

ALPINE CITY CONSTRUCTION STANDARDS

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Section 100. General Provisions.

100.010. Improvement Requirements.

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100.020. Definitions.

100.010. Improvement Requirements.

- A. General. This policy defines the general requirements for improvements to be built by the Developer, sub-divider, owner, or Contractor for all types of construction, (to include residential, commercial, industrial, institutional, governmental and professional office). All improvements which are in areas that are or will become public rights-of-way and/or easements, or that will be under the responsibility of a homeowners association shall meet the requirements of these specifications.

The improvements shall include all street improvements in front of all lots and along all dedicated streets to a connection with existing improvements of the same kind and to the boundaries of the development. Layout must provide for future extension to adjacent development and to be compatible with the contour of the ground for proper drainage. All drinking water, sanitary sewer, pressurized irrigation, electric, communication, storm, land or groundwater drains and any other buried utilities or conduits shall be installed to the boundary lines of the Subdivision or development.

- B. Improvements Made Before Recording. No improvements shall be commenced until a final plat is approved and inspection fees paid.
- C. Variations, Substitutions, Exceptions and Changes. Any variation, substitution or exception from the standards in this policy must be authorized in writing by the City Engineer or his/her designee. Product options and substitutions must meet the requirements of APWA 01 25 00 (Product Options and Substitutions). Any item of construction not covered in these standards must have plans and specifications approved by the City Engineer or his/her designee. Requests for changes to the Construction Standards shall be made in writing to the City Engineer. These requests will be reviewed during revision process conducted in conjunction with the APWA revisions.
- D. Protection of Existing Improvements. The Contractor shall be responsible for the protection of any existing improvements on public or private property at the start of work or placed there during the progress of the work. Existing improvements shall include but are not limited to permanent surfacing, curbs, ditches, driveways, culverts, fences, walls and landscaping. Any surface improvements damaged as a result of construction shall be restored or replaced to an equal or better condition than before. This shall be accomplished in a timely manner.
- E. Maintaining Existing Road Surfaces. The Contractor shall be responsible for maintaining existing road surfaces suitable for travel by the public. The Contractor shall be responsible for all dust and mud control and all claims and damages resulting from failure to maintain the construction area.
- F. New Materials. Only new materials may be used during construction unless otherwise authorized by the City Engineer or his/her designee. In such a case where used materials are proposed, only materials of similar use may be installed in a new system with the same use. Example: Only previously used storm drain pipe can be evaluated for use in a new storm drain system or only previously used culinary main line may be evaluated for use in a new culinary system. If approved, the used materials must meet all applicable standards, thoroughly cleaned, and be restored to their original condition prior to installation.
- G. City Furnished Products. If the City furnishes any products the Contractor shall conform to requirements and specifications of APWA 01 64 00 (Owner-furnished Products).
- H. Product Delivery and Handling. The Contractor shall conform to requirements and specifications of APWA 01 65 00 (Product Delivery and Handling).
- I. Product Storage and Protection. The Contractor shall conform to requirements and specifications of APWA 01 66 00 (Product Storage and Protection).
- J. Building Permits. The City may issue a building permit upon application, in compliance with all laws, ordinances, rules, and regulations. No building permit will be issued until all the improvements essential to meet the building code and fire code are installed, accepted, and in service and all building permit and impact fees are paid.

When asphalt pavement plants are closed for the winter, building permits may be issued before paving if there is eight inches of compacted road base in all areas to be paved.

The City Engineer or his/her designee is hereby designated as the responsible official to accept the improvements.

- K. Other Specifications and Standards. City standards and ordinances shall supersede all other Standards whenever they conflict.

100.020. Definitions.

- A. AASHTO. The American Association of State Highway and Transportation Officials, is a standards setting body which publishes specifications, test protocols and guidelines which are used in highway design and construction throughout the United States.
- B. APWA. The Utah Section, American Public Works Association Manual of Standard Specifications, latest edition with all approved supplements. These standard specifications can be obtained at <http://utah.apwa.net/>. When sections of the APWA manual are referred to in these standards, the Contractor shall also adhere to the requirements and specifications of all related sections referred to by the section of the APWA manual.
- C. AWWA. The American Water Works Association Standards, latest edition.
- D. City. The City of Alpine, Utah.
- E. City Engineer. The person appointed by the City to be the City Engineer.
- F. City Planner. The person appointed by the City to be the City Planner.
- G. Civil Engineer. A person-licensed with the State of Utah to practice as a professional engineer.
- H. County. Utah County, Utah.
- I. Construction Plans. Construction plans include drawings showing all required improvements for a development showing their location, size, grade, and elevations.
- J. Customer. A person or company receiving service from any City utilities
- K. Contractor. A person or company hired by the City or a Developer to perform construction in or for the City, having appropriate state licenses to perform said work.
- L. Council or City Council. The governing body of the City.
- M. Cul-de-sac. A permanent dead end street.
- N. Developer. Person, persons, partnership or corporation developing residential, commercial or industrial property.
- O. Development Code. The Alpine City Development Code as currently adopted by the City Council.
- P. Final Plat. An original recordable plat drawn on mylar in a form approved by the City and County, showing all lots, streets, utility easements, etc.
- Q. Flood Plain. That area designated on the most recent Flood Insurance Rate Map for the City of Alpine, prepared by the Federal Emergency Management Agency, as a flood plain as amended.
- R. General Plan. The general plan document as approved by the city council.
- S. Improved Lot. A lot which has all the improvements required in the Alpine City Development Code.
- T. Improvements. Includes roads, streets, curb, gutters, sidewalks, grading, landscaping, water and sanitary sewer systems, irrigation systems, drainage systems, power and communication systems, fences, public facilities, trees or other requirements by this Section or by the City.
- U. Land Surveyor. A person licensed with the State of Utah to practice as a licensed land surveyor.
- V. Lot. A parcel or tract of land within a subdivision which is or may be occupied by a building or structure and the accessory buildings, structures or uses customarily incident thereto, including such open

- spaces as are arranged and designed to be used in connection with the building according to the zone within which the lot is located.
- W. LID. Low Impact Development is an approach to land development that works with nature to manage storm water as close to its source as possible. LID employs principles such as preserving and creating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treats storm water as a resource rather than a waste product.
 - X. MUTCD. The Manual on Uniform Traffic Control Devices defines the standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public traffic.
 - Y. NEC. The National Electrical Code is a United States standard for the safe installation of electrical wiring and equipment.
 - Z. NESC. The National Electrical Safety Code establishes rules which govern: a) methods of grounding; b) installation and maintenance of electric-supply stations and equipment, of overhead supply and communication lines, and of underground and electric-supply and communications lines; and c) operation of electric-supply and communication lines and equipment.
 - AA. Offsite Facilities. Facilities outside of the boundaries of the subdivision or development site which are designated and located to serve the needs of the subdivision or development or adjacent property, usually lying between a development and existing facilities.
 - BB. Onsite Facilities. Facilities installed within or on the perimeter of the subdivision or development site.
 - CC. OSHA. The Occupational Safety and Health Administration is the main federal agency charged with the enforcement of safety and health legislation.
 - DD. Parcel of Land. A contiguous area of land in the possession or ownership of one person with one tax identification number.
 - EE. Planning Commission. The Planning Commission of Alpine City.
 - FF. Preliminary Plat. A map or plat of a proposed subdivision or development with accompanying supplementary documents.
 - GG. Public Utility Easements. The easements required to place public utilities across any privately owned property.
 - HH. ROW. A public Right of Way is a strip of land that is granted, through an easement or other mechanism, for transportation purposes, such as for a trail, driveway, rail line or highway. A right-of-way is reserved for the purposes of maintenance or expansion of existing services with the right-of-way.
 - II. Site Plan. A plan for a commercial, industrial, institutional, governmental or planned residential development in the City.
 - JJ. Streets. A thoroughfare which has been dedicated and accepted by the City Council, which the City has acquired by prescriptive right or which the City owns, or is offered for dedication on an approved recorded final plat. For further explanation see the streets section.
 - KK. Subdivision. Any parcel of land that is divided, re-subdivided or proposed to be divided into two or more lots, parcels, sites, units, plots, or other division of land for the purpose, whether immediate or future, for offer, sale, lease, or development either on the installment plan or upon any and all other plans, terms, and conditions. A subdivision includes (1) the division or development of land whether by deed, metes and bounds description, devise and testacia, lease, map, plat, or other recorded instrument; and (2) divisions of land for all land for all residential and nonresidential uses, including land used or to be used for commercial, agricultural, and industrial purposes.
 - LL. Utilities. Includes drinking water lines; irrigation lines; sanitary sewer; storm, land and groundwater drains; gas lines; electric power lines; cable television and telephone lines; underground conduits; and junction boxes and all appurtenances to the above.

Section 200. Improvement and Design Requirements.**200.010. General.**

- A. Easement.
- B. Traffic Control.
- C. Survey.
- D. Temporary Controls.
- E. Landfill, Construction Debris, or Garbage.

200.015. Specialized Engineering.

- A. General
- B. Hillside Geotechnical Engineering.
- C. Bank Stabilization.

200.020. Construction Plans.

- A. General.
- B. Plan Sheets.
- C. Electric and Communication Plans.
- D. Street, Parking Lot and Driveway Plans.
- E. Sanitary Sewer, Storm, Land and Groundwater Drain Plans.
- F. Drinking Water and Pressurized Irrigation Plans.
- G. Landscaping Plans.
- H. Irrigation Canal and Pipe Plans.

200.030. Street Improvements.

- A. General.
- B. Cul-de-sacs.
- C. Curbs, Gutters, and Sidewalks.
- D. Partial-Streets Widths.
- E. Driveway and Intersection Location.
- F. Parking.
- G. Reverse Frontage Lots.
- H. Temporary Turn-Arounds.
- I. Allowable Grades.
- J. Stamped Concrete.
- K. Precast Concrete or Block Walls.
- L. Pedestrian Ramps.
- M. Horizontal and Vertical Curve.

200.040. Utility Improvements.

- A. General.
- B. Communication.
- C. Electric.
- D. Pressurized Irrigation.
- E. Sanitary Sewer.
- F. Storm Drain.
- G. Drinking Water.

200.010. General.

A. Easements. Developer shall provide easements for all utility extensions through private property. Developer shall also provide a 10 foot public utility easement along public right-of-ways or streets, along all exterior property boundaries of the development, and 5 foot public utility easements along all interior property lines of the development. If setbacks are less than 10 feet then public utility easements shall be the extent of the setback.

B. Traffic Control. A traffic control plan shall be submitted to the City prior to construction in or along public streets. All traffic control shall comply with APWA 01 55 26 (Traffic Control) and the MUTCD.

C. Survey. The alignment of the side property lines for each lot in a subdivision shall be marked in the top back of curb with a lot line witness marker that meets the requirements and specifications of APWA 31 05 10 (Boundary Markers and Survey Monuments). Developer shall provide survey bench marks and monuments as required by the City Engineer or his/her designee.

All property corners shall be marked with a rebar corner marker that meets the requirements and specifications of APWA 31 05 10 (Boundary Markers and Survey Monuments). Corners must be marked before acceptance of a subdivision's improvements by the City. The rebar must be offset 2 to 4 inches by a steel tee post four feet out of the ground on the property line alignment.

D. Temporary Controls. Temporary controls such as noise, dust, mud, surface water, ground water, pollution and erosion controls shall be made. Controls shall meet the requirements and specifications of APWA 01 57 00 (Temporary Controls). The pumping of groundwater across sidewalks, into gutters or into the sanitary sewer system is prohibited.

E. Landfill, Construction Debris or Garbage. No buildings, paved parking lots, paved roads, curb, gutter, or sidewalks are allowed to be located over landfills, construction debris, or garbage.

200.015. Specialized Engineering.

A. General. Any specialized engineering beyond the expertise of city staff such as, but not limited to, geotechnical, traffic, environmental, hillside, floodplain, bank stabilization and erosion control will require the review of qualified consultants. All review costs shall be paid by the property owner/developer.

B. Hillside Geotechnical Engineering. All Major subdivisions, as outlined in the Development Code, shall be required to submit a site specific geotechnical report. The geotechnical report shall include sufficient subsurface exploration, laboratory testing and geotechnical engineering analysis to render design level geotechnical recommendations and opinions regarding slope stability and required mitigation to protect planned or future development above and below the slope(s) from earth deformations and other adverse soil or geologic conditions.

All work completed in connection with the site specific geotechnical report shall be performed by an experienced geotechnical engineering firm and under the direct supervision and direction of a professional geotechnical engineer properly licensed in the state of Utah.

The scope of work described below is considered the minimum requirement for the geotechnical investigation. The geotechnical firm (Consultant) shall use their experience and engineering judgment in conjunction with the minimum requirements outlined below to develop an appropriate site-specific geotechnical scope of work and report.

1. Field Explorations. Prior to commencing field explorations the geotechnical engineer shall review available geologic maps, aerial photographs and other pertinent literature to develop an understanding of the site and its geologic setting.

Locate utilities within areas of explorations by notifying the appropriate local one-call state utility locate service. Independent private utility locates may be required for utilities not identified by the local one-call service. Complete subsurface explorations, as many as needed to obtain a representative sample of all soil conditions for the entire site, but specifically shall be obtained for proposed roadway locations and residential building.

Boring (s) shall be located within close proximity to slope crests so as to render a representative soil profile of the slope for analysis. The boring(s) shall extend to a minimum depth of 15 feet

below the top of the slope. For example, if a 30-foot tall slope is being evaluated the boring shall extend at least 45 feet below the top of the slope. Borings shall extend through existing fill materials so that at least one sample is collected in native soil. Adjust boring depths for anticipated site development cuts and fills and for known soil conditions.

The geotechnical shall consider past property use and location. Additional soil borings shall be planned for sites located in areas that are known or suspected to have had previous slope deformations or seeps, springs or other adverse features. Special attentions shall be given to identifying, to the extent practical, the presence and extent of existing fill.

Collect a minimum of four (4) soil samples in the upper ten (10) feet of the profile and at intervals of five (5) feet thereafter. Adjust sampling intervals to include major changes in soil layering. Collect a sufficient number of undisturbed samples in fine-grained soils to properly assess strength and consolidation properties. Perform split barrel sampling in granular soils. Field blow counts should be corrected for energy and depth and presented as Standard Penetration Test (SPT) blow counts on the soil boring logs.

Field classify encountered soil in accordance with the American Standard for Testing and Materials (ASTM) and Unified Classification System (USCS).

Borings encountering bedrock shall be extended a minimum of 5 feet into the bedrock. Rock coring equipment shall be used where practical to aid in assessing rock properties. Where cores are collected, Rock Quality Designator (RQD) values should be presented on the boring logs.

2. Laboratory Testing. Samples collected in the field shall be properly packaged to avoid disturbance or freezing and transported to an accredited geotechnical and materials testing laboratory for further observation and testing. Laboratory testing shall be performed under the direction of a Utah licensed professional geotechnical engineer and in accordance with appropriate ASTM standards. At a minimum laboratory testing shall include the following:

- a. Sieve analysis – determine grain size distribution and percent fines (minus 200 sieve)
- b. Atterberg tests – classification, indexing, shrinkage and expansiveness
- c. In-place density
- d. Natural moisture content
- e. Shear strength – Direct Shear and/or Triaxial Shear

Additional laboratory testing may be required to address site conditions and provide necessary engineering properties for analysis. The geotechnical engineer shall use his professional judgment and local experience to determine an appropriate scope for laboratory testing.

Laboratory test results shall be presented in the Geotechnical Report, on individual summary sheets in the report appendix or on the boring logs.

3. Geotechnical Report Requirements. The results of the field and laboratory programs shall be evaluated by a Utah registered professional geotechnical engineer. Based on the results of their evaluation, an engineering report shall be prepared that details the results of the testing performed, provides logs of the borings and a diagram of the site/boring layout and provides geotechnical recommendations and information regarding following:

- a. General suitability of the site for the planned development
- b. Recommended precautions and limitations
- c. Subsurface exploration procedures
- d. Soil and rock conditions encountered
- e. Groundwater depth during and after drilling
- f. Geologic setting
- g. Geologic hazards
- h. Slope stability including provisions, recommendations and designs to mitigate the effects of unstable slopes and other geologic hazards that may adversely impact planned developments above and below the slope(s)
- i. Special design and construction provisions for footings or foundations near steep slopes, including type and depth of foundation system and set back distance from slopes
- j. Surface water runoff control and drainage

- k. Subsurface drainage
- l. Site grading and earthwork requirements, as appropriate

Detailed individual boring logs and graphical cross sections summarizing soil / rock profiles and slope stability analysis and results shall be included in the geotechnical report. The logs shall contain sufficient detail to render a clear description of the soil stratigraphy, soil descriptions and classifications, SPT blow counts, sample locations and depths, ground water depths and appropriate laboratory test results. Individual boring logs shall include a description of the boring location, exploration equipment used, relative or actual elevation, date of exploration and other pertinent information relative to the field exploration. The cross sections shall contain sufficient detail to render a clear description of the slope stability analysis results and any mitigation measures required. The cross sections shall contain soil profile data and a summary of engineering properties and parameters used in the analysis for each significant soil / rock layer.

The final geotechnical report shall bear the geotechnical engineer's stamp and seal. One (1) electronically submitted PDF copy of the report shall be delivered to the City of Alpine within sufficient time for review and comment. The City will have the report reviewed by its own geotechnical engineer. The cost of that review will be borne by the applicant.

200.020. Construction Plans.

- A. General. The following instructions are for the purpose of standardizing the preparation of construction plans to obtain uniformity in appearance, clarity, size, and style. Plans and designs shall meet the standards defined in the specifications and drawings hereinafter outlined. All drawings and/or prints shall be clear and legible and conform to good engineering and drafting room practice.

Include the following in construction plans for all developments:

- 1. A copy of the proposed final plat or site plan;
- 2. A plan view of the entire project showing all utilities, roads, and appurtenances;
- 3. Plan and profiles of all storm, land and groundwater drains, sanitary sewer, curb, gutter, and irrigation;
- 4. Detail drawings of street cross sections according to the standard drawings and other detail drawings only for items not found in the City standard drawings. Detail drawings shall be to scale and completely dimensioned and described. All items shall be designed in accordance with minimum requirements established by the City Construction Standards;
- 5. Complete plans for all off-site work to be done in conjunction with the project;
- 6. A stamp and signature of a Civil Engineer licensed in the state of Utah on each plan sheet, detail drawing, and design sheet;
- 7. Engineer's take off quantities and cost estimate for all construction work related to the project;

- B. Plan Sheets. Include the following on each plan sheet:

- 1. North Arrow;
- 2. A standard engineering scale between 1 inch equals 10 feet and 60 feet. A scale of 1 inch equals 100 feet may be used on the plan view of the entire project if necessary to fit project on one sheet;
- 3. Title block along right side of sheet with title of drawing in lower right corner. Include in title block:
 - a. Name of subdivision and plat or site plan;
 - b. Name of city;
 - c. Specific type of drawing (construction drawings, plan view, plan and profiles, off-site construction, detail drawings);
 - d. Name of engineer, surveyor, or firm preparing drawings;
 - e. Drawing number of total number of drawings;
- 4. Also include the following with profile drawings:
 - a. Vertical scale of 1 inch equals 1, 2, 3, 4, 5, or 6 feet;
 - b. Reference to the vertical datum. The 1929 or 1988 North American Vertical Datum (NAVD29 or NAVD88) shall be used for all elevation data;
 - c. Benchmark location and elevation for checking construction;
 - d. Stationing aligned from plan view with the profile view;
 - e. Existing ground, ditch, and utility lines;
 - f. A sheet index on each sheet showing profiled area in relation to the overall project.

- C. Electric and Communication Plans. Construction plans must include the location of all existing poles, transformers, secondary junction boxes, gas lines, sectionalizers, overhead electrical wire and overhead

communication cable. Developers will be required to work separately with owners of these companies to obtain the necessary approvals from them.

- D. Street, Parking Lot, and Driveway Plans. Include the following for curb, gutter, storm, land and groundwater drains, drainage structures, sidewalks, and street surfacing plans:
 1. Plan and profile for top back of curb for each side of the street. Label profile line as top back of curb for both sides of street if it is the same;
 2. Stationing and top back of curb elevations with curve data for curb returns;
 3. Flow direction and type of cross drainage structures at intersections with adequate flow line elevations;
 4. Type of curb and gutter if other than the standard twenty-four inch curb and gutter in the standard drawings;
 5. Location and width of driveways;
 6. Street cross sections with all proposed and existing utilities and base sections as per soils report and Construction and Development Standards;

- E. Sanitary Sewer, Storm, Land and Groundwater Drain Plans. Include the following for sanitary sewer, storm, land and groundwater drain plans:
 1. Plan and profile of all new and existing mains and manholes;
 2. Box and manhole size, location, and elevations of flow lines and rim;
 3. Location, size, grade, and type of pipe of new and existing mains;
 4. Location of each lateral with distance stubbed back into property clearly drawn and dimensioned;
 5. Storm water calculations per the Alpine City Storm Water Drainage Design Manual and Appendicies;
 6. Storm inlet boxes shall be located on street corners and or property lines.

- F. Drinking Water and Pressurized Irrigation Plans. Include the following for drinking water and pressurized irrigation plans:
 1. Location, size, and type of pipe of new and existing water mains;
 2. Location of valves, fittings, hydrants, boxes, meters, and appurtenances;
 3. Minimum cover;
 4. Location of each lateral with distance stubbed back into property clearly drawn and dimensioned;
 5. Looping of the drinking waterline will be required at the discretion of the City Engineer or his/her designee to provide adequate fire flows and redundancy.

- G. Landscaping Plans. For landscaping that will be maintained by the City or a homeowner's association submit one copy of the landscaping plans including all irrigation system layouts, details, legends, and drawings. These project plans shall meet the requirements of the Section 30.90. Landscaping and Section 30.95. Irrigation Sprinkler Systems.

- H. Irrigation Canal and Pipe Plans. Plans that affect canals or irrigation pipes must be stamped approved by those responsible for their maintenance before they will be approved by the City.

200.030. Street Improvements.

- A. General. The Developer shall construct all streets and appurtenances required for the development as specified by the City Council in accordance with the City Construction and Development Standards and/or other codes adopted by the City. The design and all street work shall be done as directed and under the supervision of the City Engineer or his/her designee.

- B. Access. Access requirements shall be in accordance with the Development Code. All secondary access roads shall be paved according to the standards outlined therein.

- C. Cul-de-sacs. The maximum length of a cul-de-sac is 450 feet measured from the nearest right-of-way line of the adjoining street to the center of the cul-de-sac. The minimum radius of the cul-de-sac is 60 feet at the property line.

- D. Curbs, Gutters and Sidewalks. Curbs, gutters, and sidewalks shall be built along all public streets according to the standard drawings. All curbs, gutters, and sidewalks shall connect to existing curbs, gutters, and sidewalks within a reasonable area as determined by the City Engineer or his/her designee.

- E. Partial-Streets Widths. Per Alpine City Development Code

- F. Driveway and Intersection Location. Driveways and street intersection locations shall be designed according to Alpine City Transportation Master Plan. No driveways shall be constructed within the following distances from an adjoining street. These distances are from Top Back Curb(TBC) to the edge of driveway for accesses:
 - 1. Along Local Streets:
 - a. 34' from an adjoining local street,
 - b. 100' from adjoining collector/arterial (approach),
 - c. 120' from adjoining collector/arterial (departure).
 - 2. Curb cuts shall only be allowed for driveways. Driveways shall be a minimum of 3 feet from any above grade utility box. All accesses and streets onto collectors and arterials must be approved by the City Engineer or his/her designee.
- G. Parking. Parking shall meet the requirements of the Development Code.
- H. Reverse or Double Frontage Lots. Per Alpine City Development Code
- I. Temporary Turn-Arounds. Per Alpine City Development Code.
- J. Allowable Grades. Per Alpine City Development Code
- K. Stamped Concrete. Alpine City does not allow colored/stamped concrete on city owned concrete flatwork unless recommended by the Planning Commission and approved by the City Council.
- L. Precast Concrete or Block Walls. The design of all walls must be approved through the Building Department. Design must be stamped and signed by a licensed professional civil engineer registered in the state of Utah.
- M. Pedestrian Ramps. Pedestrian ramps shall be placed at all corners of intersections and at all other locations of regular pedestrian traffic across roads as determined by the City Engineer or his/her designee. All ramps shall conform to the requirements of the Americans with Disabilities Act and City standards.
- N. Horizontal and Vertical Curve. Per Alpine City Development Code

200.040. Utility Improvements.

- A. General. It shall be the responsibility of the Developer to connect to existing utilities or improvements wherever they are located and extend those improvements to and through the development. Workmanship and details of construction shall be in accordance with the City Construction Standards and/or other codes adopted by the City. All work shall be done under the supervision of the City Engineer or his/her designee.
- B. Communication. Communication lines shall be underground except when the City Engineer or his/her designee feels that such underground lines are not in the best interest of the City.
- C. Electric. Electrical lines shall be underground except when the City Engineer or his/her designee feels that such underground lines are not in the best interest of the City. Lines shall be located opposite of water and pressurized irrigation lines.
- D. Pressurized Irrigation. The Developer shall connect the development with the city pressurized irrigation system with all appurtenances and shall make such pressurized irrigation available to each lot or unit within the development. Adequacy of supply and sizes of pressurized irrigation mains shall be established by the City Engineer or his/her designee. Meter boxes shall be on the opposite corner of the lot from where the electrical boxes are located.
- E. Sanitary Sewer. The Developer shall provide each lot with a sanitary sewer system in accordance with the ordinances of the City. All said work shall be done as directed and under the supervision of the City Engineer or his/her designee.
- F. Storm Drain. The Developer shall provide on-site storm drainage facilities according to the storm water Drainage Design manual and in accordance with the ordinances of the City. Storm drainage systems shall incorporate Low Impact Development (LID) systems. The maximum allowable storm water discharge from any commercial and industrial development will be limited to 0.15 cfs/acre of development.

- G. Drinking Water. The Developer shall connect the development with the city drinking water system with all appurtenances and shall make such drinking water is available to each lot or unit within the development. Adequacy of supply and sizes of drinking water mains shall be established by the City Engineer or his/her designee. Pipes shall be located opposite from electrical lines. Looping of the drinking waterline will be required at the discretion of the City Engineer or his/her designee to provide adequate fire flows and redundancy.

Section 250. Inspection and Testing.**250.010. General.**

- A. Quality Assurance.
- B. Submittals.
- C. Preconstruction Meeting.
- D. Inspection and Testing Notification.
- E. Testing and Sampling.
- F. Testing Agency.
- G. Work without Required Inspection and Testing.
- H. Inspection and Testing Fees.
- I. Sub-standard Work and Pay Factors.
- J. Weekly Progress Meetings.
- K. Road Construction.
- L. As-Built Survey.
- M. Acceptance of Improvements.

250.020. Communication.

- A. Conduit Inspection.
- B. Service Stub Inspection.
- C. Final Communication Inspection.
- D. Bedding Inspection.

250.030. Earthwork.

- A. Compaction and Moisture Content Tests.
- B. Red-head Inspection.
- C. Proof Roll Inspection.
- D. Thickness Test.

250.040. Electric.

- A. Conduit Inspection.
- B. Service Stub Inspection.
- C. Street Light Base Inspection.
- D. Bedding Inspection.
- E. Final Electrical Inspection.

250.050. Landscaping and Irrigation Sprinkler Systems.

- A. Plant Material Inspection.
- B. Sprinkler System Assembly Inspection.
- C. Fall Sprinkler Winterizing Test
- D. Spring Sprinkler Energizing Test.
- E. Final Acceptance Inspection.

250.060. Portland Cement Concrete Work.

- A. General.
- B. Slump, Temperature, and Air Entrainment Test.
- C. Compression Test.
- D. Forms and String Line Inspection.
- E. Gutter Drainage Inspection.
- F. Thickness Test.
- G. Curing Inspection.

250.070. Pressurized Irrigation.

- A. General.
- B. Main Line Inspection.
- C. Pressurized Irrigation Service Inspection.
- D. Pressure Test.
- E. Leakage Test.

250.080. Sanitary Sewer.

- A. General.
- B. Main Line Inspection.

- C. Service Inspection.
- D. Air Pressure Test.
- E. Video Inspection.
- F. Deflection Test.

250.090. Storm, Land and Groundwater Drains.

- A. General.
- B. Main Line Inspection.
- C. Air Pressure Test.
- D. Video Inspection.

250.100. Streets.

- A. Asphalt Pavement Material Tests.
- B. Compaction Tests.
- C. Grading Inspection.
- D. Thickness Test.
- E. Profile Tolerance Inspection.
- F. Asphalt Concrete Temperature Test.
- G. Asphalt Paving Limitations.

250.110. Drinking Water.

- A. General.
- B. Main Line Inspection.
- C. Drinking Water Service Inspection.
- D. High Chlorine Test.
- E. Pressure Test.
- F. Leakage Test.
- G. Bacteria Test.

250.010. General.

- A. Quality Assurance. The following work shall be subject to the inspection and testing requirements of this Section:
1. Work on existing or proposed City property;
 2. Work on property that will be owned by a property owners association;
 3. Work on existing or proposed streets, easements, or right-of-ways;
 4. Work on existing or proposed City utilities.

The Contractor must ensure that all inspection and testing required by these standards is performed and accepted by the City Engineer or his/her designee. The Contractor must also ensure that any additional inspection and testing required by the City or a testing company is performed and accepted by the City. In projects other than those bid out by the City, the Developer is ultimately responsible for the work of the Contractor.

- B. Submittals. Contractor shall turn in submittals for all testing not performed by the City.
1. *Field Test Report.* Contractor must submit original field test report immediately to City whenever possible. Reports may not be submitted later than the end of the current day.
 2. *Laboratory Test Report.* Submit original report to the City within 48 hours after test results are determined.
 3. *Material and Equipment Specifications.* One copy of the manufacturer's specifications and manuals for equipment and materials used must be submitted to the City 7 days before the pre-construction meeting. Pre-construction meeting may not be held until material and equipment specifications are approved.
- C. Preconstruction Meeting. The Contractor must schedule a preconstruction meeting with the City's engineering department before any work on a new development or City project may begin.

The Contractor, Developer, project engineer, and all sub-contractors must be present at the preconstruction meeting. Any sub-contractor not attending the preconstruction meeting must schedule an additional preconstruction meeting with the City before beginning work. Work must begin within 4 weeks of the preconstruction meeting or a new preconstruction meeting must be scheduled by the Contractor.

- D. Inspection and Testing Notification. The City may contract with a private company to conduct any inspections or testing specified to be performed by the City. All inspections and tests must be scheduled with the City or company contracted by the City a minimum of 1 full business day before needed. Requests for inspection on work requiring continuous inspection shall be made 3 full business days prior to commencing the work.
- E. Testing and Sampling. The City Engineer or City Inspector may require that sampling be performed in their presence, in which case the Developer or Contractor shall be notified of this requirement in writing at the time the building permit is issued, or at the preconstruction meeting, or when construction drawings are released by the City for construction, as applicable.

Each sample or test shall be accompanied by the following written data, which shall be reported to the City with test results:

1. Name of Project.
 2. Name of Developer/Contractor.
 3. Project Street Address.
 4. Appropriate Test Name.
 5. Date of Sampling.
 6. Sample Number (if more than one sample per day).
 7. Name of technician who performed the testing.
 8. Location of sample.
- F. Testing Agency. All materials testing, whether in a laboratory or in the field, shall be conducted by a testing agency approved by the City Engineer or his/her designee.
- G. Work without Required Inspection and Testing. Any work performed without required inspection or testing will give the City the option to hold the bond covering that portion of the improvements in violation, or, require the removal and replacement of the un-inspected work. The City shall have the option of retaining part or all of the bond for 10 years after installation of improvements constructed without required inspection or testing. The City Engineer may also accept the work at a reduced price if the lowest pay factor is applied.

- H. Inspection and Testing Fees. Inspection fees and/or connection fees required by Resolution 99-18 shall be paid and permits required shall be obtained prior to the preconstruction meeting.
- I. Sub-standard Work and Pay Factors. If any inspection or test indicates that work does not meet City standards the City Engineer may require that the work be redone. If the work has a pay factor option in the standards, the City Engineer may accept the work at a reduced price upon condition that the pay factors outlined in the City standards apply. Payment reduction amounts shall either be assessed to the developer as a fee based upon bond estimates for the work, or be applied against payments to Contractors for City contracts. When any work is done to a lower standard than allowed for in the pay factor tables the work shall be redone until it meets City standards.
- J. Weekly Progress Meetings. All construction projects in the City will have a weekly progress meeting unless otherwise specified by the City Engineer. The City Engineer or his/her designee, City inspectors, the Contractor, and sub-contractors shall be in attendance.
- K. Road Construction. Road construction may not commence until all underground utilities are installed and pass all the inspections and tests required by these standards.
- L. As-Built Survey. The Contractor shall notify the City to survey all underground utilities either installed or uncovered in the course of construction. Contractor shall give the City 24 hour's notice to survey utilities.
- M. Acceptance of Improvements. Inspections made by the City or a company hired by the City to determine compliance with the specifications do not imply final acceptance of the work. The City requires the completion of all facilities before any are accepted for maintenance. The following inspections must be scheduled and passed before final acceptance of any improvements:
 - 1. *End of Construction Inspection.* The Contractor must schedule with the City an end of construction inspection once all the improvements in a development or project are completed according to the Construction and Development Standards.
 - 2. *Final Acceptance Inspection.* One year after the Contractor or Developer passes the end of construction inspection, he or she must schedule a final acceptance inspection.

If the Contractor or Developer does not pass one of these inspections a punch list of work items necessary to pass the inspection will be given to the Contractor or Developer within 2 business days of the inspection. The Contractor or Developer must reschedule inspections with the City until the project or development passes the inspection.

All improvements shall be free from defects, damage, or debris at the time of these inspections. The Contractor or Developer shall not be responsible for debris or damage not caused as a result of his or her work or quality of work.

Any faulty or defective work shall be corrected by the Contractor within 30 days of the failed inspection or according to the contract the City has with the Contractor.

If the Contractor or Developer fails to do so, the City Engineer or his/her designee shall have such repairs made, and the cost of such repairs shall be paid by the Developer together with 25% in addition thereto for stipulated damages for such failure on the part of the Developer to make the repairs.

250.030. Earthwork.

- A. Compaction and Moisture Content Tests. The Contractor will test all sub-grade and fill material for compaction and moisture content and will provide these tests to the city within 48 hours of testing. Test locations shall be determined by the City.
 - 1. *Trenches.* Tests will generally be taken 1 per 200 lineal foot of trench per 8 inch lift.
 - 2. *Streets.* Tests will generally be taken 3 per 200 lineal foot of street per 8 inch lift.
 - 3. *Other Cuts and Fills.* Tests will generally be taken 1 per 2,000 square feet of compacted area.
- B. Red-head Inspection. The project engineer must provide red-heads for all grade work when brought to within 3 inches of finish grade. The City must inspect and accept finished grading to the engineered red-heads.
- C. Proof Roll Inspection. Prior to placing fill material for roadbed backfills, proof roll sub-grade using gross weight of 18,000 pounds per tandem axle, with a tire pressure at least 90 psi, unless otherwise specified by

the soils report. Contractor shall proof roll under the supervision of the City according to the following conditions:

1. *Passes.* All proof roll passes will traverse the sub-grade parallel to the roadbed centerline. All subsequent passes will be offset half the vehicle width until the entire sub-grade is tested.
 2. *Mitigation.* The City will analyze, determine, designate, and measure the areas, if any, requiring additional compaction or reconstruction.
 3. *Sub-grade Protection.* Once sub-grade passes the proof rolling test, protect the surface from construction operations and traffic damage. Repair all cuts, ruts, and breaks. Keep surface in a satisfactory condition until geotextile fabric or base course has been placed.
- D. Thickness Test. Material thickness tests will be conducted by the City when the City Engineer or his/her designee considers it necessary. The total depth shall be reasonably close to that shown on the typical section. Depth analysis shall be made on at least four holes for each section. Base thickness shall be accepted if 75% of the test holes are less than 1/4" below the specified thickness and no individual hole shall be more than 3/4" below the specified thickness.

250.050. Landscaping and Irrigation Sprinkler Systems.

- A. Plant Material Inspection. All plant materials are to be inspected and approved by the City at the time of delivery on site. This approval does not constitute final acceptance of any plant material by the City Parks Department Representative. All plant materials will be inspected again at time of final inspection and once again at the end of the warranty period. Any plant found to be unacceptable at any of these inspections shall be immediately removed and replaced.
- B. Sprinkler System Assembly Inspection. An on-site inspection shall be conducted by the City after the entire sprinkler system is assembled and prior to backfilling the trenches. During this inspection all fittings, bends, sweeps, valves, sprinkler heads and any other appurtenance on the system shall be surveyed by the City.
- C. Fall Sprinkler Winterizing Test. In the fall of the year during the installation and guarantee period, the Contractor shall meet with the City on the project site. The Contractor shall winterize the system by draining all the water and doing everything necessary to insure the protection of the system until spring. Blowing out the lines by compression shall be permitted during the 1 year guarantee. The individuals involved from both parties shall exchange all information necessary for the eventual takeover of the system by the Alpine City Maintenance Personnel.
- D. Spring Sprinkler Energizing Test. The Contractor with the City Maintenance Personnel in attendance shall energize the sprinkler irrigation system the spring following the fall winterizing test. Contractor shall repair all defects found as a result of winter damage, improper installation, improper maintenance, defective materials or inadequate sprinkler drainage.
- E. Final Acceptance Inspection. At the end of the guarantee period, all landscaping and irrigation sprinkler systems must then be inspected and tested by the City. As-built drawings shall be furnished to the City at the time of the final inspection.

Irrigation sprinkler systems must operate in a satisfactory manner, with a full uniform coverage of the areas that are indicated to be sprinkled. Sprinkler heads shall be adjusted to proper level.

Landscape and irrigation sprinkler systems will not be inspected for acceptance in parts. Where inspected work does not comply with requirements, Contractor shall replace rejected work and continue specified maintenance until reinspected by the City and found to be acceptable. Remove rejected plants and materials promptly from the project site.

250.060. Portland Cement Concrete Work.

- A. General. All materials and processes involved in concrete work shall be subject to inspection and testing as detailed in the various paragraphs of this section and in general compliance with ASTM E105-54T. Results of tests performed by laboratories approved by the City to the satisfaction of the City Engineer or his/her designee shall be accepted by the supplier as a basis for acceptance or rejection of any and all materials.

The latest appropriate ASTM tests and methods shall be considered to be standard, and will include but not be limited to concrete, cement, aggregates additives, curing compounds, parting compounds and jointing materials. A copy of all batch tickets for concrete placed shall be submitted to the City.

- B. Slump, Temperature and Air Entrainment Test. The Contractor shall be test slump, temperature, and air entrainment on every fifty cubic yards or less of concrete placed each day. Tests shall be taken after ½ to 1 yard has been poured from the mixer. Once a sample is taken the concrete pour shall be stopped until tests show that the concrete meets City standards. Concrete that does not meet City requirements for slump, temperature, and air entrainment shall not be used. Any that may already have been poured shall be removed before hardening.
- C. Compression Test. The Contractor shall test compression on every fifty cubic yards or less of concrete placed each day according to ASTM C143, C231, C1064, C172, and C31. Three cylinder specimens shall be taken for each test, one shall be broken at 7 days, one at 28 days and the third held for 45 days after submittal in case further testing is required.

Specimens shall attain the specified strength at 28 days. One lot is 1 day’s production. A lot with sub-standard compressive strength may be accepted at reduced price if the appropriate pay factor is applied to the whole lot. The following table outlines the pay factors for sub-standard Portland cement concrete strength:

PORTLAND CEMENT CONCRETE
COMPRESSIVE STRENGTH PAY FACTORS

Pay Factor	Tolerance (psi below 28 day specified strength)
0.98	1 to 100
0.94	101 to 200
0.88	201 to 300
0.80	301 to 400
0.50	401 to 500
Replace	More than 500

These pay factors may not be applied toward concrete in structures.

- D. Forms and String Line Inspection. The City shall inspect all forms and string lines before concrete may be placed.
- E. Gutter Drainage Inspection. The City shall inspect all gutters for drainage prior to paving. Water shall be let into all gutters and any gutters with standing water in excess of 1/4 inch after runoff shall be replaced. Contractor must supply water truck for gutter drainage inspection.
- F. Thickness Test. The City shall determine the number, if any, and location of core tests necessary to ensure the proper thickness of Portland cement concrete. Tests shall be taken at equal intervals in a test area. A test area shall be defined as a total area placed at the same time and by the same process. The average thickness shall then be determined from all the cores taken. Tests shall be taken and verified by a certified testing lab, paid for by the Contractor.

When the average thickness is more than 0.25 inches below the specified thickness, a minimum of 1 core per 1,500 square feet of pavement shall be taken. Work with sub-standard thickness may be accepted at reduced price if the appropriate pay factor for the lowest tested thickness is applied to all of the sub-standard work. The following table outlines the pay factors for sub-standard Portland cement concrete thickness:

PORTLAND CEMENT CONCRETE
THICKNESS PAY FACTORS

Pay Factor	Tolerance (inches below specified thickness)
1.00	0.00 to 0.25
0.90	0.26 to 0.50
0.70	0.51 to 0.75
0.50	0.76 to 1.00
Replace	More than 1.00

G. Curing Inspection. The City shall inspect the curing of all Portland cement concrete work within 24 hours of pouring the concrete.

250.070. Pressurized Irrigation.

- A. General. The inspections and tests in this section are required for all pressurized irrigation construction in the City boundaries and on all construction relating to the City pressurized irrigation system outside the city boundaries.
- B. Main Line Inspection. The City must inspect all pressurized irrigation main line installation on an ongoing basis. Inspection notification must be given before any construction of the main line may begin. All crosses, tees, bends, valves, and drains must be inspected and surveyed by the City before they are backfilled.
- C. Pressurized Irrigation Service Inspection. The City must inspect all pressurized irrigation services before service trenches are backfilled. The City must be able to survey services at the main during the inspection.
- D. Pressure Test. The Contractor must pressure test all pressurized irrigation systems, system extensions and service laterals to the setter in the presence of the City Engineer or his/her designee or have tests documented and submitted by a certified testing company approved by the City. Pressure tests must meet the requirements and specifications of APWA 33 08 00 (Commissioning of Water Utilities).
- E. Leakage Test. Leakage tests shall be conducted concurrently with the pressure tests. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.

No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$Q \equiv \frac{LD * \sqrt{P}}{133,200}$$

In which Q is the allowable leakage, in gallons per hour; L is the length of pipeline tested in feet; P is the average test pressure, in pounds per square inch (gage) and D is the nominal diameter of the pipe in inches.

Provide a 225 psi test pressure for 2 hours unless specified otherwise. If any test of pipe laid discloses leakage greater than specified, the Contractor shall, at their own expense, locate and repair the defective material until the leakage is within the specified allowance. All visible leaks are to be repaired regardless of the amount of leakage.

250.080. Sanitary Sewer.

- A. General. The inspections and tests in this section are required for all sanitary sewer construction in the City boundaries and on all construction relating to the City sanitary sewer system outside the city boundaries.

- B. Main Line Inspection. The City must inspect all sanitary sewer main line installation on an ongoing basis. Inspection notification must be given before any construction of the main may begin.
- C. Service Inspection. The City must inspect all sanitary sewer services before service trenches are backfilled. The City must be able to survey services at each end during the inspection.
- D. Air Pressure Test. Contractor shall conduct a low pressure air test by the following method under the direction of the City Engineer or his/her designee with equipment equal to Cherne Industrial, Inc., or provide proof that test was conducted by a certified testing company. Sanitary sewer pipes with inside diameters of 30 inches or larger shall be leak tested according to manufacturer's specifications.

All wyes, tees, or ends of lateral stubs shall be suitably capped and braced to withstand the internal test pressures. Caps shall be easily removable for future lateral connections or extensions. After a manhole to manhole section of line has been backfilled and cleaned, it shall be plugged at each manhole with pneumatic plugs.

Low pressure air shall be introduced into the sealed line until the internal air pressure reaches 4 psi-G greater than the average back pressure of any ground water that may be over the pipe. At least 2 minutes shall be allowed for the air pressure to stabilize.

The portion of line being tested shall be accepted if the portion under test does not lose air at a rate greater than 0.003 cubic feet per minute per square foot of internal pipe surface or 2.0 cubic feet per minute minimum when tested at an average 3.0 psi-G greater than any back pressure exerted by ground water that may be over the pipe at the time of the test.

The pipe and joints shall also be considered acceptable when the time required in minutes for pressure to decrease from 3.5 To 2.5 psi-G (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time shown for the given diameters in the following table:

PRESSURE REDUCTION TIME LIMITS	
Pipe Diameter (inches)	Time (minutes)
4	2.0
6	3.0
8	4.0
10	5.0
12	5.5
15	7.5
18	8.5
21	10.0
24	11.5

If the installation fails to meet this requirement, the Contractor shall determine at his/her own expense the source of leakage. He shall repair or replace all defective materials and/or workmanship. All sanitary sewer mains shall be tested, cleaned and accepted by Alpine City before laying the street surface.

- E. Video Inspection. Contractor shall clean and then have the City video inspect all sanitary sewer main lines prior to paving. The City must approve video inspection company.

Cleaning shall be done using a high pressure jet cleaning machine, producing a minimum of 800 psi. Waste water and debris shall not be permitted to enter the City sanitary sewer system, but shall be removed at the lowest manhole of the extension.

Video Inspection shall be done by the Contractor. A digital video disk (DVD) of video inspection and log report shall be submitted by the inspection company to the City Engineer or his/her designee.

Main line determined to be defective by the City Engineer or his/her designee shall be remedied by the Contractor. Contractor shall then clean and video inspect the main lines again.

- F. Deflection Test. Contractor shall perform a displacement test on all sewer lines after video inspection. Deflections tests must be conducted in the presence of the City Engineer or his/her designee or be documented and submitted by a certified testing company approved by the City. In no case shall pipe be accepted that has a deflection of more than 5% after it has been backfilled. The Mandrel must be pulled by hand or air. A pipe deflection test shall be required of the Developer/Contractor after backfilling and compaction of the trench.

250.090. Storm, Land and Groundwater Drains.

- A. General. The inspections and tests in this section are required for all storm, land and groundwater drain construction in the City boundaries and on all construction relating to the City storm, land and groundwater drain system outside the city boundaries.
- B. Main Line Inspection. The City must inspect all storm, land and groundwater drain main lines during installation on an ongoing basis. Inspection notification must be given before any construction of the pipe may begin. All groundwater drains shall be pre-approved by the City Engineer or his/her designee.
- C. Air Pressure Test. Contractor shall conduct a low pressure air test for all sealed drains by the following method under the direction of the City Engineer or his/her designee with equipment equal to Cherne Industrial, Inc., or provide proof that test was conducted by a certified testing company. Storm drain pipes with inside diameters of 30 inches or larger shall be leak tested according to manufacturer’s specifications.

All wyes, tees, or ends of lateral stubs shall be suitably capped and braced to withstand the internal test pressures. Caps shall be easily removable for future lateral connections or extensions. After a manhole to manhole section of line has been backfilled and cleaned, it shall be plugged at each manhole with pneumatic plugs.

Low pressure air shall be introduced into the sealed line until the internal air pressure reaches 4 psi-G greater than the average back pressure of any ground water that may be over the pipe. At least 2 minutes shall be allowed for the air pressure to stabilize.

The portion of line being tested shall be accepted if the portion under test does not lose air at a rate greater than 0.003 cubic feet per minute per square foot of internal pipe surface or 2.0 cubic feet per minute minimum when tested at an average 3.0 psi-G greater than any back pressure exerted by ground water that may be over the pipe at the time of the test.

The pipe and joints shall also be considered acceptable when the time required in minutes for pressure to decrease from 3.5 To 2.5 psi-G (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time shown for the given diameters in the following table:

PRESSURE REDUCTION TIME LIMITS	
Pipe Diameter (inches)	Time (minutes)
4	2.0
6	3.0
8	4.0
10	5.0
12	5.5
15	7.5
18	8.8
21	10.0
24	11.5

If the installation fails to meet this requirement, the Contractor shall determine at his/her own expense the source of leakage. He shall repair or replace all defective materials and/or workmanship. All storm drain lines shall be tested, cleaned and accepted by Alpine City before laying the street surface.

- D. Video Inspection. Contractor shall clean and then video inspect all storm, land and groundwater drain lines before paving. The City must approve video inspection company.

Cleaning shall be done using a high pressure jet cleaning machine, producing a minimum of 800 psi. Debris shall not be permitted to enter the City storm drain system.

Video inspection shall clearly show any debris, broken pipe, misaligned pipe, displaced pipe and defective joints for all sections of the main line. All defects and their location shall be detailed on a separate video log report. A digital video disk (DVD) of video inspection and log report shall be submitted by the inspection company to the City Engineer or his/her designee.

Log reports shall be submitted on the City video form or an approved equivalent. Log reports must be submitted with an 11x17 copy of the plans. All manholes in the log report must reference the labeled manholes numbers on the plans. Each manhole must also have a street address clearly shown on the log report.

250.100. Streets.

- A. Asphalt Pavement Material Tests. Material tests will be conducted by the Contractor when the City Engineer or his/her designee considers it necessary.
- B. Compaction Tests. The Contractor will test all bituminous pavement for compaction and moisture content. Test locations shall be determined by the City but will generally be taken 3 per 200 lineal foot of street or 1 per 2,000 square foot of paved area. Pay factors as per APWA 32 12 16 (Plant-Mix Asphalt Paving) shall apply.
- C. Grading Inspection. The sub-grade, sub-base, and road base shall all be graded to an engineered red-head and accepted by Alpine City. Red-heads shall be placed every 50 feet at the crown of the road. If the distance between red-heads and edge of pavement exceeds 25 feet additional redheads shall be installed half way between the crown and edge of pavement. Red-heads shall also be placed every 50 feet at the edge of pavement where there is no curb and gutter.
- D. Thickness Test. Material depth tests will be conducted by the City when the City Engineer or his/her designee considers it necessary. The total depth shall be reasonably close to that shown on the typical section. Depth analysis shall be made on at least four holes for each section. Base thickness shall be accepted if 75% of the test holes are less than 1/4" below the specified thickness and no individual hole shall be more than 3/4" below the specified thickness. Work with sub-standard thickness may be accepted at reduced price if the appropriate pay factor for the lowest tested thickness is applied to all of the sub-standard work. The following table outlines the pay factors for sub-standard asphalt pavement thickness:

PAVEMENT DEPTH PAY FACTORS

Pay Factor	Tolerance (inches below specified thickness)
0.95	0.00 to 0.25
0.90	0.26 to 0.50
Replace	More than 0.5

- E. Profile Tolerance Inspection. Profile tolerance inspections may be required by the City any time within a year of paving. Collector and arterial streets shall meet the requirements of APWA 32 12 16 (Plant-Mix Asphalt Paving). For local streets profiling, the maximum vertical distance from the pavement surface to a straight edge is:
 - a. 1/4-inch in 10-feet parallel to centerline.
 - b. 3/8-inch in 10-feet perpendicular to centerline except at cross section grade breaks.

Collector and arterial streets shall meet the requirements of APWA 32 12 16 (Plant-Mix Asphalt Paving).

- F. Asphalt Concrete Temperature Test. This test shall be conducted on the first three loads of asphalt concrete installed, and on one in four of all future loads as required by the City. Testing shall be conducted according to the requirements and specifications of APWA 32 12 16 (Plant-Mix Asphalt Concrete Paving). Temperature gauge shall be allowed to stabilize for 1 minute before taking reading if using probe type. If using infra-red "gun" type, reading shall consist of an average of a minimum of 3 readings, where reading is

taken immediately after displacing a minimum of 2 inches of material from the surface being tested and the "gun" is within 18" of the surface being tested.

- G. Asphalt Paving Limitations. Pave according to Section 02741 Part 3.8 of the 2012 Standard Specifications for Road and Bridge Construction published by the Utah Department of Transportation (UDOT) unless otherwise approved by the City Engineer or his/her designee. In the event the City Engineer approves paving between October 15th and April 15th, an overlay in the spring will be required as outlined in the table below. Do not place HMA on frozen base or during adverse climatic conditions such as precipitation or when roadway surface is icy or wet. Use a release agent that does not dissolve asphalt and is acceptable to the City Engineer or his/her designee for all equipment and hand tools used to mix, haul, and place the HMA. Place HMA between April 15 and October 15, and when the air temperature in the shade and the roadway surface temperature are above 50 degrees Fahrenheit.

PAVEMENT DEPTH AFTER OCTOBER 15TH / BEFORE APRIL 15TH

Street	Typical	Base Asphalt	Spring Overlay	Total Asphalt
Local	3"	2.5"	2"	4.5"
Collector	4"	3"	2"	5"
Arterial	5"	4"	2"	6"
Parking lot & Driveway	3"	2.5"	2"	4.5"
Commercial Local	4"	3"	2"	5"

250.110. Drinking Water.

- A. General. The inspections and tests in this section are required for all drinking water construction in the City boundaries and on all construction relating to the City drinking water system outside the city boundaries.
- B. Main Line Inspection. The City must inspect all drinking water main line installations on an ongoing basis. Inspection notification must be given before any construction of main line may begin. All crosses, tees, bends, valves and hydrants must be inspected and surveyed by the City before they are backfilled.
- C. Drinking Water Service Inspection. The City must inspect all drinking water services before service trenches are backfilled. The City must be able to survey services at the main during the inspection.
- D. High Chlorine Test. High Chlorine tests shall meet the requirements and specifications of APWA 33 13 00 (Disinfection). The Contractor must conduct a high chlorine test at every hydrant on a new drinking water main installation. If a hydrant does not exist on the test section, tests must be taken at the end of each line. The chlorine residual shall be at least 25 mg/L.
- E. Pressure Test. Pressure test must be conducted after the successful completion of the bacteria test. The Contractor must pressure test all drinking water systems, system extensions and service laterals to the setter in the presence of the City Engineer or his/her designee or have tests documented and submitted by a certified testing company approved by the City. Pressure tests must meet the requirements and specifications of APWA 33 08 00 (Commissioning of Water Utilities).
- F. Leakage Test. Leakage tests shall be conducted concurrently with the pressure tests. Tests shall be conducted in accordance with AWWA Standard C600-10. If any test of pipe laid discloses leakage greater than specified, the Contractor shall, at their own expense, locate and repair the defective material until the leakage is within the specified allowance. All visible leaks are to be repaired regardless of the amount of leakage.
- G. Bacteria Test. Bacteria tests shall meet the requirements and specifications of APWA 33 13 00 (Disinfection). Tests may only be scheduled at certain regular times set by the City. The Contractor shall be present and open all hydrants or other locations to be tested from. The City shall submit samples to a certified lab to be tested according to state drinking water regulations.

If any sample point fails on the first test, the line will be flushed and re-tested at all sample points. If any sample point fails a second time, the complete line will be re-disinfected and re-tested at all sample points. If any samples come back marked "presence", which means coli form bacteria is present, the line will be re-disinfected and re-tested at all sample sites. Contractor is responsible to pay for all bacteria tests and retests.

Drinking water services will not be installed until bacteria sample results have been approved by the City Engineer or his/her designee. All testing lab fees shall be paid for by the Contractor.

Section 300. Contractor Requirements.**300.010. General.**

- A. Contractors Working for a Developer.
- B. Contractors Working for the City.
- C. Status Verification System.

300.020. Insurance.

- A. General.
- B. Workers' Compensation.
- C. Commercial General Liability Insurance.
- D. Automobile Liability Insurance.

300.030. Bonding.

- A. General.

300.040. Excavation Permits.

- A. General.
- B. Contractors.
- C. Property Owners.

300.050. Inspection Fees.

- A. General.

300.060. Materials Submittals.

- A. General.

300.070. Quality Control.

- A. General.
- B. Materials Production.
- C. Testing and Inspection.

300.010. General.

- A. Contractors Working for a Developer. Contractors and Sub-Contractors working for a Developer must prequalify before doing any work in existing or proposed City property, streets, easements, or right-of-way and for any work on existing or proposed City utilities. To prequalify the following must be on file in the City Engineer’s office:
 - 1. A current Contractor’s license specified for project type according to Utah State Code;
 - 2. Insurance information;
 - 3. Contractor information sheet;
 - 4. Project Bond;
 - 5. Excavation Permit;
 - 6. UDOT Permit for construction in state right-of-way; and

Failure to pre-qualify before doing any construction shall constitute grounds for legal action.

- B. Contractors Working for the City. Bids for City projects will only be awarded to the lowest responsible bidder with current contractor’s license specified for the project type according to the Utah State Code. The City’s contractor qualifications and experience forms shall be completely filled out and submitted with bid. Failure to do so is basis to reject the bid. Alpine City reserves the right to determine a non-responsible bidder based upon these forms or any other research conducted by the city.
- C. Status Verification System. Contractor agrees that it, and its subcontractors, will register with and use a Status Verification System to verify the federal employment authorization status of all employees hired after July 1, 2009. Contractor, and its subcontractors, will comply, in all respects, with Utah Code Annotated §63-99a-103, as it may be amended from time to time.

300.020. Insurance.

- A. General. A Contractor must acquire the insurance stipulated in this section to prequalify to do construction work. The city must receive and accept proof of the insurance before any work may begin. The submittal of said evidence to the City shall not relieve or decrease the liability of the Contractor hereunder.
- B. Workers’ Compensation. Contractor shall obtain workers compensation insurance as required by State law.
- C. Commercial General Liability Insurance. The following commercial general liability insurance must be obtained and submitted on ISO Form CG 00 01 (11/85) or equivalent, occurrence policy, with limits not less than:
 - 1. General Aggregate \$1,000,000
 - 2. Products - Comp/OPS Aggregate \$1,000,000
 - 3. Personal and Advertising Injury \$ 500,000
 - 4. Each Occurrence \$ 500,000
 - 5. Fire Damage (any one fire) \$ 50,000
 - 6. Medical Expense (any one person) \$ 5,000

Also include the follow endorsements or their equivalents attached thereto:

- 1. ISO Form CG 25 03 (11/85), Amendment of Limits of Insurance (Designated Project or Premises), describing the subject contract and specifying limits as shown above.
- 2. ISO Form CG 20 10 (11/85), Additional Insured -- Alpine City, Lessees, or Contractors (Form B), naming the City as additional insured and containing the following statement, “This Endorsement Also Constitutes Primary Coverage in the Event of any Occurrence, Claim, or Suit”.
- D. Automobile Liability Insurance. Contractor shall obtain automobile liability insurance with limits of not less than \$500,000 Combined Single Limit per accident. Coverage shall apply to any auto.

300.030. Bonding.

- A. General. The owners and/or developers of property shall deposit security with the City prior to recording the final plat to guarantee proper installation of all required improvements in accordance with the plans, specifications, time limitations, and conditions relating thereto as meets with the approval of the City Council or such personnel as the City Council shall designate. Security shall be in the form of cash in the minimum amount of 10% of the City’s bond amount. The balance of the security shall be in the form of cash, an irrevocable letter of credit, or an escrow bond. The amount of the security shall be 110% of the City’s estimated costs of the improvements.

Irrevocable letters of credit or escrow bonds shall be executed by financial institutions acceptable to the City and authorized to conduct business in the State of Utah, and must be in the form approved by the City. The bond or letter of credit as required by this section must be posted prior to recording. Upon completion of the punch list for the end of construction inspection, the security less the 10% cash bond and the amount estimated for the asphalt preservation coat shall be released to the Developer. Ten percent (10%) of the security amount shall be held for a period of one (1) year following final inspection and acceptance to warrant improvements for this time period. The ten percent retained shall be the cash amount required as the minimum security.

300.040. Excavation Permits.

- A. General. Contractors are required to qualify before obtaining an excavation permit to do construction work unless a project is already approved, bonded and insured. The permit must be approved 48 hours prior to construction. The permittee is given a copy of the permit and plan after the City Engineer or his/her designee has approved and signed them.

The City may stipulate time limits for completion of work and suspend permits for non-compliance. A copy of the excavation permit shall be on site during construction. The following fee factors shall be applied toward excavation permits for more recently paved streets:

FEE FACTORS

Fee Factor	Age of Pavement
4.00	Less than 1 Year
3.00	1 to 3 Years
2.00	3 to 5 Years
1.50	5 to 10 Years

If utilities are bored then the excavation permit fee shall be reduced by one half.

- B. Contractors. Contractors are required to submit the following information to obtain an excavation permit:
 - 1. Copy of Contractors license;
 - 2. Certificate of Insurance;
 - 3. License and permit bond of \$10,000.00;
 - 4. Detailed drawing of proposed work and traffic control (4 copies).
- C. Property Owners. Individual property owners doing his/her own work for drive approaches and other similar, minor concrete work in the City right-of-way are required to submit the following information to obtain an excavation permit:
 - 1. Proof of homeowners or similar insurance;
 - 2. Detailed drawings of the proposed work, including safety, barricades, traffic and pedestrian control.

Any cuts or changes to the curb shall be performed by a licensed contractor who has obtained an excavation permit or building permit.

300.050. Inspection Fee.

- A. General. For bonded developments, an inspection fee will be collected. The fee will be for city costs relating to the construction. These costs include but are not limited to survey, inspection, testing and administration. The fee will be estimated based upon previous projects. Portions of the fee not used shall be refunded to the Developer after the punch list of the final acceptance inspection is completed.

If City costs relating to inspection exceed the inspection fee, these costs will be paid for by the developer or they will be deducted from the 10% cash bond.

300.060. Materials Submittals.

- A. General. Contractors are required to provide materials submittals for all materials to be used to the City for review and approval.

1. For pre-manufactured items, documentation must be submitted a minimum of 2 weeks before installation and must include sufficient information, including shop drawings, if applicable, to establish models, colors, sizes, installation requirements, etc. that will be used.
2. For on-site manufactured items, such as asphalt, concrete or base courses, submit mix designs, hot/cold weather installation plans, and materials certifications a minimum of 5 working days prior to planned installation.
3. Submittals for the following, at a minimum, should be submitted:
 - a. All pre-manufactured items meeting city standards such as light fixtures, electrical components, utility fixtures and piping, landscaping, etc.
 - b. Hot Mix Asphalt Mix Designs
 - c. Portland Cement Concrete Mix Designs
 - d. Treated Base Course Mix Designs
 - e. Untreated Base Course Job Mix Formulas
 - f. Tack and Prime Coats
 - g. Concrete Curing Compounds
4. Submit copies of all Quality Control testing and inspection reports within 48 hours of placement of materials.

300.070. Quality Control.

- A. General. Perform Quality Control work in accordance with applicable materials sections of the APWA Standard Specifications unless otherwise directed.

The contractor is responsible for performing quality control work sufficient to meet requirements of APWA Standard Specifications and to demonstrate compliance with acceptance criteria. The City will perform assurance functions at their discretion and inform the contractor of acceptance or rejection.

- B. Materials Production. Use UDOT certified facilities for asphalt and Portland cement concrete.
 1. Submit verification of Plant Certifications with mix designs.
- C. Testing and Inspection. Use UDOT certified laboratories and personnel.
 1. Submit names, certificate levels and years of experience of testing agency's Field Technician that are assigned to work. Laboratory must comply with ASTM Standards. Use AMRL certified laboratory and WAQTC/UDOT TTQP certified technicians.
 2. Submit verification of lab and personnel with mix designs.

Section 400. Drinking Water.**400.010. General.**

- A. Specifications.
- B. Pipe.
- C. Size.
- D. Location.
- E. Unusual Piping and Plumbing.
- F. Dead Ends.
- G. Drains.
- H. Surface Water Crossings.

400.020. Installation.

- A. General.
- B. Pipe Cleanliness.
- C. Identification Tape.
- D. Lateral Displacement.
- E. Restraining.
- F. Connections to Existing Drinking Water Lines.
- G. Bedding.

400.030. Pipe and Fittings.

- A. Polyvinyl Chloride Pipe (PVC).
- B. Ductile Iron Pipe.
- C. Polyethylene Pipe.
- D. Steel Pipe - Lined and Coated.
- E. Fittings.

400.040. Valves and Couplings.

- A. General.
- B. Resilient Seated Gate Valve.
- C. Butterfly Valve.
- D. Valve Boxes.
- E. Couplings.
- F. Pressure Regulation Valves.
- G. Tapping Valves.
- H. Air Vacuum and Release Valves.
- I. Isolation Valves.

400.050. Fire Hydrants.

- A. General.
- B. Placement and Location.

400.060. Meters and Services.

- A. General.
- B. Placement and Location.
- C. Meters.

400.070. Flushing.

- A. General.
- B. Velocity.

400.080. Disinfection of Drinking Water Lines.

- A. Cleaning.
- B. Methods.

400.010. General.

- A. Specifications. These specifications cover the installation of drinking water lines. See Section 200 for improvement and design requirements, Section 250 for inspection and testing requirements, and Section 350 for earthwork and trench requirements. See standard drawings related to water.
- B. Pipe. Ductile iron pipe shall be used for all culinary drinking water mains unless otherwise authorized by the City Engineer or his/her designee. Only PVC or polyethylene pipe may be used in corrosive soils. Copper pipe is to be used for the service lateral where the main line is ductile, polyethylene pipe shall be used in conjunction with PVC main lines. Special precautions shall be taken in areas of contamination. Pipe and joint materials which are not susceptible to contamination, such as permeation by organic compounds, shall be used. Non-permeable materials shall be used for all portions of the system including water mains, service connections, and hydrant leads. The Division of Drinking Water shall be contacted to establish specific design requirements in areas of contamination or potential contamination such as sewer treatment plants, septic systems, or industrial sites.
- C. Size. The City Engineer or his/her designee must approve the sizes of all proposed drinking water lines. It is required to have the design hydraulically modeled by the City's designated Hydraulic Engineer, the Hydraulic Engineer must confirm that the design meets Utah Division of Drinking Water Standards. The minimum size of drinking water pipe is 8 inch diameter for main lines and 3/4 inch diameter for services unless otherwise authorized by the City Engineer or his/her designee.
- D. Location. Drinking water mains shall be located on either the north or east sides of a street 4 feet from the edge of curb. All drinking water appurtenances shall conform to the minimum separation standards from sanitary sewer systems as outlined in Utah Code R309-550-7 and R309-550-12. See standard drawings for utility locations.
- E. Unusual Piping and Plumbing. Special and unusual piping and plumbing for equipment or structures are treated as separate items and are not included in these standards. They shall be approved by the City Engineer or his/her designee.
- F. Dead Ends. To provide increased reliability of service and reduce head loss, dead ends shall be minimized by making appropriate tie-ins whenever practical. Where dead-end mains occur, they shall be provided with a fire hydrant or with an approved flushing hydrant or blow-off for flushing purposes. See section 400.070 for flushing specifications.
- G. Drains. No drain within the culinary water system or other such appurtenances to the distribution system can be connected to the sanitary sewer or storm drain system. Where drains cannot be drained to daylight, underground gravel-filled absorption pits may be used if the site is not subject to flooding and conditions will assure adequate drainage. Sump pumps may also be considered if a drain to daylight or absorption pit is not feasible.
- H. Surface Water Crossings. Surface water crossings, whether over or under water, require Division of Drinking Water approval and shall conform to Utah Code R309-550-8 (8).

400.020. Installation.

- A. General. Drinking water distribution and transmission systems shall be installed according to the Utah State-adopted plumbing code as well as the requirements and specifications of APWA 33 11 00, 33 05 05, 33 05 06, 33 05 07, AWWA M23; 2003, and AWWA M55; 2006. (Water Distribution and Transmission).
- B. Pipe Cleanliness. All foreign matter or dirt shall be removed from the inside of the pipe before it is placed and it shall be kept clean during and after laying. No debris, tools, or other materials shall be placed in the pipe during laying operations. When laying of pipe is not in progress, the pipe shall be closed by a water-tight plug.
- C. Identification Tape. All drinking water mains shall be installed with identification tape that meets the requirements and specifications of APWA 33 05 20 (Backfilling Trenches). Tape shall be buried 12 inches above the pipe.
- D. Lateral Displacement. All pipes shall be protected from lateral displacement resulting from impact or unbalanced loading during backfilling operations.

- E. Restraining. Either thrust blocks or mechanical restraining devices shall be used for all tees, valves, plugs, caps and bends. Restraining shall be accomplished according to the most recent APWA standards.
- F. Connections to Existing Drinking Water Lines. The Contractor will be responsible to verify actual size, type of material and location of existing utilities in the field. The fittings and materials required for construction must be approved by the City Engineer or his/her designee.

Where fitting sizes, such as tees and crosses, are shown on the plans, those sizes will be used. However, no attempt has been made to show all needed fittings or materials.

Tapping tees may only be installed when authorized by the City Engineer or his/her designee and when the existing main is at least one size larger than the proposed intersecting line.

- G. Bedding. A continuous and uniform bedding shall be provided in the trench for all buried pipe. Stones larger than 3/4" for plastic pipe or 2-inch minus for ductile iron pipe shall be removed for a depth of at least 6 inches below the bottom of the pipe. Bedding materials shall otherwise be installed per APWA standards

400.030. Pipe and Fittings.

- A. Polyvinyl Chloride Pipe (PVC). PVC pipe shall meet the standards and specifications of APWA 33 05 07 (Polyvinyl Chloride Pipe), AWWA C900 and C905. Only blue or white, SDR-18 pressure class 150 psi PVC pipe may be used for drinking water mains.
- B. Ductile Iron Pipe. Ductile iron pipe shall meet the standards and specifications of APWA 33 05 05 (Ductile Iron Pipe). Only a pressure class of 150 psi or larger may be used. A tubular black polyethylene encasement must be installed according to AWWA C105 over all ductile iron pipe and fittings. Flanges, when required, shall meet the requirements and specifications of AWWA C115.
- C. Polyethylene Pipe. Polyethylene pipe shall meet the standards and specifications of APWA 33 05 06 (Polyethylene Pipe) and AWWA C906 which includes NSF-61 certification.
- D. Steel Pipe - Lined and Coated. Steel pipe shall meet the standards and specifications of APWA 33 05 09 (Steel Pipe - Lined and Coated).
- E. Copper Tubing. Copper tubing shall be "soft annealed" and shall conform to the standards for "Type K," prescribed in ANSI/AWWA C800-89 Section A.2 for "Copper Water Tubing" and to ASTM, designation B42 and B88-99, and current revisions thereof. It shall be free from grooving cracks, indentations, flaws or other defects. At intervals of not greater than one and one-half feet, the tubing shall bear clear, permanent markings indicating the type and manufacturer.
- F. Fittings. Use Ductile Iron fittings that conform to the provisions of ANSI/AWWA C110/A21.10 or C153/A21.53 unless otherwise recommended by the manufacturer and authorized by the City Engineer or his/her designee. All PVC pipe being inserted into fittings shall have the bevel end removed. All the bolts and nuts of all fittings shall be greased. All fittings shall have an 8 mil vinyl wrap plastic cover.

Minimum pressure Class will be 250 for pipes larger than 12 inch diameter. Pipes of 12 inch diameter and smaller shall be pressure Class 350.

FLOW REQUIREMENTS FOR FLUSHING

Pipe Diameter	Flow in Gallons Per Minute
4 inch	100
6 inch	220
8 inch	390
10 inch	610
12 inch	880
16 inch	1,567
18 inch	1,980
20 inch	2,450

24 inch	3,525
30 inch	5,507

400.040. Valves and Couplings.

- A. General. All valves shall meet the requirements of APWA 33 11 00 (Water Distribution and Transmission) and APWA 33 12 16 (Water Valves).
- B. Resilient Seated Gate Valve. All valves on 4 inch to 10 inch drinking water mains shall be resilient seated gate valves. Valves shall also be of iron body have non-rising bronze stems and meet the following specifications:
 - 1. Mechanical Joint. When valves are Mechanical Joint, they shall be furnished with all necessary glands, followers, and bolts and nuts to complete installation.
 - 2. Valve Stems. Bronze valve stems shall be interchangeable with stems of the double disc valves of the same size, direction of opening and manufacture.
- C. Butterfly Valve. All valves 12 inches and larger shall be butterfly valves which meet the requirements and specifications of APWA 33 11 00 (Water Distribution and Transmission) and APWA 33 12 16 (Water Valves) and the following specifications:
 - 1. General. Valve bodies shall be cast iron, ASTM A-126 Class B. Body ends shall be flanged with facing and drilling in accordance with ANSI B16.1, Class 125; or mechanical joint in accordance with AWWA C111. All mechanical joint end valves shall be furnished complete with joint accessories (bolts, nuts, gaskets, and glands). All valves shall conform to AWWA Standard C-504, Table 3, Laying Lengths for Flanged Valves and Minimum Body Shell Thickness for all Body Types.
 - 2. Disc. Valve disc shall be ductile iron ASTM A-536, grade 65-45-12. Valve disc shall be of the offset design providing 360 degree uninterrupted seating.
 - 3. Shaft Bearings. Shaft bearings shall be contained in the integral hubs of the valve body and shall be self-lubricated sleeve type.
 - 4. Coating. All valves shall be coated with epoxy in conformance to AWWA Standard C-550, latest revision. Interior wetted ferrous surfaces shall be coated a nominal 10 mils thick for long life; and body exterior shall have a minimum of 3 to 4 mils coating thickness in order to provide superior base for field-applied finish coats.
- D. Valve Boxes. Valves shall be bolted to the cross in the intersection of streets as a cluster valve set. Earth fill shall be carefully tamped around the valve box to a distance of 4 feet on all sides of the box, or to the undisturbed trench face if less than 4 feet.

All top of valve boxes located in streets shall be installed 1/4 inch below grade. When a 1 inch overlay is required a year after the road construction, the pavement surrounding the valve box shall be neatly cut to form a 30 inch round opening with the valve box centered, and a concrete collar shall be cast around the box 1/4 inch below grade and the valve box set 1/2 inch below grade. Valve boxes in off-road areas shall extend 6 inches above grade. Lid detail shall be similar to Comco C-6517.

- E. Couplings. Couplings shall be equal to the product of Smith-Blair or Dresser with cast iron couplings being used on all cast iron and PVC pipe. Couplings shall be of the straight, transition, or reducing style as required by the specific installation. All steel fittings and bolts shall be coated with a non-oxide coating and wrapped with polyethylene.
- F. Pressure Regulation Valves. Pressure regulation valves (PRV) which are required in a development when static pressures exceed 150 psi and shall be designed by the Developers engineer, the design shall be submitted to the City Engineer or his/her designee for review and approval prior to starting construction. All PRV's shall be Cla-Val with a 4" bypass or approved by the City Engineer, be placed in a concrete vault, have isolation valves on each side, and have telemetry included.
- G. Tapping Valves. Tapping valves may only be used when approved by the City Engineer or his/her designee. Tapping saddles with an "O" ring may be used if the drinking water main line to be tapped is larger than the new drinking water main line. Where the tap is the same size as the existing main, cast iron or stainless steel tapping sleeves shall be used, which encase the full perimeter of the pipe. The valve shall be a tapping valve with a guide lip on the flanged side. The opposite side of the valve shall have a mechanical joint connection.

- H. Air, Vacuum and Release Valves. Combination air, vacuum and release valves shall be installed according to the standard drawings at high points in the system as required by the City Engineer or his/her designee.
- I. Isolation Valves. Sufficient number of valves shall be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs. Valves shall be located at every roadway intersection or block on all segments of pipe. Where a proposed system may serve widely scattered customers and where future development is not expected, the valve spacing shall not exceed one mile.
- J. Backflow Devices. Installation of backflow devices shall conform to the State-adopted plumbing code.

400.050. Fire Hydrants.

- A. General. Fire hydrants shall meet the requirements and specifications of APWA 33 12 19 (Hydrants). All fire hydrants shall be Mueller Super Centurion 250 or approved equivalent and red in color. They shall have a 5 ¼ inch barrel diameter and 6 inch mechanical joint connection. The six inch gate valve will be mechanical joint by flange connected to the 90 bend at the base of the hydrant. The valve box complete for 6 foot trench with lid that read "FIRE" with one 4 ½ inch streamer nozzle and two 2 ½ inch hose nozzles. Hydrants shall be frost proof. The threads shall be National Standard Fire Hose Thread. Spacing of fire hydrants shall be according to the Uniform Fire Code but more specifically, hydrants are required to be located within 250' of any structure, typically located on property lines. The fire flow level of service Alpine City has established is 1,750 gpm for 2 hours at every hydrant, this will be verified when the proposed plan is submitted and reviewed by the City's designated Hydraulic Engineer.
- B. Placement and Location. Fire hydrant location to be approved by the City Engineer or his/her designee. Fire hydrants shall be set vertical and held in place by adequate concrete blocking which shall be left in the trench. Hydrants shall be set at a height that will allow approximately 2 inches exposed between the finished ground and the sidewalk flange. A gravel filled drip area shall be provided. Hydrant drains shall not be connected to or located within 10 feet of sanitary sewers. Where possible hydrant drain shall not be located within 10 feet of storm drains. See standard drawing for fire hydrants.

The relocation of fire hydrants shall meet the requirements and specifications of APWA 33 11 11 (Relocate Water Meters and Fire Hydrants) and related sections.

400.060. Meters and Services.

- A. General. Alpine City owns and maintains the water system up to and including the water meter. Between the water meter and home is the responsibility of the home owner. See the standard drawings for drinking water services. The minimum size of new drinking water service lines is 3/4 inch. All drinking water services shall have dual check valves. Drinking water services shall extend 20 feet beyond the back of curb and shall be capped until connected to a building. Meter and service line installation shall conform to the State-adopted plumbing code and conform to the standard meter installation detail as noted in the Alpine City Standard Details.
- B. Placement and Location. All meter boxes shall have their location and grade staked prior to installation. No meter boxes shall be set in sidewalks or driveways. Service taps shall be a minimum of 36 inches apart. No taps will be allowed within 36 inches of the end of the pipe.

Service laterals shall extend perpendicular from the main to the meter box. If a meter must be coordination with the City Engineer is required. When a new service line is installed the old corporation stop shall be shut off at the main and the old service line cut two feet from the main.

Drinking water service lines shall meet the separation from sanitary sewer requirements in this Section. Drinking water services shall extend 20 feet beyond the back of curb and capped until connected to a building.

The relocations of drinking water meters shall meet the requirements and specifications of APWA 33 11 11 (Relocate Water Meters and Fire Hydrants) and related sections. Services 3/4 – 2 inch shall be copper tubing shall be "soft annealed" and shall conform to the standards for "Type K," prescribed in ANSI/AWWA C800-89 Section A.2 for "Copper Water Tubing" and to ASTM, designation B42 and B88-99, and current revisions thereof. Pipe damaged by scratches, cuts, kinks, or buckled areas shall not be installed. PVC, as mentioned in section 400.010 (B) shall be used in conjunction with PVC mains where corrosive soils exist and shall conform to the requirements and specifications of APWA 33 05 06 (Polyethylene Pipe), only CTS SDR9 200 psi blue polyethylene pipe shall be used for service lines. Deflection in joints shall meet

manufacturer's specifications and shall be approved by the City Engineer or his/her designee, or shall be replaced with the proper fitting.

- C. Meters. All meters shall be paid for by the Contractor and supplied by the City. Meter boxes shall be in good repair. They shall not be set at an angle, crushed, or dented. The inside of boxes must be free from obstructions such as dirt, rocks or debris.

400.070. Flushing.

- A. General. All drinking water lines shall be flushed after the high chlorine test and prior to the pressure test. See Section 250. Testing and Inspection for testing information. Flushing shall be accomplished through hydrants and at the end each line. No flushing device shall be directly connected to a sewer or storm drain.
- B. Velocity. The Contractor shall install a tap sufficient in size to provide for 2½ foot per second flushing velocity in the line. The following is the flow quantity required to provide a 2½ foot per second flushing velocity.

FLOW REQUIREMENTS FOR FLUSHING

Pipe Diameter in Inches	Flow in Gallons per Minute
4 inch	100
6 inch	220
8 inch	390
10 inch	610
12 inch	880
16 inch	1,567
18 inch	1,980
20 inch	2,450
24 inch	3,525
30 inch	5,507

400.080. Disinfection of Drinking Water Lines.

- A. Cleaning. The pipe shall be clean prior to disinfection. If in the opinion of the City, contamination is such that it cannot be removed by flushing, the pipe shall be cleaned by mechanical means and then swabbed with a 1% hypochlorite disinfection solution.
- B. Methods. All drinking water pipeline shall be disinfected as outlined in AWWA C651 by one of the following methods:
 1. *Tablet Method.* The tablet method shall consist of placing calcium hypochlorite tablets at the specified rate in the main during construction at the upstream end of each section of pipe. The tablet shall be attached with an adhesive, such as Permatex No. 1 or equivalent as approved by the City Engineer or his/her designee. The line shall then be filled slowly (velocities less than 1 ft/sec), expelling all air pockets and maintaining the disinfection solution in the line for at least 24 hours, 48 hours if the water temperature is less than 41° F. The disinfection solution shall have a concentration of at least 25 mg/l of available chlorine.
 2. *Continuous Feed Method.* The continuous feed shall be done exactly as outlined in AWWA C651 and shall have a twenty-five mg/l available Chlorine after 24 hours.

Under both methods the Contractor shall not be allowed to flush the line until the chlorine residual test has been passed by the City. If necessary drinking water lines shall be re-chlorinated until satisfactory bacteriological testing is obtained. See Section 250. Testing and Inspection for testing information.

Section 450. Pressurized Irrigation.**450.010. General.**

- A. Specifications.
- B. Pipe.
- C. Size.
- D. Location.
- E. Unusual Piping and Plumbing.

450.020. Installation.

- A. General.
- B. Pipe Cleanliness.
- C. Minimum Cover.
- D. Identification Tape.
- E. Lateral Displacement.
- F. Restraining.
- G. Connections to Existing Pressurized Irrigation Lines.

450.030. Pipe and Fittings.

- A. Polyvinyl Chloride Pipe (PVC).
- B. Ductile Iron Pipe.
- C. Polyethylene Pipe.
- D. Steel Pipe - Lined and Coated.
- E. Fittings.

450.040. Valves and Couplings.

- A. General.
- B. Resilient Seated Gate Valve.
- C. Butterfly Valve.
- D. Valve Boxes.
- E. Couplings.
- F. Pressure Regulation Valves.
- G. Tapping Valves.
- H. Air, Vacuum and Release Valves.

450.050. Meters, Boxes and Services.

- A. General.
- B. Placement and Location.
- C. Meters and Boxes.
- D. Polyethylene Pipe.

450.060. Flushing.

- A. General.
- B. Velocity.

450.010. General.

- A. Specifications. These specifications cover the installation of pressurized irrigation lines. See Section 200 for improvement and design requirements, Section 250 for inspection and testing requirements, and Section 350 for earthwork and trench requirements. See standard drawings related to pressurized irrigation.
- B. Pipe. Polyvinyl Chloride (PVC) pipe shall be used for all pressurized irrigation mains 12 inches in diameter and smaller unless otherwise authorized by the City Engineer or his/her designee. Ductile iron, PVC, or polyethylene pipe shall be used for pressurized irrigation mains larger than 12 inches in diameter as approved by the City Engineer or his/her designee. Only PVC or polyethylene pipe may be used in corrosive soils.
- C. Size. The City Engineer or his/her designee must approve the sizes of all proposed pressurized irrigation lines. The minimum size of pressurized irrigation pipe in thru streets is 6 inch diameter for main lines, 4 inch diameter for cul-de-sacs unless otherwise specified in the Pressurized Irrigation System Master Plan. 1 inch diameter for services are required for each lot. A dual service shall be 1½" to the service tee.
- D. Location. Pressurized irrigation mains shall be located on either the south or west sides of a street 3 feet from the edge of curb. See standard drawings for utility locations.
- E. Unusual Piping and Plumbing. Special and unusual piping and plumbing for equipment or structures are treated as separate items and are not included in these standards.

Tapping tees may only be installed when authorized by the City Engineer or his/her designee and when the existing main is at least one size smaller than the proposed main.

450.020. Installation.

- A. General. Pressurized irrigation distribution and transmission systems shall be installed according to the requirements and specifications of APWA 33 11 00 (Water Distribution and Transmission). PVC pipe shall also be installed according to the requirements and specifications of AWWA C605.
- B. Pipe Cleanliness. All foreign matter or dirt shall be removed from the inside of the pipe before it is placed and it shall be kept clean during and after laying. No debris, tools, or other materials shall be placed in the pipe during laying operations. When laying of pipe is not in progress, the pipe shall be closed by a water-tight plug.
- C. Minimum Cover. All pressurized irrigation mains shall have a minimum cover of 2 feet to the top of the pipe.
- D. Identification Tape. All pressurized irrigation mains shall be installed with identification tape that meets the requirements and specifications of APWA 33 05 20 (Backfilling Trenches). Tape shall be buried 12 inches above the pipe.
- E. Lateral Displacement. All pipes shall be protected from lateral displacement resulting from impact or unbalanced loading during backfilling operations.
- F. Restraining. Either thrust blocks or mechanical restraining devices shall be used for all tees, valves, plugs, caps and bends. Restraining shall be accomplished according to the standard drawings.
- G. Connections to Existing Pressurized Irrigation Lines. The Contractor will be responsible to verify actual size, type of material and location of existing utilities in the field. The fittings and materials required for construction must be approved by the City Engineer or his/her designee.

Where fitting sizes, such as tees and crosses, are shown on the plans, those sizes will be used. However, no attempt has been made to show all needed fittings or materials.

450.030. Pipe and Fittings.

- A. Polyvinyl Chloride Pipe (PVC). PVC pipe shall meet the requirements and specifications of APWA 33 05 07 (Polyvinyl Chloride Pipe) and AWWA C900 and C905. Only purple, SDR-18 pressure class 150 psi pipe may be used for pressurized irrigation mains.
- B. Ductile Iron Pipe. Ductile iron pipe shall meet the standards and specifications of APWA 33 05 05 (Ductile Iron Pipe). Only a pressure class of 150 psi or larger may be used. A tubular purple polyethylene encasement must be installed according to AWWA C105 over all ductile iron pipe and fittings. Flanges,

when required, shall meet the requirements and specifications of AWWA C115. Ductile iron may be directed tapped for the use of corporation stops.

- C. Polyethylene Pipe. Polyethylene pipe shall meet the standards and specifications of APWA 33 05 06 (Polyethylene Pipe).
- D. Steel Pipe - Lined and Coated. Steel pipe shall meet the standards and specifications of APWA 33 05 09 (Steel Pipe - Lined and Coated).
- E. Fittings. Use Ductile Iron fittings that conform to the provisions of ANSI/AWWA C110/A21.10 or C153/A21.53 unless otherwise recommended by the manufacturer and authorized by the City Engineer or his/her designee. All PVC pipe being inserted into fittings shall have the bevel end removed. All the bolts and nuts of all fittings shall be greased. All fittings shall have an 8 mil vinyl wrap plastic cover.

450.040. Valves and Couplings.

- A. General. All valves shall meet the requirements of APWA 33 11 00 (Water Distribution and Transmission) and APWA 33 12 16 (Water Valves).
- B. Resilient Seated Gate Valve. All valves on 4 inch to 10 inch water mains shall be resilient seated gate valves. Valves shall also be of iron body have non-rising bronze stems and meet the following specifications:
 - 1. *Mechanical Joint.* When valves are Mechanical Joint, they shall be furnished with all necessary glands, followers, and bolts and nuts to complete installation.
 - 2. *Valve Stems.* Bronze valve stems shall be interchangeable with stems of the double disc valves of the same size, direction of opening and manufacture.
- C. Butterfly Valve. All valves 12 inches and larger shall be butterfly valves which meet the requirements and specifications of APWA 33 11 00 (Water Distribution and Transmission) and APWA 33 12 16 (Water Valves) and the following specifications:
 - 1. *General.* Valve bodies shall be cast iron, ASTM A-126 Class B. Body ends shall be flanged with facing and drilling in accordance with ANSI B16.1, Class 125; or mechanical joint in accordance with AWWA C111. All mechanical joint end valves shall be furnished complete with joint accessories (bolts, nuts, gaskets, and glands). All valves shall conform to AWWA Standard C-504, Table 3, Laying Lengths for Flanged Valves and Minimum Body Shell Thickness for all Body Types.
 - 2. *Disc.* Valve disc shall be ductile iron ASTM A-536, grade 65-45-12. Valve disc shall be of the offset design providing 360 degree uninterrupted seating.
 - 3. *Shaft Bearings.* Shaft bearings shall be contained in the integral hubs of the valve body and shall be self-lubricated sleeve type.
 - 4. *Coating.* All valves shall be coated with epoxy in conformance to AWWA Standard C-550, latest revision. Interior wetted ferrous surfaces shall be coated a nominal 10 mils thick for long life; and body exterior shall have a minimum of 3 to 4 mils coating thickness in order to provide superior base for field-applied finish coats.
- D. Valve Boxes. All buried valves shall be installed complete with two-piece, cast iron, slip type, 5-1/4-inch shaft valve box with drop lid. The lid shall have the word "IRRIGATION" or "DRAIN" according to the standard drawing cast in the metal.

Valves and valve boxes shall be installed where shown on the drawings. Valves and valve boxes shall be set plumb. Valve boxes shall be centered directly over the valve. Valves shall be aligned with property lines where possible. Earth fill shall be carefully tamped around the valve box to a distance of 4 feet on all sides of the box, or to the undisturbed trench face if less than 4 feet. Valves shall have the interiors cleaned of all foreign matter before installation.

All top of valve boxes located in streets shall be installed 1/4 inch below grade. The pavement surrounding the valve box shall be neatly cut to form a 30 inch round opening with the valve box centered, and a concrete collar shall be cast around the box. Valve boxes in off-road areas shall extend 6 inches above grade unless otherwise specified by the City Engineer or his/her designee. Lid detail shall be similar to Comco C-6517.

- E. Couplings. Couplings shall be equal to the product of Smith-Blair or Dresser with cast iron couplings being used on all cast iron and PVC pipe. Couplings shall be of the straight, transition, or reducing style as

required by the specific installation. All steel fittings and bolts shall be coated with a non-oxide coating and wrapped with polyethylene.

- F. Pressure Regulation Valves. Pressure regulation valves (PRV) which are required in a development shall be designed by the Developers engineer and the design shall be submitted to the City Engineer or his/her designee for review and approval prior to starting construction. All PRV's shall be Cla-Val with a 4" bypass or as specified by design, be placed in a concrete vault and have telemetry included.
- G. Tapping Valves. Tapping valves may only be used when approved by the City Engineer or his/her designee. Tapping saddles with an "O" ring may be used if the water main line to be tapped is larger than the new water main line. Where the tap is the same size as the existing main, cast iron or stainless steel tapping sleeves shall be used, which encase the full perimeter of the pipe. The valve shall be a tapping valve with a guide lip on the flanged side. The opposite side of the valve shall have a mechanical joint connection.
- H. Air, Vacuum and Release Valves. Combination air, vacuum and release valves shall be installed according to the standard drawings at high points in the system as required by the City.

450.050. Meters, Boxes and Services.

- A. General. See the standard drawings for pressurized irrigation services. The minimum size of new pressurized irrigation service lines is 1 inch for single service and 1 ½" for dual service.
- B. Placement and Location. All meters and boxes shall have their location and grade staked prior to installation. No meters or boxes shall be set in sidewalks or driveways. Meters and boxes are to be set 5 feet uphill from the water meter, 1 foot behind the sidewalk or 11 feet behind the curb. Service taps shall be a minimum of 36 inches apart. No taps will be allowed within 36 inches of the end of the pipe.

Service laterals shall extend perpendicular from the main to the meter or box. For dual pressurized irrigation services, laterals shall extend perpendicular from the main to the tee.

If a meter must be moved coordination with the City Engineer is required. When a new service line is installed the old corporation stop shall be shut off at the main and the old service line cut two feet from the main.

- C. Meters and Boxes. All meters shall be paid for by the developer and purchased by the City. Meter boxes and pressurized irrigation boxes shall be in good repair. They shall not be set at an angle, crushed, or dented. The inside of boxes must be free from obstructions such as dirt, rocks or debris. Meters shall be installed by the Developer or Contractor.
- D. Polyethylene Pipe. Only CTS SDR9 200 psi purple polyethylene pipe shall be used for pressurized irrigation service lines. Pipe damaged by scratches, cuts, kinks or buckled areas shall not be installed.

The bottom of trench shall be flat with no hollows, no lumps and no rock. If these conditions do not occur pipe must be bedded in coarse sand. No rocks shall be allowed within six inches of pipe.

Pipe shall be cut with either a wheel or scissor type tubing cutter with a blade specifically designed for plastic. Cuts shall be square and clean. Cutter manufacturer instructions shall be followed when cutting pipe. All connections shall have stainless steel stiffeners.

There shall be no unnecessary bending of pipe. Taps shall be exactly horizontal to the pressurized irrigation main. If bending cannot be avoided maximum bending radius shall be 25 times the pipe diameter as measured in inches (i.e.: a 16 inch pipe cannot bend on a curvature having a radius less than 16 x 25= 400 feet). There shall be no bending within 3 feet of a fixed point and no "S" shape curves.

450.060. Flushing.

- A. General. All pressurized irrigation lines shall be flushed before placed in service. Flushing shall be accomplished through the end of each line.
- B. Velocity. The Contractor shall install a tap sufficient in size to provide for 2 ½ feet per second flushing velocity in the line. The following is the flow quantity required to provide a 2 ½ foot per second flushing velocity.

FLOW REQUIREMENTS FOR FLUSHING

Pipe Diameter	Flow in Gallons Per Minute
4 inch	100
6 inch	220
8 inch	390
10 inch	610
12 inch	880
16 inch	1,567
18 inch	1,980
20 inch	2,450
24 inch	3,525
30 inch	5,507

Section 1000. Standard Details