

# **EAGLE MOUNTAIN CITY CONSTRUCTION AND DESIGN STANDARDS**



**EAGLE**  
M O U N T A I N

**EAGLE MOUNTAIN CITY**  
1650 East Stage Coach Run  
Eagle Mountain, UT 84005

SEPTEMBER 2015

## TABLE OF CONTENTS

Chapter 1	General Improvements Requirements
Chapter 2	Improvement and Design Standards
Chapter 3	Inspection
Chapter 4	Prerequisites of Contractors
Chapter 5	Earthwork
Chapter 6	Excavation and Backfill for Trenches
Chapter 7	Water Lines
Chapter 8	Pressurized Irrigation
Chapter 9	Sewer Lines
Chapter 10	Storm Drains
Chapter 11	Restoration of Surface Improvements
Chapter 12	Street Surfacing
Chapter 13	Concrete Curb, Gutter, Sidewalks, and Trails
Chapter 14	Hillside Site Development
Chapter 15	Surface Irrigation and City Open Space Requirements

# **Chapter 1 General Improvement Requirements.**

## ***1.010. General.***

This section 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 and professional office).

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 or to the boundary of the subdivision nearest existing improvements. Layout must provide for future extension to adjacent development and to be compatible with the contour of the ground for proper drainage. All water lines, sewer lines, and any other buried conduit shall be installed to the boundary lines of the subdivision or development.

## ***1.020 Preliminary Plat***

Requirements for the preliminary plat shall conform to the current Eagle Mountain City Development Code.

## ***1.030 Final Plat***

Requirements for the Final Plat shall conform to the current Eagle Mountain City Development Code.

## ***1.040 Street Cross Sections***

Requirements for the Street Cross Sections shall conform to the current Eagle Mountain City Development Code.

## Chapter 2 Improvement and Design Standards.

- 2.010. Utility Connection.
- 2.011. Utility Extension.
- 2.012. Utilities through Private Roads
- 2.020. Water Supply.
- 2.021. Flush Hydrants.
- 2.030. Sewers and Sewage Facilities.
- 2.031. Water and Sewer Laterals.
- 2.040. Storm Drainage.
- 2.050. Pressurized Secondary Irrigation
- 2.060. Streets.
- 2.070. Street Widths, Intersecting Driveways, Maximum Street grades.
- 2.080. Intersecting Grades.
- 2.081. Vertical Curves.
- 2.090. Cul-De-Sacs.
- 2.100. Temporary Turn-Arounds.
- 2.120. Off-Setting Intersections.
- 2.130. Clear Vision Area.
- 2.140. Curbs, Gutters, and Sidewalks.
- 2.150. Parking Lots and Driveways.
- 2.160. Ground Water.
- 2.170. Underground Utilities.
- 2.180. Licensed Contractor.
- 2.190. Time Limitation for Completion.
- 2.200. Building Permits.
- 2.210. Security for Improvements Required.
- 2.220. Standards for Construction Drawings.
- 2.230. Landscape Improvements Standards.
- 2.240. Half-Street Width.
- 2.250. Traffic Control.
- 2.251. Construction Safety.
- 2.260. Excavation Permit.
- 2.270. Survey.
- 2.280. Construction SWPPP Entrance.
- 2.290. Site Clean up.
- 2.300. Noncompliance
- 2.310. Hours of Work
- 2.320. Defensible Space
- 2.330. Reimbursement Agreements
- 2.340. Improvements Warranty
- 2.350. Street Lighting

### 2.010. Utility Connection.

It shall be the responsibility of the developer to connect to any utilities or improvements wherever they are located and extend those improvements to and through the development as shown on the approved construction drawings.

### 2.011 Utility Extension

It may be the responsibility of the developer to extend all utilities or improvements to the end of their property for

future connection of adjacent property. Reimbursements may be made for these extension based on the excess capacity provided these expense meet the requirements as set forth by the City or as stated in the Master Development Agreement. The excess capacity, if any, formula and terms for any reimbursement agreement will be identified prior to the beginning of construction. Utilities that connect onto Eagle Mountain public utilities will maintain Eagle Mountain City standards for material, workmanship, and trench back fill/pipe bedding

### 2.012. Utilities through Private Roads.

Utilities that connect onto Eagle Mountain public utilities will maintain Eagle Mountain City standards for material, workmanship, and trench back fill/pipe bedding.

### 2.020. Water Supply.

The developer shall connect the subdivision with the City water system with all appurtenances and shall make such water available to each lot within the subdivided area. Adequacy of supply and sizes of water mains shall be established by the City Engineer or his/her designee. The minimum water line size shall be 8" diameter.

Workmanship and details of construction shall be in accordance with the APWA Standard Specifications as amended by the City. All work in connection with water services shall be done as directed and under the supervision of the City Engineer or his/her designee.

The design of all subdivisions shall be such that a minimum water pressure of 50 psi and a maximum of 115 psi will be maintained at street level.

### 2.021. Flush Hydrants

Flush hydrants, blow-offs, or some other adequate mechanism shall be installed at the end of all water lines to adequately flush all water lines.

### 2.030. Sewers and Sewage Facilities.

The developer shall provide each lot with a sanitary sewer system in accordance with the ordinances of the City and pursuant to the APWA Standard Specifications as amended by the City. All work shall be completed by the developer as directed and under the supervision of the City Engineer or his/her designee.

### 2.031 Water and Sewer Laterals.

All sewer services and water services need to be marked with a 2 inch by 4 inch stake at the end of each service a minimum of 36 inches above grade and a 2 inch ØSø for sewer or 2 inch ØWø for water needs to be stamped in the top of the curb at the service locations. Curb markings may also be made on a brass cap hammered into the curb. Water and sewer lateral must extend a minimum of 15 feet behind the property line.

#### **2.040. Storm Drainage.**

The developer shall provide on-site facilities for a 100 year storm event and piping and appurtenances to convey the highest intensity 10 year storm to the on site retention facilities. Additional piping and appurtenances shall be required to convey the 10 historical discharge from the on site retention facility to the City's existing storm water facility. The minimum storm drain pipe size shall be 15 inches.

All improvements shall be constructed in accordance with the City ordinances and pursuant to the APWA Standard Specifications as amended by the City and/or other codes adopted by the City. All said work shall be done as directed and under the supervision of the City Engineer or his/her designee.

#### **2.050 Pressurized Irrigation System**

The developer may be required to connect the subdivision to the City secondary pressurized irrigation system, as designated by the City's Master Secondary Irrigation Plan as outlined in the development agreement if such facilities are expected to be available for use within 3 years of the installation of such improvements. The use of treated re-use water may allow a credit of banked water rights consistent with the amount of culinary water which should have been used for irrigation to be offset with secondary irrigation.

The minimum pressurized irrigation size shall be 4 inches in diameter. The adequacy of supply lines and sizes of main shall be established by the City Engineer or his/her designee. Workmanship and construction shall comply with the Eagle Mountain City Construction Standards and Specifications. Installation shall conform the Chapter 8 of these Construction Standards.

Pressurized irrigation systems to be installed in existing city roads and rights of way shall conform to all relevant chapters of these Construction Standards.

#### **2.060. Streets.**

The developer shall construct all streets required by the subdivision as specified by the City Council in accordance with the APWA Standard Specifications as amended by the City. All streets shall be constructed pursuant to standards recommended by the City Engineer or his/her designee based on soil conditions and required structural engineered materials to be used in the construction of the road.

The developer shall be responsible to construct all streets required in the final plat and as a condition of the final plat approval to the standard required by the City Engineer or his/her designee. The developer shall be required to provide an engineered design for the street sub-grade construction.

#### **2.070. Street Widths, Intersecting Driveways, Maximum Street Grades.**

Street widths, intersecting driveways and maximum

street grade shall conform to the current Development Code as adopted by Eagle Mountain City Titles 16 and 17. All street cross sections shall be graded such that the storm runoff is directed away from the street section. In general, along collector and arterial roadways with larger rights of way, a vertical depression of six to 12 inches from the elevation of the top of curb shall be installed. In instances which include a median, a vertical depression of six to twelve inches shall also be maintained. In no instances shall grading on the sides or medians of roadways promote drainage from the landscaped areas onto the roadway.

#### **2.080. Intersection Grades**

The maximum grade at intersections shall not exceed 4 percent for 100 feet measured from the edge of asphalt on the intersecting street.

The grade may be increased to a maximum of 6 percent on a collector road if there is no signalization or traffic control. In addition, detailed designs are required for the intersection design along with storm drain inlet boxes at each of the intersecting curb returns.

#### **2.081. Vertical Curves.**

Vertical curves shall be designed to meet the maximum sight distance/and stopping sight distances required by AASHTO.

#### **2.090. Cul-De-Sacs.**

The maximum length of a cul-de-sac is 500 feet measured from the nearest right-of-way line of the adjoining street to the center of the cul-de-sac, and the minimum radius as defined by the Development Code and International Fire Code, unless otherwise approved by the City Engineer and the Fire Chief. No reversed grade cul de sacs shall be allowed unless adequate storm and sewer facilities are designed and approved by the City Engineer or his/her designee. Cul-de-sacs shall have a maximum of 15 lots unless stated otherwise in the Eagle Mountain City Development Code.

#### **2.100. Temporary Turn-Arounds.**

Temporary turn-arounds are to be provided on all streets which are more than one (1) lot from intersections unless approved otherwise by the Eagle Mountain Fire Chief. These are to be recorded on the plat as easements; 60 feet diameter 4 inches thick compacted road base and 2 inches of asphalt. If it is not anticipated that the temporary turnaround will be in place longer than a year, the developer may, at their discretion, forego installation of the asphalt in favor of bonding these improvements. If the temporary turn around is still required at the end of the warranty period, and if asphalt has not been installed, the asphalt will be installed by the developer at his/her expense, or the City will make a claim against the bond. All temporary turn-arounds must be approved by the Eagle Mountain City Fire Chief or his/her designee.

### **2.120. Off-Setting Intersections.**

All intersections shall be at right angles, or within 10 degrees, extending a minimum of 150 feet along the centerlines from the center of the intersection to the point of tangency. Offset intersections will have a minimum offset of 100 feet between centerlines.

### **2.130. Clear Vision Area.**

The clear vision area is that triangular area of a corner lot or parcel formed by the street property lines and the line connection then at points 30 feet from the intersecting right-of-way lines of the two streets. Fencing and planting is restricted within this area as follows:

1. No fence shall exceed a height of three feet.
2. Shrubs shall be pruned to a height not to exceed three feet.
3. Trees shall be pruned to maintain a clear area below eight feet.

A second clear vision area with 20 foot sides is also required where the rear of a corner lot adjoins an interior lot. The same restrictions for landscaping and fencing apply in this area unless the interior lot is already developed and has no existing driveway within 10 feet of the property line adjoining the corner lot.

### **2.140. Curbs, Gutters and Sidewalks.**

When required on Table 7.2 Right of Way Classification in Title 2 of the Eagle Mountain City Development Code, all curbs, gutters and sidewalks shall be built on all existing and proposed streets required by the subdivision in accordance with the APWA Standard Specifications as amended by the City. 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.

### **2.150. Parking Lots and Driveways.**

Parking shall meet the size and configuration requirements as shown-in the standard drawings. Parking lots and drives shall be designed to meet appropriate Engineering standards, including drainage and load capacity. All drive and parking lot drainage, asphalt, and base designs shall be reviewed by the City Engineer or his/her designee prior to approval.

Any trenches for installation of public utilities shall be backfilled and compacted using engineered fill (A1,A2) and be tested in accordance with Eagle Mountain City standards. Section 6.040.

### **2.160. Ground Water.**

Potential groundwater or subsurface drainage problems may have additional requirements; further requirements will be reviewed and approved by the City Engineer or his/her designee. Pumping of groundwater across sidewalks or into the gutters or the sewer system will not be allowed.

### **2.170. Underground Utilities.**

Utilities including electrical, and gas lines shall be underground except when the City feels that such underground lines are not in the best interest of the City.

### **2.180. Licensed Contractor.**

All work performed in accordance with this title shall be performed by a contractor licensed to perform such work by the State of Utah.

### **2.190. Time Limitation for Completion.**

All improvements within subdivisions listed herein must be completed within one (1) year of the date of recording of the final plat except for required corrections to defective work as found in the final walkthrough and itemized in a punch list generated by Eagle Mountain City which shall be completed at the end of the warranty period after asphalt installation. Improvements that are not completed within the time limitation imposed herein may be required to work a forfeiture of any bond or surety that shall have been posted by the owner or developer, or may be allowed to post an additional bond for an additional amount reflective of increased construction costs. At no times will an unimproved recorded plat be allowed to constitute a risk or hazard to the public.

Approved construction drawings will only be valid for 3 years from the date of approval. After three years from the time of approval, drawings must be resubmitted prior to construction for a staff review to ensure adequate construction standards are reflected in said plans.

### **2.200. Building Permits.**

The City may issue a building permit upon application, in compliance with all laws, ordinances, rules, and regulations. No building permits will be issued until all required infrastructure improvements are installed and accepted by the City of Eagle Mountain. Required infrastructure shall include City owned utilities such as sanitary sewer, water, pressurized irrigation, storm drain, gas, and electrical, as well as streets, sidewalks, and street signs. Exceptions may be granted between the months of October and April when asphalt hot plants may not be in operation. Building permits may be recommended without pavement, provided that all contaminated road base is removed and replaced prior to asphalt placement. Subdivisions which receive building permits without asphalt must have asphalt placed by June 1, weather permitting.

The City Engineer or his/her designee is hereby designated as the responsible official to accept the improvements. Once acceptance has been granted, a building permit may be obtained. Temporary Model Home Building Permits may be granted if basic safety related infrastructure has been installed. Such infrastructure should include at a minimum a drivable street, street sign, fire hydrants and all required sanitary sewer, water and storm drain systems. A checklist detailing required improvements and acceptance by

the City is included in the Appendix of these Standards.

### 2.210. Security for Improvements Required.

In order to insure the proper installation of the improvements required by this chapter and in order to insure prompt payment of all persons supplying labor or materials to the sub-dividers or their contractors or subcontractors installing said improvements, the owners of property or the principal sub-dividers shall, prior to subdivision recordation or issuance of a building permit, deposit with the City, or a depository acceptable to the City, a cash escrow bond, or an improvement surety bond, furnished by a surety authorized to do business in the State of Utah and operating in good standing, conditioned on the requirements that installation of all required improvements within the required time and in accordance with the plans, specifications, time limitations and conditions relating thereto as approved by the City Engineer or his/her designee.

The bond or cash escrow shall be established in a form acceptable to counsel for the City and shall be in an amount to be determined by the City Engineer or his/her designee, and shall be filed in the office of the City recorder and shall amount to 110 percent of the estimated cost of improvements. The developer shall sign a "Development Agreement" agreeing to install and warrant the improvements required for approval of the subdivision or other project.

### 2.220. Standards for Construction Drawings.

The following instructions are for the purpose of standardizing the preparation of drawings to obtain uniformity in appearance, clarity, size and style.

Following approval of the City Council, five (5) copies of the construction plans shall be submitted with three (3) copies to be retained by the City Engineer or his/her designee and two copies returned to the sub-divider with the approval mark and signature of the City Engineer or his/her designee. One (1) approved copy shall be kept available at the construction site.

These plans and designs shall meet the standards defined in the specifications and drawings of the City described herein. The minimum information required on drawings for improvements are as follows:

All drawings and/or prints shall be clear and legible and conform to good Engineering and drafting room practice. Size of drawings shall be 24" x 36" (trim line) with minimum borders of 1/2" on top, bottom and right sides, left side 1-1/2".

- A) Include the following with the construction drawings:
1. A copy of the proposed final plat.
  2. A plan view of the entire project.
  3. Plan and profiles of all curb, gutter, storm drain, irrigation and sewer systems.
  4. Detail drawings only for items not found in the APWA manual. Detail drawings shall be

to scale and completely dimensioned and described. All structures shall be designed in accordance with minimum requirements established by the City of Eagle Mountain "Construction Standards" or the APWA manual.

5. Complete plans for all off-site work to be done in conjunction with the project.
  6. A SWPPP page with maps showing:
    - a. Storm drain system.
    - b. Topographical lines and flow arrows.
    - c. UPDES permit number with contact information.
    - d. Locations of BMPs and good housekeeping measures.
- B) Include the following on each drawing sheet:
1. North Arrow.
  2. Scale. Use a standard Engineering scale between 1 inch equals 10 feet and 60 feet. Use a scale of 1 inch equals 100 feet 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.
    - b. Name of City.
    - c. Specific type of drawing (construction drawings, plan view, plan and profiles, off-site construction, detail drawings).
    - d. Space provided for approval signature of City Engineer or his/her designee and date.
    - e. Name of Engineer, surveyor or firm preparing drawings.
    - f. 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 or 4 feet.
    - b. Reference to the vertical datum. The 1929 North American Vertical Datum (NAVD29) 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.
- C) Include the following for curb, gutter, storm 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 thirty inch modified curb and gutter in the standard drawings.
  5. Plan and profile of all new and existing storm drains and storm manholes and boxes.
  6. Storm box and manhole size, location, and elevations of flowlines and rim.
  7. Location, size, grade and type of pipe of new and existing storm drains.
  8. Storm water calculations for a 25 year and 100 year storm.
  9. Detail of ADA Ramps with detectable warning pads.
- D) Include the following for sewer plans:
1. Plan and profile of all new and existing sewer mains and manholes.
  2. Manhole size, location, and elevations of flowlines and rim.
  3. Location, size, grade and type of pipe of new and existing sewer mains.
  4. Location of each lateral with distance stubbed back into property clearly drawn and dimensioned.
- E) Include the following for culinary water plans:
1. Location, size and type of pipe of new and existing water mains.
  2. Profile or detail showing separation at each conflicting utility crossing.
  3. Location of valves, fittings, hydrants, boxes, meters and appurtenances.
  4. Minimum cover.
  5. Location of each lateral with distance stubbed back into property clearly drawn and dimensioned.
- F) Include the following for the pressurized irrigation plans:
1. Location, size and type of pipe of new and existing irrigation mains.
  2. Profile or detail showing separation at each conflicting utility crossing.
  3. Location of valves, fittings, boxes, meters and appurtenances.
  4. Minimum cover.
  5. Location of each lateral with distance stubbed back into property clearly drawn and dimensioned.

#### 2.230. *Landscape Improvement Standards.*

Landscape improvements shall conform to APWA Construction Standards and Eagle Mountain City Landscape Construction Standards. All landscape plans are to be approved by the Eagle Mountain City Planning Department and Parks Division prior to construction.

#### 2.240. *Half-Street Width.*

In certain conditions, and when special approval is

given, half road widths may be allowed. Half road width requires all improvements to the centerline plus an additional ten (10) feet of asphalt. Adequate storm water control should be constructed for non curbed roadside. All improvements must be made on sub-divider's property.

#### 2.250. *Traffic Control.*

Traffic control shall be submitted to the City prior to any work in accordance with MUTCD. Any road closures must notify Public Safety at a minimum of 24 hours in advance of the road closure.

#### 2.251. *Construction Safety.*

Open pits and trenches left for an overnight period or longer shall be clearly marked with flashing barricades. All national and state standards must be maintained for open trenches. The City Engineer or his/her designee may require additional barricades as determined in the field. Trenches may not be left open for an extended period of time.

If any subdivision is located such that there are no available construction access other than through existing subdivisions, an additional monetary amount to be determined by the City Engineer or his/her designee shall be placed in the subdivision improvement bond to protect the city from damaged infrastructure.

#### 2.260. *Excavation Permit.*

In order for a street excavation permit to be approved, City of Eagle Mountain needs the following information: (1) Copy of Contractors License; (2) Certificate of Insurance; (3) Performance Bond of \$5,000.00; and (4) Detailed drawing of proposed work and traffic control (4 copies).

The contractor is given a copy of the signed permit and the signed / approved plan after the City Engineer or his/her designee has approved and signed the application. Time limits may be set; and the permit can be suspended for non-compliance.

Trenches left open for more than 24 hours may be required to be either covered or backfilled if, at the discretion of the City Engineer or his/her designee.

#### 2.270. *Survey.*

All property corners shall be marked with a 30 inch rebar and licensed land surveyor's cap before acceptance of subdivision improvements by City of Eagle Mountain. These rebar's must be offset one foot by a steel tee post four feet out of the ground.

All property corners shall be in place at the time of final acceptance.

#### 2.280. *Construction SWPPP Entrance.*

All subdivisions shall include separate entrance for construction traffic, which is not in a City right of way. If no such access is available, an alternate cross section designed for specifically for the use of construction vehicles during the building phase of the project must be construction within the



City right of way and all construction must access the site from this point of access. The purpose of this requirement is to reduce damage caused by heavier vehicular traffic to new surfaces, and the existing adjacent roadways. Compliance with this requirement shall be overseen by the City Engineer or his/her designee.

If any subdivision is located such that there are no available construction access other than through existing subdivisions, an additional monetary amount to be determined by the City Engineer or his/her designee shall be placed in the subdivision improvement bond to protect the city from damaged infrastructure.

### **2.290. Site Clean Up.**

The Contractor is responsible to maintain a clean work environment within the limits of the City. A cobble track out pad consisting of 3ø to 6ø cobble 8ø thick minimum with width of 20 feet and extending 50 feet past existing asphalt road way or an approved equivalent alternative shall be placed at all locations where construction traffic enters paved roadways to prevent dirt and mud from being tracked onto city streets. Additionally, vehicles may have to be hosed down prior to leaving the site. Dirt and debris tracked onto city roads must be cleaned by contractor each work day or be subject to fines as determined in the City fee schedule. Proper dust control measures must be exercised at all times. Non-compliance can result in all construction activities being shut down until corrective measures are taken.

### **2.300. Noncompliance.**

Noncompliance with these Construction Standards can result in a stop work order issued by the City Engineer or his/her designee, a forfeiture of bonds, or a hold on building permits until all compliance meets compliance.

### **2.310. Hours of Work**

Unless limited through City ordinance otherwise, construction activities shall be restricted to between the hours of 7:00 a.m. and 9:00 p.m., Monday through Friday and 9:00 a.m. and 9:00 p.m. on Saturdays and Sunday in residential and commercial areas.

### **2.320. Defensible Space**

Property owners, including Eagle Mountain City, and individual residential home owners and/or Home Owner Associations shall be responsible to maintain an adequate defensible space to act as a fire break as detailed in the applicable state fire ordinances. All construction and staging areas shall also maintain a defensible space of at least 30 feet throughout the construction process.

### **2.330. Reimbursement Agreements**

In instances when subdivisions are required to install improvements which may provide capacity in excess to the requirements of the subdivision, to meet conditions established as part of a master plan, or for the benefit of a third party, such increases in capacity may be eligible for reimbursement. Reimbursements may be in the reduction of impact fees collected by the City for the particular type of improvement installed, a reduction in connection fees, or may be negotiated as a cash reimbursement collected by third parties at building permit, and remitted to the original developer annually.

All reimbursement agreements are to be approved by the City Council, and the city will not consider verbal agreements made by the City or staff to be valid. Requests for reimbursements must be made to the City prior to the installation of utilities for which the reimbursement is sought.

### **2.340. Improvements Warranty**

All required improvements shall be placed into a warranty period following acceptance by the City for a minimum of one year. Should the completion of the one year period occur during winter months, the warranty period may be extended for up to six months to allow the completion of any corrective requirements to be completed during reasonable weather.

A warranty bond for 10% of the estimated construction costs shall be maintained for the duration of the warranty period.

Prior to the expiration of the warranty period, Eagle Mountain City shall notify the developer that a warranty walkthrough is to be performed on the subdivision. Said walkthrough shall take place, and all corrective actions as determined by this walkthrough and as outlined in a punch list to be generated by Eagle Mountain City shall be completed prior to release from the warranty period.

### **2.350. Street Lighting**

Eagle Mountain City shall contract with an independent consultant for street lighting design. Unless approved otherwise by the City's consultant street lighting will be installed throughout all developments using the following criteria:

1. Street lights will be installed at all intersections with the only exception being where a four way intersection has an offset of less than 100 feet.
2. Streetlights will be installed at a minimum spacing of 300 feet and a maximum spacing of 600 feet. They will be installed at the closest property line to the mid point between the lights on either side. Streetlights placed

between corners will be shown on the electrical construction drawing, and will indicate the direction that the street light will be aimed. Streetlights at intersections may aim to the center of the intersection or may be set at a 90-degree angle along collector and larger roads.

3. Any street that extends more than 600 feet without an intersection will have a street light at approximately the mid point.
4. Each street light will be installed so that the street light pole is located 24" from the top back of the curb to the center of the pole in a public utility easement or public right of way.
5. A ground wire shall be connected to the street light pole using N.E.C. approved methods and a separate ground wire shall be run from the pole base to the closest secondary pedestal or transformer. If the street light is fed from a secondary pedestal, an 8" X 5/8" copper clad ground rod must be installed at the pedestal, and street light ground will be attached to the ground rod using the N.E.C. approved connector.
6. A ground wire shall be connected to the street light pole using N.E.C. approved methods and a separate ground wire shall be run from the pole base to the closest secondary pedestal or transformer. If the street light is fed from a secondary pedestal, an 8" X 5/8" copper clad ground rod must be installed at the pedestal, and street light ground will be attached to the ground rod using the N.E.C. approved connector.
7. Pole-14 Aluminum street light pole shall be used. The pole shall be manufactured by holophane and shall be green with base. All bases must be embedded in concrete with a 20" diameter hole and 4"
8. Luminaire A luminaire that reduces all sky ward light shall be 50 watt high pressure sodium light and shall have a shield to keep light off of houses.

## Chapter 3 Inspection.

- 3.010. All Work Subject to Inspection.**
- 3.020. Inspection Fees.**
- 3.025. Acceptance of Improvements.**
- 3.030. Requests for Inspection.**
- 3.040. Construction Completion Inspection.**
- 3.050. Work Without Inspection.**
- 3.055. As-Build Drawings.**

### *3.010. All Work Subject to Inspection.*

All construction work involving the installation of improvements in subdivisions shall be subject to inspection by the City. The developer shall be responsible to ensure inspection and provide certified reports are obtained and maintained on record and are provided in the as-built subdivision packet. The records shall include the following inspections:

- A) Compaction of all trenches;
- B) Pressure tests on water mains; 2 sets of bacteria samples
- C) Pressure tests, television inspection of sewer mains, and mandrel deflection tests; Vacuum test all manholes/boxes; Air pressure test at mandrel storm drain per APWA Standards.
- D) Slump tests and compression tests and air entrainment on all concrete work; and test (air, slump) and set of cylinders per 50 yards of concrete.
- E) Proof rolls on native, sub-base and base.(3 proof rolls)
- F) Red heading is required on sub-base and base. Native, subbase and base.
- G) Compaction test on all sub-base, untreated base course, and bituminous surface course.

Certain types of construction shall have continuous inspection while others may have only periodic inspections. It is the responsibility of the developer/sub-divider to insure that all contractors give the City appropriate notice to allow scheduling of said inspections.

- A) Inspection shall be required on the following types of work:
  - 1. Laying of street surfacing.
  - 2. Placing of concrete for curb and gutter, sidewalks and other structures.
  - 3. Laying of sewer pipe, drainage pipe, water pipe, lateral connections, pressurized irrigation, valves, hydrants and testing.
  - 4. Sub-grade.
  - 5. Street grading and gravel base.
  - 6. Excavations for curb and gutter and sidewalks.
  - 7. Excavations for structures.
  - 8. Trenches for laying pipe.
  - 9. Forms for curb and gutter, sidewalks and structures. No work shall be started except in

- the presence of, or with the prior approval of the City Engineer or his/her designee.
- 10. Collars around storm drain inlet boxes/manholes. Thrust blocks for water, collars for storm drain and collars for man hole. Value boxes in asphalt.
- 11. Collars around sewer manholes & water valve boxes.
- B) Inspectors must be notified and must approve all catch basin elevation and location prior to final ties.
- C) Inspectors may require survey stakes with elevations to ensure depths and slopes met the approved construction drawings. Specifically, requirements may be made on fire hydrants, clean outs, sewer manholes
- D) See individual sections for specific inspection and testing requirements.

### *3.020. Inspection Fees.*

Inspection fees and/or connection fees required by ordinance shall be paid and permits required shall be obtained prior to the recording of final plat.

The developer or Contractor shall be responsible for all sampling, delivery of samples to a qualified testing agency, testing, and delivery of test results or materials certifications to City at no charge to the City. Testing and certifications reports shall be approved by the City as to conformance to City Standard Specifications prior to final inspection and/or acceptance by the City of any materials or workmanship.

Inspection requests made for weekend or off hours of regular City business hours shall be subject to overtime inspection fees. If such inspections are scheduled at these times due to a inability of the City to provide inspections during normal business hours, no additional inspection fees shall be required.

### *3.025. Acceptance of Improvements.*

Inspection made by the City to determine compliance with the specifications does not imply acceptance of the work. The City requires completion of all facilities before any are finally accepted to start the warranty period established by the City Code or otherwise by Development Agreement. Final acceptance of improvements will be made at an inspection by the City at the completion of all improvements. All improvements shall be free from defects or damage due to design or installation at the time of inspection. Specifically the following are required:

- 1. All asphalt, sidewalks and curb and gutter shall be free of cracks greater than 1/8" vertically and horizontally and construction damage and shall be true to line and grade.
- 2. All sewer manholes and water valve boxes shall be raised to pavement level.
- 3. All water valves and hydrants shall be operative.
- 4. All storm drainage improvements shall be

- completed.
5. All street lights shall be operable.
  6. All open space improvements shall be planted and all irrigation improvements installed, unless a separate landscape bond is provided to the City, in which case landscaped improvements shall be warranted separately from the infrastructure improvements.
  7. All trail improvements in open space areas shall be completed.
  8. All recreational equipment shall be installed in the trails and open space areas, or a separate landscape bond may be posted. All landscape improvements are required to be installed prior to one year from the date of recordation, or prior to the second half building permit being issued.
  10. Clean-up. Where excavations are made in City streets, the rock, etc., shall be removed and gravel base placed in the excavation the same day as backfill is placed. All debris leaving a job site shall be the responsibility of the Contractor to clean-up each day.
  11. All lot corner stakes installed.

A final walk-through to inspect the improvements shall be arranged by the developer with the City when said improvements are completed. The improvements will be accepted when the punch list from the final walk-through is completed and accepted by the City.

### 3.030. Requests for Inspection.

Requests for inspection shall be made to the City by the person responsible for the construction. Requests for inspection on work requiring continuous inspection shall be made **three (3) working days** prior to the commencing of the work. Notice shall also be given **one (1) working day in advance** of the starting of work requiring periodic inspection. The City shall provide written confirmation either through fax or email for all scheduled inspection appointments.

### 3.040. Construction Completion Inspection.

An inspection shall be made by the City Engineer or his/her designee after the warranty period. Specifically, the City Engineer or his/her designee will determine if any installed infrastructure displays signs of failure, such as concrete cracks greater than 1/8", rutting or settled asphalt. When such defects are minimal, patching or sealing will be allowed by the City, provided the defect is not a structural defect. The City Engineer or his/her designee will generate a punch list of all items to be corrected by the developer prior to final acceptance by the City.

Any punch list generated by the City Engineer or his/her designee shall only be valid for a period of 30 days. Subdivisions with outstanding items past thirty days may be subject to an additional walkthrough prior to acceptance by the City to address any additional faulty or defective work.

It is further agreed and understood that the determination for

necessity of repairs of the work rests with the City Engineer or his/her designee. His/Her project review shall include, but shall not be limited to the entire street base, and all pipes, utilities, joints, valves, backfill and compaction as well as the working surface, curbs, gutters, sidewalks, and other accessories that are, or may be affected by the construction operations, and whenever, in the judgment of the City Engineer or his/her designee, shall cause a written notice to be served to the developer and thereupon the developer shall undertake and complete such repairs, or rebuilding prior to the final City acceptance and release of the warranty bond. The City Engineer and his/her designee shall make every effort to distinguish between failures which result from poor design or workmanship from those cause by third parties such as builders, and shall not knowingly require developers to correct failures caused by third parties. Specific examples shall include cracked concrete which likely would have resulted from builders placing heavy equipment on concrete shall not require replacement. However, excessive spalling of concrete, which is likely caused by workmanship issues will be required to be replaced. Contractors and subcontractors hired for the completion of the required improvements are NOT considered third parties, and damage found to be from such individuals will be obligated to be repaired by the developer. Failure to complete repairs in a timely manner may result in a forfeiture of the warranty bond, at which time the City will complete the improvements. Appeals to items included in the project review must be made in writing to the Public Works Director within five (5) days of being notified of the deficient items. Additional appeals may be made to the Eagle Mountain City Mayor or City Council.

### 3.050. Work Without Inspection.

**Any** work performed without proper inspections, as required above, will give the City the option to hold the bond covering that portion of the improvements in violation or require removal and replacement of the un-inspected work. The City shall have the option of retaining part or all of the bond for five (5) years after installation of improvements in violation of this chapter. It is the responsibility of the developer to ensure his/her contractors request all necessary inspections.

Inspection services provided by outside inspection services will be allowed provided that the City approves of any inspection companies in writing prior to inspection services, and the City is notified that what services will be provided by said outside inspection services prior to the inspection services taking place.

### 3.055. As-Built Drawings.

As-built drawing shall be submitted to the City Engineer or his/her designee before final inspection and acceptance by the City. As-built drawings shall be prepared by a licensed land surveyor and submitted on a hard copy and a computer aided design (CAD) file. As-built drawings shall show all utilities and boundary lines as shown in the Eagle Mountain standard drawings for As-builts. CAD files shall be submitted on a CD or by e-mail in an autocad or dxf format. The CAD file of the as-built drawings must be in the NAD27 State

Plane Coordinate System with a tie to a section corner. If anything is submitted by e-mail the Engineering Division must be contacted for the proper e-mail address and for confirmation the e-mail was received. The portion of the bond generally released at final inspection will not be released until the as-builts are submitted and approved.

## Chapter 4 Prerequisites of Contractors.

### 4.010. Prequalification.

### 4.020. Bonding.

### 4.030. Street Excavation Permits.

#### 4.010. Prequalification.

##### Insurance.

The contractor shall not commence work in City property, streets, easements, or right-of-ways without written permission to do so and until he has obtained, as a minimum, the insurance required hereunder and evidence of such insurance has been submitted to and approved by the City. The submittal of said evidence to the City shall not relieve or decrease the liability of the contractor hereunder.

##### Workers' Compensation & Employers' Liability Insurance.

- A) As required by State law.
- B) Commercial General Liability Insurance - ISO Form CG 00 01 (11/85) or equivalent, occurrence policy, with the following information:
  - a. Limits of not less than -
    - i. General Aggregate \$1,000,000
    - ii. Products - Comp/OPS Aggregate \$1,000,000
    - iii. Personal and Advertising Injury \$ 500,000
    - iv. Each Occurrence \$ 500,000
    - v. Fire Damage (any one fire) \$ 50,000
    - vi. Medical Expense (any one person) \$ 5,000
  - b. Endorsements attached thereto including the following or their equivalent:
    - i. 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.
    - ii. ISO Form CG 20 10 (11/85), Additional Insured -- City of Eagle Mountain, 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
- C) Automobile Liability Insurance, with
  - a. Limits of not less than \$500,000 Combined Single Limit per accident.
  - b. Coverage applying to any auto. City of Eagle Mountain requires all contractors doing work in or on any City property, street, easement, or right-of-way to pre-qualify. A current contractor's license, insurance information, and an information sheet must be on file with the Engineer's

office, prior to any construction in present or proposed City streets.

A bond will be required with each project. Prior to any construction being started in or on City property, streets, easements, or right-of-ways, a permit must be issued by the City and accepted by the Contractor. The permit application must be completed and filed with the City not less than forty-eight (48) hours prior to construction. A notice must be given to the City Engineer or his/her designee 24 hours prior to inspections. Failure to obtain a permit or proceeding without notification shall constitute grounds for legal action. The City will inspect all work. The contractor must make arrangements with the City for inspections. If work is performed without proper inspections or without pre-qualifying, the City may hold that portion of the bond for five (5) years after completion of improvements, or require reinstallation.

Prior to starting construction, the developer shall schedule with the City Engineer or his/her designee a pre-construction meeting with all contractors and sub-contractors. Contractors are required to meet with the City Engineer or his/her designee prior to commencing construction.

#### 4.020. Bonding.

A bond equal to 115% of the total estimated construction costs shall be provided to the City prior to plat recordation. Portions of this amount may be reduced based on completed infrastructure as verified by the City Engineer or his/ her appointees and approved by the City Council. Partial bond releases up to 100% of the individual line item may be provided by the City based on the completion of installed infrastructure. Five (5) percent of the bond will remain in place until after the completion of the final walkthrough has occurred, and all corrective actions have been taken, and an Autocad version of the as-built drawings have been provided to the City. The remaining 10% will be placed in warranty bond for the warranty period.

#### 4.030. Street Excavation Permits.

(See Development Code). All work not bonded for under approved subdivisions shall require a street excavation permit prior to commencement of work.

- A. Permit for Street Excavations. It shall be unlawful for any person to start any excavation in any public street before first obtaining a written permit from city office and posting proper bond. Caution must be taken to prevent the destruction or disturbance of any gutter, drain, gas, water, or other pipe or conduit or the injury or destruction of property of any kind. The Blue Stake Center must be called and utilities marked, as well as city utilities.

The City of Eagle Mountain regulates opening of all public streets. All cuts and openings in City streets shall be backfilled with approved backfill materials as defined in section 6.040 of these construction standards, and compacted to a minimum of 96% of the maximum dry density in not more than eight-inch lifts. The asphalt shall be saw cut along the trench (2øback on all edges-T-

patch) line and the new asphalt shall be placed a minimum of four inches thick in two lifts. Prior to placing asphalt the edge shall be covered with a tackifier coat. Asphalt specifications shall be as directed by the City engineer. During cold or inclement weather the asphalt cut and placement may be prohibited but in no case shall asphalt be placed when the current temperature is less than 50 degrees Fahrenheit or expected to be less than 42 degrees during the twenty four hours following placement.

- B. Barricades at Excavations. It shall be unlawful for any person to fail or neglect to maintain proper and sufficient barricades and signals at or near every excavation mentioned in this title so as to give warning of a protection against accident. OSHA requirements are to be maintained at all times.

## Chapter 5 Earthwork.

- 5.010. General.
- 5.020. Subgrade Soil Under Structures.
- 5.030. Backfill Around Structures
- 5.040. Construction of Embankments and Fills.
- 5.050. Compacting Earth Materials.
- 5.060. Road Subgrade Preparation.
- 5.070. Slope Safety.
- 5.080. Water Settling.
- 5.090. Removal and Replacement of Defective Fill.
- 5.091. Native Fill Uses for Trenches and Road Sections.

### 5.010. General.

This section defines the requirements for excavation and backfill for structures, construction requirements for embankments and fills and subgrade preparation for pavements and other surface improvements. All earthwork shall conform to the APWA Standard Specifications unless noted otherwise in this section.

### 5.020. Subgrade Soil Under Structures.

Subgrade soil for all concrete structures, regardless of type or location, shall be firm, dense, thoroughly compacted and consolidated; shall be free from mud and muck; and shall be sufficiently stable to remain firm and intact under the feet of the workmen engaged in subgrade surfacing, laying reinforcing steel, and depositing concrete. Coarse gravel or crushed stone may be used for subsoil reinforcement if results are satisfactory to the City Engineer or his/her designee. Such material shall be applied in layers, not exceeding 8 (eight) inches in thickness, each layer being embedded in the subsoil by thorough tamping. All excess soil shall be removed to compensate for the displacement of the gravel or crushed stone and the finished elevation of any subsoil reinforced in this manner and shall not be above the specified subgrade. The City Engineer may require a soil analysis and design for any area.

### 5.030. Backfill Around Structures.

Backfill around structures shall be placed to the lines shown on the approved drawings, or as directed by the City Engineer or his/her designee. After completion of foundation, footings and walls and other construction below the elevation of the final grades, and prior to backfilling, all forms shall be removed and the excavation shall be cleaned of all trash and debris. Material for backfilling shall consist of suitable materials as defined in section 6.040 of these Construction Standards and shall be placed in layers not exceeding eight (8) inches in uncompacted thickness. Each layer shall be compacted by hand or machine tampers or by other suitable equipment to a density equal to ninety-five (95) percent of maximum dry density as measured by AASHTO T180 method C. No frozen material is allowed in the

backfill.

### 5.040. Construction of Embankments and Fills.

Unsuitable materials that occur in the foundation for embankments and fills shall be removed by clearing, stripping and/or grubbing. Where suitable materials occur, after stripping, the foundation shall be scarified to a depth of not less than eight (8) inches, and the loosened material shall be moistened and compacted as hereinafter specified for each layer. All materials in embankments and fills shall be moistened, placed and compacted as provided in the following paragraphs.

When the embankment or fill exceeds the amount of excavation, sufficient additional material shall be obtained from borrow pits provided by the contractor. All material proposed to be imported shall be subject to the review and approval of the City Engineer or his/her designee prior to starting of hauling operations.

The materials used for embankment and fill construction shall be free from sod, grass, trash, rocks larger than six (6) inches in diameter and all other material unsuitable for construction of compacted fills. Grading of completed embankments and fills shall bring the surfaces to a smooth, uniform condition with final grades being within 0.1 foot of the design grade. Within a City right of way, materials must meet A1 or A2 soil classification.

### 5.050. Compacting Earth Materials.

The material shall be deposited in horizontal layers having a thickness of not more than 8 (eight) inches after being compacted as hereinafter specified; provided, that when mechanical equipment is used for placing and compacting the material on a sloping foundation, the layers may be placed parallel to the foundations. The distribution of materials shall be such that the compacted material will be homogeneous and free from lenses, pockets, or other imperfections. No frozen material may be used. Prior to and during compaction operations the material shall have the optimum moisture content required for the purpose of compaction and the moisture content shall be uniform throughout the layers, insofar as practical. Moistening of the material shall be performed at the site of construction, but such moistening shall be supplemented, as required by sprinkling at the site of excavation. If the moisture content is more than optimum for compaction the compaction operations shall be delayed until such time as the material has dried to the optimum moisture content. When the material has been conditioned as hereinbefore specified, the backfill or embankment shall be compacted as follows:

- A) Under roadways and extending one foot beyond the proposed curb line the fill or embankment material shall be compacted to a density equal to not less than 95% of maximum dry density as measured by AASHTO T-180, method C or the modified proctor test ASTM D-1557.
- B) Under sidewalks and driveways the fill or embankment material (to at least one foot each side of the edge of the slab) shall be compacted to a



density equal to not less than 95% of maximum dry density as measured by AASHTO T-180, method C or the modified proctor test ASTM D-1557.

- C) Other fills and embankments not listed above shall be compacted to a density equal to not less than 90% of maximum dry density as measured by AASHTO T-180, method C or the modified proctor test ASTM D-1557.

#### **5.060. Road Subgrade Preparation.**

In both cut and fill areas the paving subgrade shall be scarified to a depth of eight (8) inches and compacted to the equivalent of ninety-five (95) percent of maximum dry density as measured by AASHTO T-180, method C or the modified proctor test ASTM D-1557. No rocks larger than two (2) inches in diameter, organic material, soft clay, spongy material or other deleterious material will be permitted in this scarified subgrade layer. Rough subgrades shall be shaped and graded to within a tolerance of 0.15 Feet of design grade and drainage shall be maintained at all times. The developer shall provide to the City Engineer or his/her designee the results of a sub-surface investigation performed by the developer's Engineer and the recommendation as to whether existing material is adequate for road construction.

During the rolling operation, moisture content of the subgrade layer shall be maintained at no less than ninety-seven (97) or more than 105% of optimum moisture content. Rolling shall be continued until the entire road bed (to one foot back of curb) is compacted to the specified density to a minimum depth of eight (8) inches.

#### **5.070. Slope Safety.**

All slope construction shall be in accordance with all City, State and Federal regulations. Plans and Specifications for structures must be approved by the City if the excavation is greater than five (5) feet. No permanent slopes steeper than 3:1 shall be allowed without a retaining structure unless otherwise approved in writing by the City Engineer or his/her designee. Cut slopes greater than 3:1 slope in bedrock may be allowed provided the geotechnical report demonstrates that the bedrock is of sufficient depth and strength to support such cuts. The width of the excavation shall be increased if necessary to provide space for sheeting, bracing, shoring and/or other supporting installations. Unsafe slopes will be the cause for immediate shutdown of the project.

#### **5.080. Water Settling.**

Water settling may be permitted with preapproval by the City Engineer or his/her designee, depending upon the type of soil and location. When water settling is approved, a City representative shall be at the job site during the compaction. When the material has dried sufficient to allow compaction tests, the contractor shall dig test holes for compaction tests at locations and depths required by the City Engineer or his/her designee.

#### **5.090. Removal and Replacement of Defective Fill.**

Fill not conforming to the requirements of this

specification shall be reworked to the requirements or removed and replaced with acceptable fill.

#### **5.091. Native Fill Used for Trenches and Road Sections:**

Native fill will meet A-1 or A-2 classifications and be 3/8 minus. Native fill used in roadways/trenches will be completely free of organics and rocks larger than 3/8 diameter. Also native fill will be screened and mixed to maintain consistency.

## Chapter 6 Excavation and Backfill for Trenches.

- 6.010. General.
- 6.020 Trench Safety
- 6.030 Disposal of Materials
- 6.040. Engineered Fill Material.
- 6.050. Testing
- 6.060. Blasting

### 6.010. General.

These specifications cover excavation and backfill of trenches for the installation of storm sewer, sanitary sewer, water lines, electrical lines, and gas lines in streets and subdivisions. Due to varying ground composition, structure, and collapsible soils, excavation and engineered backfill for trenches shall comply with the APWA Standard Specifications or better as required or deemed needed based on review, inspection, and determination by the City Engineer or his/her designee. All OSHA requirements must be maintained in trenches at all times.

### 6.020. Trench Safety.

All construction shall be done in accordance with the provisions of the Utah State Industrial Commission and OSHA regulations. No trenches shall be left open at any time unless guarded with adequate barricades, warning lamps and signs.

When required, excavation shall be braced and shored to support the walls of the excavation to eliminate sliding and settling and as may be required to protect the workers, the work in progress, and existing utilities and improvements. All such sheeting, bracing and shoring shall comply with the requirements of the Utah State Industrial Commission and OSHA.

Any injury or damage resulting from lack of adequate bracing and shoring shall be the responsibility of the developer/contractor and the developer/contractor shall, at his/her own expense, effect all necessary repairs or reconstruction resulting from such damage. No inspections will be done in unsafe trenches and will be the cause for immediate shutdown at the project.

### 6.030. Disposal of Materials.

All excavation material, which is not required for or is unsuitable for backfill, shall be immediately removed from the area and not obstruct streets, sidewalks and driveways.

***Gutters and irrigation ditches shall be kept clean of excavated material.***

### 6.040. Engineered Fill Material

Engineered fill (Type A1 or A2 as defined by AASHTO) shall be required backfill for all trenches in the city right-of-way or public utility easements containing city owned and maintained utilities. The Contractor is responsible for supplying gradation reports showing proper gradation to meet A1 or A2 classification.

### 6.050. Testing.

Tests to determine acceptability of backfill placed will be done by a firm hired by the developer. The testing company/developer will use standard procedures of the American Society of Testing Materials (ASTM) and/or American Association of State Highway Transportation Officials (AASHTO). Compaction tests will be required at least every 100 feet per lift per trench. Each lift shall be six (6) to twelve (12) inches as determined by City of Eagle Mountain and City of Eagle Mountain's testing firm. Lift height will depend on the equipment and material used and the contractor's ability to properly compact the material. If the backfill so tested does not meet the requirements of these specifications, the trench shall be re-excavated and the backfill replaced in accordance with these specifications.

### 6.060. Blasting.

Blasting will not be allowed except by permission from the City Engineer or his/her designee as directed by the Fire Chief. The contractor shall comply with all laws, ordinances, and applicable safety code requirements and regulations relative to the handling, storage, and use of explosives and protection of life and property. He/she shall be fully responsible for all damage attributable to his/her blasting operations.

Excessive blasting or overshooting will not be permitted and any material outside the authorized cross section which may be shattered or loosened by blasting shall be removed by the contractor.

## Chapter 7 Water Lines.

- 7.010. **General.**
- 7.020. **Culinary Water Pipe.**
- 7.025. **Water Main Bedding Materials**
- 7.030. **Water Main Locations.**
- 7.040. **Water Meters and Service Lines.**
- 7.050. **Water Meter Standards.**
- 7.060. **Tapping of Water Lines.**
- 7.070. **Testing and Flushing.**
- 7.080. **Disinfection of Water Lines.**
- 7.090. **Backflow Prevention and Cross Connection Control Rules and Regulations.**
- 7.100. **Water System Extensions.**
- 7.110. **Fittings**

### 7.010. *General.*

The installation specifications for water systems shall conform to the APWA Standard Specifications unless noted otherwise in this section.

- A) Inspection. All pipe used shall be carefully inspected prior to installation. Any or all defective pipe shall be rejected.
- B) Minimum Cover. All water mains and service laterals shall have a minimum cover of 4 feet to the top of the pipe, minimum of 3ø at installation.
- C) 12 ga locator wire along water main to setters & fire hydrants.
- D) Metallic caution tape place 2ø above water main.
- E) All valves to be flanged to tees.
- F) Valves 12ø and above to be butterfly valves.
- G) Bolts at the top of fire hydrant barrel to be no lower than 1ø above finished grade & no higher than 6ø above finished grade.
- H) Water services (setters) to be installed prior to bacteria & pressure tests.

### 7.020. *Culinary Water Pipe*

PVC or Ductile Iron pipe is allowed to be used within subdivisions. Pressures, water hammer, surges, and other dynamic water characteristics shall be taken into consideration during the design and construction of the water system. The required pipe class shall be determined based upon characteristics.

### 7.025. *Water Main Bedding Materials*

Water main lines must be bedded using sand. No gravel of any kind will be allowed. All bedding material must meet AASHTO A3 classification with 100% pass #4 sieve.

### 7.030. *Water Main Type and Locations.*

Water mains shall be located on either the north or east sides of a roadway and 8 feet from the centerline.

Water mains shall be minimum one (1) foot vertical above the sewer. Separation between water and sewer mains shall be 10 feet (horizontally) minimum unless authorized in

writing by the City Engineer or his/her designee.

Water mains shall be either polyvinyl chloride (C-900 PVC, for pipes 8ø to 12ø) or DIP (poly wrapped) w/min pressure class of 250 psi for pipes greater than 12 inches. HDPE may be used for borings upon the approval of the City Engineer or his/her designee. No deflection or bending of pipe will be allowed in water lines and bend fittings will be required. All fittings to be Mega-lug fittings.

### 7.040. *Water Meters and Service Lines.*

Prior to the installation of the water service line, the Engineer retained by the developer shall stake out the water meter location and provide the grade at which the lid is to be set.

Minimum service line size is three-quarter (3/4) inch. All water service lines shall start with a corporation stop at the main and shall be of poly pipe with stiffeners or type "K" copper and meter setters to be twenty-one (21) inch or taller and are braced with dual unions and meet height specs in a twenty-one (21) inch can for water meters. A four (4) inch ring and lid shall be used and installed with the top of the setter at a depth of not less than eighteen inches (18) and not more than twenty-two (22) inches from the lid of the meter box. Meters two (2) inches and larger shall be placed in vaults (See standard drawing). All meter setters shall have dual check valves. Meter boxes shall be placed between the sidewalk line and property line with combination curb, gutter, and sidewalk or in the planter if available so that a fence may be placed on property without interfering with the maintenance and reading of said meter. No meters shall be set in sidewalks or driveways. Meter boxes shall be in good repair and relatively free from obstruction to insure ease in maintenance and reading, (not full of dirt past the base of the meter, having trash present and being badly bent to create a hazard). Damaged boxes shall be replaced. Meter boxes shall be from level to one inch high from the final grade of sidewalk. See detail.

Lids shall have a 2 inch hole in the top for the touch-read sensor, and read Eagle Mountain Water Meter on lid.

Water service lines shall be minimum one (1) foot vertical above the sewer. Water meters shall be located at the centerline of single family lots unless authorized by the City Engineer or his/her designee. On narrow lot subdivisions (lot width less than 50 feet), water laterals are to be located on alternating lot lines, although in no instances shall connections be made to the water main closer than a three feet intervals. Separation between water and sewer mains shall be 10 feet (horizontally) minimum unless authorized in writing by the City Engineer or his/her designee.

A separate and independent service lateral for water service shall be provided for every building used as a dwelling except in cases of undue hardship where the City Council deems it necessary to make an exception. The water user shall bear full responsibility for the upkeep and maintenance of all water system lines and fixtures beyond the water meter.

From and after the effective date of this ordinance all dwelling units and premises under separate ownership shall be served by individual water meters except in cases of undue

hardship or in planned unit developments when approved by the City Council.

**7.050. Water Meter Standards.**

All water meters shall be purchased from the City. All structures, dwelling units, and establishments using water from the City culinary water system must have such number and size of water meters connected to their system as are necessary to meet the requirement of the Utah Plumbing Code. Meters will be furnished by the City at the expense of the property holder, at the City's cost for said meter. Meter readings shall be taken at regular intervals as determined by the superintendent of the division and shall be submitted to the City Treasurer for the purpose of making necessary billings for water service.

Water meters will not be placed in driveways or under sidewalks. If a water meter must be moved out of a driveway, the maximum lateral movement is 24 inches. If a fitting is required to allow the meter to be relocated, the contractor must notify the Public Utilities Department so that an inspector can be present to verify the fitting is installed in accordance with City Standards. Backfill on the relocated service lateral must conform to the engineered backfill (A1 or A2) requirement of the City.

**7.060. Tapping of Water Lines.**

Tapping valves may only be used when previously 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.

Service taps shall be a minimum of thirty-six (36) inches apart. No taps will be allowed within thirty-six (36) inches of the end of the pipe.

**7.070. Testing and Flushing.**

A minimum pressure 50% in excess of the maximum line operation pressure (or 200 pounds, whichever is greater) shall be maintained on the portion being tested for a minimum period of two (2) hours, using either pneumatic or hydraulic means to maintain the pressure. After installation, fire hydrants must be covered with a black garbage bag taped down until all testing has been completed.

After pressure testing, all pipelines shall be flushed. Flushing shall be accomplished through hydrants or, if a hydrant does not exist at the end of the line, the contractor shall install a tap sufficient in size to provide for 2.5 foot-per-second flushing velocity in the line.

A leakage test shall be conducted concurrently with the pressure test.

- 1. Leakage defined. 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.

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

$$L = \frac{SD(P)^{0.5}}{133,200}$$

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

- a. Allowable leakage at various pressures is shown in Table 1.
  - b. When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal/hr/in. of nominal valve size shall be allowed.
  - c. When hydrants are in the test section, the test shall be made against the closed hydrant.
- 3. Acceptance of Installation. Acceptance shall be determined on the basis of allowable leakage. If any test of pipe laid discloses leakage greater than specified, the Contractor shall, at its 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.

All new water systems or extensions to existing systems shall be thoroughly flushed before being placed in service. Flushing shall be accomplished through hydrants, or end of line blow off assemblies at a minimum flushing velocity of 2.5-feet per second.

The following is the flow quantity required to provide a 2.5 foot-per-second flushing velocity.

PIPE SIZE (IN)	FLOW (G.P.M.)
4	100
6	220
8	390
10	610
12	880
16	1567
18	1980
20	2450
24	3525
30	5507

**7.080. Disinfection of Water Lines.**

Disinfection of water mains shall be done in accordance with the latest edition of AWWA C651.j

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 one percent (1%) hypochlorite disinfection solution.

The pipeline shall be disinfected as outlined in AWWA C651. Chemicals to be used shall conform to one of the following: AWWA B300, hypochlorite, AWWA B301, Liquid Chlorine; AWWA B302, Ammonium, and AWWA B303, Sodium Chlorite.

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 equal. 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 twenty-four (24) hours, forty-eight (48) hours if the water temperature is less than forty-one degrees (41 °) F. The disinfection solution shall have a concentration of at least twenty-five (25) mg/l of available chlorine. The continuous feed shall be done exactly as outlined in AWWA C651 and shall have a twenty-five mg/l available Chlorine after twenty-four (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.

After the chlorination, the line shall be thoroughly flushed with velocities greater than 2.5 ft/sec with clean water and if necessary re-chlorinated until satisfactory bacteriological testing is obtained. If any of the tests fail the contractor shall be responsible for the fees of additional tests. All new lines shall be isolated from existing lines when tested.

Following the approval of the testing and installation of a water main, the entire water line will be flushed through the end of the main via an approved outlet.

The developer shall take bacteria samples at the sites designated by the Public Works Director or his/her designee for each job, based on the following formula:

1. A. Minimum of 1 sample up to 200 feet.  
B. Minimum of 2 samples up to 600 feet. (One in the middle and one on the end).  
C. Minimum of 1 sample every 600 feet.  
D. Sampling points to be established during the pre-construction meeting for each project.
2. If any sample point fails on the first test, the line will be flushed and re-tested at all sample points.
3. If any sample point fails a second time the complete line will be re-disinfected and re-tested at all sample points.
4. If any samples come back marked [present], which means coliform bacteria is present, the line will be re-disinfected and re-tested at all sample sites.
5. After passing test let system relax 24 hours then take subsequent test.
6. after second test of samples is acceptable system is ready for use.

Bacteriological reports shall consist of the following:

1. Date issued, Project name, and the name, address, and telephone number of the testing

laboratory.

2. Date and time of water sample
3. Name of person collecting samples
4. Test locations
5. Initial and 24 hour disinfection residuals in ppm for each outlet tested
6. Coliform bacteria test results for each outlet tested
7. Certification that water conforms, or fails to conform, to bacterial standards of State.

#### **7.090. Backflow Prevention and Cross Connection Control Rules and Regulations.**

The following sections enact the cross-connection control and backflow prevention requirements applicable to the water system which is owned and operated by the City of Eagle Mountain.

##### **A) Definitions:**

1. *City*: The City of Eagle Mountain.
2. *The City Engineer, the Water Division Director and the Public Works Director* are vested with the authority and responsibility for the implementation of the City's Cross-Connection Control program.
3. *Approved Backflow Assembly*: A backflow assembly accepted by the Utah State Drinking Water Division, as meeting an applicable specification or as suitable for the proposed use.
2. *Auxiliary water supply*: Any water supply on or available to the premises other than the City's public water supply will be considered as an auxiliary water supply. These auxiliary waters may include water from another public potable water supply or any natural source, such as a well, spring, river, stream, harbor, irrigation water, "used waters" storage tanks or reservoirs which may or may not originate within the City. These waters may be contaminated or polluted or they may be objectionable and constitute an unacceptable water source over which the City does not have authority for sanitary control.
3. *Backflow*: The reversal of the normal flow of water caused by either back-pressure or back-siphonage.
4. *Back-pressure*: The flow of water or other liquids, mixtures, or substances under pressure into the distribution pipes of a potable water supply system from any source or sources other than the intended source.
7. *Back-siphonage*: The flow of water or other liquids, mixtures, or substances into the distribution pipes of a potable water supply system from any source other than the intended source, caused by the reduction of pressure in the potable water supply system.
8. *Backflow prevention assembly*: An assembly

- or means designed to prevent backflow. Specifications for backflow prevention assemblies are contained within the Utah Plumbing Code, Chapter 10 (appendix J) and the Cross-Connection Control Program of Utah. All backflow prevention assemblies must be approved by the Utah State Drinking Water Division, prior to installation. A listing of these approved backflow prevention assemblies may be found in the Cross-connection Control Program for Utah.
10. *Contamination*: An impairment of the quality of the potable water supply by sewage, industrial fluids or waste liquids, irrigation or other non-potable water, compounds or other materials to a degree which creates an actual or potential hazard to the public health through poisoning or through the spread of disease.
  11. *Cross Connection*: Any physical connection or arrangement of piping or fixtures between two otherwise separate piping systems, one of which contains potable water and the other water from a non-City source or non-potable water or storage tanks or reservoirs of questionable safety, through which, or because of which, backflow may occur into the potable water system; including any temporary connections, such as swing connections, removable sections, four-way plug valves, spools, dummy sections of pipe, swivel or change-over devices or sliding multiport tubes.
  12. *Cross connection - controlled*: A connection between a potable water system and water from a non-City source or a non-potable water system with an approved backflow prevention assembly properly installed and maintained so that it will continuously afford the protection commensurate with the degree of hazard.
  13. *Cross connection - containment*: The installation of an approved backflow assembly at the water service connection to any user's premises where it is physically and economically infeasible to find and permanently eliminate or control all actual or potential cross-connections within the user's water system, or the installation of an approved backflow prevention assembly on the service line leading to and supplying a portion of a user's water system where there are actual or potential cross-connections which cannot be effectively eliminated or controlled at the point of the cross-connection (isolation).
  14. *User*: A dwelling or other service connected to the City water system regardless of the location within or outside the boundary of the City.

B)

1. An approved backflow prevention assembly shall be installed on each service line to a user's water system, at or near the property line, or immediately inside the building being served, but in all cases before the first branch line leading off the service line, whenever the City determines that such is necessary for protection of the water supply or in the best interest of the users of the City's water supply system.
2. The type of protective assembly required under subsection B shall depend upon the degree of hazard which exists at the point of cross connection, i.e., whether direct or indirect, as defined in the Utah Plumbing Code.
3. All presently installed backflow prevention assemblies which do not meet the requirement of this section but were approved assemblies for the purposes described herein at the time of installation and which have been properly maintained, shall, except for the inspection and maintenance requirements listed in the next section, be excluded from the requirements of these rules so long as the City believes that they will satisfactorily protect the public water system. Whenever the existing assembly is moved from the present location or requires more than minimum maintenance or when the City finds that the maintenance of this assembly constitutes a hazard to health, the unit shall be replaced by the user with an approved backflow prevention assembly meeting the requirements of this chapter.
4. No water service connection to any premises shall be installed by any user of the City's potable water system or maintained by the user unless the water supply is protected as required by State laws, regulations and codes, and the provisions of this chapter. Service of water to any premises shall be discontinued by the user if a backflow prevention assembly required for control of backflow and cross connections is not installed, tested and maintained, or if it is found that a backflow prevention assembly has been removed or bypassed, or if an unprotected cross connection exists on the premises. Service will not be resumed by any user until such conditions or defects are corrected, and the City shall not furnish potable water to the premises of any user known by the City to be lacking suitable backflow prevention assemblies.
5. The user's system shall be open for inspection at all reasonable times to authorized representatives of the City to determine whether cross-connections or other structural or sanitary hazards, including violation of this chapter, exist. When such a condition

becomes known, the City shall deny or immediately discontinue service to the premises by providing a physical break in the service line until the customer has corrected the condition in conformance with the State Statutes and City regulations.

- C) If, in the judgement of the Director an approved backflow prevention assembly is required at the user's private water system for the protection of the public potable water distribution system from contamination or pollution due to the backflow or contaminants through water service connections, the City or its designated agent, shall give notice in writing to such user to install an approved backflow prevention assembly at a specific location or locations on his/her premises. Within ten (10) days after receipt of written notice, the user shall install such approved assembly at the user's own expense, and failure, refusal or inability on the part of the user to install, have tested, and/or maintain said assembly shall constitute grounds for discontinuing water service to the premises until such requirements are met.
- D) The Building Official shall have the responsibility to review building plans and inspect plumbing as it is installed and to prevent cross-connections from being designed and built into structures which will connect to the water system. Where the review of building plans suggests or indicates potential for a cross-connection being made an integral part of the plumbing system, the building inspector shall require such cross-connections to either be eliminated or provide with an approved backflow prevention assembly in accordance with the plumbing code.
- E) When employed by the user or the City to test, repair, overhaul and/or maintain backflow prevention assemblies, a backflow assembly technician shall have the responsibility and obligation:
  - 1. To ensure that acceptable testing equipment and procedures are used for testing, repairing, or overhauling backflow prevention assemblies.
  - 2. To make reports of such testing and/or repair to the user and the City, such reports to include the list of materials or replacement parts used.
  - 3. To ensure that replacement parts are equal in quality to parts originally supplied by the manufacturer of the assembly being repaired.
  - 4. To not change the design, material, or operational characteristics of the assembly during repair or maintenance.
  - 5. To perform the work and be responsible for the competence and accuracy of all tests and reports.
  - 6. To ensure that his license is current, and that the testing equipment being used is acceptable to the State of Utah and the City and is in

proper operating condition.

- 7. To report a failing assembly to the City within five working days from the date the failure was detected. Failure to do so may be grounds for revocation of the technician's certification.
  - 8. To be equipped with and be competent in the use of all necessary tools, gauges, and other equipment necessary to properly test, repair, and maintain backflow prevention assemblies.
  - 9. To tag each double check valve, pressure vacuum breaker, reduced pressure backflow assembly and air gaps, showing the serial number, date tested and by whom. The technician's license number must also be on such tag.
  - 10. In the case of a user requiring a commercially available technician, any certified technician is authorized to make the test and report the results of the same to the user and the City. If such a commercially tested assembly is in need of repair, the same shall be performed by a plumber licensed pursuant to Utah Statutes.
- F)
- 1. It is the duty and responsibility of the user at any premises where backflow prevention assemblies are installed to have certified inspections and operational tests made at least once per year at the user's expense. In those instances where the City deems the hazard to be great, it may require certified inspections and tests shall at more frequent intervals. All inspections and tests shall be performed by a certified backflow assembly technician, licensed through the State of Utah, and shall be made in accordance with the standards set forth by the Utah State Drinking Water Division.
  - 2. Backflow prevention assemblies shall be installed in water supply lines to provide at least the degree of protection provided in the Utah Plumbing Code, Chapter 10 (appendix J)). All backflow prevention assemblies shall be exposed for easy observation and be readily accessible.
  - 3. All backflow prevention assemblies installed in a potable water supply system for protection against backflow shall be maintained in good working condition by the user or other person or persons having control of such assemblies. The Utah State Drinking Water Division, and the City may inspect such assemblies and if found to be defective or inoperative, shall require the replacement thereof. No assembly shall be removed from use, relocated, or another assembly substituted without the approval of the City.
  - 4. Each user shall cause all backflow prevention assemblies to be tested within ten working days of installation.
  - 5. No backflow prevention assembly shall be

installed so as to create a safety hazard, i.e., installed over an electrical panel, steam pipes, boilers, pits, or above ceiling level.

#### 7.100. Water System Extensions

All extensions to the existing water system which are not covered by regulations in the approval of subdivisions and large scale developments shall comply with the provisions of this section.

- A. Any person desiring to extend the water system may make application to the City Council. Such application shall be considered by the City Council on a case by case basis and the Council shall approve such applications if (a) the proposed extension is to be constructed consistent with the City's extension standards, (b) there is adequate reserve water available to supply said need, and (c) the existing distribution system is adequate to supply the needed water to the point of beginning of the extension.
- B. The application shall contain a description of the proposed extension accompanied by a map showing the location thereof. Detailed engineering drawings showing the location and size of all lines, mains, service laterals, appurtenant facilities, anticipated water pressures and fire flows shall be included. The application shall also include an extension agreement signed by the applicant in a form approved by the City Council by which the applicant agrees to construct the facilities, both on-site and off-site, and accepts the conditions agreeing to reimbursement as outline in paragraph F of this section.
- C. Before any such application is approved, the City Council shall refer it to the water Division superintendent for his review and comment. The application may also be referred to the Planning Commission and the City Engineer for similar review and recommendation.
- D. The design, location, materials and methods and standards of construction of water line extension shall be in accordance with City standards and specifications as approved by the City Council.
- E. The City Council may require the construction of over-sized and off-site facilities as a condition of the approval of any application governed by this section.
- F. Upon completion of an extension, the applicant's share of the actual cost of making such extension shall be determined by the City Engineer from as-built drawings to be provided by the applicant. Whenever an extension of a water main benefits property which is adjacent to the extension or extended from the end of an existing extension, other than that which is owned by the applicant, the City will enter a deferred credit on its books and records in the amount of the actual prorated cost of extension across the front of said benefited property

and shall reimburse the applicant, his assignees or successors, upon collection by the City of charges assessed against such benefited property as service connections are made. All such reimbursements shall extend for a period determined by the City Council from the date of the completion of the extension and acceptance by the City, or until the initial prorated cost of the extension along the frontage not owned by the applicant shall have been refunded.

A water main Extension Charge for each and every subsequent service connection to an extension under the provisions of this section shall be paid before such service connection is made, except for frontage owned by the applicant at the time of the application. The water main Extension Charge is separate and is in addition to any service connection charge required by the City.

The amount of an Extension Charge to benefited property shall be determined by the City Council. All necessary fire hydrants and appurtenances that are provided in making the extension shall be included in determining reimbursement.

All Extension Charges levied for purposes of reimbursement shall be determined using the costs for installing water mains of eight (8) inches in diameter. Where the City requires that the extension be made using larger lines, the difference between the cost of installing an eight inch water line and the size required by the City may be subject to reimbursement by the property owners which are served by said extension in accordance with the City's reimbursement policy. All cost for the line size over eight inches shall be born by the City upon approval of the City Council. All main water line extensions become the property of the City upon acceptance by the City.

#### 7.110. Water Fitting.

All water lines fittings to have mega lug fug followers.



## Chapter 8 Pressurized Irrigation

- 8.010. General.**
- 8.020. Installation**
- 8.030. Pipe and Fittings**
- 8.040. Valves and Couplings.**
- 8.050. Meters, Boxes and Service Lines.**
- 8.060. Flushing.**

### 8.010. General.

- A) Specifications: These specifications cover the installation of pressurized irrigation lines. See standard drawings related to pressurized irrigation.
- B) Pipe: Polyvinyl chloride (PVC) pipe shall be used for all pressurized irrigation mains unless authorized by the City Engineer or his/her designee.
- C) Size: The City must approve the sizes of all proposed pressurized irrigation lines. The minimum size of pressurized irrigation pipe is 4 inches in diameter for main lines and 1 inch diameter for services.
- D) Location: Pressurized irrigation mains shall be located on either the north or east sides of a street, 5 feet from the centerline (three feet off water line). See standard drawings for utility locations.

### 8.020. Installation

- A) General: Pressurized irrigation distribution and transmission systems shall be installed according to the requirements and specifications of APWA 02510. 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 02320. Tape shall be buried 12 inches below grade.
- 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 retaining devices shall be used for all tees, valves, plugs, caps, and bends. Restraining shall be accomplished according to the standard drawings.

### G) Connection 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 fittings 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.

### 8.030. Pipe and Fittings.

a) General: 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 or polyethylene pipe shall be used for pressurized irrigation mains larger than 2 inches in diameter. Only PVC or polyethylene pipe may be used in corrosive soils.

b) Polyvinyl Chloride Pipe (PVC): PVC pipe shall meet the requirements and specifications of APWA 15014 and AWWA C900, C905, and C909. Only purple, pressure class 150 psi pipe may be used for pressurized irrigation mains.

c) Ductile Iron Pipe: Ductile iron pipe shall meet the standards and specifications of APWA 15011. 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 AWWAC115.

d) Polyethylene Pipe: Polyethylene pipe shall meet the standards and specifications of APWA 15013.

e) Steel Pipe- Lined and Coated: Steel pipe shall meet the standards and specifications of APWA 15010.

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 pipes being inserted into fittings shall have the bevel and removed. All the bolts and nuts of all the fittings shall be greased. All fittings shall have an 8 mil vinyl wrap plastic cover.

### 8.040. Valves and Couplings.

a. General. All valves shall meet the requirements of APWA 02510 and 15030.

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:

- i) **Mechanical Joint.** When valves are Mechanical joint, they shall be furnished with all necessary glands, followers, and bolts and nuts to complete installation.
- ii) **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 meets the requirements and specifications of APWA 02510, 15030 and the followings 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, gasket, and glands). All valves shall conform with AWWA Standard C-504, Table3, and 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. 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. Valves boxes in off-road areas shall extend 6 inches above grade. Lid detail shall be similar to Comco C-6517.

15 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 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.

16 Pressure Regulation Valves. Pressure Regulation Valves (PRV) which are required in a development shall be designed by the Developer's 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 bypass, be placed in a concrete vault and have telemetry included.

17 Tapping Valves. Tapping valves may only be used when previously approved by the City Engineer or his/her designee. Taping 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.

18 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.

#### 8.050. 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. Pressurized irrigation services shall be installed after electrical services. Every lot, including both sides of a twin home lot, shall have its own pressurized irrigation 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. 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. For dual pressurized irrigation services, laterals shall extend perpendicular from the main to the tee. If a meter must be moved it may only be displaced a maximum of 24 inches to either side. If it must be moved more than 24 inches, a new service line

must be installed. 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 set at an angle crushed or dented. The inside of boxes must be free of 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 use for pressurized irrigation service lines. Pipe damaged by scratches, cuts, kinks or buckled areas shall not be installed. The bottom of the 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 with in 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. There shall be no bending within 3 feet of a fixed point and no S shape curves.

**8.060. Flushing.**

2. **General.** All pressurized irrigation lines shall be flushed before placed in service. Flushing shall be accomplished through the end of each line.
3. **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.

FOR FLUSHING	FLOW REQUIREMENTS
Pipe diameter	Flow in Gallons per minute
4 inch	100
6 inch	220
8 inch	390
10 inch	610
12 inch	880
16 inch	1567
18 inch	1980
20 inch	2450

24 inch	3525
30 inch	5507

## Chapter 9 Sewer Lines.

- 9.010. General.
- 9.020. Sewer Pipe.
- 9.025. Sewer Main Bedding Materials
- 9.030. Sewer Connection Fees
- 9.050. Manhole Bases.
- 9.060. Connecting to Existing Sewers.
- 9.070. Sewer Laterals.
- 9.080. Minimum Slopes.
- 9.090. Cleaning.
- 9.100. Sewer Lift Stations.
- 9.110. Discharging Waste from Cesspools and Septic Tanks at Sewage Treatment Plant.
- 9.120. Septic systems.

### 9.010. General.

The installation specifications for sewer systems shall conform to the APWA Standard Specifications unless noted otherwise in this section.

### 9.020. Sewer Pipe.

Non-Reinforced Concrete, Reinforced Concrete, and PVC piping shall be used with the City of Eagle Mountain under the specifications and conditions in the respective pipe sections. Sanitary sewer shall be located on the south or west side of the street, five feet from the centerline. Water mains shall be minimum one (1) foot vertical above the sewer. Separation between water and sewer mains shall be 10 feet (horizontally) minimum unless authorized in writing by the City Engineer or his/her designee.

### 9.025. Sewer Main Bedding Materials

Pipe bedding for sewer mains shall consist of  $\frac{3}{4}$ 0 or pea gravel, and shall extend six (6) inches below the sewer main, and 12 (twelve) inches above crown of pipe, or one pipe diameter, whichever is larger.

### 9.030. Sewer Connection Fees.

Sewer Connection Fee. The schedule of charges to be imposed for sewer connections shall be set by the City Council from time to time by resolution.

Reimbursement of Sewer Main Line Assessment Charges . When a main line or trunk line has been installed at the expense of some third party other than the owner of adjacent property to the street or easement in which a main or trunk line has been extended is connected to by the adjacent property developer and an assessment is made against the property benefited by the main line, the third party who advanced the cost of installing the main or trunk line shall be entitled to reimbursement for that portion of the expenses incurred by him which is actual cost of extension with a maximum reimbursement not to exceed the actual cost incurred by the developer in making the main line extension

go past the property of the developer who subsequently connects on the main or trunk line. Extension reimbursements shall not be paid after the expiration of ten (10) years from the original date of installation of the main or trunk line.

Third party other than owner of adjacent property to the street or easement, in which a main or trunk line has been extended, shall file a report of actual cost of such main line extension, with the City of Eagle Mountain. The report shall be the basis for assessment made against the property benefited by main line extension.

Before any sewer connection request by adjacent property is approved, such assessment made against the property shall be paid to the City of Eagle Mountain. Such payment shall be made to the party entitled to such payment by the City of Eagle Mountain. A fee in the amount established by the City will be collected by the City of Eagle Mountain for the administration of the fund transfer.

In no event shall the right of reimbursement exceed the amount of actual cost of extension.

### 9.050. Manhole Bases.

Manhole bases shall be constructed of concrete to the dimensions shown on the drawings. Main line sewer pipe and projecting ends of the sewer and pipe stubs shall be adequately supported to prevent displacement from line or grade during installation of the base. All manholes shall have the invert shape as indicated on the "Standard Details" to provide an adequate channel between the inlet and outlet pipes. The entire surface of the manhole invert, including channels and shelves shall be steel-troweled to a smooth dense surface. All inverts of junction manholes shall be shaped while the bases of the manholes are under construction. All inverts shall follow the grades of the pipe entering the manholes. Manholes shall have a 0.20 foot fall through manhole. Rubber boots shall be provided to connect the inlet and outlet pipes and provide watertight joints.

### 9.060. Connecting to Existing Sewers.

Manholes used to connect the sewer to the existing sewer shall be plumb and centered on the existing sewer. The new pipe shall be placed against the existing pipe at the elevation designated by the Engineer and the base poured as specified above. Care shall be taken not to disturb the alignment of the existing sewer during the excavation procedure. Any damage to the existing sewer shall be repaired. When connecting to existing manhole or stub pipe a test ball shall remain inflated in the downstream pipe to prevent contamination of existing mains.

### 9.070. Sewer Laterals.

Service lines shall be constructed of substantial materials approved by the Utah Plumbing Code for the particular application. Minimum pipe size shall be 4" diameter. Sewer lateral clean outs may not be placed under any permanent structures, including porches or bay windows.

All sewer laterals shall be connected to concrete sewer mains by use of the tapping tee (cast iron), a wax bowl ring and then secured with plumbers tape and concrete or a wye

connection. Connections to P.V.C. shall use tapping tees. Sewer laterals to extend 12' beyond property line and marked with a 2 inch by 2 inch board at the end and a 2 inch ØSØ stamped on the face of the curb and gutter. Any bend in a service line between the main line and the property line greater than 22.5° needs to have a clean-out. No 90° bends are allowed. The minimum cover of sewer laterals is at 3' 6" at the property line.

**9.080. Minimum Slopes.**

Slopes shall be designed to have a two (2) foot per second velocity unless otherwise approved by the City Engineer. Minimum slopes for different size pipes are as follows:

**MINIMUM SEWER MAIN SLOPES**

Pipe Diameter	Minimum Slope
4"	2%
6"	1%
8"	.334%
10"	.248%
12"	.194%
14"	.158%
15"	.144%
16"	.132%
18"	.113%
21"	.092%
24"	.077%
27"	.066%
30"	.057%
36"	.045%

**9.090. Cleaning.**

After the sewer lines have been laid and the trench back-filled, they shall be thoroughly cleaned and tested for leakage and alignment in the presence of the City Engineer or his/her designee before acceptance by the owner. Cleaning shall be done using a high pressure jet cleaning machine, producing a min. of 800 psi. Waste water and debris shall not be permitted to enter sewer lines in service, but shall be removed by a Øsucker truckö at the lowest manhole of the extension. Such cleaning shall be done by private crews at the expense of the owner.

- A) Displacement Test. The displacement test shall be conducted by the developer and inspector in the presence of the Engineer and shall consist of the following: all sewer mains shall be washed and inspected using a television inspection unit... The televised inspection of any mains which reveal broken, misaligned or displaced pipe, or other defects, as designated by the City Engineer or his/her designee shall be remedied by the contractor. The televised inspection shall have the slope of pipe shown on tape throughout the inspection. After cleaning and inspection have been completed, the line shall be tested for leakage by the following method:

- B) Leakage Tests. The Low Pressure Air Test shall be conducted by the following method under the direction of the City Engineer or his/her designee with equipment equal to Cherne Industrial, Inc.

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 PSIG greater than the average back pressure of any ground water that may be over the pipe. At least two (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 of 2.0 cubic feet per minute minimum when tested at an average 3.0 PSIG 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 PSIG (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:

Pipe Diameter in Inches	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 sewer mains shall be tested, cleaned and accepted by City of Eagle Mountain before laying the street surface.

**9.100. Sewer Lift Stations.**

Sewer lift stations that 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 prior to starting construction. Lift stations will be the screw type design, will have standby power, telemetry, and will be designed for regional areas, not individual subdivisions. Where applicable, a dry well/wet well design may be used as approved by the City Engineer. Sewer lift stations will not be allowed if gravity flow can be accommodated.

**9.110 Discharging Waste from Cesspools and Septic**

*Tank at Sewage Treatment Plant.*

It shall be unlawful for any person; firm or corporation to discharge the waste material collected and gathered in cleaning cesspools or septic tanks at any place within the corporate limits of the city except at the designated site created for such purposes at the sewage disposal treatment plant of the City of Eagle Mountain. Illegal discharges may result in fines up to \$2,480.

**9.110 Septic Systems.**

Septic systems must be approved by the Utah County Board of Health. New subdivision within 300 feet of an existing sewer system must extend and connect to the existing sewer system unless the City Engineer or his/her designee determines elevation conditions will not allow a connection. No existing residents on septic systems shall be required to connect to the city sewer system unless required by Utah County or the State of Utah.

## Chapter 10 Storm Drains.

- 10.010. General.
- 10.020. Pipe.
- 10.030. Minimum Slopes.
- 10.040. Cleaning and Testing. (APWA 33 08 00)
- 10.050. Sumps.
- 10.060. Retention/Detention Basins.
- 10.070 Storm Water Pollution Prevention Plan

### 10.010. General.

The installation specifications for storm drain systems shall conform to the APWA Standard Specifications (33 08 00) unless noted otherwise in this section.

All residential developments will be responsible to provide a storm drain system on-site in the development that will contain a 100-year storm event. The maximum allowable storm water discharge from any commercial and industrial development will be limited to 0.2 cfs/acre of development. All storm drain pipes shall have a minimum cover of two (2) feet. Minimum size of storm drains is 12" diameter for tie-ins and 15" diameter for main lines.

No person shall discharge or cause to be discharged any storm water surface water, ground water, roof runoff, subsurface drainage, cooling water, or unpolluted industrial process waters to any sanitary sewer. Storm water and all other unpolluted drainage shall be discharged to such sewers as are specifically designated as combined sewers or storm sewers, or to a natural outlet approved by the director. Industrial cooling water or unpolluted process waters may be discharged, on approval of the director, to a storm sewer, combined sewer or natural outlet.

Storm drain manholes and sumps shall be confined space requirements, and shall be equipped with ladder runs and other such devices as required to ensure public safety.

### 10.020 Pipe.

Piping used for storm water conveyance includes concrete, HP ADS. All pipe shall conform to the specifications material and installation specifications included herein.

Storm drain bedding materials shall consist of ¾" gravel and extend 6 inches below and to the sides of the pipe and 12 inches above the crown of the pipe, or pipe diameter whichever is greater.

### 10.030. Minimum Slopes.

Minimum slopes for different size pipes are as follows:

#### MINIMUM STORM DRAIN MAIN SLOPES

PIPE DIAMETER	MINIMUM SLOPE
12"	.194%
14"	.158%
15"	.144%

16"	.132%
18"	.113%
21"	.092%
24"	.077%
27"	.066%
30"	.057%
36"	.045%

### 10.040. Cleaning and Testing.

After the storm drain lines have been laid and the trench back-filled, they shall be thoroughly cleaned and tested for leakage and alignment in the presence of the City Inspector or his/her designee before acceptance by the owner. Cleaning shall be done using a high pressure jet cleaning machine, producing a min. of 800 psi. Waste water and debris shall not be permitted to enter storm drain lines in service, but shall be removed at the lowest manhole of the extension. Such cleaning shall be done by private crews at the expense of the owner.

Storm drain lines will be required to have a deflection or TV test prior to acceptance and prior to the release of the warranty bond. Storm drain boxes or manholes shall be air tested under the general observation of the City inspector.

### 10.050. Sumps.

Sumps shall not be used in the City of Eagle Mountain unless approved by the City Engineer. If approved, all sumps must be constructed with a grease trap.

Additionally, sumps shall only be located as staked in the field and indicated on the plans. They shall be to the grade indicated by the cutsheets and as staked in the field. Excavation and backfill shall conform to Chapter 39.16 of these specifications. If the sump is located in an area where the earth is stratified with gravel layers, care shall be taken during backfill to be sure that these layers are not sealed off from the sump beginning three (3) feet below the bottom of the sump up to the top of the subgrade. One to three inch diameter drain rock shall be used. The original material shall be removed and the total backfill done with imported drain rock. After backfilling is completed, the entire excavation shall be thoroughly flooded to insure that settlement is complete. Grates shall be set in place and adjusted for final elevation and alignment. The City requires a fabric barrier between the drain rock and road base (or other backfill).

Sumps may only be constructed of reinforced concrete, precast sections and shall meet the requirements of ASTM C478-73 in accordance with standard detail drawing S-15, S-16, and S-17. Sumps shall have eccentric lids to ensure adjustments in alignment.

### 10.060. Retention/Detention Basins.

- A) Retention Basins. All retention basins shall be constructed with a maximum water depth of 4 feet. All retention basins shall have a series of interconnected sumps connected to curb inlet boxes

or storm drain main lines. All retention basins shall be landscaped in accordance with City Standards. All retention basins shall be constructed a minimum slope of 5:1.

All retention basins shall be constructed for drainage areas designated in the general plan. Basins for smaller areas may be allowed only with prior written approval of the City Engineer or his/her designee.

- B) Detention Basins. All detention basins shall be constructed with a maximum water depth of 18 inches; with that depth remaining for no longer than a 6 hour period. Detention basins must be landscaped and they may be located in park and recreational areas. Each detention basin shall have a manually controlled outlet to a storm drain main line. Detention ponds greater than 18 inches must have a minimum side slope of 5:1 unless approved by the City Engineer based on provided safety improvements. Fencing around detention ponds may be required as determined by the City Engineer or his/her designee.

Ponds must be constructed as they are required for the detention of the proposed improvements. If the ultimate design of a subdivision has located the detention basin in a future phase of the subdivision, either a temporary detention basin must be constructed, or an easement for the approved detention must be given to the City and the detention basin must be constructed with the required phase.

#### *10.070 Storm Water Pollution Prevention Plan*

A Storm Water Pollution Prevention Plan meeting all requires as mandated by the State of Utah Department of Environmental Quality shall be required and maintained for all construction within a subdivision. Elements of this SWPPP shall include BMPs to protect the existing and natural storm drainage systems from incurring increased sedimentation. BMPs will include as a minimum silt fences, inlet protection, and stabilized construction entrance. Additional BMPs may be required as needed and determined by a certified storm water plans reviewer. The SWPPP is to be approved by the City Engineer and his/ her designee. The approved SWPPP plan is to be maintained while any construction activities are occurring within a subdivision. Modifications to the SWPPP during the construction process if it becomes evident that additional modifications are needed to protect storm drainage structures or adjacent properties.



## Chapter 11 Restoration of Surface Improvements.

- 11.010. General.
- 11.020. Gravel Surface.
- 11.030. Bituminous Surface.
- 11.040. Cold Weather Patching.
- 11.050. Concrete Surfaces.

### 11.010. General.

The contractor shall be responsible for the protection and the restoration or replacement of any improvements existing 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. All improvements including landscaping shall be reconstructed to equal or better, in all respects in a timely manner. The contractor shall be responsible for maintaining a road surface suitable for travel by the public. He/She shall be responsible for all dust and mud control and all claims and damages resulting from his/her failure to maintain the construction area.

All road cuts shall be repaired within two (2) working days. All asphalt to be removed must be sawcut in a smooth straight line.

### 11.020. Gravel Surface.

Where trenches are excavated through gravel surfaced areas such as roads and driveways, etc., the gravel surface shall be restored and maintained as follows:

- A) All trenching backfill shall conform to the backfill requirements in section 6.040 of these Construction Standards.
- B) The gravel shall be placed deep enough to provide a minimum of 6 inches of material.
- C) The gravel shall be placed in the trench at the time it is backfilled. The surface shall be maintained by blading, sprinkling, rolling, adding gravel, etc., to maintain a safe uniform surface satisfactory to the Engineer. Excess material shall be removed from the premises immediately.
- C) Material for use on gravel surfaces shall be obtained from sound tough durable gravel or rock meeting AASHTO T-27 requirements. The following requirements for grading shall be met:

Passing 1-inch sieve	100%
Passing 3/4 inch sieve	85% - 100%
Passing No. 4 Sieve	45% - 65%
Passing No. 10 Sieve	10% - 30%
Passing No. 200 Sieve	5% - 10%

### 11.030. Bituminous Surface.

Where trenches are excavated through bituminous

surfaced roads, driveways or parking areas, the surface shall be restored and maintained as follows:

- A) A temporary gravel surface shall be placed and maintained as required in section 12.020 of these construction standards after the required backfill and compaction of the trench has been accomplished.
- B) The trench shall be backfilled in accordance with section 6.040 of these construction standards.
- C) The area over trenches to be resurfaced shall be graded and rolled with a roller weighing not less than twelve tons, or with the rear wheels of a five-yard truck loaded to capacity, until the subgrade is firm and unyielding. Mud or other soft or spongy material shall be removed and the space filled with gravel and rolled and tamped thoroughly in layers not exceeding 6 inches in thickness. The edges of trenches that are broken down during the making of subgrade shall be removed and trimmed neatly before resurfacing.
- D) Before any permanent resurfacing is placed, the contractor shall cut the existing paving to clean, straight lines as nearly parallel to the center line of the trench as practicable and 24" wider on each side of trench than initial excavation. Said straight lines have no deviations from such lines except as specifically permitted by the Engineer.
- E) Existing bituminous paving shall be cut back a minimum of twenty four inches beyond the limits of any excavation or cave-in along the trench so that the edges of the new paving will rest on at least twenty inches of undisturbed soil. See also APWA Standard detail 255 - Asphalt Concrete - Top patch.
- F) Within two (2) working days and weather permitting, the bituminous surface shall be restored by standard paving practices to a minimum thickness of four (4) inches for local streets and six (6) inches for collector, industrial, and commercial streets to match existing pavement height.
- G) Pavement restoration shall include priming of pavement edges and sub-base with an asphalt tack coat and placing and rolling plant mix bituminous material to the level of the adjacent pavement surfaces.
- H) All pavement restoration shall conform to Chapter 12 of these specifications.

### 11.040. Cold Weather Patching.

Trenches cut during winter months or when asphalt plants are not operating shall be patched the same day of the cut with a good quality cold mix and maintained until asphalt plants open. When asphalt plants open, the cold patch shall be removed and a new patch of hot mix asphalt shall be placed within twenty (20) days of plant opening.

### 11.050. Concrete Surfaces.

All concrete curbs, gutters, sidewalks and driveways shall be removed and replaced to the next joint or scoring lines beyond the damaged or broken sections; or in the event

that joints or scoring lines do not exist or are three or more feet from the removed or damaged section, the damaged portions shall be removed and reconstructed to neat, plane faces. On all new concrete improvements lamp-black or other pigments shall be added to the new concrete to obtain the desired results.

All concrete work shall conform to the requirements of the APWA Standard Specifications.

## Chapter 12 Street Improvements.

- 12.010. General.
- 12.020. Minimum Road Section
- 12.030. Aggregate Size.
- 12.040. Asphalt Seam Location
- 12.050. Warranty Maintenance.
- 12.060. Manholes and Valve Boxes.
- 12.070. Street Signs

### 12.010. General.

All street surfacing shall comply with the APWA Standard Specifications, unless noted otherwise in this section.

Prior to placing asphalt surfaces, temperatures shall be a minimum of 50 degrees Fahrenheit and rising, and be expected to maintain a temperature of greater than 50 degrees for a length sufficient to complete a reasonable quantity of paving. In no instance will asphalt be allowed to be placed in temperatures less than 47 degrees. No asphalt may be placed on frozen ground, or when overnight temperatures of less than 42 degrees are expected.

A soils investigation shall be performed for all new roads and those roads for which work will be performed. The results of this investigation and a design of the road cross section shall be submitted to and accepted by the City Engineer or his/her designee. These specifications cover the preparation of subgrade, the placing of base gravel, and the placing of asphalt surface on any City street.

### 12.020. Minimum Road Section.

Unless approved otherwise by the City Engineer or his/her designee, the Public Works Director, or as directed by the City Council, on residential roads, a minimum of nine (9) inches of engineered fill, meeting type A1 or A2 classifications as set forth by AASHTO with a maximum of 25% fines passing the number 200 sieve shall be placed over scarified native earth material. The minimum thickness of road base shall be six (6) inches when used in conjunction with the engineered fill. The minimum thickness of asphalt in a City road shall be three (3) inches. Road base to meet specifications for state specs on road base. The subbase is to be prepared in accordance to the geotechnical report. If soils exhibit pumping, additional preparations may also be required as detailed in the geotechnical report which may included over-excavation of materials, or the placement of a geotextile fabric. Methods or remediation must be approved by the City Engineer or his/her designee. Road sections on collector or arterial roads, or in commercial or industrial subdivisions may require an increased cross section as determined by a

geotechnical report. The minimum grade for a road shall be 1% unless approved otherwise. All roads shall have a cross slope between 2% and 4%.

### 12.030. Aggregate Size.

A one half (1/2) inch minimum mix design is to be used on all residential streets. All collector roads shall require a minimum three quarter inch (3/4) mix design.

### 12.040. Asphalt Seam Location.

The contact point of two adjacent asphalt placements shall be located such that the seam is at a minimum five (5) feet from the projected edge of the lip of gutter on the higher volume roadway. Cross gutters may be required for all roadways intersecting off a roadway classified as a collector road as directed by the City Engineer or his/her designee.

### 12.050. Warranty Repairs.

The City Engineer or his/her designee shall determine at the time of the walkthrough the minimum type of surface maintenance that will be required for the subdivision or portions thereof. Crack sealing of seams will be required at a minimum for seams with horizontal gaps greater than 1/4 inch, or in instances which exhibit vertical separation. Slurry seals may be required in instances when asphalt patching occurs on more than 40% of any portion of the roadway. All slurry seals will be a Type II slurry.

All streets shall be swept clean prior to placement of slurry seal. All manholes and valves, including concrete collars, shall be protected from slurry seal. Any slurry seal in gutters or on other concrete shall be removed. A leveling coarse shall be applied where needed before the final slurry seal is laid.

### 12.060. Manholes and Valve Boxes.

All manhole covers and valve boxes shall be raised to the proper grade after the placement of pavement. The cover shall be removed and raised to the proper elevation with concrete setting the frame 1/4" below the pavement grade. The following types of rings can be used:

-4000 psi concrete can be used with epoxy coated re-bar with 2 rings maximum each collar.

-6000 psi concrete can be used with fiber mesh, 1.5 pounds per yard 3/4 inch monofilament.

All adjustments in the elevation from the manhole cone/ lid to be made with whirly gig, manhole riser collar system or equivalent. All adjustments in elevation to water valve boxes are to be made in the top sliding riser. If grade cannot be reached with existing top another base section cut to grade must be used.

### 12.070 Street Signs.

All signs, post, and hardware shall be installed in accordance to the MUTCD Standards.

Sign post shall be 2-3/8" round post, galvanized inside and out, powder coated with 8017 brown, 16 gage with no holes, crash tested and NCHRP 350 approved.

All post shall have a galvanized dome rain cap and powder coated with 8017 brown.

Signage shall be installed to post with a sign clamp assembly, center bolt and U-bolt to be 1/2" diameter.

Post shall be anchored to a V-loc 23VRN anchor for 2-3/8" round post with a 24" leg, with stabilizer bolt, and wedge.

All anchors shall be driven into soil, no digging and burying shall be allowed.

All signage shall be marked in the bottom corner (1/4" tall, 1" wide) with date and year sign was made.

## Chapter 13 Concrete Curb, Gutter, Sidewalks, and Asphalt Trails.

- 13.010. General.
- 13.020. ADA Requirements.
- 13.030. Base Material.
- 13.040. Testing and Inspection.
- 13.050. Cold Weather Concrete.
- 13.060. Clean Gutter.
- 13.070. Drive Approaches.
- 13.080. Asphalt Trails

### 13.010. General.

All concrete work shall comply with the APWA Standard Specifications, unless noted otherwise in this section. The work shall consist of curb and gutter, sidewalk, combination curb, gutter and sidewalk, cross gutter's, and curb return constructed where indicated on the plans or as directed by the Engineer and conforming in all respects to the specified lines, grades, and dimensions. A minimum slope along any curb and gutter shall be 0.7% and on cross-gutter shall be 0.5%. Maximum grades on curb and gutter and streets shall be 10.0%.

### 13.020. ADA Requirements.

All pedestrian facilities will conform to the current Federal ADA Standards. Plastic inserts required per ADA mandate shall be yellow in color.

### 13.030. Base Material.

There shall be a minimum of 6" compacted crushed gravel road base under all concrete for public use, and extend 6ö past concrete both sides. If placing on embankment compacted engineer fill to extend 12ö both sides.

### 13.040. Testing and Inspection.

- A) Scope. All materials and processes involved in the construction shall be subject to testing and inspection as detailed in the various paragraphs of this section and in general compliance with ASTM E105-54T. Results of tests performed by recognized laboratories to the satisfaction of the Engineer shall be accepted by the supplier as a basis for acceptance or rejection of any and all materials. Standard Methods of sampling and testing shall be used. 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.
- B) Concrete. Where required by the Engineer,

samples of concrete will be tested to insure quality concrete. The City Engineer or his/her designee will take at least once for these tests every fifty cubic yards of concrete poured or as required.

- 1. Samples of wet concrete may be tested for air content. Failure to indicate the entrained air specified in this section shall be a basis for rejection of all concrete represented by the test.
- 2. Samples of wet concrete may be tested for slump. Failure to indicate the required slump shall be a basis for rejection of all concrete represented by the test.
- 3. Concrete compression specimens shall be taken for each pour of section as required by the Engineer. Such specimens shall attain the specified strength of twenty-eight (28) days with the provision that no specimen may indicate a compressive strength of less than ninety percent (90%) of the strengths nominated and with further provision that results from specimens which, in the opinion of the testing authority and the Engineer, are obviously faulty or defective may be rejected in determining the requirements. Should any specimens fail to satisfy these requirements, the concrete represented thereby shall be removed and replaced, except that the contractor may submit evidence based on ASTM designation C42-49 which shall be considered by the Engineer in relation to this requirement.

- C) Flow Tests. All curb and gutter and cross-gutters will have a flow test prior to final inspection to determine any low or high spots. (The City will be present.)
- D) All forms or string lines must be inspected by City of Eagle Mountain before concrete may be poured.

### 13.050. Cold Weather Concrete.

Concrete shall not be placed when a descending air temperature in the shade and away from artificial heat falls below 35°F. Concrete shall not be poured on frozen ground. Where high temperatures are likely to descend below 32°F, concrete shall be covered or otherwise protected against freezing. The City Engineer must approve the method by which the concrete is covered or protected. Admixtures other than calcium chloride may be added upon approval of the City Engineer.

### 13.060. Clean Gutter.

Once curb and gutter and surface course is in place they shall be kept as clean as possible. When equipment is required to cross over sidewalk, bridging will be provided to protect concrete. Dirt and gravel will not be placed in gutter or on street. Gutter will flow freely at all times.

**13.070. Drive Approaches.**

All concrete for a drive approach shall be six (6) inches thick in the public right-of-way with six (6) inches of gravel base compacted to 95 percent density.

**13.080. Asphalt Trails.**

Asphalt trails shall be 10 feet wide along pedestrian corridors or unless otherwise approved by the City Council. Asphalt trails shall consist of 6 inches of base and 3 inches of asphalt and shall be placed on undisturbed native material or documented fill material properly compacted. Base shall extend past trail edges 6ö both sides.

## Chapter 14 Hillside Site Development.

- 16.010. Average Slope-Definition.
- 16.020. Certified Report Required.
- 16.030 Certified Report Specifications.
- 16.040. Liability.
- 16.050. Retaining Walls.

### 16.010. Average Slope-Definition.

For the purpose of this chapter, the definition of "average" slope shall be as follows: The average slope of the parcel of land or any portion thereof shall be computed by applying the formula,

$$S = \frac{0.00229 \quad I L}{A}$$

to the natural slope of the land before any grading is commenced, as determined from a topographic map having a scale of not less than one inch equals 100 feet and a contour interval of not less than 5 feet, where:

- 0.00229 = A conversion factor of square feet to acres
- S = Average percent slope
- I = Contour interval, in feet
- L = Summation of the length of contour lines, in feet within the subject parcel
- A = Areas in acre of the parcel being considered.

### 16.020. Certified Report Required.

It shall be unlawful for the owner, developer, or any contractor or other person to excavate, grade, level, or build upon any lot or property within the City when the average slope of the lot exceeds twenty-five (25) percent. Building within 200 feet of slopes in excess of 25% will require a slope stability report to address the potential for landslides. Such report must be reviewed and approved by the City Engineer or his/her designee. Each lot within a hillside development shall indicate a proposed building envelope and driveway location. The lot width shall be such that the maximum twelve (12) percent driveway shall not be exceeded, unless a steeper driveway is approved by both the City Engineer or his/her representative and the Building Department based on specific design considerations such a southern facing or heated driveway. Nor shall any person grade, level, or improve in any manner any parcel of land which is crossed by a natural or manmade water course or existing utility, before such person has submitted to the City Engineer a certified report from a qualified civil Engineer licensed in the State of Utah containing the information set forth in the following section.

The certified report required in the previous section shall contain at least the following information:

- A) A plat of the property showing the following:
  1. Contour lines at five (5) foot intervals. Existing contours shall be indicated by dashed lines and proposed contours by solid lines;
  2. Elevations at the corners of foundations and at the corners of driveways; and
  3. Show or reference any existing or potential groundwater flows which may cause unstable conditions such as debris flow or slides.
- B) Assessment of the civil Engineer as to the seriousness of any development problems such as erosion, drainage, flood and geologic hazards or unstable soil conditions and their potential effect on adjoining properties and on any proposed improvements to be built on the property.
- C) The proposed method for handling the problems noted in "B" above.

### 16.040. Liability.

The purpose of this chapter is to point out to the owner and/or developer of any property that the liability and responsibility of such persons to protect the integrity of their own and adjoining properties, existing water courses and utilities lies upon the person doing the development and upon the owner of the property being developed and not upon the City or any other person. The City may require additional information on any development or building which may have potential hazards.

### 16.050. Retaining Walls.

Retaining walls shall not be built over or adjacent to city utilities. Retaining walls shall not be allowed in public utility easements. Retaining walls shall be subject to a maximum height of 5 feet or be certified by a qualified engineer to be submitted and approved by the City Engineer or his/her designee.

## **Chapter 15 Surface Irrigation Systems.**

### **15.010. General.**

#### *15.010. General.*

Specifications for surface and drip irrigation systems, including drip irrigation for xeriscape areas, included as a part of City owned open space, trails, park strips, etc., shall conform with the APWA Standards and Specifications, and the Eagle Mountain City Landscape Construction Standards.