
5. Use of existing and proposed structures.
6. Location of all fire hydrants within 500' or fire suppression methods where applicable.
7. Trash storage container location, size and how enclosed.
8. Eight foot public utility easements along all property lines where applicable.
9. Location of existing and proposed easements and/or right-of-ways.
10. Location of power, telephone, and cable facilities, including poles, anchors, transformers, and connection pedestals.
11. Areas devoted to public or open space use.
12. A proposed density range of each phase/lot.
13. An existing features site analysis which shows the location of significant features and severely constraining elements.

### **Parking Plan**

1. Parking space count.
2. Parking space dimensions, including back up area.
3. Ingress and egress.
4. Parking for people with disabilities.
5. Location of supporting columns in subgrade parking.

### **Landscaping Plan**

1. Location and dimensions of landscaped area, showing existing and proposed landscaping.
2. Types and sizes of existing and proposed landscaping materials, plants, and trees.
3. Percent of landscaping.
4. Location and type of proposed and existing retaining walls, hedges or fences.
5. Proposed and existing sprinkler/irrigation system.

## Building Design Plan

1. Exterior elevations of proposed buildings, indicating roofing materials, type of construction, exterior materials and colors.
2. Conceptual sign plans.
3. Total square footage for all floors, including rough floor plans.
4. Note all existing buildings proposed for use or for demolition.

## Traffic Study

1. Any project with 3 acres or greater of area or 10 housing units or greater must complete a final traffic report addressing the following:
  - a. Trip generation for the development using Provo Transportation Master Plan trip rates;
  - b. Threshold volumes and percent of threshold for the surrounding street system;
  - c. Local area street plan; and
  - d. All other items as determined by the Provo City Engineer.
2. Direction of traffic flow through project.
3. Location and width of proposed and existing ingress and egress.
4. Evidence of Utah Department of Transportation access approval (if applicable.)
5. Proposed street layout and design.

## Utility Plan

1. Location and size of existing and proposed water, sewer mains, laterals, power lines and utilities, gas lines and utilities, telephone utilities and connections.
2. A utility site plan for layout and design for new electrical facilities.

## Drainage Plan

1. Location of existing and proposed storm drain structures.
2. Proposed drainage system.
3. Location of irrigation pipes, ditches, canals, waterways and detention basins.
4. Detailed drainage plans with calculations based on 25 year storm event, including total impervious surface area, drainage flows from roofs or parking structures.
5. Sump details, storm sewer profiles and construction drawings.

## Grading Plan

1. Grading shall be defined as any work including filling, cutting, excavation or relocation of material which affects the contour, slope, elevation or drainage features of a parcel of property, or which involves more than fifty (50) cubic yards of material.
2. No grading shall be accomplished without first having obtained a grading permit from the City Engineer. A grading permit may be obtained at the office of the Provo City Engineer after completion of an application for permit complying with any and all permit requirements.

## Supporting Documents

1. Submitted plans should be accompanied with:
  - a. A completed application,
  - b. Required fees,
  - c. Engineer or surveyor's computer generated information disc;
  - d. Proof of single ownership or control of the subject property by title report, deeds, etc.;
  - e. Market study or cost/benefit study if required by the Community Development Director;
  - f. Phasing plan if the project is to be completed in phases;
  - g. Final subdivision plat when determined applicable;
  - h. Development agreement where applicable;
  - i. Other information or studies to aid the Planning Commission in its deliberations;
  - j. Other documents that require compliance with Provo City Code.

## FINAL SUBDIVISION CHECKLIST

The following is a brief outline of the submittal requirements that a developer should consider when submitting for an Annexation, Rezone, Concept Plan, Preliminary Plan or Final Plan Approval. This outline also lists the items that the Provo City Public Works Department will review at each approval level.

### 1. Annexation

- A. The Developer will provide a location map of the proposed annexation.
  - a. The map will show the location of the parcel to be annexed, and will include the legal description of the parcel to be annexed.
    - 1. The legal description for the annexation will match the adjacent annexation parcels as recorded at the Utah County Recorder's Office or on file with the City recorder.
- B. The Public Works Department will provide a report concerning the actual annexation. The report will define the availability of water, sewer, storm drainage and street configuration for the proposed annexation area. This information will be of a general nature, and is not intended to be inclusive of all requirements for the proposed annexation area. The report will include development requirements that will be imposed as a condition of annexation.
- C. The developer shall provide an Annexation Plat to be reviewed and approved by the Provo City Surveyor, City Engineer and Community Development Director.

### 2. Rezone

- A. The Developer will provide the site plan location map. The map will show the location of the parcel for rezone and will include the legal description for the rezone.
- B. The Public Works Department will provide a statement concerning the ~~actual~~ rezone. This will include a statement which defines the availability of water, sewer, storm drainage and the street configuration for the proposed rezone area. This information will be of a general nature, and is not intended to be inclusive of all requirements for the proposed rezone area.

### 3. Concept Plan

- A. The purpose of the concept plan approval is to provide a layout and design which is general in nature. The configuration of the lots and streets shall be included.
- B. The Developer will submit:
  - a. Lot Configuration
    - 1. Concept plan with boundary legal description.
      - a. The site plan shall include adjacent parcels.
      - b. The site plan shall be scaled no smaller than 1" = 100'
    - 2. Area of each lot
    - 3. Contour lines with actual elevations referenced to Utah County information.

- a. 2 foot intervals shall be required. Additional contour information may be required.
    - 4. Slopes exceeding 30% shown and are required to be avoided by development including grading and landscaping.
    - 5. The site plan will show the location of any retainage structures that exceed a height of 10 feet that maybe will be required to be constructed prior to the construction of any home.
  - b. Street configuration
    - 1. Proposed street grades shall be included. Maximum street grade is 12% for local streets though 8% maximum is encouraged.
    - 2. Proposed street cross section.
    - 3. Locations of cuts/fills exceeding 2 feet.
  - c. Location of existing and proposed improvements
    - 1. Location of water, sewer, storm drainage, streets, and natural drainage path.
    - 2. Locations of existing easements, i.e. gas lines, irrigation lines, power lines, phone lines, private access easements.
- C. The Public Works Department will provide the following information:
  - a. A written memorandum addressing the acceptability of the street configuration, the street cross-section, the slope of the lots. The Community Development Department will address the lot size and their configuration.
  - b. The memorandum will provide information concerning waterline size, possible off-site utility system improvements, sanitary sewer size and details, storm drain configuration, sub-surface drainage requirements, slope protection requirements (including easements and revegetation), and possibly other items specific to the development.
  - c. The memorandum will specify if a geotechnical report will be required. If the report is required, it must be submitted with the Preliminary Plan.
4. Preliminary Plan
- A. The purpose of the Preliminary Plan is to show the feasibility of the proposed development and the conformance to the adopted standards. The Staff, and Planning Commission may require alterations to the Preliminary Plan as necessary such that the development conforms to the standards and specifications of the City. The preliminary approval will give the developer the direction needed to complete the improvement plans. The preliminary approval shall terminate one year after the Planning Commission has given approval.
  - B. The Developer shall submit a geotechnical study, if necessary, for the development area with the preliminary subdivision plan. The geotechnical report will contain the minimum information required, as shown in the geotechnical section of this booklet, and the improvement plans will reflect the recommendations of the geotechnical report.

- C. The developer will submit an electronic pdf copy of the preliminary plan containing the following information.
- a. Lot configuration
    1. Preliminary subdivision plan with boundary legal description.
      - a. The preliminary subdivision plan shall include adjacent parcels.
    2. Area of each lot
    3. Contour lines with actual elevations
      - a. 2 foot intervals shall be required. Additional contour information may be required.
    4. Slopes exceeding 30% shown and are required to be avoided by development including grading and landscaping.
    5. The site plan will indicate that the maximum slope for a driveway shall be 15%.
  - b. Street configuration
    1. Maximum street grade is 12% for local streets. 8% maximum shall be required unless approved by the City Engineer.
    2. Proposed street cross section conforming to City Street Standards.
    3. The preliminary plan shall include cross-section drawings at locations where the slopes will have cuts or fills exceeding two (2) feet on either side of the street. The cross-section drawings shall be spaced no greater than 50 feet.
  - c. Location of existing improvements
    1. Location of water, sewer, storm drainage, streets, irrigation (open ditch or pressure lines) and natural drainage paths and/or creeks and streams.
    2. Locations of existing easements, i.e. gas lines, irrigation lines, power lines, communication lines, and private access easements.
      - a. All easements shall be shown on the preliminary subdivision plat.
    3. Location of all cuts/fills exceeding two (2) feet at the right-of-way line.
  - d. Proposed configuration of public utilities, i.e., sanitary sewer, culinary water, storm drainage, sub-surface drainage, pressure irrigation, communication, natural gas, electrical power and cable T.V.
    1. The sizes of the system(s) must be shown but the City has the right to require changes to location and sizes prior to final submittal.
  - e. Boundaries of areas subject to flooding or listed on the FEMA flood plan maps and drawings.
    1. Areas subject to flooding may include low areas created by street construction.
  - f. Written approval from affected entities.
    1. Stream alteration – State Engineer

2. Irrigation system relocation – Irrigation users and company.
  3. Acknowledgement to grant easements on adjacent private property from the property owner(s).
- D. The Public Works Department will provide written comments through the CRC review process the following information:
- a. The acceptability of the street configuration, street cross-sections, and the grading and slope of the lots. The Community Development Department will address the lot size and their configuration.
  - b. Information concerning waterline size, sanitary sewer size and details, storm drain configuration, sub-surface drainage requirements, slope protection requirements (including easements and revegetation), possible off-site utility system improvements and other items specific to the development.
  - c. If a geotechnical report will be required for the development, project review will not be completed until the geotechnical report has been submitted and reviewed.



## CULINARY WATER SYSTEMS

### 1. WATER STANDARDS:

- a. All Water System installation and design must conform to Provo City's Water System Master Plan
- b. Minimum allowable main line size is eight inches (8") in diameter.
- c. Pipe type shall be ductile iron with grease on bolts, polywrap and #14 underground copper tracer wire installed per detail P-594.
- d. Horizontal clearance between a water main and sewer lines shall be a minimum of ten (10) feet edge to edge per Utah Administrative Code R317-3-2 and R309-550.
- e. Minimum cover required shall be 48 inches (48") to top of pipe.
- f. Valves shall be located at all intersections and shall equal number of legs.
- g. All valves larger than 12 inch (12") shall be butterfly design.
- h. Provo City may use a hydraulic model to verify that fire flow and water demand as specified by the project plans. The proposed system may need to be modified to comply with model output.
- i. Fire hydrant maximum spacing shall be 500' and at the end of all dead end lines.
- j. Valves are required at main lines for all fire lines and fire hydrants.
- k. Install an approved backflow prevention device as per Provo City Standard Drawings.
- l. Minimum size water service line is to be one inch (1") diameter for residential connections. All unused water service lines shall be abandoned at water main line.
- m. Minimum twenty foot (20') public utility easements shall be provided for all public water mains installed outside of the street right of way.
- n. All water system design shall comply with Provo City Standards or as approved by the Water Resources Director.

# SANITARY SEWER SYSTEMS

## 1. SEWER STANDARDS:

- A. All sanitary sewer installation and design shall comply with Provo City's Wastewater Collection System Master Plan.
- B. Minimum mainline size shall be 8" in diameter.
- C. Allowable sanitary sewer main pipe material for all projects shall be green PVC SDR 35.
- D. Horizontal clearance to any culinary water line shall be at least 10 feet (10') edge to edge per R309-550 and R317-3-2.
  - a. Any other utility crossing the sewer main shall do so as close to a right angle as possible.
  - a. For waterline crossings, the water shall be a minimum of 18" above the sewer.

### B. Minimum slope shall be

- a. 4 and 6 inch sewer laterals: 2.00%
- b. 8 inch sewer lines: 0.40%
- c. 10 inch sewer lines: 0.28%
- d. 12 inch sewer lines: 0.22%
- e. 15 inch sewer lines: 0.15%
- f. 18-inch sewer lines: 0.12%
- g. 21 inch and larger sewer lines: 0.10%

### C. Sewer manholes shall be installed:

- a. At a maximum spacing of four hundred (400) feet.
- b. At all changes in grade, size or alignment, and at all intersections with other mainlines.
- c. At the end of main lines (no cleanouts allowed)
- d. Manholes are required on laterals six inches (6") or larger at the intersection with a sewer mainline twelve inches (12") in diameter or less.

### D. Sewer manholes shall be sized based on the following:

- a. Manholes shall conform to Provo City Standard drawing P-411.
- b. Five foot (5') diameter manholes required at three way manholes, 90° bends, over 15" and 18" pipes, manholes over 15' deep, and in manholes with over 1 foot drop in manhole.
- c. Six foot (6') diameter manholes required over pipes 24" and greater, at 3 way manholes, where the deflection exceeds 90°, and where height of manhole exceeds 16'.

### E. Cleanouts shall be required every 100 feet (100') and at angle points.

### F. Pretreatment will generally be required for each use producing a sewer load different from a standard residential unit. Grease traps shall conform to Drawing No. P-441.

- G. Minimum twenty foot (20') wide public utility easements (PUE) are required for all publicly owned and maintained sewer mainlines located on private property.
- H. All unused sewer laterals shall be abandoned at the main line.

## **STORM DRAIN SYSTEM**

### **1. DRAINAGE PLAN**

- A. All system installation and design must conform to Provo City's Storm Water Master Plan.
- B. Surface drainage shall be designed as such that all drainage is addressed within own project boundaries and not adversely affect other properties.
- C. Provide protection to the project from natural drainage ways such as Utah Lake, Provo River and canyon drainage flows.
- D. Identify all existing storm drain and irrigation features within and adjacent to the project boundaries.
- E. Projects that are within the high water table area, per Provo City Code 15.05.170 High Water Table and Wetland Area Development Standards, must meet and address those conditions as part of the project including, but not limited to the following;
  - I. Retention basins are not allowed.
  - II. Provide minimal building elevations adjacent to Utah Lake or Provo River.
  - III. Provide the high ground water table elevation.
- F. Identify public and private drainage systems.
- G. Provide overall predevelopment and post development pervious and impervious surface area measurements.

### **2. HYDRAULIC DESIGN CRITERIA**

- A. The design of a storm drainage system should have as its objective the design of a balance between the maximum allowable discharge rate and downstream receiving system's capacity. Refer to Provo City Storm Water Design manual for more detail of allowable discharge rates, storm frequency and intensity.
- B. Piped systems are to be designed using the 25-year storm event.
  - a. Provo City may use a hydraulic model to verify system demand as specified by the project plans. The proposed system may need to be modified to comply with model output.
- C. Basins
  - I. Detention basins are to be designed using the 25-year 24-hour storm event. The maximum discharge rate is 0.2 cfs/ac or less where downstream capacities require additional restrictions. Refer to Provo City Storm Water Design manual for these areas.
  - II. Retention basins are to be sized using a 100-year, 24-hour storm event.
  - III. As part of the design consideration, a geotechnical study is required to determine infiltration rates and the highest ground water table elevation.
  - IV. The floor of a detention basin must be at least 1 foot above the highest elevation of the following; groundwater table, Utah Lake or Provo River (where applicable).

- V. The maximum design depth for a basin shall be 3 feet with an additional 1 foot for free board to the top of the spillway.
  - VI. Provide a minimum 10 foot wide maintenance access area to the hydraulic related features.
  - VII. Provide a Storm Drainage System Maintenance Agreement for all components of the proposed private drainage system.
    - a. The party responsible for executing the maintenance agreement, i.e., homeowners association, property owner, etc.
    - b. Extent of the maintenance activities to be performed.
    - c. Frequency of proposed recordkeeping and reporting of performed maintenance and inspection activities.
    - d. Provide easements to Provo City to access and inspect temporary and permanent Storm Water Controls.
3. STORM DRAIN PIPE SIZE AND TYPE
- A. The minimum public storm drain main pipeline diameter is 18 inch reinforce concrete and 15 inch for laterals.
  - B. All public storm drain lines within public rights of way shall be reinforced concrete pipe.
  - C. Provo standard manholes P-411 are required for accesses at all pipe transitions including changes in direction, elevation, slope and pipe sizes.
4. STORM DRAIN MANHOLES
- A. Provo standard manholes P-411 should be spaced every 400 feet and is required for accesses at all pipe transitions including direction, elevation, slope and at changes in pipe sizes.
5. STORM DRAIN INLETS
- A. A minimum of 12 inches of separation from flow line of outlet pipe to floor of inlet box is required.
  - B. Inlet boxes shall be the drop back hood type of inlet box, Provo Standard Drawings series P-315 a-c Curb Face and Inlet Box with stamped hood, drains to river or lake with the fish logo.
  - C. Inlet boxes should be placed at a distance of no more than four hundred (400) lineal feet of street curb and gutter and when gutter flows are  $\geq 3$  cfs.
  - D. A double inlet type of boxes shall be installed at low points of vertical curves, downgrade cul-de-sacs or dead end streets and in areas with steep slopes.
  - E. The use of combination inlet type of structures is discouraged and allowed in rare cases or where found necessary and as approved by the City Engineer.
6. PRIVATE LOT DRAIN CONNECTION
- A. Lot drains shall use SDR 35 and the color white PVC for all piping.
  - B. Lot drains shall be 4 inch diameter minimum.
  - C. Back flow prevention device may be required on lot drain line as determined by the City.
  - D. For further information, refer to Provo Standard detail P-392 a-c.

## 7. WATER QUALITY

- A. A pretreatment device is required prior to all connections onto a City system, into an underground detention or retention basin system, which include class V injection wells or sumps.
  - I. Pretreatment device must meet manufacturer design requirements and the following criteria.
    - a. Remove floatable contaminants.
    - b. Filter sediment.
- B. Fill out and submit the Storm Water Pollution Prevention Plan (SWPPP) Construction Activity Template.

## **SUB-SURFACE DRAIN - (AS REQUIRED)**

### **1. SUB-SURFACE DRAIN SIZE DETERMINATION**

- A. The minimum sub-surface drain size shall be eight (8)-inches.
- B. The sub-surface drain shall be sized to carry 0.8 cfs per 100 acres of developed area.
- C. The sub-surface drain shall have a minimum flow velocity of one (1) foot per second.
- D. The minimum slope on a sub-surface mainline drain shall be 0.4%.
- E. A sub-surface drain shall be a separate system from the storm drain system. A sub-surface lateral shall not connect to storm drain lines.

### **2. SUB-SURFACE DRAIN LINE PLACEMENT**

- A. The sub-surface drainage system shall be installed as determined by the City.
- B. Sub-surface drain lines shall not be placed in side lot or rear lot property lines unless approved by the City.
  - a. Sub-surface drain lines that are approved for side lot or rear lot installation shall have a 20-foot easement provided.
  - b. Sub-surface drain lines that are approved for side lot or rear lot installation shall provide for vehicular access to all manholes.
- C. The lines shall be installed with a minimum cover of 4.5 feet from the top of the pipe to the finish ground elevation.
- D. The design should insure that there will be no conflict between the land drain line and the sanitary sewer line.
- E. The lateral line will be installed within 5 feet of a common property line. The contractor will install identifier tape one foot over the lateral, running the length of the lateral, with the wording 'Drain Line' on the tape.

### **3. MANHOLE SIZE AND PLACEMENT DETERMINATION**

- A. Manholes shall be installed as follows:
  - a. Maximum spacing is 400 feet.
  - b. Change in alignment.
  - c. Change in slope.
  - d. Junction with other lines.
- B. Minimum size manhole is four-foot (4) inside diameter.
- C. Five-foot (5) inside diameter manholes shall be used for all locations as follows:
  - a. Intersection of three land drain lines.
    - 1. A 6-inch multi-user/commercial line connecting to an 8 inch or larger requires a manhole.
  - b. Change of grade with an algebraic difference of five percent (5.0%)
  - c. Change in alignment where the interior angle is greater than 70 degrees but less than 90 degrees.
- D. Manholes shall be placed at the end of all lines, including temporary dead-ends.

#### 4. SUB-SURFACE DRAIN SERVICE LATERAL SIZE AND PLACEMENT

- A. All residential connections shall have an individual service connection. Sharing or joint use of lines is not allowed.
- B. Residential service lines shall be 4 inch White PVC pipe.
  - a. The service lateral shall be installed as per Provo City Standards.
  - b. The service lateral shall extend to the property on a minimum slope of 2.0%.
  - c. The contractor will install identifier tape one foot over the top of the lateral the entire length of the lateral and the tape will say "Land Drain."
- C. All commercial connections shall have individual connections based on unit ownership.
  - a. If one building is divided into units one connection per unit will be required.

#### 5. PIPE LINE MATERIALS, CONSTRUCTION AND TESTING

- A. 4 inch and 6 inch service lines shall be PVC ASTM 3034 pipe.
- B. 8 inch and 10 inch sub-surface drain lines may be concrete or PVC ASTM 3034 pipe.
  - a. PVC pipe shall have a minimum of 6 inches of 1-1/2" drain rock placed for bedding-and covering the line.
  - b. PVC lines shall be tested for deflection after the trench has been backfilled and compacted.
  - c. Concrete pipe shall be bedded as per Provo City Standards.
  - d. The backfill around and over the concrete pipe shall be compacted to a minimum of 95%.
- C. Manhole bases may be pre-cast using the design as a guide for stub orientation.
  - a. Pre-cast manhole bases shall be placed on a minimum of 8 inches of gravel bedding.
- D. Poured-in-place manhole bases shall conform to the following standards:
  - a. The concrete base shall be at least 10 inches thick.
  - b. The sub-grade material shall be gravel bedding.
- E. Manhole sections shall be tongue & groove, pre-cast concrete sections with cast-in-place vinyl steps.
- F. The frame and cover shall be cast iron.



## **IRRIGATION SYSTEM IMPROVEMENTS**

Submit a written approval for the relocation of the system.

### **1. FLOOD IRRIGATION SYSTEMS**

- A. The developer shall provide adequate conveyance for flood irrigation wastewater to pass around or through a developed subdivision.
  - a. The conveyance may be either a pipe system or open channel.
    - 1. A pipe shall be required if the system crosses any street or access way.
    - 2. The City Engineer and the owner shall approve the conveyance system.
- B. The developer will be required to install a pipe system to convey any supply ditch that passes through the proposed subdivision.
  - a. The pipe size shall be determined by the owner and approved by the City Engineer and by the owner.
  - b. The location of the pipe system shall approved by the City Engineer.

## **GRADING PLAN**

1. Grading shall be defined as any work including filling, cutting, excavation or relocation of material which affects the contour, slope, elevation or drainage features of a parcel of property, or which involves more than fifty (50) cubic yards of material.
2. No grading shall be accomplished without first having obtained a grading permit from the City Engineer. A grading permit may be obtained at the office of the Provo City Engineer after completion of an application for permit complying with any and all permit requirements.

## **STREET IMPROVEMENTS**

### **1. STREET WIDTHS**

- A. Proposed street shall have the minimum width for the rights-of-way. The width is measured from lot line to lot line. Street widths shall comply with street classifications as defined by the Master Street Plan or as approved by the City Engineer.
- B. The minimum asphalt width shall be attained whenever curb and gutters are installed.
- C. The asphalt on all public streets shall be bordered on both sides by Type E curb & gutter or as approved by the City Engineer.

### **2. STREET INTERSECTIONS**

- A. On collector and local streets, four (4) way intersections may be designed with a roundabout according to Provo City Standards and as approved by the City Engineer.
- B. Streets shall intersect each other as near as possible at right angles.
- C. Offsets between intersections from ten (10) feet to one hundred twenty (120) feet, measured from street center line to street center line, shall be prohibited.
- D. Residential streets and alleys shall not extend more than five hundred (500) feet in length without an off-setting intersection to another street.
- E. Curb at all intersections shall be rounded with curves having a minimum lip of curb radius as per city standards.

### **3. STREET LAYOUT**

- A. The arrangement of streets in new developments shall make provision for the continuation of the existing streets in adjoining areas or their proper projection where adjoining land is not subdivided.
  - a. New streets shall be made at the same or greater width as the existing road, but in no case less than the required minimum width.
- B. Street alignments shall be selected to relate to the natural topography and other natural conditions.

- C. Direct driveway access from residential property to collector and arterial streets shall not be permitted without approval of the City Engineer. Access to new residential development shall be provided by local streets.
4. STREET CURVE DESIGNS
- A. Where the street lines within a block deflect from each other, there should be a connecting curve that meets the minimum curve radii as per city standards.
  - B. Local streets shall be designed with horizontal and vertical curves. (Refer to AASHTO– A Policy on Geometric Design of Highways and Streets.)
5. STREET SLOPES
- A. Street slopes shall be kept within minimum and maximum allowable slopes.
  - B. Cross slope shall be designed at 2%. A minimum cross slope of 1% and a maximum cross slope of 4% is allowed by the City Engineer.
6. CURB & GUTTER/ SIDEWALK / WATERWAY
- A. Curb & Gutter shall be placed on each side of developed streets.
    - a. 24” Type E curb & gutter shall be used on all streets.
    - b. See APWA Plan 205 for design guidelines.
  - B. Sidewalk shall be placed on each side of developed streets.
    - a. Sidewalks shall be six (6) feet in width except where other widths are deemed appropriate by the City Engineer and comply with the latest Americans with Disabilities Act requirements.
    - b. Planter strips of a minimum seven (7) feet in width shall be used in all street cross sections except as determined by the City Engineer
    - c. See Provo City Standards and Specifications for design guidelines.
  - C. Waterways
    - a. Design street drainage to eliminate waterways. Waterways will only be allowed as approved by the City Engineer.
    - b. Refer to APWA Plan 211 for design guidelines.
7. CUL-DE-SAC REQUIREMENTS
- A. Each [cul-de-sac](#) shall have a minimum right-of-way of fifty (50) feet and a radius of fifty (50) feet of right-of-way for the cul-de-sac bulb.
  - B. The maximum length of a cul-de-sac shall not exceed five hundred (500) feet, unless;
    - a. Physical conditions necessitate providing a longer cul-de-sac.
    - b. A cul-de-sac street which exceeds five hundred (500) feet shall include an intermediate turnaround near the midpoint of the street as approved by the City Engineer.
  - C. In no case shall a cul-de-sac street length exceed one thousand (1,000) feet.

8. SECOND ACCESS REQUIREMENTS

- A. A second street access is required under the following conditions:
  - a. A development that has fourteen (14) or more residential lots. (250 ADT)
  - b. A development that extends more than one thousand (1,000) feet from a connecting street. (Comply with the Fire Code)

9. ALLEYS

- A. Where access is desired to the side or rear of abutting properties, an alley may be provided. Alleys shall have a minimum width of twenty-four (24) feet of asphalt or concrete pavement measured from face of curb to face of curb. The design grade and alignment design of an alley shall conform to local street standards, except that the centerline radius may be reduced where appropriate, as determined by the City Engineer.

10. PRIVATE STREETS

- A. Private streets shall be designed to meet Provo City Street Standards. Any modifications require the approval of the City Engineer.
- B. Provo City shall not open, grade, pave, or perform any maintenance work on any private or undedicated street, road or alley
- C. Provo City shall refrain from laying utility lines in any street which has not:
  - a. Been accepted by the City as a public street or alley
  - b. Received approval of the Mayor as part of a final subdivision plat or development, unless an easement is granted therefor.
- D. The City shall not accept or maintain streets unless such streets have been constructed in accordance with Provo City standards and specifications.

11. RIGHT-OF-WAY SLOPE REQUIREMENTS

- A. The developer shall provide cross-section drawings of the right-of-way when the cut or fill exceeds 2 feet at the right-of-way line.
- B. The developer shall provide slope easements on the dedication plat when the cut or fill exceeds two (2) feet.
- C. The developer shall provide engineering drawings for slope retaining when the cut or fill requires retaining walls or structures.

12. GRADING PLAN

- A. Grading shall be defined as any work including filling, cutting, excavation or relocation of material which affects the contour, slope, elevation or drainage features of a parcel of property, or which involves more than fifty (50) cubic yards of material.
- B. No grading shall be accomplished without first having obtained a grading permit from the City Engineer. A grading permit may be obtained at the office of the

Provo City Engineer after completion of an application for permit complying with any and all permit requirements.

**13. TRAFFIC STUDY**

- A. A traffic study shall be required for all developments three (3) acres or greater or ten (10) units or greater, and may be required for other developments as reasonably determined by the City Engineer.
- B. The Developer and or Engineer shall be required to meet with the City Engineer prior to initiating the traffic study.
- C. Items considered in a traffic study shall include:
  - a. A study of existing area conditions
  - b. Traffic projections (determined by trip generation rates obtained from the Provo Transportation Master Plan trip rates or approved by the City Engineer)
  - c. Traffic analysis
  - d. On- and off-site improvement analysis, conclusions, and recommendations

**Street Standard Values**

	<b>Arterial Street</b>	<b>Minor Arterial Street</b>	<b>Collector Street</b>	<b>Local Street</b>
Minimum Street Width	120 ft	84 ft	72 ft	56 ft
Minimum Asphalt Width	90 ft	66 ft	54 ft	<ul style="list-style-type: none"> <li>• 24 ft where projected ADT is less than 500 ADT and on-street parking is prohibited</li> <li>• 32 ft where projected traffic is less than 500 ADT and on-street parking is not prohibited</li> <li>• 38 ft where projected traffic volume is 500 ADT or greater</li> </ul>
Minimum Lip of Curb Radius at Intersection	30 ft	30 ft	NA	15 ft
Minimum Curve Radius at Street Deflection	510 ft	335 ft	NA	200 ft
Minimum Street Slope	0.004	0.004	NA	0.004
Maximum Street Slope	0.08	0.08	NA	0.12
Street Cross Slope	2%	2%	2%	2%

## GEOTECHNICAL INFORMATION

If the City Engineer determines that an unsafe physical condition described in Section [15.05.020](#), Provo City Code, appears to exist in relation to the subject property, the developer shall submit a geologic report which shall include:

### 1. MINIMUM INFORMATION REQUIRED

- A. Project plan showing boring locations.
  - a. Boring logs shall include the following:
    - 1. Elevation
    - 2. Drill or backhoe type
    - 3. Samples
    - 4. Field tests
    - 5. Ground water level fluctuations
- B. Laboratory Tests – Performed in general accordance with ASTM
  - a. Sieve analysis
  - b. Atterberg Limits
  - c. CBR
  - d. Direct Shear
  - e. Consolidation
  - f. Identify Soils according to USCS
  - g. Moisture density curve(s)
- C. Engineer Analysis and recommendations
  - a. Foundations and Retaining Walls
    - 1. Allowable bearing capacity
    - 2. Lateral loads friction coefficients
    - 3. Settlement
    - 4. Drainage – Backfill information
    - 5. Seismic loading
  - b. Pavements
    - 1. Traffic loads
    - 2. Subgrade support value (CBR)
    - 3. Pavement thickness
  - c. Special Considerations
    - 1. Site preparation – use of on-site materials
    - 2. Expansive soils
    - 3. Collapsible soil
    - 4. Slope stability
    - 5. Rock Fall
    - 6. Shallow ground water level – drainage, etc.
    - 7. Surcharge / preloading (if used, developer needs to install settlement monitors and elevations benchmark.)
    - 8. Identification of geological hazards.

The number and depth of borings/pits are to be determined for each specific project shall be determined by the geotechnical engineer. However, as a minimum, the depth should be deeper than any anticipated excavation (cuts, foundations, utilities, etc.). The number of borings shall be determined by the geotechnical engineer/geologist and shall be compatible with the complexity/simplicity of the geology, subsurface conditions and the type of project.

D. Following the construction of the utilities in the street(s) within the development and prior to the final paving of the street(s), the Developer must submit written documentation from the consulting Geotechnical Engineer, the Design Engineer and the Contractor, indicating that each have received and read the Geotechnical Report and have incorporated the recommendations into the design and construction of the development.

## 2. USE OF FILTER FABRIC FOR STREET CONSTRUCTION

- A. Normal woven or non-woven filter fabric is a viable material to use when a separation layer is needed over a soft subgrade and beneath granular fill. These materials provide some minor reinforcing for supporting loads, but primarily act to prevent the movement of many fines up into the overlying crushed base or other clean granular material.
- B. If reinforcement of soft subgrade is desired, a geo grid should be designed for the intended purpose.

## 3. FLOWABLE FILL

- A. Utility excavations and subsequent backfill are the source of many problems for paved streets. It is extremely difficult to nearly impossible to place the utility, and backfill the trench, so that some subsequent differential settlement does not occur at the pavement surface. Cost associated with supplying, placing in lifts and compaction conventional backfill materials is high and results are unsatisfactory to marginal. Therefore, “flowable fill” is a preferential backfill alternative for utility installations beneath paved streets where hydraulic equipment is difficult to use such as a trench narrower than 36 inches.

## 4. TRENCHLESS TECHNOLOGY

- A. Trenchless technology/directional drilling is encouraged to be used for many utilities placed beneath streets without making a pavement utility cut. This procedure should be used whenever feasible.

## **WARRANTY PERIOD**

The warranty period for the culinary water system, sanitary sewer system, sub-surface drainage system, storm drainage system, and street improvements as defined in Provo City Code 15.03.260.

The developer will be responsible for the placement of all sidewalks within the development. The placement of the sidewalk may be delayed until the actual construction of a house, but the developer will be required to keep a bond in place until the installation of the sidewalk has been completed.