



FRUIT HEIGHTS CITY PUBLIC HEARING NOTICE

NOTICE IS HEREBY GIVEN that the Fruit Heights Planning Commission will hold a Public Hearing on Tuesday, April 30, 2024, at 7:00 pm in the Council Chambers of City Hall located at 910 S. Mountain Road, Fruit Heights, Utah, 84037.

PUBLIC HEARING FOR THE FOLLOWING:

- Update to Fruit Heights City Public Works Standards.

See more information on the pages below.

DEVELOPMENT, DESIGN, AND
CONSTRUCTION STANDARDS
for
FRUIT HEIGHTS CITY



SUBMITTED & RECOMMENDED:

Zac Burk, P.E.
City Engineer

Date

APPROVED:

John Pohlman
Mayor

Date

Darren Frandsen
City Manager

Date

Jeff Oyler
City Planner

Date

Layne Leonard
Public Works Director

Date

Attest, City Treasurer

Date

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SECTION 1 GENERAL

1.01 Applicability

These Development, Design, and Construction Standards are applicable to any land use application, all work within the public-right-of-way, and all city capital improvement projects.

1.02 Fruit Heights City Municipal Code Governs

Nothing in this document shall be construed to be contrary to Fruit Heights City Municipal Code. Should a conflict exist between this document and the Ordinances, the Code shall govern.

1.03 Conformance with Federal, State, and Local Laws

These Development, Design, and Construction Standards are applicable to any land use application, all work within the public-right-of-way, and all city capital improvement projects.

1.04 Definitions

- A. Contractor – The individual, firm, co-partnership, or corporation, and his, their, or its heirs, executors, administrators, successors, and assigns, or the lawful agent of any such individual firm, partnership, covenantor, or corporation, or his, their, or its surety under the contract bond, constituting one of the principals to the contract and undertaking to perform the Work.
- B. Drawings – The City-approved construction drawings, the Fruit Heights City Public Works Standard Drawings, and/or the Manual of Standard Drawings, as applicable.
- C. Developer – The person sponsoring construction of the improvements.
- D. Development – The subject subdivision, minor subdivision, or building.
- E. Improvements – See “Work.”
- F. Improvement Plans – See “Drawings.”
- G. Inspector – The authorized representative of the City or City Engineer assigned to make all necessary inspections of the Work performed or being performed, or of materials furnished or being furnished by the Contractor.
- H. Work – All types of work necessary to provide safe access and utility service to and within proposed subdivision or site, including, but not limited to, site grading, utility installation, and street construction. Work includes all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning.¹

¹ From EJCDC® C-700, Standard General Conditions of the Construction Contract.

- I. See also the Fruit Heights City Municipal Code. Where definition conflicts arise between City Ordinance and this document, the definitions in this document shall take precedence when in reference to this document.

1.05 Acronyms

- A. ALUA – Administrative Land Use Authority
- B. APWA – American Public Works Association
- C. AWWA – American Water Works Association
- D. BMP – Best Management Practice
- E. CFP – Capital Facilities Plan
- F. DDW – Division of Drinking Water
- G. DWQ – Division of Water Quality
- H. DWRi – Division of Water Rights
- I. FEMA – Federal Emergency Management Agency
- J. HOA – Homeowners’ Association
- K. IFC – International Fire Code
- L. LID – Low Impact Development
- M. RCP – Reinforced Concrete Pipe
- N. FHC – Fruit Heights City
- O. UAC – Utah Administrative Code
- P. UDEQ – Utah Department of Environmental Quality
- Q. UDOT – Utah Department of Transportation
- R. UPDES – Utah Pollutant Discharge Elimination System
- S. USACE – United States Army Corps of Engineers

1.06 Modification Process

- A. Whenever, in the opinion of the City Public Works Department, the City Engineer, or the Superintendent having jurisdiction, a literal enforcement of these regulations may work an undue hardship or a literal enforcement of the provisions may be unnecessary to meet the goals and standards of the City, the City may modify those standards in the following manner:
 - 1. Modifications may be granted when there are practical difficulties involving carrying out the provisions of the Public Works Standards and Technical Specifications, and a panel consisting of the City Planner, City Engineer, and the Public Works Director or his Representative determine that granting of a modification for an individual case will

meet the goals and requirements of the City without unduly jeopardizing the public and the individual's interest.

2. The City shall first receive a written request for a modification to the standards from any interested party.
3. Upon receipt of the request, the panel of three discussed above shall find that a special individual reason makes the strict letter of the standard impractical and shall find the modification is in conformance with the intent and purpose of the standards and shall find that such modification does not in any way lessen the integrity of the standards.
4. When such findings of fact are made, the panel may grant such modification as it deems appropriate. The details of any action granted as modification by this panel shall be recorded and entered in the files of the City, with the specific reasons for the granting of said modification.

SECTION 2 DEVELOPMENT STANDARDS

2.01 Approval Procedure

See Title 11 – Subdivision Regulations of the Fruit Heights City Municipal Code

2.02 Developer Responsibilities

A. Required Improvements and Guarantees – see Title 11 of Fruit Heights City Municipal Code.

B. Permits and Approvals

1. Developer is responsible for obtaining all necessary permits and approvals for the construction of the Improvements. Copies of all applications and approved permits shall be submitted to the City. Agencies/permits that may be required include, but are not limited to:
 - a. DDW Plan Approval (pre-construction)
 - b. DDW Operating Permit (post-construction)
 - c. UPDES NOI and NOT
 - d. DWRi Stream Alteration
 - e. DWRi Dam Safety
 - f. EPA 404 Wetlands
 - g. FEMA CLOMA and/or CLOMR
 - h. UDOT
 - i. UTA
 - j. Others as applicable

C. Improvements

1. The required improvements shall include all street improvements in front of each lot abutting dedicated streets to a connection with existing improvements of the same kind or to the boundary or the subdivision nearest existing improvements. Design 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.
2. Upsizing based on CFPs – The Developer will be required to construct/install infrastructure sized in accordance with the City’s currently adopted CFPs. The City may be responsible for paying the difference in cost between the master planned infrastructure size and the minimum infrastructure size required for the development.
3. Seal Coat / Chip Seal - The Developer is responsible to pay for the seal coat / chip seal, but the City is responsible for the timing and installation of the seal coat / chip seal.

4. Street Lighting – The Developer is responsible to pay for, install, and supply power to the required street lighting.
 5. Street Signage – The Developer is responsible for paying for the required street signs. The City is responsible for ordering the signs. The Developer is required to install the street signs.
- D. Materials and Construction Testing - Developer shall be responsible for materials and construction testing in accordance with the applicable specification(s). Testing must be performed by a properly licensed and qualified testing agency. The results shall be provided to the City’s inspector.
 - E. Mapping of New Improvements – Developer shall reimburse City for time spent completing field surveying and the mapping of new improvement locations into the City’s GIS database.
 - F. Survey of Existing Improvements – Developer shall reimburse City for City Engineer’s time spent surveying in locations of new improvements. This does not include the marking or placing of survey monuments.

2.03 Subdivision Standards

- A. The general standards for subdivision layout and development are found in Title 11 – Subdivision Regulations.
- B. See also Section 3 – Design Standards and Section 4 – Construction Standards of this document.

2.04 Traffic Impact Study

- A. A traffic impact study shall be conducted for the following:
 1. See Appendix B, Traffic Impact Study Minimum Requirements, Section B3, Level of Study.
 2. The study shall be complete in nature, and its findings shall be summarized in a Traffic Impact Study Report. The Traffic Impact Study Report shall be signed and sealed by a licensed Professional Engineer with expertise in the field of traffic engineering.
- B. See Appendix B for requirements regarding the Traffic Impact Study Report.

SECTION 3 DESIGN STANDARDS

3.01 Required Improvements

- A. See Title 11 Chapter 6 for information on the required improvements.
- B. See also Section 5 – Technical Specifications and Section 6 – Standard Drawings, Plans, and Details of this document for additional information.

3.02 Improvement Plans

- A. Complete and detailed, and signed and sealed (in accordance with Utah Code 58-22-602, as amended) construction plans and drawings of improvements shall be submitted to the City for the review by the ALUA prior to receiving final plat approval and prior to commencing construction.
- B. No construction shall begin until plans have been checked, received final land use approval, and a preconstruction meeting has been held.
- C. The Engineer of Record must provide a written certification (signed and dated), to be included on the final improvement plans, that states the following:
 - 1. As the Engineer-of-Record, I hereby certify that to the best of my knowledge these construction plans and supporting documentation (Plans) comply with the City Code, Public Works Standards, local, State, and Federal regulations, and general engineering practices (Standards). I understand and agree that:
 - a. The City's acknowledgment of these Plans shall not be construed to be a permit for, or an approval of, any variance from any provisions of the Standards.
 - b. Any communication from the City giving feedback on the Plans shall be construed as feedback only and shall not be interpreted as authorization to vary from or cancel the provisions of the Standards.
 - c. The City's acknowledgment of these Plans, or feedback from the City on whether the Plans meet the Standards, shall not prevent the City from requiring the correction of errors in the Plans at any time, including during the construction of improvements.
 - d. Any exceptions to the Standards granted by the appropriate governing agency have been provided in writing to the City.
- D. The following instructions are for the purpose of standardizing the preparation of drawings to obtain uniformity in appearance, clarity, size, and style. The plans and designs shall meet the standards defined in the specifications and drawings hereinafter outlined. The minimum information required on the drawings for improvements is as follows:
 - 1. All drawings and/or prints shall be clear and legible and conform to industry standard engineering and drafting practices.

2. Drawings shall be legible and to a common scale when printed on 11"x17" paper.
3. Both plan view and centerline profile must be shown. On subdivisions along steep cross slopes, profiles for each side of the street may be required to be shown.
4. Plan and profiles shall indicate design and/or existing grades a minimum of 200 feet beyond the limits of the proposed project.
5. All wet utilities (water, sewer, storm drain, irrigation) shall be shown in plan and profiles views.
6. Each set of plans shall be accompanied by a separate sheet of details for special structures which are to be constructed and are not covered by the City Standards. All structures shall be designed in accordance with the minimum Fruit Heights City Standards and approved by the ALUA.
7. Separate drawings of elements of the City Standards shall not be required to be redrawn and submitted with the construction drawings unless specific deviations from the standards are requested for approval; however, the construction drawings shall refer to the specific items of the Standards that are to be incorporated into the Work.
8. The plan and profile construction plans shall be submitted in portable document format ("pdf"). Upon approval, the developer's engineer shall provide the City Engineer with electronic files of the final plat and improvement plans in AutoCAD or other City Engineer approved format. A hard copy of the approved construction plans bearing the signature of the City Engineer shall be kept available at the construction site. Prior to final acceptance by the City, the developer, developer's representative, contractor, or project engineer shall submit to the City Engineer a set of "as built" drawings for permanent City file record.
 - a. All changes shall be clouded and documented.

3.03 Sanitary Sewer Design (Central Davis Sewer District Standards)

- A. Collection lines shall be located in public rights-of-way or private road rights-of-way, as approved. Collection lines shall not be located on private property (easements) without the express written permission from the City. If such case is granted, easement shall be a minimum of 20' and shall be dedicated to the City of Fruit Heights or Central Davis Sewer District as the case may be.

3.04 Water Design

- A. All design shall be in accordance with UAC R309, as amended and AWWA Standards.
- B. Valves are required on all branches of tees and crosses. Isolation valves shall be located at intervals of not more than one block or 800 feet [UAC R309-550-5(8), as amended].
- C. At dead end lines, including temporary dead ends, provide fire hydrant at termination point.

- D. All fire lines shall meet the IFC and Public Works Standards and Technical Specifications, but shall remain privately owned and maintained.
- E. Fire hydrants
 - 1. Fire hydrants are to be installed in locations as required by the IFC and approved by the Fire District and the City, with a maximum spacing of 500-ft.
 - 2. Fire hydrants shall not be located within 10-ft of any sanitary sewer line or manhole.
 - 3. Fire hydrants must maintain a 5-ft minimum clearance from an adjacent proposed or existing improvement (e.g. mailbox, streetlight, fencing, etc.)
- F. When crossing a stream or other body of water the design must comply with UAC R309-550-8(8) Surface Water Crossings, as amended.

3.05 Street/Road Design

- A. Streets shall be designed in accordance with these Standards, standard engineering practices, and AASHTO and MUTCD guidelines.
- B. Local (residential) streets shall have not less than 333-ft radius curves.²
- C. No changes of grade in excess of 1.5% shall be permitted without a vertical curve.
- D. Sight triangles, in accordance with AASHTO requirements, shall be shown as required in the Drawings.
- E. Horizontal points of curvature shall not be located closer than 150-ft from the center of an intersection.
- F. Intersections
 - 1. Roadway centerlines shall intersect at 90-degrees. Where a 90—degree angle is not feasible, the intersection angle may be reduced to as low as 80-degrees with the City Engineer’s concurrence. In no case shall the angle be less than 80-degrees.
 - 2. Intersections shall be no closer than 500-ft to one another, as measured from centerline to centerline.
- G. Cul-de-Sacs
 - 1. Length of cul-de-sac shall not exceed 600-ft (as measured from the cul-de-sac center monument to the closest intersecting street centerline monument) as shown in the Standard Drawings.
- H. Pavement / Pavement Section
 - 1. Developments
 - a. Pavement section shall comply with the Standard Drawings.

² AASHTO A Policy on Geometric Design of Highways and Streets (2018): Table 3-13, 30mph, $e = -2.0\%$.

2. City Projects
 - a. Pavement section shall be included in the Project Plans.
 3. See Standard Drawings for minimum pavement section and notes.
 4. Both Development and City Projects must meet the minimum pavement section thicknesses. Where geotechnical pavement design thicknesses exceed the standard minimums, the geotechnical pavement design thicknesses shall govern.
- I. Temporary Turnarounds
1. When turnaround cannot be constructed outside of subdivision, it shall be located on a portion of the subdivision lots as required in the Drawings.
 2. The lot(s) on which the turnaround is constructed shall be restricted as follows:
 - a. Platted as “R” (restricted lot).
 - b. This lot cannot be sold or building permits issued until the road is extended beyond the subdivision boundary, complete with curb, gutter, and sidewalk.
 3. Drainage onto adjacent property must be by written approval (easement) of adjacent property owner.
- J. Landscaping
1. When landscaping is required to be designed/installed, refer to the Standard Drawings.
- K. UDOT
1. Roadway intersections with UDOT controlled streets shall be in accordance with UDOT Standards. A copy of the approved UDOT Access Permit shall be submitted to the City.
- L. Street Amenities
1. Streetlights (see Drawings) shall be installed at intersections, curves, overpasses, or as deemed necessary by the City.
 2. Signs and traffic safety devices shall be placed as required by the City.
- 3.06 Storm Drain Design**
- A. See Appendix A for Storm Drain and Drainage Design Standards.
 - B. Low Impact Development (See Appendix A).
 - C. 80th Percentile Storm Retention (See Appendix A).

SECTION 4 CONSTRUCTION STANDARDS

4.01 General Policies

A. General Conditions

1. Permit/License: When the work is in progress, Contractor shall have at the work site a copy of the permit and his contractor's license number.
2. Private access: Temporary all-weather roadways, driveways, walks, and rights-of-way for vehicles and pedestrians shall be constructed and continuously maintained where required.
3. Street excavation in winter: Excavation of City streets during the winter months (herein defined as November 1st to April 1st) will be allowed only if the work is a new service connection, required maintenance or emergency, or otherwise approved by the Public Works Department. Permanent patching of City streets excavated in the winter may be delayed until April 1 with the following provisions: Within five working days from the completion of the excavation, the permittee provide/maintain a minimum of 1-1/2" thick temporary winter asphalt surface until such time as the permanent asphalt surface is installed; the permittee shall provide/maintain a temporary untreated base course surface until such time as the temporary winter asphalt surface is installed. These provisions apply regardless of whether the permittee or City crews are performing the permanent resurfacing.
4. Existing utilities: All projects shall be "Blue Staked" prior to construction. The contractor shall use extreme caution to avoid a conflict, contact, or damage to existing utilities, such as power lines, sewer lines, storm drains, street lights, telephone lines, cable television lines, water lines, gas lines, poles, or other appurtenances during the course of construction of this project. Any such conflict, contact, or damage shall be immediately communicated to said utility company and the Public Works Department.
5. Preconstruction pictures of existing public way improvements: The permittee may secure pictures of the conditions of the existing public way improvements such as curbing, sidewalk, landscaping, asphalt surfaces, etc. In the event that public way improvements are damaged and no pictures are taken, the Public Works Department will assume the correction of the damage is the responsibility of the permittee.

B. Licensing

1. Contractor (including all sub-contractors) must be licensed with the State of Utah: It is the policy of Fruit Heights City that contractors desiring to perform work in the City's public way shall be properly licensed in the State of Utah, as required by the UAC R156-55a, as amended (Utah Construction Trades Licensing Act Rule).

2. Exceptions: A license shall not be required by the City when the permittee is a public utility company. However, subcontractors for utility companies shall have a valid contractor's license.

C. Permits

Developer/Contractor is responsible for obtaining all necessary permits for the construction of the Improvements prior to commencement of said Improvements. Agencies/permits required may include, but are not limited to:

1. Encroachment (City)

- a. Fruit Heights City's Department of Public Works issues permits to control any excavation and construction operations in the public right-of-way. All contractors, sub-contractors, and utility companies proposing to construct, repair, or replace any facility within the public right-of-way shall contact the Fruit Heights City Public Works Department and complete all permit requirements prior to commencing proposed work.
- b. Work by utility companies and their contractors in constructing facilities in new subdivision streets shall be required to post a bond with the City and will be subject to City inspection and compliance with all requirements.
- c. Emergency Work
 - (i) Maintenance of pipelines or facilities in the public way may proceed without a permit when emergency circumstances demand the work be done immediately provided a permit could not reasonably and practicably have been obtained beforehand.
 - (ii) In the event that emergency work is commenced on or within any public way of the City, the Public Works Department shall be notified within one-half hour when the work commences or as soon as possible from the time the work is commenced. Contact shall be made to the City's "on call" personnel. ~~If emergency work is commenced during off business hours,~~ The Public Works Department will be notified within one (1) hour of the start of work on the first regular business day of which City offices are open after such work commences, and, at the discretion of the Public Works Department, a permit may be issued which shall be retroactive to the date when the work was begun. Before commencing the emergency work, all necessary safety precautions for the protection of the public and the direction and control of traffic shall be taken. None of the provisions of these regulations are waived for emergency situations except for the prior permit requirement.
- d. Enforcement: Violators of these regulations of working within the Public Way shall be subject to the provisions of the applicable Fruit Heights City Municipal Code.

2. USACE/DWRi Stream Alteration – Stream Alteration
 3. UPDES
 4. Dam Safety (DWRi)
 5. UDOT
 6. Davis County Surveyor's Monument
- D. Excavation Operations
1. Blue Stakes: Before commencing excavation operations, the permittee shall call "Blue Stakes" at 811.
 2. Traffic control devices: Traffic control devices such as construction signs, barricades, and cones must be in place before excavation begins.
 3. Protection of paved surfaces outside of excavation area: In order to avoid unnecessary damage to paved surfaces, backhoes, outriggers, tracked equipment, or any other construction equipment that may prove damaging to asphalt shall use rubber cleats or paving pads when operating on or crossing said surfaces.
 4. Open trench limits: Open trenches will be limited to one block at a time or 660 feet, whichever is less.
 5. In the event of a planned road closure, Contractor shall notify the City, Fire Department, emergency services dispatch, US Postal Service, and Davis School District a minimum of 24 hours prior to the closure. In the case of an emergency, the above-listed agencies will soon be notified at the soonest possible time.
- E. Environmental Controls
1. Dust and debris: The permittee or contractor shall keep dust and debris controlled at the work site at all times. If necessary, a container shall be provided for debris and dusty areas shall be wet down. The permittee or contractor shall be responsible for the cleanup of mud or debris from public roads deposited by vehicles or construction equipment exiting the work site. The City Public Works Department reserves the right to shut down the work or issue a citation if dust is not controlled.
 2. Noise: The permittee or contractor shall keep neighborhood free of noise nuisance in accordance with the Noise Ordinance.
- F. Cleanup: The permittee or contractor shall remove all equipment, material, barricades, and similar items from the right-of-way. Areas used for storage of excavated material will be smoothed and returned to their original contour. Vacuum sweeping or hand sweeping shall be required when the Public Works Department determines cleaning equipment is ineffective.

- G. Storm Water: All Contractors working within the boundaries of Fruit Heights City shall conform to all requirements and regulations as outlined by the Fruit Heights City Storm Water Management Plan. Copies of the plan are available on the City's website.

4.02 Pre-Construction Meeting

- A. The pre-construction conference shall not be held until the ALUA has approved and signed the construction plans.
- B. A preconstruction conference shall be held before any excavation or other work is begun in the subdivision or Project. The meeting may include, but is not limited to the following:
 - 1. Public Works Director
 - 2. City Engineer or Project Manager
 - 3. Developer or Project Manager
 - 4. Subdivision or Project Engineer
 - 5. All contractors and subcontractors involved with installing the subdivision or project improvements (license verification provided prior to meeting)
 - 6. Representatives of affected Fruit Heights City Departments
 - 7. Representatives of local utility companies (as may be required by the City).
- C. Items pertaining to the construction and inspection of the subdivision or Project improvements will be discussed.

4.03 Construction

- A. Specifications
 - 1. Contractor shall be responsible for constructing all improvements in accordance with the Technical Specifications, per Section 5 of this document.
 - 2. No deviation will be allowed unless reviewed and authorized by the City on a case-by-case basis.
- B. Plans and Details
 - 1. Contractor shall be responsible for constructing all improvements in accordance with the Drawings, Plans, and Details, per Section 6 of this document.
 - 2. No deviation will be allowed unless reviewed and authorized by the City on a case-by-case basis.
 - 3. In the event that as-built conditions of the improvements are found to be out of compliance with the approved improvement plans and tolerances contained in these Standards, it shall be the contractor's responsibility to remove those improvements and replace them with improvements that comply with the approved improvement plans

and are within the given tolerances. Adjacent improvements may also require replacement to bring all improvements into compliance.

C. Sequence/Timing

1. All underground utility work shall be completed prior to placement and compaction of the roadway base course. Utilities, including service lines, not installed prior to roadway construction shall be bored as approved by the Public Works Department.
2. All concrete collars shall be installed within fourteen (14) days of asphalt placement.

D. Inspection

1. All construction work involving the installation of improvements in the subdivision or project shall be subject to inspection by the City. It shall be the responsibility of the person responsible for construction to ensure that inspections take place where and when required. Certain types of construction shall have continuous inspection, while others may have only periodic inspections.
2. Requests for Inspections
 - a. Requests for inspections shall be made to the Public Works Department by the person responsible for the construction.
 - b. Requests for inspection on work requiring continuous inspection shall be made three (3) working days prior to the commencing of the work.
 - c. Notice shall also be given one (1) day in advance of the start of work requiring periodic inspection, unless specific approval is given otherwise by the City Engineer, or his duly authorized representatives.
3. Continuous Inspection
 - a. May be required on (but not limited to) the following types of work:
 - (i) Laying of street surfacing
 - (ii) Placing of concrete for curb and gutter, sidewalks, and other structures
 - (iii) Laying of sewer pipe, irrigation pipe, drainage pipe, water mains, water service laterals and testing.
 - (iv) On construction requiring continuous inspection, no work shall be done except in the presence or by permission of the City Engineer or authorized city representative.
4. Periodic inspections
 - a. Shall be required on (but not limited to) the following types of work:
 - (i) Street grading and gravel base
 - (ii) Excavations for curb and gutter and sidewalks

- (iii) Excavations for structures
- (iv) Trenches for laying pipe
- (v) Forms for curb and gutter, sidewalks and structures

5. Substantial and Final Completion Inspections

- a. A substantial completion inspection shall be requested by the Contractor and made by the City Engineer or authorized representative after all construction work is completed. Any faulty or defective work shall be corrected by the persons responsible for the work within a period of thirty (30) days of the date of the City Engineer's or authorized representative's Punchlist defining the faulty or defective work.
- b. A final completion inspection shall be requested by the Contractor and made by the City Engineer or authorized representative after all faulty and defective work has been corrected.

E. Testing

1. Development Projects

- a. Developer/Contractor shall be responsible for all testing in accordance with the Technical Specifications per Section 5 of this document.
- b. Testing shall be performed by a licensed and qualified testing firm. Contractor shall submit qualifications to City for approval of firm prior to beginning Work.
- c. Testing reports shall be submitted to City weekly for review. Areas with failed tests shall be corrected and retested.
- d. Failure to submit testing reports to the City shall be cause for work stoppage or rejection by City.

2. City Projects

- a. Contractor shall select a properly licensed and qualified testing agency.
- b. Contractor shall be responsible for coordinating all testing in accordance with the Technical Specifications per Section 5 of this document and the Project Manual.
- c. Testing reports shall be submitted to City weekly for review. Areas with failed tests shall be corrected and retested. Contractor may be required to pay for retesting.
- d. Failure to have improvements tested as they are constructed may be cause for work stoppage or rejection by City.

F. Safety

- 1. Contractor is solely responsible for jobsite safety.

2. Contractor shall comply with all local, state, and federal rules and regulations regarding jobsite safety.
3. City and/or its authorized representatives shall have the authority to shut down a job when unsafe working conditions are found.

SECTION 5 TECHNICAL SPECIFICATIONS

5.01 Technical Specifications for Fruit Heights City

- A. Adoption of Divisions 01 through 34 of the Manual of Standard Specifications, as published by Utah LTAP Center, Utah State University, Logan, Utah, current edition, with all published amendments.
- B. Modifications and Additions to Manual of Standard Specifications (see Appendix C)

5.02 Order of Precedence

- A. Approved project-specific specifications (when applicable)
- B. Modifications and Additions to Manual of Standard Specifications
- C. Manual of Standard Specifications, current edition, with all published amendments

SECTION 6 STANDARD DRAWINGS, PLANS, AND DETAILS

6.01 Standard Drawings, Plans, and Details for Fruit Heights City

- A. Fruit Heights City Public Works Standard Drawings, current edition (See Appendix D)
- B. Adoption of Manual of Standard Plans, published by Utah LTAP Center, Utah State University, Logan, Utah, current edition, with all published amendments.

6.02 Order of Precedence – City Projects

- A. Approved project-specific drawings and details (when applicable)
- B. Fruit Heights City Public Works Standard Drawings, current edition
- C. Manual of Standard Plans, current edition, with all published amendments, when not covered by one of the aforementioned items

6.03 Order of Precedence – Development Projects

- A. Fruit Heights City Public Works Standard Drawings, current edition
- B. Manual of Standard Plans, current edition, with all published amendments, when not covered by one of the aforementioned items.
- C. Final Land Use Approval Specific Drawings and Details

APPENDIX A – STORM DRAIN AND DRAINAGE DESIGN STANDARDS

APPENDIX A

STORM DRAIN AND DRAINAGE DESIGN STANDARDS

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EXHIBITS

1. NOAA Point Precipitation Frequency Estimates – Intensity
2. NOAA Point Precipitation Frequency Estimates – Depth
3. Summary of Allowable LID BMPs

A1. General Provisions

- A. This document represents the reporting, design and construction standards for private and public design and construction as it relates to storm drainage within the City.
- B. A Storm Water Report is required for all new development and redevelopment projects.
- C. Implementation of LID measures and 80th percentile storm retention does not reduce or eliminate the requirement for detention/retention as contained in this document but may be included within the designed detention/retention volumes calculated.

A2. Definitions and Acronyms

The following terms shall be defined as follows in this document related to storm water:

- A. 80th Percentile Storm – The rainfall event whose precipitation total is greater than or equal to 80 percent of all storm events over a given period of record.
- B. Best Management Practices (BMPs) – Construction practices and control measures necessary to protect against pollution generated by construction sites.
- C. Common Plan of Development – "Common plan of development or sale" means one plan for development or sale, separate parts of which are related by any announcement, piece of documentation (including a sign, public notice or hearing, sales pitch, advertisement, drawing, plat, blueprint, contract, permit application, zoning request, computer design, etc.), physical demarcation (including contracts) that identify the scope of the project. A plan may still be a common plan of development or sale even if it is taking place in separate stages or phases, is planned in combination with other construction activities, or is implemented by different owners or operators.¹ Common plans of development may be residential, commercial, or industrial in nature.
- D. Detention Basin – A water storage pond designed to store a volume of water that reduces the post-development peak runoff of a storm to the pre-development runoff rate or other rate as defined by the governing body. This is accomplished by the use of an outlet which controls the rate of flow out of the pond into the receiving storm drain or water body. Detention ponds contain an inlet, outlet, and spillway; the inlet and outlet may be one and the same. The detention basin is intended to drain the storm water within a period of time to make the volume available for the next storm event.
- E. Development – Any man-made change to unimproved land, including but not limited to site preparation, excavation, filling, grading, paving, and construction of buildings or other structures.

¹ General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s); State of Utah Department of Environmental Quality, Division of Water Quality; August 16, 2023.

- F. Disturb – To alter the physical condition, natural terrain or vegetation of land by clearing, grubbing, grading, excavating, filling, building or other construction activity.
- G. Drain Inlet – A point of entry into a sump, storm water basin, or storm drain system.
- H. Drinking Water Source Protection Zone – Zones determined by geo-hydrology designed to protect groundwater aquifers of a well in a culinary water system.
- I. DWQ – Acronym for Division of Water Quality, a division of the UDEQ.
- J. Freeboard – The vertical distance between the emergency spillway and the top of the basin embankment.
- K. General Permit for discharges from MS4 (Permit) – Authorization for a municipal separate storm sewer system to discharge storm water into waters of the United States.
- L. Hardscape – Generally impervious areas, typically streets, sidewalks, driveways, parking areas, and roofs.
- M. Infiltration – The movement of water through the soil surface and into the soil;² the movement of water downward from the ground surface through the upper soil.³
- N. Infiltration Rate – The rate at which water enters the soils during a storm.²
- O. Infiltration System (storm water) – A system which is designed to return storm water runoff into an underground aquifer.
 - 1. Bioretention facilities, rain gardens, and tree boxes that are designed to slow down and hold storm water runoff for biological treatment and use by vegetative uptake are not considered to be infiltration systems if they are not isolated from groundwater. Groundwater isolation may be achieved with impermeable liners or an underdrain that does not discharge into a dug, bored, drilled or driven well, improved sinkhole or other subsurface fluid distribution system.
 - 2. The discharge of storm water piping below grade for the purpose of infiltration is considered a Class V injection well facility.
- P. Injection Well, Class V – As defined in UAC R317-7-2, as amended:
 - 1. A bored, drilled, or driven shaft whose depth is greater than its largest surface dimension, OR
 - 2. A dug hole whose depth is greater than its largest surface dimension, OR
 - 3. An improved sinkhole, OR
 - 4. A subsurface fluid distribution system.

² Linsley/Franzini/Freyberg/Tchobanglous. (1992). *Water Resources Engineering and Environmental Engineering*. New York: McGraw-Hill Inc.

³ Lindeburg. (2003). *Civil Engineering Reference Manual*. Belmont, CA: Professional Publications, Inc.

- Q. Low Impact Development (LID) – An approach to land development (or re-development) that works with nature to more closely mimic pre-development hydrologic functions, reduces or minimizes the quantity of storm water runoff, and protects or improves water quality in receiving water bodies.
- R. LID Analysis and Report – A written analysis of a development or redevelopment site that (1) identifies appropriate methods to reduce storm water runoff, (2) identifies the pollutants to target for each drainage area, and (3) selects appropriate structural controls to implement on the site.
- S. Municipal Separate Storm Sewer System (MS4) – The storm water conveyance system owned by the City which includes streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains. For a full definition, see UAC 317-8.
- T. Outlet – The discharge mechanism of a detention basin, typically a pipe containing a head gate or orifice to control the release of water out of the basin.
- U. Percolation – The movement of water through the subsurface soil layers, usually continuing downward to the groundwater table,³ measured by a Standard Percolation Test in units of minutes per inch.
- V. Pollutant – Chemicals, sediment, trash, disease-carrying organisms, and other contaminants picked up by storm water which is conveyed into rivers, streams, and other water bodies.
- W. Redevelopment – Alteration of a property that change the footprint of a site or building.
- X. Retention Basin – A water storage pond designed to store the runoff volume of a storm and dispose of water through percolation, infiltration, and evaporation within a period of time to make the volume available for the next storm event. A retention basin contains an inlet and spillway, but no structural outlet.
- Y. Softscape – Generally pervious areas, such as native vegetation and landscaped areas.
- Z. Spillway, Emergency – A storm drain basin feature that controls and guides storm water as it spills over the basin's embankment.
- AA. Spillway, Internal – A storm drain basin feature that allows excess water to leave the basin through discharge piping which is set at an elevation below the emergency spillway.
- BB. Storm Drain System – The system of conveyances (including but not limited to catch basins, detention basins, retention basins, infiltration galleries, curbs, gutters, ditches, cross drains, roads, man-made channels, sumps, pipes, etc.) owned and operated by the City, which is designed and used for collecting and/or conveying storm water.
- CC. Storm Water Pollution Prevention Plan (SWPPP) – A written plan that evaluates and minimizes the impact of pollutants on storm water through the use of control measures and activities that target pollution sources. A SWPPP template can be found on the UDEQ Water Quality website.
- DD. Storm Water Report – A written analysis of a development or redevelopment site that

estimates the volume and rate of storm water runoff generated by the proposed improvements. The report details rationale and calculations for establishing the sizes of storm water piping and storage facilities in compliance with this document. This Report shall also contain the calculations for determining the 80th Percentile Storm volume and methods evaluated and selected to manage the rainfall on-site.

1. This Report may be combined with the LID Analysis and Report.

EE. Storm Water Runoff – Precipitation that is not intercepted or otherwise captured at a site which eventually enters into natural water bodies such as rivers, streams, and lakes.

FF. Subsurface Fluid Distribution System – An assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids below the surface of the ground. (i.e. infiltration galleries, underground retention)

GG. UAC – Acronym for Utah Administrative Code.

HH. UDEQ – Acronym for Utah Department of Environmental Quality.

A3. Rainfall Hydrology

A. All storm drain systems shall be designed to carry the 100-year storm, unless otherwise stated.

B. Storm Specifications

1. Local storm drain piping shall be designed for the 10-year storm, where the road or other above ground conveyance will carry the difference to the 100-year storm.
2. Storm drain piping connecting two (2) streets through private property shall be designed for the 100-yr storm.
3. Local detention basins, including all piping into the basin from the nearest point of entry shall be designed to accommodate a 10-year storm event with a maximum discharge of 0.2 cubic feet per second (cfs) per acre.
4. Local retention basins, including piping into the basin from the nearest point of entry, shall be designed to accommodate the 100-year 2-hour storm.
5. Regional detention basins, including all piping into the basin from the nearest point of entry, shall be designed to accommodate the 100-year storm event.
6. The storm duration used for the sizing of basins shall be based upon the worst-case scenario. The time of concentration shall be calculated and shown.
7. See Exhibits 1 and 2 for rainfall data.

C. Hydrologic Methodology

1. Parameters

- a. Hardscape – Proposed streets and sidewalk areas plus the estimated hardscape areas (roofs, driveways, patios, walkways etc.) determined by using a recent subdivision with similarly sized lots, or calculated area as measured from approved site plan.
 - b. Softscape – The remaining area of the subdivision not hardscape.
2. Developments within sensitive land area(s)
 - a. See City Code, Title 10 Zoning Regulations, Chapter 10 Sensitive Lands and Overlay Zones.
 - b. Local detention basins, including all piping into the basin from the nearest point of entry shall be designed to accommodate a 10-year storm event with a maximum discharge of 0.1 cubic feet per second (cfs) per acre.
3. Developments less than 20 acres
 - a. The Rational Method may be used. A computer model may also be used. See paragraph 3 for more information.
 - b. Rainfall Intensity – When using the Rational Method, use the rainfall intensity table provided in Exhibit 1 of this document.
 - c. Runoff Coefficients – The following C-values shall be used when using the Rational Method:
 - i. Hardscape – 0.90
 - ii. Softscape (open space, landscaping) – 0.25
 - iii. Values from published sources may be used when pre-approved by the City Engineer.
4. Developments larger than 20 acres
 - a. A City Engineer-approved computer model shall be used.
 - b. Rainfall Pattern and Depth – The following rainfall pattern shall be used. This pattern is based on the Farmer-Fletcher Distribution. This pattern is for a 1-inch unit storm and must be multiplied by rainfall depth for storms of other magnitudes, as provided in Exhibit 2.

Farmer-Fletcher Distribution

Unit Storm

Time (Min.)	Depth (inches)	Time (Min.)	Depth (inches)	Time (Min.)	Depth (inches)	Time (Min.)	Depth (inches)	Time (Min.)	Depth (inches)	Time (Min.)	Depth (inches)
1	0	11	0.004	21	0.033	31	0.052	41	0.012	51	0.005
2	0	12	0.005	22	0.034	32	0.045	42	0.011	52	0.005
3	0.002	13	0.008	23	0.035	33	0.04	43	0.01	53	0.004

4	0.002	14	0.009	24	0.038	34	0.035	44	0.009	54	0.004
5	0.002	15	0.009	25	0.039	35	0.03	45	0.009	55	0.004
6	0.002	16	0.013	26	0.045	36	0.022	46	0.008	56	0.003
7	0.002	17	0.017	27	0.052	37	0.02	47	0.006	57	0.003
8	0.002	18	0.02	28	0.054	38	0.018	48	0.006	58	0.002
9	0.003	19	0.024	29	0.054	39	0.016	49	0.005	59	0.002
10	0.003	20	0.029	30	0.054	40	0.014	50	0.005	60	0.001

A4. Storm Drain System

A. Independent System

1. Storm waters shall not be conveyed in irrigation ditches.
2. Irrigation waters shall not be conveyed in storm drain systems.

B. Groundwater

1. Where adverse groundwater conditions exist, the City may allow the installation of a subsurface land drain system. Laterals may be installed to each lot for clear groundwater only (surface water may be permitted only upon approval from the City Engineer). Subsurface lines shall be installed with a slope adequate for proper drainage. A backflow control device may be required at the confluence of the land drain system and storm drain system, as determined by the City Engineer.

C. Piping

1. Storm Drain Lines

- a. All storm drain lines that are considered to be part of the City's storm drain system shall be reinforced concrete pipe (RCP), of appropriate class when installed in the public right-of-way.
- b. Minimum size for storm drain mains shall be 15-inch diameter.
- c. Public storm drain pipes shall not be curved.
- d. See Section A3 for sizing requirements.

2. Land Drain Lines

- a. All land drains shall be PVC or RCP.
- b. Minimum size for land drain mains shall be 8-inch diameter.
- c. Minimum size for land drain laterals shall be 4-inch diameter.

3. Pipe specifications are included in Section 5 of the Public Works Standards.

4. Reimbursement / Pioneering Agreements – Where determined by the City Engineer and/or the Storm Drain Capital Facilities Plan, larger drain lines shall be installed to accommodate future development. The cost to provide adequate storm drainage for a

development shall be paid for by the Developer. Upsizing will be coordinated at the time of development. The cost of upsizing will be the responsibility of the City or as defined in the agreement.

- D. Access – Storm drain lines shall have cleanout boxes, inlets, or manholes installed at all changes in grade or alignment, with a maximum distance of 400 feet between accesses. Structures shall be installed in accordance with the standard specifications and Standard Drawings.
- E. Sumps
 - 1. Sumps are not allowed in the City’s storm drain system, except as approved by the City Engineer on a case-by-case basis.
 - 2. Sumps shall not be permitted within zones 1 or 2 of any Drinking Water Source Protection Zone of any drinking water source.
 - 3. Class V Injection Well permitting is required.
- F. Grates
 - 1. Grates shall be provided at all entrances/exits of the storm drain system, and on the upstream end of all culverts greater than 50-ft in length.
 - 2. Grates shall be provided on catch basins, junction boxes, control structures, etc.
 - 3. Bar spacing shall be designed for location, function, and safety. (Generally, bar spacing should not exceed three (3) inches.)

A5. Detention and Retention Basins

- A. When Required
 - 1. Storm drainage basins are required for all development; however, residential developments less than one (1) acre are not required to have detention or retention, except when determined by the City Engineer.
 - 2. In an effort to increase the City’s ability to more easily manage storm events, Regional Detention Basins shall be constructed wherever possible, as shown in the City’s Storm Water Capital Facilities Plan.
 - 3. As shown in the City’s Storm Water Capital Facilities Plan, Developer may be required to participate in the construction of a new regional detention basin or the upgrading of an existing detention basin that is designated as a regional detention basin in lieu of onsite detention within the proposed development, if the development is located within a regional detention basin’s drainage subbasin.

B. Basin Property, Easement, and Access

1. Public Basins – Public basins shall be located on a separate parcel dedicated to the City with frontage along a public roadway. The developer shall provide the City permanent access to any portion of a public basin requiring operation and/or maintenance.
2. Private Basin – Private basins serving multiple lots shall be located on a separate parcel, owned by the home-or land-owners association. Private basins serving a single lot shall be located within the lot. The City shall be provided an easement to, around, and across the basin for emergency access, operation, and/or repair for a private basin.
3. Access – Each basin shall be constructed with sufficient, all-weather, drivable access to all structures from a public street. A turnaround area shall be provided at the termination of the access road.

C. Maintenance and Ownership

Actual ownership and maintenance responsibility shall be specifically defined in the Owner's Dedication, Certificates, Development Agreements, or by Deed.

1. Local Basins – Local basins shall be constructed by the developer. Following conditional acceptance of the construction, the operation and maintenance shall be conveyed to the City when applicable.
2. Regional Basins – Regional basins shall be owned and maintained by the City, constructed according to the criteria herein, and approved of the City Engineer.
3. Private Basins
 - a. Single Lots (Non-residential only) – When approved, private basins shall be owned and maintained by the property owner.
 - b. Multiple Lots – When approved, private basins shall be owned and maintained by the Homeowners' Association.
 - c. Access may be provided from a private street provided an access easement is granted to the City providing access to/from the basin from a public street.
 - d. For all private basins, Developer is required to enter into a Long-Term Storm Water Maintenance Agreement with the City.

D. Basin Volume

1. All basin designs and calculations shall be included in the Storm Water Report and submitted to and reviewed by the City Engineer for approval.
2. Volume shall be measured to the internal spillway (overflow) elevation.
3. Volume in pipes, ditches, or roadside swales shall not be considered in the volume calculation for detention and retention basins.
4. Above-grade storage of water shall not be allowed in parking lots.

E. Allowable Discharge Design

1. See Section A3.B for storm specifications.
2. Discharge shall not exceed the lesser of:
 - a. Pre-development runoff with pre-development, meaning the condition of the land prior to settlement, or
 - b. The discharge rate is determined by using the standard rate of 0.20 cubic feet per second per total acre.

Show all calculations or provide spreadsheet or program file.

3. Calculations shall be based on the total acreage of the development draining to the basin.
4. Pass-through of offsite drainage through the development must be considered and will be allowed.

F. Detention and Retention Basin Elements

1. Depth – Basins should not exceed three (3) feet in depth as determined from its lowest point to the overflow or spillway, unless otherwise approved by the City.
2. Side slopes – Side slopes shall not be steeper than 4:1 (horizontal to vertical).
3. Bottom Slope – The basin floor shall be designed so as to prevent the permanent ponding of water. The slope of the floor of the basin shall not be less than 1% to provide drainage of water to the outlet grate and prevent prolonged wet, soggy, or unstable soil conditions.
4. Freeboard – At least one (1) foot of freeboard is required (berm above the high-water mark).
5. Spillways
 - a. The purpose of a spillway is to protect life and property by providing an emergency route for floodwaters in excess of the design storm event. Spillways are required for all detention basins.
 - b. The spillway shall be designed to carry the 200-year storm flow minus the 100-year storm flow which is handled by the outlet control structure.
 - c. Spillways shall introduce flows back into the pipe or stream downstream of the outlet control.
 - d. Spillways shall include a maintained swale and drainage easement to a safe location.
 - e. The spillway shall be designed to prevent erosion.
 - f. All spillways shall be designed to protect adjacent embankments, nearby structures, and surrounding properties.

6. Ground Covers – The surface area of the basin shall be sodded with a drought resistant turf. A minimum of four (4) inches of top soil must be installed prior to sod placement. A sprinkler irrigation system is also required for all grassed basins. Developer/contractor is responsible for establishing vegetation.
 7. Embankment (Fill) Construction – If a raised embankment is constructed for a basin (constructed with granular materials), it shall be provided with a minimum of 6-inches of clay cover on the inside of the berm to prevent water passage through the soil.
 8. Excavation (Cut) Construction – If the basin is constructed primarily by excavation, then it may be necessary to provide an impermeable liner and land drain system when constructed in the proximity of basements or other below grade structures as determined by a geotechnical evaluation.
 9. Multi-Use Basins – Basins may be designed as multi-use facilities when appropriate precautions are incorporated into the design. If amenities such as pavilions, playground equipment, volleyball courts, etc. are to be constructed within the water detention area of a basin, they shall be designed appropriately. Structures shall be designed for saturated soil conditions and bearing capacities are to be reduced accordingly. Restrooms shall not be located in areas of inundation. Inlet and outlet structures should be located as far as possible from all facilities. No wood chips or floatable objects may be used in the area that will be inundated.
 10. Fencing – A conveniently-located access gate, appropriately sized for entrance by maintenance vehicles and equipment, shall be provided for fenced basins. Fencing should not be located at the top of the basin embankment where maintenance equipment, vehicles, and personnel need access. Fencing shall be a minimum of 6-ft tall, with material in accordance with these Public Works Standards and City Zoning Requirements.
- G. Detention Basins (LID BMPs may be incorporated when approved, See Sections A6 and A7)
1. Percolation – No reduction due to percolation for detention basins volumes shall be permitted.
 2. Outlet Control
 - a. Private detention basins may have a calculated fixed orifice plate mounted on the outlet of the basin.
 - b. Public detention basins shall have movable, screw-type head gates set at the calculated opening height with a stop block required to carry the maximum allowable discharge.
 3. Low Flow Piping – The inlet and outlet structures may be located in different areas of the basin, requiring a buried pipe to convey any base flows that enter and exit the basin. (Cross gutters and surface flows are prohibited.) The minimum pipe size and material for the low flow pipe shall be 15-inch RCP or as otherwise specified by the City Engineer.

4. Oil/Sediment Separators

- a. Sizing and design of oil/sediment separators shall be reviewed by the City Engineer and City Personnel prior to installation.
 - i. Manufacturer's recommendations for sizing must be followed with calculations submitted to the City.
 - ii. Consideration must be given to frequency and ease of maintenance of the structure.
 - iii. Separator should be installed upstream of detention basin and appropriately sized for such location.
- b. Any site dealing with large parking lots or particularly dirty parking lots such as auto repair and maintenance will be required to have an oil separator.
- c. On an annual basis, Private basins with Separators shall be required to be cleaned and provide documentation to the City per the Long-Term Storm Water Maintenance Agreement.

H. Retention Basins (excludes 80th Percentile Storm Retention, See Sections A6 and A7)

1. Retention basins must be specifically approved by the City Engineer.
2. Retention basins shall not be permitted within zones 1 or 2 of any Drinking Water Source Protection Zone of any drinking water source.
3. An approved oil/sediment separator shall be installed upstream of retention basin.
4. Retention Basin Criteria – Retention basins may be permitted if the following conditions apply:
 - a. The distance between the nearest City storm drain and the boundary of the development is greater than:
 - i. For residential development: 500 feet or 50 feet times the number of lots in the entire development (whichever is greater);
 - ii. For commercial development: 20 feet times the number of parking stalls on site.
 - b. The basin is not located within a Hazardous Area (such as a steep slope) or some other sensitive area (such as a Drinking Water Source Protection Zone).
 - c. Site is topographically incapable of draining to the City system.
 - d. Recommendation by the City Engineer.
5. Percolation Rate for Retention Basins
 - a. A percolation test shall be performed by a licensed tester. The percolation test shall be performed at the elevation of the proposed grade of the bottom of the retention basin.

- b. Due to degradation of soils ability to percolate over time, only 70% of the percolation rate shall be used in the calculations for the retention basins.
- 6. Retention basins shall be designed to completely drain within 48 hours of the primary storm event.
- I. Subsurface Fluid Distribution Systems
 - 1. Subsurface Fluid Distribution Systems are allowed for private basins only.
 - 2. See Paragraph H for requirements related to Percolation Rate for Retention Basins.
 - 3. A Class V injection well permit is required.
 - 4. An approved oil/sediment separator shall be installed upstream of subsurface fluid distribution system.
 - 5. Subsurface Fluid Distribution Systems are not allowed for storm water disposal if located in Zone 1 or 2 of a drinking water source. They may be allowed in Zone 3 or 4 of a drinking water source if they are equipped with appropriate pretreatment and approved by the City Engineer.
 - 6. Examples of Subsurface Fluid Distribution Systems include but are not limited to: ADS StormTech® systems, ACF Environmental R-Tanks® and similar; perforated pipe infiltration galleries, etc.

A6. Water Quality

- A. Long-term Best Management Practices (BMPs) shall be used to maintain, to the maximum extent practical, the quality of the water to the pre-developed condition.
- B. Construction BMPs shall be implemented per the City's Storm Water Management Plan.

A7. Low Impact Development

All new development and redevelopment projects equal to or greater than one (1) acre, or projects that are less than one (1) acre that are part of a larger common plan of development or sale, shall be required to evaluate Low Impact Development (LID) approaches to infiltrate, evapotranspiration, and/or harvest and use storm water from the site to protect water quality.⁴

A. 80th Percentile Storm Retention

- 1. All new development and redevelopment projects equal to or greater than one (1) acre, or projects that are less than one (1) acre that are part of a larger common plan of development or sale, shall be required to manage rainfall on-site, and prevent the off-site discharge of the precipitation from all rainfall events less than or equal to the 80th percentile rainfall event [storm]. This objective must be accomplished by the use of practices that are designed, constructed, and maintained to infiltrate,

⁴ Adapted from General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s); State of Utah Department of Environmental Quality, Division of Water Quality; May 12, 2021.

evapotranspiration, and/or harvest and reuse rainwater. If meeting this retention standard is technically infeasible, a rationale shall be provided on a case-by-case basis for the use of alternative design criteria. The project must document and quantify that infiltration and evapotranspiration have been used to the maximum extent technically feasible and that full employment of these controls are infeasible due to site constraints.³

2. In the City, the 80th percentile storm has been determined to be 0.50 inches of depth.
 3. The intent is to manage water as close as possible to the point at which it falls.
 4. Calculations and implementation rationale must be contained in the Storm Water Report.
 5. LID measures should be implemented to meet the 80th Percentile Storm requirements.
- B. Implementation of this retention standard does eliminate the requirement for detention/retention basins as described in Section A5 but may be included within the designed detention/retention volumes calculated.
- C. Structural controls may include green infrastructure practices such as:
1. Rainwater harvesting (e.g. rain barrels)
 2. Rain gardens
 3. Permeable pavement or pavers (not permitted on public streets)
 4. Vegetated swales
 5. Preservation of vegetation (non-disturbance)
 6. Xeriscaping
 7. Others as approved by the City Engineer
- D. LID approaches must be evaluated and detailed in a LID Analysis and Report, which shall be submitted to and approved by the City Engineer.
- E. If an LID approach cannot be utilized, the Applicant must document an explanation of the reasons preventing this approach and the rationale for the *chosen alternative controls* on a case by case basis for each project.³
- F. Implementation of LID measures does not eliminate the requirement for detention/retention basins as described in Section A5 but may be included within the designed detention/retention volumes calculated.

EXHIBIT 1 – NOAA POINT PRECIPITATION FREQUENCY ESTIMATES - INTENSITY

Point precipitation frequency estimates (inches/hour)

EXHIBIT 1

NOAA Atlas 14 Volume 1 Version 5

Data type: Precipitation Intensity

Time series type: Partial duration

Project area: Southwest

Location name (ESRI Maps): Kaysville Utah USA

Station Name: FARMINGTON

Latitude: 41.0271°

Longitude: -111.9098°

Elevation (USGS): 4272 ft

PRECIPITATION FREQUENCY ESTIMATES

by duration for ARI (years):

	1	2	5	10	25	50	100	200	500	1000
5-min:	1.79	2.24	3.06	3.79	5	6.14	7.49	9.12	11.7	14.2
10-min:	1.36	1.71	2.33	2.88	3.81	4.68	5.7	6.94	8.93	10.8
15-min:	1.12	1.41	1.92	2.38	3.15	3.87	4.71	5.73	7.38	8.94
30-min:	0.756	0.95	1.3	1.6	2.12	2.6	3.17	3.86	4.97	6.02
60-min:	0.467	0.588	0.802	0.993	1.31	1.61	1.96	2.39	3.08	3.72
2-hr:	0.32	0.4	0.514	0.624	0.806	0.97	1.17	1.41	1.79	2.15
3-hr:	0.244	0.302	0.374	0.444	0.566	0.676	0.811	0.968	1.23	1.46
6-hr:	0.159	0.195	0.233	0.269	0.324	0.37	0.436	0.514	0.645	0.764
12-hr:	0.101	0.123	0.148	0.17	0.203	0.231	0.26	0.292	0.357	0.413
24-hr:	0.065	0.079	0.095	0.108	0.126	0.139	0.154	0.168	0.188	0.209
2-day:	0.039	0.047	0.057	0.065	0.075	0.084	0.092	0.1	0.112	0.121
3-day:	0.029	0.035	0.042	0.048	0.057	0.063	0.07	0.076	0.085	0.093
4-day:	0.024	0.029	0.035	0.04	0.047	0.053	0.058	0.064	0.072	0.078
7-day:	0.017	0.02	0.025	0.028	0.033	0.037	0.041	0.044	0.05	0.054
10-day:	0.013	0.017	0.02	0.022	0.026	0.029	0.031	0.034	0.037	0.04
20-day:	0.009	0.011	0.013	0.015	0.017	0.018	0.02	0.021	0.023	0.024
30-day:	0.007	0.009	0.011	0.012	0.014	0.015	0.016	0.017	0.018	0.019
45-day:	0.006	0.008	0.009	0.01	0.011	0.012	0.013	0.014	0.015	0.016
60-day:	0.005	0.007	0.008	0.009	0.01	0.011	0.012	0.012	0.013	0.014

Date/time (GMT): Fri May 18 05:44:29 2018

pyRunTime: 0.0958669185638

EXHIBIT 2 – NOAA POINT PRECIPITATION FREQUENCY ESTIMATES - DEPTH

Point precipitation frequency estimates (inches)

EXHIBIT 2

NOAA Atlas 14 Volume 1 Version 5

Data type: Precipitation Depth

Time series type: Partial duration

Project area: Southwest

Location name (ESRI Maps): Kaysville Utah USA

Station Name: FARMINGTON

Latitude: 41.0271°

Longitude: -111.9098°

Elevation (USGS): 4272 ft

PRECIPITATION FREQUENCY ESTIMATES

by duration for ARI (years):

	1	2	5	10	25	50	100	200	500	1000
5-min:	0.149	0.187	0.255	0.316	0.417	0.512	0.624	0.76	0.978	1.18
10-min:	0.226	0.285	0.388	0.48	0.635	0.78	0.95	1.16	1.49	1.8
15-min:	0.28	0.353	0.481	0.596	0.787	0.967	1.18	1.43	1.85	2.23
30-min:	0.378	0.475	0.648	0.802	1.06	1.3	1.59	1.93	2.48	3.01
60-min:	0.467	0.588	0.802	0.993	1.31	1.61	1.96	2.39	3.08	3.72
2-hr:	0.64	0.8	1.03	1.25	1.61	1.94	2.34	2.82	3.58	4.29
3-hr:	0.734	0.908	1.12	1.33	1.7	2.03	2.43	2.91	3.68	4.39
6-hr:	0.955	1.17	1.4	1.61	1.94	2.21	2.61	3.08	3.86	4.58
12-hr:	1.22	1.49	1.78	2.05	2.44	2.78	3.13	3.52	4.3	4.97
24-hr:	1.55	1.91	2.28	2.59	3.02	3.35	3.69	4.04	4.51	5.02
2-day:	1.86	2.28	2.73	3.1	3.61	4.01	4.41	4.82	5.37	5.8
3-day:	2.07	2.54	3.05	3.48	4.07	4.54	5.01	5.5	6.15	6.66
4-day:	2.28	2.8	3.38	3.86	4.53	5.06	5.61	6.17	6.93	7.53
7-day:	2.79	3.44	4.14	4.73	5.53	6.16	6.82	7.48	8.38	9.07
10-day:	3.22	3.97	4.75	5.38	6.21	6.84	7.48	8.11	8.93	9.56
20-day:	4.31	5.31	6.3	7.07	8.05	8.76	9.46	10.1	11	11.6
30-day:	5.32	6.53	7.71	8.62	9.79	10.6	11.5	12.3	13.3	14
45-day:	6.62	8.12	9.56	10.7	12.2	13.3	14.3	15.4	16.7	17.7
60-day:	7.84	9.62	11.3	12.7	14.3	15.6	16.7	17.9	19.3	20.3

Date/time (GMT): Fri May 18 05:22:38 2018

pyRunTime: 0.095978975296

EXHIBIT 3 – SUMMARY OF ALLOWABLE LID BMPs



Summary of LID BMPs and Recommendations on Where to Allow
from *A Guide to Low Impact Development within Utah*
<https://deg.utah.gov/water-quality/low-impact-development>

LID BMP Category	LID BMP Type	Fact Sheet ID	Removal Effectiveness ¹	Primary Functions			Maintenance Effort	Where Permitted				
				Bioretention	Volume Retention	Biofiltration		Residential - Public Roads	Residential - Private Roads	Residential - Multi-family	Commercial	Industrial
Bioretention	Rain Garden	BR-1	high	yes	yes	yes	low-med	no	yes	yes	yes	yes
	Bioretention Cell	BR-2	high	yes	yes	yes	low-med	yes	yes	yes	yes	yes
	Bioswale	BR-3	medium	yes	some	yes	low	yes	yes	yes	yes	yes
	Vegetated Strip	BR-4	med-high	yes	some	yes	low	yes	yes	yes	yes	yes
	Tree Box Filter	BR-5	med-high	yes	varies	yes	medium	no	yes	yes	yes	yes
	Green Roof	BR-6	med-high	yes	yes	yes	med-high	no ²	no ²	no ²	yes	yes
Pervious Surfaces	Pervious Surfaces	PS-1	high	yes	yes	some	low-med	no ²	no ²	no ⁶	yes	yes
Infiltration Devices ⁵	Infiltration Basin	ID-1	high	yes	yes	yes	low	yes ³	yes ³	yes ³	yes ³	yes ³
	Infiltration Trench	ID-2	high	yes	yes	some	low	no	yes	yes	yes	no
	Dry Well ⁴	ID-3	high	yes	yes	no	low-med	yes ³	yes ³	yes ³	yes ³	no
	Underground Infiltration Gallery ⁴	ID-4	high	yes	yes	no	low-med	yes ³	yes ³	yes ³	yes ³	yes ³
Harvest and Reuse	Harvest and Reuse	HR-1	varies	varies	yes	varies	low	no ²	no ²	no ²	yes	yes

Notes

¹ Sediment, Nutrients, Metals, Bacteria, Oil/Grease

² Individual homes may utilize BMP, but it will not count towards LID and retention requirement for development.

³ Requires pre-treatment

⁴ Requires UIC Class V injection well permit from State of Utah

⁵ Other factors (e.g. drinking water source protection zone, contaminated groundwater, etc.) may limit use.

⁶ May be permitted in certain areas as allowed by City per site plan (not permitted in utility areas).

APPENDIX B – TRAFFIC IMPACT STUDY MINIMUM REQUIREMENTS

APPENDIX B
TRAFFIC IMPACT STUDY MINIMUM REQUIREMENTS

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B1. Purpose and General Provisions

- A. The level of the Traffic Impact Study (TIS) is based upon the size and magnitude of the proposed project.
- B. The purpose of the TIS is to identify the system and immediate area impacts associated with the proposed connection(s). Identification of impacts and appropriate mitigation measures allows the City to assess the existing and future system safety, performance, maintenance, and capacity needs.
- C. Threshold criteria for different levels of projects have been developed to avoid placing undue burden on applicants with small projects, while ensuring that large projects with significant impacts are thoroughly evaluated.
- D. Any proposed access onto a state road will be subject to all applicable UDOT provisions. In addition to any study required by UDOT, the City may require a separate TIS to identify impacts unique to the City's interests.
- E. All reports shall include the minimum requirements and use the study level parameters as detailed below.
- F. All reports shall be signed and sealed by a registered Professional Engineer licensed in Utah.

B2. Report Contents

- A. Traffic Impact Study submitted to Fruit Heights City shall generally include the following contents, as applicable.

CONTENTS

- 1.0 *Introduction and Summary*
- 2.0 *Proposed Project*
- 3.0 *Study Area Conditions*
- 4.0 *Analysis of Existing Conditions*
- 5.0 *Projected Traffic*
- 6.0 *Traffic Analysis*
- 7.0 *Conclusions*
- 8.0 *Recommendations*
- 9.0 *Appendices*
 - 9.1 *Traffic Counts*
 - 9.2 *Traffic Capacity Analysis*
 - 9.3 *Accident Summary*
 - 9.4 *Request for change or access (if applicable)*
- 10.0 *Figures and Tables*

B. The following items shall be documented in the Study:

1. Site location – showing area roadways.
2. Site Plan.
 - a. Identify geometric / physical concerns relating to area, site and specific access points.
 - b. Include adjacent street and access points.
3. Existing roadway and traffic control features:
 - a. Number of lanes
 - b. Lane widths
 - c. Alignment
 - d. Location of traffic signals
 - e. Signs
 - f. Off system features as related to site plan and access point(s)
4. Existing daily volumes (directional if possible) and peak hour training volumes.
 - a. Discuss traffic characteristics (vehicle mix, % makeup, and any special vehicle requirements)
5. Collection diagram summary.
6. Site generated trip summary.
 - a. Discuss trip vehicle make-up and any special vehicle requirements
 - b. Discuss trip reduction strategies (if applicable)
7. Directional distribution of site generated traffic.
8. Assignment of non-site related traffic (existing, background, and future).
 - a. Document both existing and committed development, and when appropriate other background planned development traffic
 - b. Assignment of total future non-site traffic for design year
9. Assignment of site traffic.
10. Traffic capacity analysis.
 - a. Projected levels of service without the project – coincide with development phase years
 - b. Projected levels of service with the project (by development phase year)
 - c. Recommended mitigation / improvement(s)

11. Scaled schematic drawings illustrating:

- a. Alignment
- b. Number of lanes
- c. Lane widths
- d. Signing
- e. Pavement markings
- f. Signal phasing
- g. Signal head locations
- h. Lane markings

B3. Level of Study

The following guidelines shall be used when determining the level of study required:

Study Level	Threshold	Typical Land Use Intensity Threshold (ITE Trip Generation)	
1	Projected Site Traffic < 100 ADT AND No proposed modifications to traffic signals or elements of the roadway	Single Family Apartment Lodging General Office Retail	< 10 units < 15 units < 11 occupied rooms < 9,000 square feet < 2,500 square feet
2	Projected Site Traffic 100 to 3,000 ADT OR Projected Peak Hour Traffic < 500 AND Minor modifications to traffic signals or elements of the roadway	Single Family Apartment Lodging General Office Retail Gas Station Fast Food Restaurant	10 to 315 units 15 to 450 units 11 to 330 occupied rooms 9,000 to 27,000 square feet 2,500 to 70,000 square feet 1 to 18 fueling positions 1,000 to 6,000 square feet 1,000 to 26,00 square feet
3	Projects Site Traffic 3,000 to 10,000 ADT OR Projected Peak Hour Traffic 500 to 1,200 OR Proposed installation or modification to traffic signals or elements of the roadway, regardless of project size	Single Family Apartment Lodging General Office Retail Fast Food	315 to 1,000 units 450 to 1,500 units 330 to 1,100 occupied rooms 270,000 to 900,000 square feet 70,000 to 230,000 square feet 6,000 to 20,000 square feet
4	Projected Site Traffic > 10,000 ADT OR Proposed installation / modification of two or more traffic signals, addition of travel lanes or proposed modification of highway or freeway, or interchange, regardless of project size	Single Family Apartment Lodging General Office Retail	> 1,000 units > 1,500 units > 1,100 occupied rooms > 900,000 square feet > 230,000 square feet

B4. Level 1 Study Requirements**A. When Required**

1. Project ADT < 100 trips
2. No proposed modifications to traffic signals or roadway elements or geometry.

B. Minimum Study Requirements

1. Incorporate traffic engineering principles and standards as required in the City Standards, State Standards, and national practices. Additional requirements and investigation may be imposed upon the applicant as deemed necessary by the City.
2. Study Area
 - a. Depending on the size and intensity of the development and surrounding development, the study area may be identified by parcel boundary, area of immediate influence, or reasonable travel time boundary.
 - b. May be limited to or include property frontage and include neighboring and adjacent parcels.
 - c. Shall identify site, cross, and all adjacent up and down stream access points within 1,000-ft of property boundaries.
 - d. May be extended or revised by the City Engineer, as deemed necessary.
3. Design Year
 - a. Current year of the project.
4. Analysis Conditions and Period
 - a. Identify site traffic volumes and characteristics.
 - b. Identify adjacent street(s) traffic volume and characteristics.
5. Right-of-Way Access
 - a. Identify right-of-way, geometric boundaries, and physical conflicts.
 - b. Investigate existence of federal or state, no access, or limited access control line.
6. Data Collection
 - a. Generate access point capacity analysis as necessary.
 - b. Analyze site and adjacent traffic for the following time periods:
 - i. Weekday AM and PM peak hours
 - ii. Saturday peak hours
 - c. Identify special event peak hour as necessary (per roadway peak and site peak)

7. Trip Generation

- a. Use equations or rates available in latest edition of ITE Trip Generation.
- b. Where developed equations are unavailable for intended land use, perform trip rate study and estimation following ITE procedures or develop justified trip rate agreed to by the City.

8. Design and Mitigation

- a. Identify operational concerns and mitigation measures to ensure safe and efficient operation in accordance with industry standards and the City's adopted minimum level of service.

B5. Level 2 Study Requirements

A. When Required

- 1. Project ADT 100 to 3,000 trips
- 2. Peak hour < 500 trips
- 3. Any proposed modification to traffic signals or roadway elements or geometry.

B. Minimum Study Requirements

- 1. Incorporate traffic engineering principles and standards as presented in the City Standards, State Standards, and national practices. Additional requirements and investigation may be imposed upon the applicant as deemed necessary by the City.
- 2. Study Area
 - a. Defined by Traffic Engineer completing the TIS.
 - b. Depending on the size and intensity of the development and surrounding development, the study area may be identified by parcel boundary, area of immediate influence, or reasonable travel time boundary.
 - i. An acceptable traffic study boundary, based on travel time, may be identified as a 10 to 20 minutes travel time or by market area influence.
 - c. Intersection of site access drives with state highways and any signalized and unsignalized intersection within 2,000-ft of property line.
 - d. Include any identified queuing distance at site and study intersection.
 - e. May be extended or revised by the City Engineer, as deemed necessary.
- 3. Design Year
 - a. Current year of the project.
 - b. 5 years after project completion.
 - c. Document and include all phases of development.

4. Analysis Period
 - a. Analyze site and adjacent road traffic for weekday AM and PM peak hours including Saturday peak hours.
 - b. Identify special event peak hours as necessary (adjacent roadway peak and site peak).
5. Data Collection
 - a. Daily and turning movement counts.
 - b. Identify site and adjacent street roadway and intersection geometries.
 - c. Traffic control devices including traffic signals and regulatory signs.
 - d. Traffic accident data within the last 10 years.
6. Trip Generation
 - a. Use equations or rates available in latest edition of ITE Trip Generation.
 - b. Where developed equations are unavailable for intended land use, perform trip rate study and estimation following ITE procedures or develop justified trip rate agreed to by the City.
7. Trip Distribution and Assignment
 - a. Document distribution and assignment of existing site, background, and future traffic volumes or surrounding network of study area.
8. Conflict / Capacity Analysis
 - a. Diagram flow of traffic at access point(s) for site and adjacent development.
 - b. Perform capacity analysis for daily and peak hour volumes.
9. Right-of-Way Access
 - a. Identify right-of-way, geometric boundaries, and physical conflicts.
 - b. Investigate existence of federal or state, no access, or limited access control line.
10. Design and Mitigation
 - a. Determine and document safe and efficient operational design needs based on site and study data.
 - b. Identify operational concerns and mitigation measures to ensure safe and efficient operation in accordance with industry standards and the City's adopted minimum level of service.

B6. Level 3 Study Requirements**A. When Required**

1. Project ADT 3,000 to 10,000 trips
2. Peak hour 500 to 1,200 trips
3. Any proposed installation or modification to traffic signals or roadway elements or geometry – regardless of project size or trip generation.

B. Minimum Study Requirements

1. Incorporate traffic engineering principles and standards as presented in the City Standards, State standards, and national practices. Additional requirements and investigation may be imposed upon the applicant as deemed necessary by the City.
2. Study Area
 - a. Defined by Traffic Engineer completing the TIS.
 - b. Depending on the size and intensity of the development and surrounding development, the study area may be identified by parcel boundary, area of immediate influence, or reasonable travel time boundary.
 - i. An acceptable traffic study boundary, based on travel time, may be identified as a 10 to 20 minutes travel time or by market area influence.
 - c. Intersection of site access drives with state highways and any intersection within ½ mile of property line on each side of project site.
 - d. May be extended or revised by the City Engineer, as deemed necessary.
3. Design Year
 - a. Current year of the project.
 - b. 5 years after project completion.
 - c. Document and include all phases of development.
4. Analysis Period
 - a. Analyze site and adjacent road traffic for weekday AM and PM peak hours including Saturday peak hours.
 - b. Identify special event peak hours as necessary (adjacent roadway peak and site peak).
5. Data Collection
 - a. Daily and turning movement counts.
 - b. Identify site and adjacent street roadway and intersection geometries.

- c. Traffic control devices including traffic signals and regulatory signs.
 - d. Automatic continuous traffic counts for at least 48 hours.
 - e. Traffic accident data within the last 10 years.
- 6. Trip Generation
 - a. Use equations or rates available in latest edition of ITE Trip Generation.
 - b. Where developed equations are unavailable for intended land use, perform trip rate study and estimation following ITE procedures or develop justified trip rate agreed to by the City.
- 7. Trip Distribution and Assignment
 - a. Document distribution and assignment of existing site, background, and future traffic volumes or surrounding network of study area.
- 8. Conflict / Capacity Analysis
 - a. Level of Service (LOS) for all intersections.
 - b. LOS for existing conditions, design year without project, design year with project.
- 9. Traffic Signal Impacts (for proposed traffic signals) shall follow all UDOT requirements and include:
 - a. Traffic signal warrants as identified.
 - b. Traffic signal drawings as identified.
 - c. Queuing analysis.
 - d. Traffic systems analysis (includes acceleration, deceleration, and weaving).
 - e. Traffic coordination analysis.
- 10. Right-of-Way Access
 - a. Identify right-of-way, geometric boundaries, and physical conflicts.
 - b. Investigate existence of federal or state, no access, or limited access control line.
- 11. Accident and Traffic Safety Analysis
 - a. Existing vs. proposed development.
- 12. Design and Mitigation
 - a. Determine and document safe and efficient operational design needs based on site and study data.
 - b. Identify operational concerns and mitigation measures to ensure safe and efficient operation in accordance with industry standards and the City's adopted minimum level of service.

B7. Level 4 Study Requirements**A. When Required**

1. Project ADT > 10,000 trips
2. Peak hour > 1,200 vehicles per hour
3. Any proposed installation or modification of 2 or more traffic signals
4. Addition of traffic lanes
5. Modification of freeway interchange

B. Minimum Study Requirements

1. Incorporate traffic engineering principles and standards as presented in the City Standards, State standards, and national practices. Additional requirements and investigation may be imposed upon the applicant as deemed necessary by the City.
2. Study Area
 - a. Defined by Traffic Engineer completing the TIS.
 - b. Depending on the size and intensity of the development and surrounding development, the study area may be identified by parcel boundary, area of immediate influence, or reasonable travel time boundary.
 - i. An acceptable traffic study boundary, based on travel time, may be identified as a 10 to 20 minutes travel time or by market area influence.
 - c. Intersection of site access drives with state highways and any intersection within ½ mile of property line on each side of project site.
 - d. Any intersection or freeway interchange impacted by more than 500 peak hour trips.
 - e. May be extended or revised by the City Engineer, as deemed necessary.
3. Design Year
 - a. Current year of the project.
 - b. 5 years after project completion.
 - c. Document and include all phases of development.
4. Analysis Period
 - a. Analyze site and adjacent road traffic for weekday AM and PM peak hours including Saturday peak hours.
 - b. Identify special event peak hours as necessary (adjacent roadway peak and site peak).

5. Data Collection
 - a. Daily and turning movement counts.
 - b. Identify site and adjacent street roadway and intersection geometries.
 - c. Traffic control devices including traffic signals and regulatory signs.
 - d. Automatic continuous traffic counts for at least 48 hours.
 - e. Traffic accident data within the last 10 years.
6. Trip Generation
 - a. Use equations or rates available in latest edition of ITE Trip Generation.
 - b. Where developed equations are unavailable for intended land use, perform trip rate study and estimation following ITE procedures or develop justified trip rate agreed to by the City.
7. Trip Distribution and Assignment
 - a. Document distribution and assignment of existing site, background, and future traffic volumes or surrounding network of study area.
8. Conflict / Capacity Analysis
 - a. Level of Service (LOS) for all intersections.
 - b. LOS for existing conditions, design year without project, design year with project.
9. Traffic Signal Impacts (for proposed traffic signals) shall follow all UDOT requirements and include:
 - a. Traffic signal warrants.
 - b. Traffic signal drawings.
 - c. Queuing analysis.
 - d. Traffic systems analysis (includes acceleration, deceleration, and weaving).
 - e. Traffic coordination analysis.
10. Right-of-Way Access
 - a. Identify right-of-way, geometric boundaries, and physical conflicts.
 - b. Investigate existence of federal or state, no access, or limited access control line.
11. Accident and Traffic Safety Analysis
 - a. Existing vs. proposed development.
12. Design and Mitigation

- a. Determine and document safe and efficient operational design needs based on site and study data.
- b. Identify operational concerns and mitigation measures to ensure safe and efficient operation in accordance with industry standards and the City's adopted minimum level of service.

APPENDIX C – MODIFICATIONS AND ADDITIONS TO MANUAL OF STANDARD SPECIFICATIONS

APPENDIX C

MODIFICATIONS AND ADDITIONS TO THE 2017 MANUAL OF STANDARD SPECIFICATIONS

Modifications and Additions to the
2017 Manual of Standard Specifications

as published by:
Utah LTAP Center
Utah State University
Logan Utah
2017

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SECTION 03 20 00 M
CONCRETE REINFORCING (MODIFIED)

PART 3	EXECUTION
---------------	------------------

3.1 PLACING

Add paragraphs F and G as follows:

- F. No steel shall extend from or be visible on any finished surface
- G. All steel shall have a minimum of 1.5-inches of concrete cover.

**SECTION 03 30 04 M
CONCRETE (Modified)****PART 2 PRODUCTS**

2.4 Add paragraph F as follows:

- F. Fiber Reinforcement: A minimum of 1.0 pounds per cubic yard of polyolefin fiber reinforcement shall be evenly distributed into the mix. Mixing shall be as recommended by the manufacturer/supplier such that the fibers do not ball up. Polyolefin fibers shall meet the requirements of ASTM C1116 and ASTM D7508.

2.5 **MIX DESIGN**

Replace Paragraph A with the following:

- A. **Class:** When not specified in the plans or project specifications, use the following table to select the class of concrete required for the application:

Class	Application
5,000	Reinforced Structural Concrete
4,000	Sidewalks, curb, gutter, cross gutters, waterways, pavements, and unreinforced footings and foundations
3,000	Thrust blocks
2,000	Anchors, mass concrete

SECTION 03 30 10 M
CONCRETE PLACEMENT (Modified)

PART 3	EXECUTION
---------------	------------------

3.2 PREPARATION

Add paragraph F as follows:

- F. No concrete shall be placed until the surfaces have been inspected and approved by the City Engineer or City Inspector.

SECTION 31 23 16 M
EXCAVATION (Modified)

PART 3	EXECUTION
---------------	------------------

3.3 GENERAL EXCAVATION REQUIREMENT

Add paragraph I as follows:

- I. Excavation for pipelines under existing curb and gutter, concrete slabs, or sidewalks shall be open cut. Neither tunneling nor water jetting is allowed. At the option of the City Engineer, jacking or boring under permanent facilities may be allowed based on his/her direction.

Add Section 31 23 20 Fill

**SECTION 31 23 20
FILL**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-structural fill materials.
- B. Non-structural placement and compaction.

1.2 REFERENCES

A. ASTM Standards

- D 698 Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- D 1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
- D 2922 Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

- A. When requested by ENGINEER, submit laboratory dry density and optimum laboratory moisture content for each type of fill to be used.

1.4 QUALITY ASSURANCE

- A. Do not change material sources without ENGINEER's knowledge.
- B. Reject material that does not comply with the requirements specified in this Section.

1.5 STORAGE

- A. Safely stockpile materials.
- B. Separate differing fill materials, prevent mixing, and maintain optimum moisture content of materials.

1.6 SITE CONDITIONS

- A. Do not place, spread, or roll any fill material over material that is damaged by water. Remove and replace damaged material at no additional cost to OWNER.
- B. Control erosion. Keep area free of trash and debris. Repair settled, eroded, and rutted areas.
- C. Reshape and compact damaged structural section to required density.

1.7 ACCEPTANCE

- A. General: Native material may be wasted if there is no additional cost to substitute material acceptable to ENGINEER.
- B. Lift thickness: One test per Lot.

C. Compaction: One test per Lot. Verify density using nuclear tests, ASTM D 2922.

Compaction and Lot sizes as follows:

1. Compact to 92% Standard Proctor
2. One Lot = 1500 square feet per lift

1.8 **WARRANTY**

A. Repair settlement damage at no additional cost to OWNER.

PART 2 PRODUCTS

2.1 **FILL MATERIALS**

A. Material shall be free from sod, grass, trash, rocks larger than four (4) inches in diameter, and all other material unsuitable for construction of compacted fills.

2.2 **WATER**

- A. Make arrangements for sources of water during construction and make arrangements for delivery of water to site.
- B. Comply with local Laws and Regulations at no additional cost to OWNER when securing water from water utility company.

PART 3 EXECUTION

3.1 **PREPARATION**

- A. Implement the traffic control plan requirements, Section 01 55 26.
- B. Verify material meets maximum size requirements.
- C. If ground water is in the intended fill zone, dewater.

3.2 **PROTECTION**

- A. Protect existing trees, shrubs, lawns, structures, fences, roads, sidewalks, paving, curb and gutter and other features.
- B. Protect above or below grade utilities. Contact utility companies to repair utility damage. Pay all cost of repairs.
- C. Avoid displacement of and damage to existing installations while compacting or operating equipment.
- D. Do not use compaction equipment adjacent to walls or retaining walls that may cause wall to become over-stressed or moved from alignment.
- E. Restore any damaged structure to its original strength and condition.

3.3 **LAYOUT**

- A. Identify required line, levels, contours, and datum.
- B. Stake and flag locations of underground utilities.

- C. Upon discovery of unknown utility or concealed conditions, notify ENGINEER.
- D. Maintain all benchmarks, control monuments and stakes, whether newly established by surveyor or previously existing. Protect from damage and dislocation.
- E. If discrepancy is found between Contract Documents and site, ENGINEER shall make such minor adjustments in the Work as necessary to accomplish the intent of Contract Documents without increasing the Cost of the Work to CONTRACTOR or OWNER.

3.4 **SUBGRADE**

- A. Protect Subgrade from desiccation, flooding, and freezing.
- B. Before placing fill over Subgrade, get ENGINEER's inspection of subgrade surface preparations.
- C. If Subgrade is not readily compactable get ENGINEER's permission to stabilize the subgrade.

3.5 **TOLERANCES**

- A. Compaction: Ninety-two (92) percent minimum relative to a standard proctor density, Section 31 23 26.
- B. Lift Thickness (before compaction):
 - 1. Eight (8) inches when using riding compaction equipment.
 - 2. Six (6) inches when using hand held compaction equipment.

3.6 **CLEANING**

- A. Remove stockpiles from site. Grade site surface to prevent free standing surface water.
- B. Leave borrow areas clean and neat.

END OF SECTION

**SECTION 31 41 00 M
SHORING (Modified)**

PART 1 GENERAL

1.2 PRICE – MEASUREMENT AND PAYMENT

A. In Trenching, Shoring:

Revise subparagraph 1 to read as follows:

1. A two (2) part Protective System is required if each Side of the Trench is to be shored. The use of a Trench Box shall be classified as one Protective System.

1.4 DESIGN OF PROTECTIVE SYSTEMS

Add paragraphs C and D as follows:

- C. Trenches five (5) feet deep or greater require a protective system unless the excavation is made entirely in stable rock. If less than five (5) feet deep, a competent person may determine that a protective system is not required.
- D. Trenches 20 feet deep or greater require that the protective system be designed by a registered professional engineer or be based on tabulated data prepared and/or approved by a registered professional engineer in accordance with 1926.652(b) and (c).

1.5 SUBMITTALS

Revise paragraph A to read as follows:

- A. Submit a Protective System plan:
1. When excavation is over twenty (20) feet deep, or
 2. When requested by ENGINEER.

Add Article 1.6 as follows:

1.6 REFERENCES

- A. 29 CFR Part 1910 – Occupational Safety and Health Standards
- B. 29 CFR Part 1926 Subpart P – Excavations

PART 3 EXECUTION

3.4 INSPECTIONS

Add paragraph C as follows:

- C. OWNER and/or ENGINEER may order an immediate work stoppage if working conditions are thought to be unsafe. Work may resume only after proper safety precautions are implemented.

SECTION 32 01 06 M
STREET NAME SIGNS (Modified)

PART 1	GENERAL
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1.2 REFERENCES

Add paragraph C as follows:

- C. **Fruit Heights City Public Works Standard Drawings**

**SECTION 32 01 13.64 M
CHIP SEAL (Modified)**

PART 1 GENERAL

1.2 REFERENCES**A. ASTM Standards:**

Add the following to paragraph A:

- | | |
|-------|--|
| C 29 | Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate |
| C 330 | Standard Specification for Lightweight Aggregates for Structural Concrete |

Rename Article 1.5 as follows:

1.5 WEATHER AND CONDITIONS**D. Temperature**

Add subparagraph 4 as follows:

4. Do not place if forecasted temperature is expected to drop below 40 deg F within 72 hours of placement.

B. Moisture and Wind:

Add subparagraph 1 as follows:

1. Do not place chip seal coat if surface moisture is present.

PART 2 PRODUCTS

2.1 ASPHALT BINDER

Revise paragraph B as follows:

- A. Emulsified Asphalt: CRS-2P or LMCRS, Section 32 12 03. Use any of the following additives to match aggregate particle charge, weather conditions, and mix design:
(Subparagraphs 1-5 remain unchanged.)

2.2 COVER AGGREGATE**A. Material:**

Revise subparagraph 2 to read as follows:

2. 100% Crusher processed rotary kiln lightweight expanded shale chips (Utelite or approved equal).

Replace Table 1 with the following:

Table 1 – Physical Properties of Lightweight Aggregate (ASTM C330)			
Property	ASTM	Min.	Max.
Clay Lumps and Friable Particles, percent	C142	-	2
Bulk Density Dry Loose Condition, lb/ft ³	C29	-	55

B. Gradation: Analyzed on a dry weight and percent passing basis.

Replace Table 2 with the following:

Table 2 – Master Grading Band for Lightweight Aggregate		
Sieve	ASTM	C330 Requirement
1/2"	C136	100
3/8"		80-100
No. 4		5-40
No. 8		0-20
No 16		0-10
No. 200		0-10

Replace Article 2.3 with the following:

2.3 **FOG SEAL/FLUSH COAT**

A. Material: Use cationic emulsified asphalt grade CSS-1h, Section 32 12 03.

Add Article 2.4 as follows:

2.4 **MIX DESIGN**

- A. Select Type and grade of emulsified asphalt, ASTM D 3628.
- B. Use the following application rates, or submit mix design for approval by Engineer.
 - 1. Emulsion: Use Table 3.

Table 3 – Emulsion Application Rate	
Emulsion	Application Rate (gal/sy)
CRS-2P	0.32 – 0.35
LMCRS-2	0.32 – 0.35

2. Cover Material: Use Table 4.

Table 4 – Cover Material Application Rate	
Emulsion	Application Rate (lbs/sy)
CRS-2P	10.0 – 12.0
LMCRS-2	10.0 – 12.0

3. Fog Seal/Flush Coat: Use 0.10 – 0.12 gal/sy at a 2:1 dilution rate.

PART 3 EXECUTION

3.2 PREPARATION

Add paragraph F as follows:

- F. Cover manholes, valves boxes, storm drain inlets, and other service utility features before placing any chip seal coat.

3.4 APPLICATION

Revise paragraph A to read as follows:

- A. Asphalt Emulsion: Keep viscosity between 50 and 100 centistokes during application, ASTM D 2170. Keep temperature to a minimum of 145 deg F.

Revise Article 3.6 to read as follows:

3.6 FOG SEAL/FLUSH COAT

- A. Apply asphalt seal over the chips within 24 hours of placing chips.
- B. Keep viscosity between 50 and 100 centistokes, during application, ASTM D 2170.

SECTION 32 12 05 M
BITUMINOUS CONCRETE (MODIFIED)
(Amendment 2 of the 2017 Edition of APWA Specifications)

PART 1	GENERAL
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1.4 SUBMITTALS

Revise paragraph C as follows:

Replace item 11 with the following:

11. Tensile Strength Ration or Hamburg Rut Test results.

Add the following item:

14. Unless otherwise specified, Road Class II shall be use for the selection of Mix Design parameters.

SECTION 32 16 13 M
DRIVEWAY, SIDEWALK, CURB, GUTTER (Modified)

PART 3	EXECUTION
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3.4 CONTRACTION JOINTS

D. Curb, Gutter, Waterway:

Revise subparagraph 1 to read as follows:

1. Place joints at intervals not exceeding 10 feet.

3.5 EXPANSION JOINTS

B. Sidewalks:

Add subparagraph 5 as follows:

5. Expansion joints are to be placed at 48-foot intervals (minimum) for 6-foot wide sidewalk and 50-foot for 5-foot wide sidewalk; or wherever new sidewalk adjoins existing sidewalks, driveways, or aprons.

C. Curb, Gutter, Waterway:

Add subparagraph 4 as follows:

4. Place expansion joint where new curb and gutter adjoins existing curb and gutter.

SECTION 32 31 13 M
CHAIN LINK FENCES AND GATES (Modified)

PART 2 PRODUCTS

2.6 POSTS, CAPS, RAILS, COUPLINGS

- A. Posts, Frames, Stiffeners, Rails: ASTM F 1043:

Revise applicable rows of Table 1 to read as follows:

Top Rail	1-5/8" pipe
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PART 3 EXECUTION

3.6 INSTALLATION OF FENCE FABRIC

Revise paragraph A to read as follows:

- A. Place fence fabric on roadway side of posts unless otherwise specified. Place fabric approximately 1 ½ inch above the grounds. Maintain a straight grade between posts by excavating ground high points and filling depressions with soil.

SECTION 32 31 16 M
WELDED WIRE FENCES AND GATES (Modified)

PART 1 GENERAL

1.2 REFERENCES

Add paragraph D as follows:

D. UDOT Standard Drawing

FG 2A Right of Way Fence and Gates (Metal Post)

FG 2B Right of Way Fence and Gates (Metal Post)

PART 3 EXECUTION

3.2 INSTALLATION

Add paragraph N as follows:

N. Install per UDOT Standard Drawings FG 2A and FG 2B.

Add Section 32 31 23 Poly(Vinyl Chloride)(PVC) Fences and Gates

**SECTION 32 31 23
POLY(VINYL CHLORIDE)(PVC) FENCES AND GATES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. PVC fencing, posts, gates, and appurtenances.

1.2 REFERENCES

A. ASTM Standards:

- D 1784 Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
- F 626 Fence Fittings
- F 964 Rigid Poly(Vinyl Chloride)(PVC) Exterior Profiles Used for Fencing and Railing
- F 1999 Installation of Rigid Poly(Vinyl Chloride)(PVC) Fence Systems

1.3 SUBMITTALS

- A. Drawings: Indicate plan layout, grid, size and spacing of components, accessories, fittings, anchorage, and post section.
- B. Data: Submit manufacturer's installation instructions and procedures, including details of fence and gate installation.
- C. Submit sample of fence fabric and typical accessories.

PART 2 PRODUCTS

2.1 GENERAL

- A. Products from other qualified manufacturers having a minimum of 5 years' experience manufacturing PVC fencing will be acceptable by the architect as equal, if approved in writing, ten days prior to bidding, and if they meet the following specifications for design, size, and fabrication. PVC Profiles, lineals, and extrusions used as components must "meet or exceed" the minimum performance guidelines laid out in ASTM 964.

2.2 PVC FENCE

- A. Pickets, rails, and posts fabricated from PVC extrusion. The PVC extrusions shall comply with ASTM D 1784, Class 14344B and have the following characteristics:

Specific Gravity (+/- 0.02)	1.4
Using 0.125 specimen Izod impact ft. lbs./in. notch	23.0
Tensile strength, PSI	6,910
Tensile modulus, PSI	336,000
Flexural yield strength, PSI	10,104
Flexural modulus, PSI	385,000
DTUL at 264 PSI	67°C

- B. All fence parts made from PVC shall have a minimum thickness of 0.17 in except where specified otherwise.

2.3 POST CAPS

- A. Molded, one piece.
- B. Cross Section: Match post or gate upright cross section.
- C. Thickness: 0.095" minimum.
- D. Configuration: Flat or four-sided as required for installation to top of posts and gate.

2.4 ACCESSORIES

- A. Standard gate brace, screw caps, rail end reinforcers, and other accessories as required.

2.5 MISCELLANEOUS MATERIALS

- A. Stiffener Chemicals: Galvanized steel structural channel. Configure channels for concealed installation within PVC rails with pre-drilled holes for drainage. Aluminum extruded channel available upon request.
 - 1. Cross Section: 3.00" x 3.00" x 1.500" hourglass shape to grip picket.
 - 2. Thickness: 0.040 Gauge (minimum)
- B. Fasteners and Anchorage: Stainless Steel. All fasteners to be concealed or colored heads to match. Provide sizes as recommended by fence manufacturer.
- C. PVC Cement: As recommended by fence manufacturer.

2.6 GATE HARDWARE AND ACCESSORIES

- A. General: Provide hardware and accessories for each gate according to the following requirements.
- B. Hinges: Size and material to suit gate size, non-lift-off type, self-closing, glass filled nylon with stainless steel adjuster plate, offset to permit 120 degree gate opening. Provide one pair of hinges for each gate.
 - 1. Stainless Steel, painted with carbo zinc base.
 - 2. Finish: Pre-painted, 2 coats "Polane."
 - 3. Color: Black Gravity Latch or dual access gravity latch.
- C. Latch: Manufacturers' standard self-latching, thumb latch, pre-finished steel, or stainless steel gravity latch. Provide one latch per gate.

1. Finish: Match gate hinge finish.
 - D. Hardware: Stainless Steel. Provide sizes as recommended by fence manufacturer.
 1. Finish: Match gate hinge finish.
- 2.7 **CONCRETE**
- A. Use Class 3000 concrete. Section 03 30 04.
- 2.8 **REINFORCING FOR FILLED POSTS**
- A. Steel Reinforcing:
 1. Steel Reinforcing Bars: ASTM A 615. Grade 60. Deformed (#4 or ½").
 2. Install 2 bars for each corner or gate post as specified in the drawings.

PART 3 EXECUTION

3.1 PREPARATION

- A. Locate and preserve utilities, Section 31 23 16.
- B. Excavation, Section 31 23 16.
- C. Review to ASTM F 567 and CLFMI products manual for chain link fence installation.
- D. Protect roots and branches of trees and plants to remain.
- E. Limit amount of clearing and grading along fence line to permit proper installation.

3.2 LAYOUT OF WORK

- A. Accurately locate and stake locations and points necessary for installation of fence and gates.
- B. General arrangements and location of fence and gates are indicated. Install except for minor changes required by unforeseen conflicts with work of other trades.

3.3 INSTALLATION – GENERAL

- A. Install fence in compliance with manufacturer's written instructions.
- B. PVC components shall be carefully handled and stored to avoid contact with abrasive surfaces.
- C. Install components in sequence as recommended by fence manufacturer.
- D. Install fencing as indicated on the drawings provided.
- E. Variations from the installation indicated must be approved.
- F. Variations from the fence and gate installation indicated and all costs for removal and replacement will be the responsibility of the CONTRACTOR.

3.4 INSTALLATION OF POSTS

- A. Excavation
 1. Drill or hand-excavate (using post hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.

2. If not indicated on drawings, excavate holes for each post to a minimum diameter of 12 inches.
3. Unless otherwise indicated, excavate hole depths not less than 30 inches or to frost line.

B. Posts

1. Install posts in one piece, plumb and in line. Space as noted in the drawings. Enlarge excavation as required to provide clearance indicated between post and side of excavation.
2. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment and hold in position during placement and finishing operations.
 - a. Unless otherwise indicated, terminate top of concrete footings 3 inches below adjacent grade and trowel to a crown to shed water.
 - b. Secure posts in position for manufacturer's recommendations until concrete sets.
 - c. After installation of rails and unless otherwise indicated, install reinforcing in posts in opposing corners of post as shown and fill end and gate posts with concrete to level as indicated. Concrete fill shall completely cover the reinforcing steel and gate hardware fasteners. Consolidate the concrete by striking the post face with a rubber mallet, carefully tamping around the exposed post bottom.
 - d. Install post caps. Use #8 screws, nylon washers and snap caps.
 - e. Remove concrete splatters from PVC fence materials with care to avoid scratching.

3.5 INSTALLATION OF RAILS

A. Top and Bottom Rails

1. Install rails in one piece into routed hole fabricated into posts to receive top and bottom rails, and middle where necessary. Except at sloping terrain, install rails level.
 - a. Prior to installation of rails into posts, insert concealed steel channel stiffeners in top rail, where necessary. Bottom rails shall include minimum 2- $\frac{1}{4}$ " drainage holes.
 - b. At posts to receive concrete fill, tape rail ends to prevent seepage when filling post with concrete.

B. Middle Rails:

1. Where necessary, install middle rails in one piece into routed hole in posts with larger holes facing down. Except at sloping terrain, install middle rails level. Secure mid rail to pickets with 2-#8 x 1- $\frac{1}{2}$ " screws evenly spaced.
 - a. At posts to receive concrete fill, tape rail ends to prevent seepage when filling post with concrete.

3.6 INSTALLATION OF FENCE FABRIC/PICKETS

- A. Pickets:** Install pickets in one piece as per manufacturer recommendations. Install pickets plumb.

3.7 INSTALLATION ON SLOPING TERRAIN

- A. At sloping terrain rails may be racked (sloped) or stepped to comply with manufacturer's recommendations.

3.8 INSTALLATION OF GATES

- A. Prior to installation of rails into posts, apply PVC cement into sockets per manufacturer's recommendations. Bottom rail shall include minimum 2-¼" drainage holes.
- B. Assemble gate prior to fence installation to accurately locate hinge and latch post. Align gate horizontal rails with fence horizontal rails.
- C. Install gates plumb, level, and secure for full opening without interference according to manufacturer's instructions.
- D. Gate Latch Installation. Install gate latch according to manufacturer's instructions.
- E. Allow minimum 72 hours to let concrete set-up before opening gates.

END OF SECTION

SECTION 32 92 00 M
TURF AND GRASS (Modified)

PART 1 GENERAL

1.3 SUBMITTALS

Add paragraph C as follows:

- C. Submit seed mix if proposing alternate seed mix show in paragraph 2.1.0 below.

PART 2 PRODUCTS

2.1 SEED

Add paragraph D as follows:

- D. Seed Mix:

<u>SEED #</u>	<u>BOTANICAL NAME</u>	<u>COMMON NAME</u>	<u>% by Weight</u>
1	Agropyron cristatum 'Fairway'	Fairway Crested Wheatgrass	15%
2	Agropyron riparium 'Sodar'	Streambank Wheatgrass	20%
3	Bromus inermis 'Manchar'	Smooth Brome	32%
4	Fescue rubra 'Fortress'	Red Fescue	25%
5	Poa compressa 'Reuben's'	Reuben's Canadian Bluegrass	6%
6	Trifolium repens	White Dutch Cover	2%

PART 3 EXECUTION

3.4 SEEDING

Revise paragraph A to read as follows:

- A. Apply seed at a rate of eight (8) pounds per 1,000 square feet evenly in two (2) intersecting directions. Rake in lightly.

Add Section 33 05 12 Conductive Trace Wire for Pipe Installation

**SECTION 33 05 12
CONDUCTIVE TRACER WIRE FOR PIPE INSTALLATION**

PART 1 GENERAL

1.1 SUMMARY

This section covers the requirements for installation of a conductive tracer wire with underground pipe.

1.2 SYSTEM DESCRIPTION

Install electrically continuous tracer wire with access points as described herein to be used for locating pipe with an electronic pipe locator after installation.

PART 2 PRODUCTS

- 2.1** Trace wire shall be twelve (12) gauge minimum solid copper with thermoplastic insulation recommended for direct burial. Wire connectors shall be 3M DBR, or approved equal, and shall be watertight and provide electrical continuity.

PART 3 EXECUTION

3.1 ERECTION / INSTALLATION / APPLICATION AND/OR CONSTRUCTION

- A. General: Trace wire shall be installed in the same trench and inside bored holes and casing with pipe during pipe installation. It shall be secured to the pipe as required to insure that the wire remains adjacent to the pipe. The trace wire shall be securely bonded together at all wire joints with an approved watertight connector to provide electrical continuity, and it shall be accessible at all new water valve boxes, water meter boxes, fire hydrants, sewer manholes, and sewer cleanouts as applicable to the utility line being installed.
- B. Manholes: The wire shall be installed from the exterior of the manhole to the interior by installing the wire underneath the manhole frame.
- C. Depth: For lines with more than 5 feet of cover, the wire shall be installed directly over the pipe at a depth of 5 feet.

3.2 TESTING

CONTRACTOR shall perform a continuity test on all trace wire in the presence of ENGINEER or ENGINEER'S representative.

3.3 REPAIR /RESORATION

If the trace wire is found to be not continuous after testing, CONTRACTOR shall repair or replace the failed segment of the wire.

END OF SECTION

**SECTION 33 05 25 M
PAVEMENT RESTORATION (Modified)**

PART 1 GENERAL

1.2 REFERENCES

Replace paragraph A to read as follows:

- A. **Fruit Heights City Public Works Standard Drawings**

PART 2 PRODUCTS

2.2 ASPHALT PAVEMENT

Revise paragraph A to read as follows:

- A. Permanent Warm Weather Asphalt Concrete: Section 32 12 05 M unless indicated otherwise.

Revise paragraph C to read as follows:

- C. Pavement Sealing:
1. Crack Seal: Section 32 01 17
 2. Chip Seal: Section 32 01 13.64 and 32 01 13.64 M.
 3. Fog Seal: Section 32 01 13.50.

PART 3 EXECUTION

3.5 ASPHALT PAVEMENT RESTORATION

Revise paragraphs A and B to read as follows:

- A. Follow Fruit Heights City Public Works Standard Drawings.
- B. Match existing pavement thickness or 4-inches minimum, whichever is greater.

SECTION 33 08 00 M
COMMISSIONING OF WATER UTILITIES (Modified)

PART 3 EXECUTION

3.5 INFILTRATION TEST

Revise paragraph A to read as follows:

- A. General: 150 gallons per inch diameter per mile per day. If the ground water table is less than two (2) feet above the crown of the pipe, the infiltration test is not required.

Revise Article 3.6 in its entirety to read as follows:

3.6 EXFILTRATION TEST

A. Non-Pressurized System:

- 1. General: Air test or hydrostatic test is CONTRACTOR's choice.
- 2. Air Test:
 - a. Plastic Pipe: ASTM F 1417.
 - (i) For pipe up to 30 inches diameter, pressure drop is 0.5 psi.
 - (ii) For pipe larger than 30 inches diameter, isolated joint test is 3.5 psi maximum pressure drop is 1.0 psi in 5 seconds.
 - b. Concrete Pipe:
 - (i) ASTM C 1214 for concrete pipe 4" to 24" diameter.
 - (ii) ASTM C 1103 for concrete pipe 27" and larger.
- 3. Hydrostatic Test: Provide air release taps at pipeline's highest elevations and expel all air before the test. Insert permanent plugs after test has been completed.
 - a. Plastic Pipe: ASTM F 2497.
 - b. Concrete Pipe: ASTM C 497. Abide by Section 3 and Section 16 in the ASTM standard and applicable recommendations of manufacturer.

B. Pressurized System:

- 1. Pressure Test: All newly laid pipe segments and their valves, unless otherwise specified, shall be subjected to a hydrostatic pressure test of 200 psi or 50 psi above working pressure, whichever is higher. The hydrostatic pressure test shall be conducted after the pipe segments have been partially backfilled.
- 2. Duration of Pressure Test: The duration of each hydrostatic pressure test shall be at least two (2) hours.
- 3. Test Procedure: Each pipe segment shall be slowly filled with water and the specified test pressure, measured at the point of lowest elevation, shall be applied by means of a pump connected to the pipe in a satisfactory manner. Testing against closed valves will be allowed. The pump, pipe connection, and all necessary apparatus including gauges

and meters shall be furnished by the CONTRACTOR. CONTRACTOR shall provide all labor and equipment necessary to perform the test.

4. Expelling Air Before Test: Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, air release mechanisms shall be installed, if necessary, at points of highest elevation, and afterwards tightly capped.
5. Examination Under Pressure: All pipes, fittings, valves, hydrants, joints, and other hardware will be subject to examination under pressure during the hydrostatic test. Any defective pipes, fittings, hydrants, valves, or other hardware discovered in consequence of this pressure test shall be removed and replaced by the CONTRACTOR with sound material, at no expense to the OWNER, and the test shall be repeated until the ENGINEER is satisfied.
6. No piping installation will be acceptable until the leakage is less than the amount allowed by industry standards for the type of pipe material being tested. Or, if no standard prevails, then the number of gallons per hour is determined by the formula:

$$Q = \frac{LD\sqrt{P}}{148,000}$$

Where: Q = allowable leakage, gallons per hour
 L = length of pipe under test, feet
 D = diameter of pipe, inches
 P = average test pressure, psig

SECTION 33 11 00 M
WATER DISTRIBUTION AND TRANSMISSION (Modified)

PART 1 GENERAL

1.2 REFERENCES

Revise paragraph B to read as follows:

B. Fruit Heights City Public Works Standard Drawings

Add to paragraph C. AWWA Standards:

C105	Polyethylene Encasement for Ductile Iron Pipe Systems
C110	Ductile-Iron and Gray-Iron Fittings
C111	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
C223	Fabricated Steel and Stainless Steel Tapping Sleeves
M14	AWWA Recommended Practice for Backflow Prevention and Cross-Connection Control

Add paragraph F as follows:

F. ANSI/NSF Standards:

61	Drinking Water System Components
----	----------------------------------

Add paragraph G as follows:

- G. Utah Administrative Code R309-550. Facility Design and Operation: Transmission and Distribution Pipelines**

1.3 PERFORMANCE REQUIREMENTS

Replace paragraph A with the following:

A. Depth of Cover:

1. Minimum as indicated on the drawings. If minimum cannot be achieved, contact ENGINEER.
2. Maximum of 72 inches unless indicated on the plans or approved by ENGINEER.

1.5 SITE CONDITIONS

Revise paragraph D to read as follows:

- D. Do not operate any water valve until its owner and water company's permission is secured.**

PART 2 PRODUCTS

2.1 PIPES AND FITTINGS

Revise paragraph A to read as follows:

- A. Provide piping materials and factory fabricated piping products of sizes, types, pressure ratings, and capacities indicated. Use only NSF 61 approved products in drinking water systems. All such products shall be appropriately stamped with the NSF logo.

Add paragraphs E and F as follows:

- E. Mechanical Joint Fittings: Ductile iron, Class 250
- F. Flanged Fittings: Ductile iron, Class 250

2.3 VALVE BOX

Revise paragraph A to read as follows:

- A. Buried Valves in Traffic Areas: Cast iron two (2) piece slip sleeve type, 5-1/4 inch shaft, with a drop lid, rated for HL-93 loading.

Revise paragraph C to read as follows:

- C. Markings: Potable water main line valves box covers shall contain the wording "FRUIT HEIGHTS WATER."

Add Articles 2.9 and 2.10 as follows:

2.9 TAPPING SLEEVE AND VALVE

- A. AWWA C223.
- B. Sleeve shall be full circumferential seat with all stainless steel tapping sleeve.
- C. Flanged outlet with flanged by MJ valve.

2.10 FIRE SPRINKLER/SUPPRESSION LINES

- A. Lines:
 - 1. Ductile iron, Class 51, or as approved in writing by OWNER or ENGINEER.
 - 2. Meet all specifications for main lines.
- B. Valve:
 - 1. All fire lines shall be equipped with an isolation gate valve located at the main line.

PART 3 EXECUTION

3.3 LAYOUT

Replace paragraph B with the following:

- B. The Utah Division of Drinking Water must grant an exception where a potable water line crosses under a sanitary sewer line.

3.4 INSTALLATION – PIPE AND FITTING

- A. General:

Add subparagraphs 3 through 7 as follows:

- 3. Encase all buried ductile iron valves, fitting, connections, and specialties in minimum 8 mil. polyethylene sheets in accordance with AWWA C105.
- 4. Waterline shall be laid and maintained to lines and grades established by the drawings, with fittings and valves at the required locations. Deviations as approved in writing by OWNER or ENGINEER.
- 5. Lay water lines on a continuous grade to avoid high points except as shown on the plans.
- 6. Cut edges and rough ends shall be ground smooth. Bevel end for push-on connections.
- 7. Do not drop pipe or fittings into trench.

Add paragraph I as follows:

- I. Tie-Ins:
 - 1. All tie-ins shall be made dry and not on a day proceeding a weekend or holiday.
 - 2. OWNER requires 48-hours' notice for water turn-off.
 - 3. At least 24-hours prior to a service disruption, CONTRACTOR shall notify all affected water users.
 - 4. Where shutting down a line is not feasible as determine by OWNER or ENGINEER, CONTRACTOR shall make a wet tap using a tapping sleeve and valve.

3.5 INSTALLATION – CONCRETE THRUST BLOCK

Revise paragraph A to read as follows:

- A. Fruit Heights City Public Works Standard Drawings.

3.8 INSTALLATION – TAPS

Revise paragraph A to read as follows:

- A. Fruit Heights City Public Works Standard Drawings.

3.9 INSTALLATION – SERVICE LINE

Revise paragraph C to read as follows:

- C. Meter Box: Fruit Heights City Public Works Standard Drawings.

Add paragraph D as follows:

- D. New Water Service Line

- 1. 1" Service

- a. All service lines must be of one continuous copper tube between the corp stop and the meter yoke. No joints or copper to copper connectors are allowed.

- 2. 1.5" and 2" Services

- a. All service lines must be of one continuous poly pipe and tracer wire between the corp stop on the saddle and the meter yoke. No joints or couplings are allowed.

3.10 INSTALLATION – WATERMAIN LOOP (SYPHON)

Revise paragraph A to read as follows:

- A. Fruit Heights City Public Works Standard Drawings.

3.12 BACKFILLING

- B. Trenches: Section 33 05 20:

Revise subparagraphs 1 and 2 to read as follows:

- 1. Pipe zone backfill, Fruit Heights City Public Works Standard Drawings.
 - 2. Trench backfill, Fruit Heights City Public Works Standard Drawings.

3.13 SURFACING RESTORATION

- A. Roadway Trenches and Patches: Section 33 05 25:

Revise subparagraphs 1 and 2 to read as follows:

- 1. Asphalt concrete patch, Fruit Heights City Public Works Standard Drawings.
 - 2. Concrete pavement patch, contact OWNER for instructions.

Add new Article 3.14 as follows:

3.14 FIRE SPRINKLER/SUPPRESSION LINES

- A. Notify OWNER 48 hours prior to installation.
- B. Unless written authorization is given by OWNER, no services shall be connected to the fire sprinkler/suppression lines.
- C. Location: As approved by OWNER.

**SECTION 33 12 16 M
WATER VALVES (Modified)**

PART 1 GENERAL

1.2 REFERENCES

Modify the fourth (4th) item in paragraph A to read as follows:

C509 Resilient-Seated Gate Valves for Water Supply Service

Add paragraph B as follows:

B. Fruit Heights City Public Works Standard Drawings

PART 2 PRODUCTS

2.1 VALVES – GENERAL

A. Underground:

Add subparagraph 3 as follows:

3. Valves over five (5) feet in depth shall have a valve nut extension stem.

2.2 GATE VALVES

Add paragraph D as follows:

D. Model: Mueller A-2361

Add Article 2.10 as follows:

2.10 AIR/VACUUM RELIEF VALVES

- A. Operation: Relieve air build-up and/or allow intrusion of air to prevent vacuum conditions within pipe.
- B. Location: Valve and vent placement location as approved by OWNER or ENGINEER.
- C. Connection: Service saddle.

PART 3 EXECUTION

3.1 INSTALLATION

Add paragraphs D, E, and F as follows:

- D. Prior to installation, inspect valves for direction of opening, freedom of operation, tightness of pressure-containing bolting, and cleanliness of valve ports and seating surfaces.
- E. Examine all valves for damage or defects immediately prior to installation.
- F. Mark and hold defective materials for inspection by OWNER or ENGINEER. Replace rejected materials.

**SECTION 33 12 19 M
HYDRANTS (Modified)**

PART 1 GENERAL

1.2 REFERENCES

Revise paragraph A to read as follows:

- A. **Fruit Heights City Public Works Standard Drawings**

PART 2 PRODUCTS

2.1 DRY-BARREL FIRE HYDRANT

Add paragraph C as follows:

- C. Model: Mueller Super Centurion, Clow Medallion, or Waterous.

2.2 VALVES

Revise paragraph A to read as follows:

- C. Gate Valve: Section 33 12 16.

2.3 ACCESSORIES

Revise paragraph D to read as follows:

- D. Valve Box, Valve Chamber: Section 33 11 00.

PART 3 EXECUTION

3.2 INSTALLATION

Revise paragraph A to read as follows:

- C. Install hydrant according to Fruit Heights City Public Works Standard Drawings and AWWA M17.

Revise paragraph H to read as follows:

- H. Install thrust block according to Fruit Heights City Public Works Standard Drawings.

SECTION 33 12 33 M
WATER METER (Modified)

PART 1 GENERAL

1.2 REFERENCES

Add paragraph B as follows:

- E. **Fruit Heights City Public Works Standard Drawings.**

PART 2 PRODUCTS

2.2 METERS FOR SERVICE PIPING

Revise paragraph A to read as follows:

- F. **OWNER shall supply and set all meters. CONTRACTOR/DEVELOPER/BUILDER shall pay for all meter costs.**

2.3 SERVICE LINE, VALVES, AND FITTINGS

Revise paragraph A to read as follows:

- A. **Service Pipe: Type K Copper, Section 33 05 03, with compression copper fittings made of brass.**

Revise paragraph B to read as follows:

- B. **Service Valves and Fittings:**
1. **AWWA C800.**
 2. **1-Inch Service Laterals – Brass corporation stops with CC thread.**
 3. **1.5-Inch and 2-Inch Service Laterals – Stainless steel compression fittings (ball valves, strainers, nipples, tees, bends, etc.).**
 4. **Greater than 2-Inch – Coordinate with and obtain approval from OWNER and ENGINEER.**

Replace Article 2.4 with the following:

2.4 METER BOXES

- A. **See Fruit Heights City Public Works Standard Drawings.**

PART 3 EXECUTION

3.1 INSTALLATION

Revise paragraph D to read as follows:

D. OWNER Supplied Meters: Installed by OWNER unless indicated otherwise.

Add paragraphs E and F as follows:

- E. Install one solid piece of copper pipe from main to meter.
- F. Install service laterals with 48-inches of cover, minimum.

SECTION 33 13 00 M
DISINFECTION (Modified)

PART 1 GENERAL

1.2 REFERENCES

Modify paragraph B to read as follows:

- B. Utah Administrative Code
R309 Drinking Water

Add paragraph C as follows:

- C. NSF/ANSI Standards:
60 Drinking Water Treatment Chemicals – Health Effects

Add paragraph D as follows:

- D. Utah Administrative Code R309-520. Facility Design and Operation: Disinfection

1.4 SUBMITTALS

Delete paragraphs B, C, and D in their entirety.

Add Article 1.8 as follows:

1.8 WORK PERFORMED BY OWNER

- A. OWNER will perform bacteriological and high chlorine sampling and testing. CONTRACTOR shall provide all other work associated with this Section.

PART 2 PRODUCTS

1.1 DISINFECTANT

Add paragraph E as follows:

- E. All products shall comply with NSF/ANSI 60.

PART 3 EXECUTION

3.1 PREPARATION

Add paragraphs C and D as follows:

- C. Notify OWNER at least 72 hours prior to any flushing or disinfecting.
- D. Install temporary connections for flushing water lines after disinfection. After the satisfactory completion of the flushing work, remove and plug the temporary connection.

3.2 DISINFECTION OF WATER LINES

Revise paragraph D to read as follows:

- D. Coordinate with OWNER to collect a bacteriological water sample at end of line to be tested. If sample fails bacteriological test, flush system and retest. Continue flushing and retesting until sample passes test.

Revise paragraph G to read as follows:

- G. After a passing bacteriological test sample is obtained, let the system relax for 24 hours. Flush and coordinate with OWNER to collect a subsequent bacteriological sample for testing. If the subsequent test passes, then water line is acceptable.

3.5 FIELD QUALITY CONTROL

- A. Bacteriological Test:

Revise subparagraphs 1 and 2 to read as follows:

1. Coordinate with OWNER to collect samples for testing no sooner than 16 hours after system flushing.
2. OWNER will have water samples analyzed per State of Utah requirements.

Add Article 3.6 as follows:

3.6 SPECIAL PROCEDURE FOR TAPPING SLEEVES

- A. Before a tapping sleeve is installed, the exterior of the main to be tapped shall be thoroughly cleaned, and the interior surface of the sleeve shall be lightly dusted with calcium hypochlorite powder.

APPENDIX D - FRUIT HEIGHTS CITY PUBLIC WORKS STANDARD DRAWINGS

FRUIT HEIGHTS CITY CORPORATION

PUBLIC WORKS STANDARD

DRAWINGS

SUBMITTED & RECOMMENDED

ZAC J. BURK P.E.
FRUIT HEIGHTS CITY ENGINEER

SEAL

APPROVAL

JOHN POHLMAN
FRUIT HEIGHTS CITY MAYOR

DATE

DARREN FRANSEN
FRUIT HEIGHTS CITY MANAGER

DATE

LAYNE LEONARD
FRUIT HEIGHTS CITY PUBLIC WORKS DIRECTOR

DATE

ATTEST, CITY RECORDER

DATE

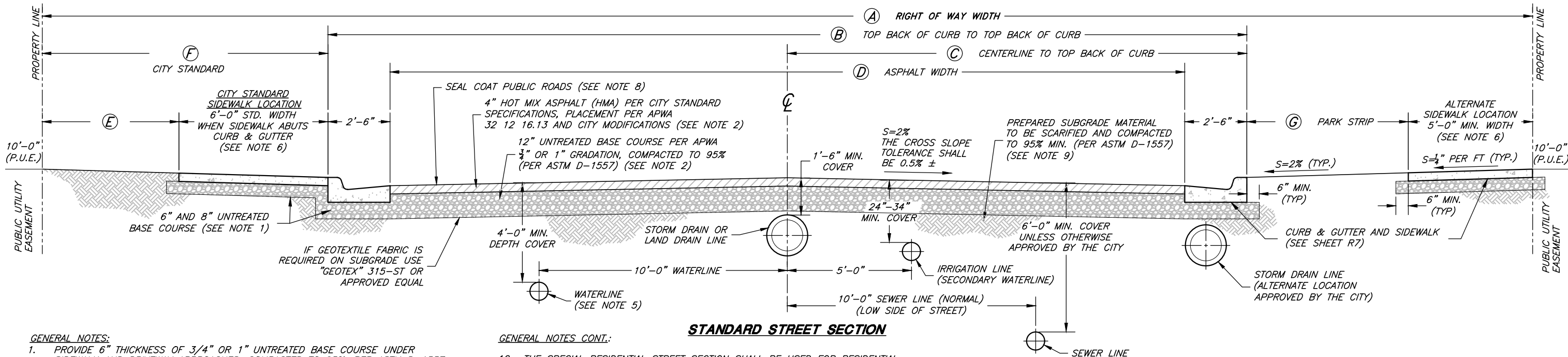


- SPECIAL STANDARD NOTES:**
- A. THE CITY ADOPTS THE FOLLOWING AS STANDARDS FOR ALL ISSUES RELATED TO THE DESIGN, CONSTRUCTION, AND MAINTENANCE OF IMPROVEMENTS NOT SPECIFICALLY COVERED BY THIS MANUAL:
1. APWA: MANUAL OF STANDARD SPECIFICATIONS (CURRENT EDITION) AND ALL ADOPTED AMENDMENTS
 2. APWA: MANUAL OF STANDARD PLANS (CURRENT EDITION)
- B. AS TO ANY PARTICULAR ISSUE, IF A CONFLICT EXISTS BETWEEN ANY OF THE FOREGOING STANDARDS, THE CITY STANDARDS TAKE PRECEDENCE.
- C. AT THE CITY'S SOLE DISCRETION, ALTERNATE METHODS OF CONSTRUCTION OR DEVIATIONS FROM THESE STANDARDS MAY BE REQUIRED OR APPROVED BY THE CITY ENGINEER AND PUBLIC WORKS DIRECTOR (OR THEIR DESIGNEE), WHEN SUCH ARE NECESSARY TO MEET THE BEST INTERESTS OF THE CITY.
- D. WHEN CITY APPROVAL IS REQUIRED, IT SHALL MEAN APPROVAL FROM THE ADMINISTRATIVE LAND USE AUTHORITY, PUBLIC WORKS DIRECTOR, CITY ENGINEER, OR THEIR DESIGNEE.

APRIL 2024

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R2.....	TYPICAL STREET INTERSECTION, UTILITY LATERAL CONFIGURATION, AND STREET MONUMENT DETAILS
R3.....	TYPICAL DRIVE APPROACH DETAILS
R4.....	TYPICAL ADA RAMP DETAILS
R5.....	CUL-DE-SAC & TEMPORARY TURNAROUND DETAILS
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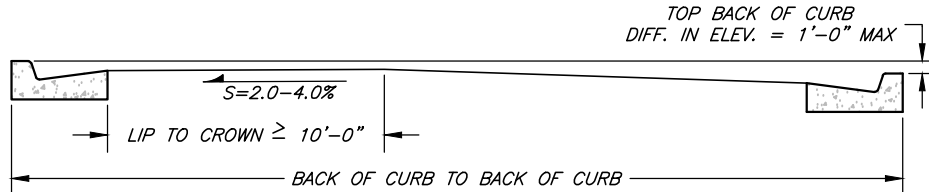
GENERAL NOTES:

1. PROVIDE 6" THICKNESS OF 3/4" OR 1" UNTREATED BASE COURSE UNDER SIDEWALK AND DRIVEWAY APPROACHES, COMPACTED TO 95%, PER ASTM D-1557.

PROVIDE 8" THICKNESS OF 3/4" OR 1" UNTREATED BASE COURSE UNDER CURB & GUTTER, COMPACTED TO 95%, PER ASTM D-1557.
2. THE PAVEMENT THICKNESS SHALL BE CONSIDERED AS CITY MINIMUMS AND MAY BE REQUIRED TO BE ADJUSTED WHEN A GREATER DEPTH IS NECESSARY TO PROVIDE STABILITY. OR PER THE GEOTECHNICAL REPORT OR CITY. DESIGNER AND/OR DEVELOPER MAY SUBMIT AN ALTERNATIVE PAVEMENT DESIGN BASED ON A DETAILED SOILS ANALYSIS FOR APPROVAL BY THE CITY WHICH MAY MODIFY PAVEMENT THICKNESS, BUT IN NO CASE SHALL THE BITUMINOUS SURFACE COURSE BE LESS THAN 4" THICK AND UNTREATED BASE COURSE LESS THAN 12" THICK. GRANULAR BORROW THICKNESS PER GEOTECHNICAL REPORT.
3. ALL ROAD CUTS SHALL BE PATCHED PER SHEET R8 AND SHEET R9
4. CURB & GUTTER AND SIDEWALKS SHALL BE CONSTRUCTED USING FIBER REINFORCED CONCRETE AND IN COMPLIANCE WITH FRUIT HEIGHTS CITY TECHNICAL SPECIFICATIONS AND THESE DRAWINGS.
5. ALL CULINARY WATER MAINS AND SERVICES MUST MAINTAIN A MINIMUM SEPARATION FROM ALL SEWER MAINS AND LATERALS OF 10'-0" HORIZONTAL AND 18" VERTICAL IN ACCORDANCE WITH THE STATE OF UTAH DIVISION OF DRINKING WATER RULES SECTION R309-550-7
6. THE 6'-0" SIDEWALK AGAINST THE BACK OF CURB (TBC) SHOWN ABOVE IS TO BE CONSIDERED THE "CITY STANDARD." OTHER LOCATIONS AND TYPES OF SIDEWALK AS REQUESTED BY THE DEVELOPER MUST BE APPROVED BY THE CITY. SIDEWALK TO BE A MINIMUM OF 4" THICK (6" THICK THROUGH DRIVEWAY APPROACHES & ADA RAMPS)
7. NATURAL GAS TYPICALLY LOCATED BEHIND THE SIDEWALK OR IN THE PARK STRIP, POWER AND COMMUNICATION LINES TYPICALLY LOCATED BEHIND PROPERTY LINES OR IN LOT EASEMENTS.
8. "SEAL COAT" CONSISTS OF THE FOLLOWING:
a. CHIP SEAL PER APWA 32 01 13.64 AND CITY MODIFICATIONS, AND
b. FOG SEAL PER APWA 32 01 13.50
9. IMPORTED FILL UNDER ROADWAY SHALL BE GRANULAR BORROW, 2" MAX.
10. ALL EARTHWORK SHALL BE SUBJECT TO SOIL TESTING.
11. PARK-STRIPS: IN ORDER TO ACCOMMODATE UTILITY MAINTENANCE, REPAIR, CONSTRUCTION OR REPLACEMENT, HARD SURFACING SUCH AS CONCRETE, STAMPED CONCRETE, ASPHALT, TREES, OR HEDGES ARE NOT ALLOWED IN PARK-STRIP AREAS. ANY PROTECTIVE COVERING IN THE PARK-STRIP MUST BE LIMITED TO MATERIALS SUCH AS PAVERS, BARK, DECORATIVE ROCK, SOD, FLOWERS OR OTHER LOW GROWING PLANTS COMMONLY USED FOR LANDSCAPING. HARD SURFACING MATERIAL MAY BE ALLOWED AFTER CONSIDERATION OF SPECIAL CONDITIONS AND ONLY WHEN APPROVED BY THE CITY.

GENERAL NOTES CONT.:

12. THE SPECIAL RESIDENTIAL STREET SECTION SHALL BE USED FOR RESIDENTIAL ROADWAYS THAT QUALIFY TO BE WIDER (AS PER UTAH CODE 10-9A-508(51)). THE CITY CAN REQUIRE THE INSTALLATION OF PAVEMENT IN EXCESS OF 32'-0" FOR RESIDENTIAL ROADS THAT MEET THE FOLLOWING CONDITIONS:
 - TO ADDRESS SPECIFIC TRAFFIC FLOW CONSTRAINTS AT AN INTERSECTION, MID-BLOCK CROSSINGS, OR OTHER AREAS;
 - TO ADDRESS AN APPLICABLE GENERAL OR MASTER PLAN IMPROVEMENT, INCLUDING TRANSPORTATION, BICYCLE LANES, TRAILS, OR OTHER SIMILAR IMPROVEMENTS THAT ARE NOT INCLUDED WITHIN AN IMPACT FEE AREA;
 - TO ADDRESS TRAFFIC FLOW CONSTRAINTS FOR SERVICE TO OR ABUTTING HIGHER DENSITY DEVELOPMENTS OR USES THAT GENERATE HIGHER TRAFFIC VOLUMES, INCLUDING COMMUNITY CENTERS, SCHOOLS, AND OTHER SIMILAR USES;
 - AS NEEDED FOR THE INSTALLATION OR LOCATION OF A UTILITY WHICH IS MAINTAINED BY THE MUNICIPALITY AND IS CONSIDERED A TRANSMISSION LINE OR REQUIRES ADDITIONAL ROADWAY WIDTH;
 - FOR THIRD-PARTY UTILITY LINES THAT HAVE AN EASEMENT PREVENTING THE INSTALLATION OF UTILITIES MAINTAINED BY THE MUNICIPALITY WITHIN THE ROADWAY;
 - FOR UTILITIES OVER 12'-0" IN DEPTH;
 - FOR ROADWAYS WITH A DESIGN SPEED THAT EXCEEDS 25 MILES PER HOUR;
 - AS NEEDED FOR FLOOD AND STORMWATER ROUTING;
 - AS NEEDED TO MEET FIRE CODE REQUIREMENTS FOR PARKING AND HYDRANTS;
 - OR AS NEEDED TO ACCOMMODATE STREET PARKING.



CROWN LOCATION FOR VARIOUS CROSS SLOPES

CROWN NOTES:

- A. MAXIMUM DIFFERENCE IN ELEVATION BETWEEN CURBS ON OPPOSITE SIDES OF THE STREET SHALL NOT EXCEED 1'-0" AS SHOWN IN DETAIL.
- B. ON CERTAIN STREETS APPROVED BY THE THE CITY ADMINISTRATIVE LAND USE AUTHORITY, THE CITY WILL PROVIDE A PAVEMENT DESIGN. LOCATION OF SIDEWALK AND CURB & GUTTER MAY VARY PER DIRECTION OF THE CITY.
- C. ALL OTHER PROPOSED STREET CROSS SECTIONS SHALL BE APPROVED BY THE CITY.

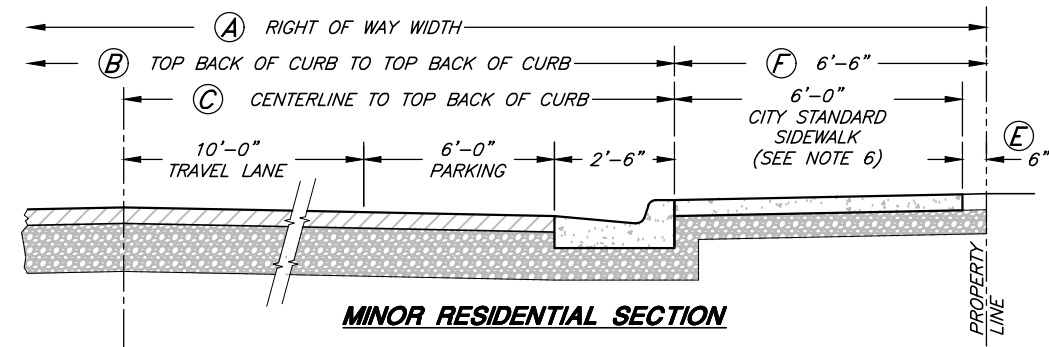
STANDARD STREET SECTION

CURBED ROAD SECTION

STREET DESIGNATION	R.O.W. WIDTH A	T.B.C. TO T.B.C. B	CENTERLINE TO T.B.C. C	ASPHALT WIDTH D	SIDEWALK TO PROPERTY LINE E	T.B.C. TO PROPERTY LINE F	PARK STRIP G
MINOR RESIDENTIAL (SEE NOTE A2 & DETAIL THIS SHEET)	50'-0"	37'-0"	18'-6"	32'-0"	6"	6'-6"	NA
LOCAL RESIDENTIAL	60'-0"	37'-0"	18'-6"	32'-0"	5'-6"	11'-6"	6'-6"
SPECIAL RESIDENTIAL (SEE GENERAL NOTE 12)	60'-0"	41'-0"	20'-6"	36'-0"	3'-6"	9'-6"	4'-6"
COLLECTOR	66'-0"	47'-0"	23'-6"	42'-0"	3'-6"	9'-6"	4'-6"

CURBED ROAD SECTION NOTES:

- A1. ROAD SECTION REQUIRED SHALL BE DETERMINED BY THE CITY BASED UPON ZONING, GENERAL PLAN, MASTER PLAN, SIZE OF DEVELOPMENT, ESTIMATED TRAFFIC VOLUME, AND AMOUNT OF OPEN SPACE ASSOCIATED WITH DEVELOPMENTS, AS WELL AS THE PROXIMITY TO HIGH VOLUME ROADS OR COMMERCIAL ZONING.
- A2. CAN ONLY BE USED FOR CUL-DE-SACS, WHERE RECOMMENDED AND APPROVED BY THE CITY.



MINOR RESIDENTIAL SECTION

CITY ENGINEER	REV.	DATE	APPR.
APRIL 2024			
DATE			

SCALE:

N.T.S.



CONSULTING ENGINEERS

6080 Fashion Point Drive
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FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS - ROAD IMPROVEMENT STANDARDS

TYPICAL STREET SECTION DETAILS

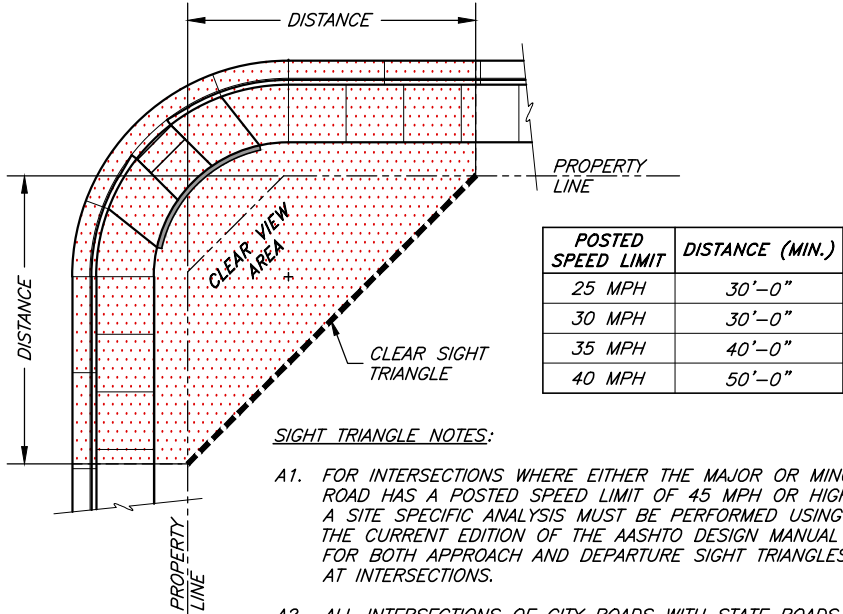
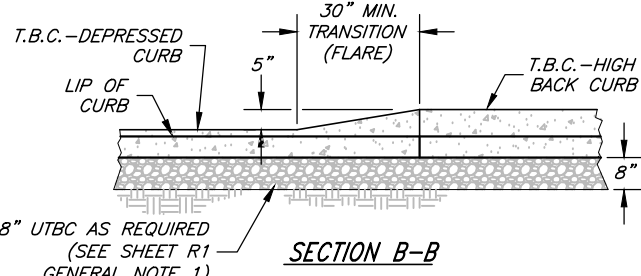
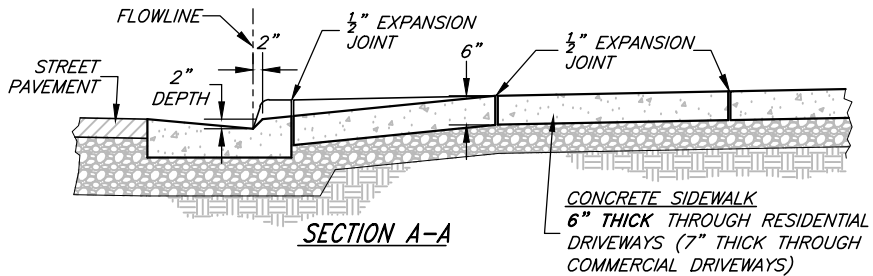
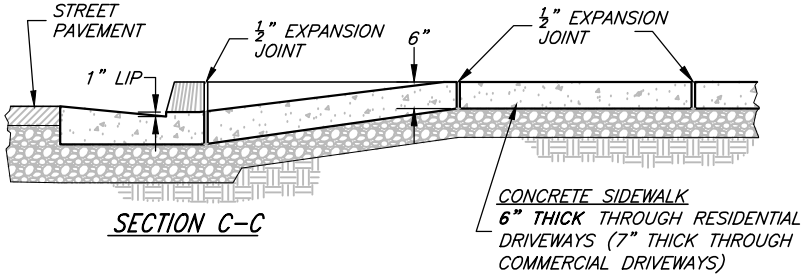
SHEET:

R1

OF 28 SHEETS
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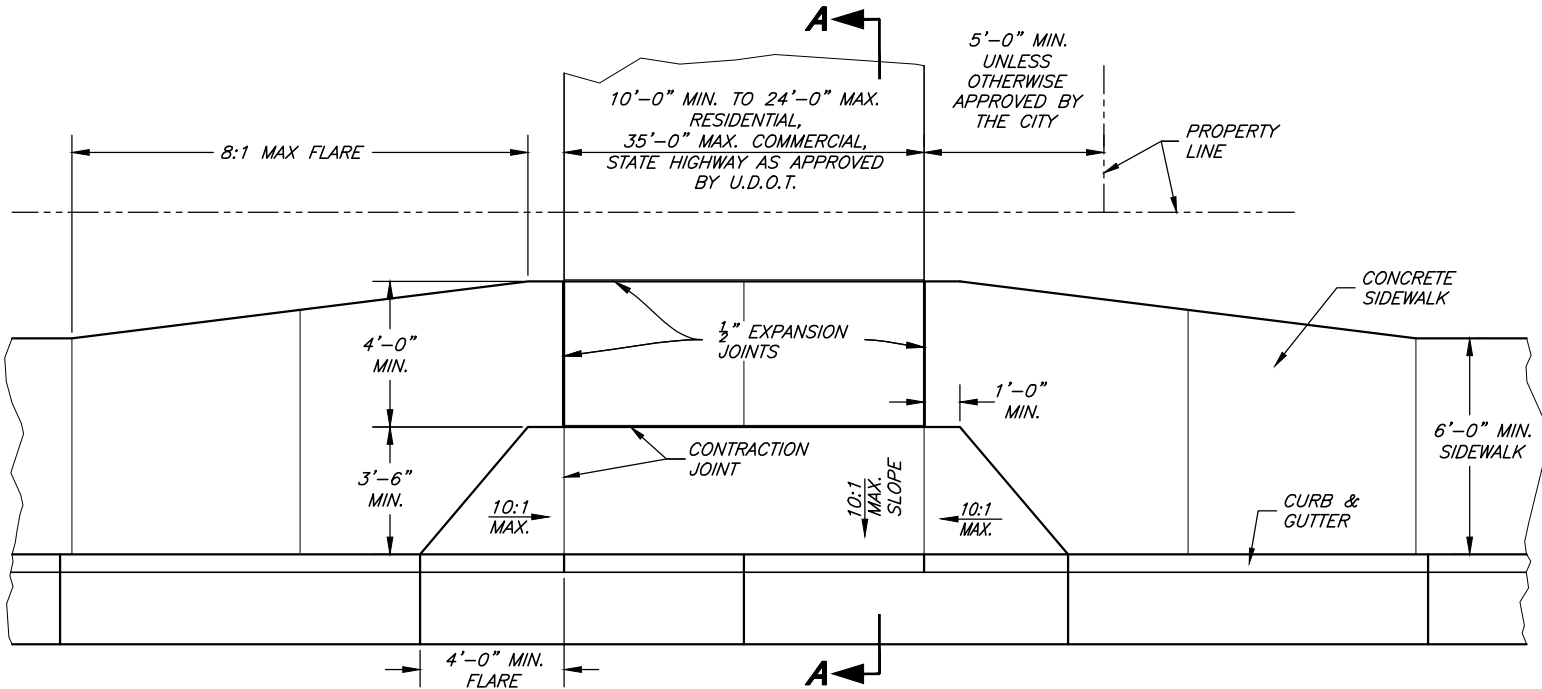
DRIVEWAY APPROACH NOTES:

1. IN NEW DEVELOPMENTS WHERE FUTURE DRIVEWAY LOCATIONS ARE UNKNOWN, THE DRIVEWAY APPROACH SHALL BE MADE BY SAW CUTTING THE BACK OF THE EXISTING CURB TO THE REQUIRED DRIVEWAY WIDTH. ALL SAW CUTTING SHALL BE ACCOMPLISHED BY A CITY APPROVED LICENSED CONTRACTOR.
2. APPROACHES SHALL NOT BE ALLOWED ON CORNER LOTS WITHIN THE CLEAR VIEW AREA. (SEE CLEAR VIEW DETAIL THIS SHEET)
3. IF A RESIDENTIAL LOT HAS TWO FRONTAGES AND ONE OF THOSE FRONTAGES IS LOCATED ON A COLLECTOR OR ARTERIAL STREET, THE DRIVEWAY SHALL BE LOCATED ON THE RESIDENTIAL STREET ONLY. NO DRIVEWAY ACCESS WILL BE PERMITTED ONTO THE COLLECTOR OR ARTERIAL STREET.
4. SCORE SIDEWALK 1/4" OF SIDEWALK THICKNESS AT EACH 6'-0" OR 5'-0" SECTION. EXPANSION JOINTS AT EACH 48'-0" (6'-0" SIDEWALK) OR 50'-0" (5'-0" SIDEWALK), PROVIDE ADDITIONAL CONTRACTION JOINTS ON OVERSIZED DRIVEWAYS.
5. STAMPED CONCRETE OR PAVERS ARE NOT ALLOWED WITHIN THE DRIVE APPROACH AREA.

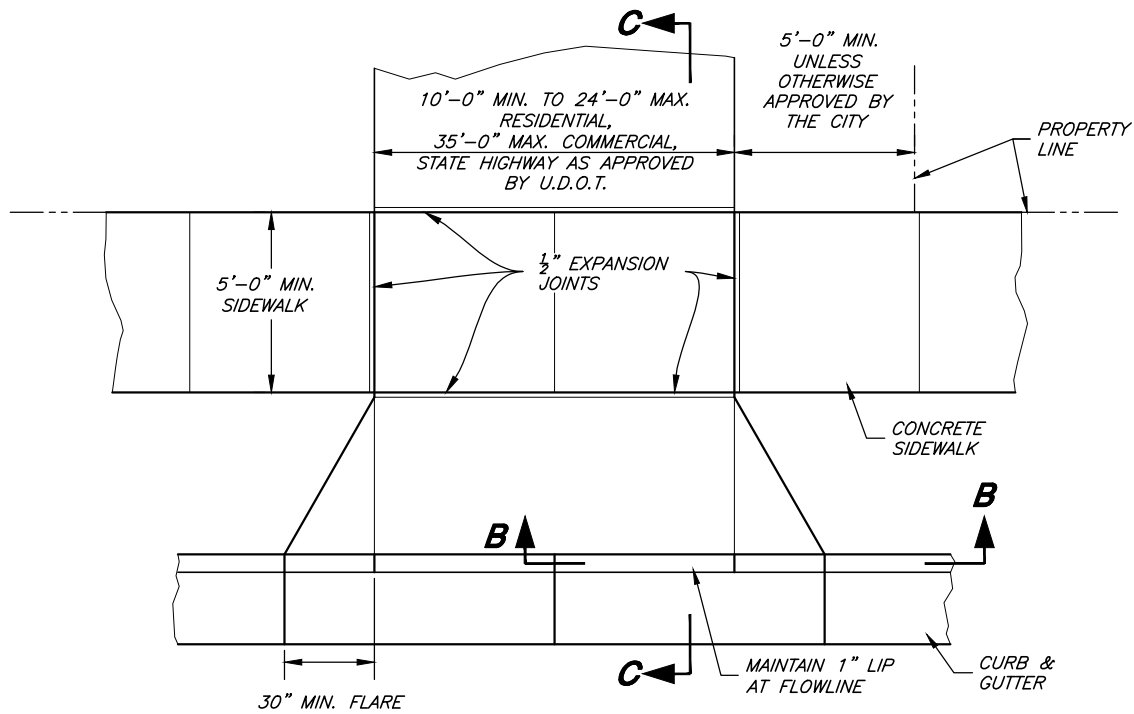


- SIGHT TRIANGLE NOTES:
- A1. FOR INTERSECTIONS WHERE EITHER THE MAJOR OR MINOR ROAD HAS A POSTED SPEED LIMIT OF 45 MPH OR HIGHER A SITE SPECIFIC ANALYSIS MUST BE PERFORMED USING THE CURRENT EDITION OF THE AASHTO DESIGN MANUAL FOR BOTH APPROACH AND DEPARTURE SIGHT TRIANGLES AT INTERSECTIONS.
 - A2. ALL INTERSECTIONS OF CITY ROADS WITH STATE ROADS MUST MEET UDOT SIGHT TRIANGLE REQUIREMENTS.
 - A3. DRIVEWAYS DIRECTLY CONNECTED TO ROADS WITH SPEED LIMITS OF 30 MPH OR HIGHER ARE SUBJECT TO THE SAME REQUIREMENTS FOR SIGHT TRIANGLES AS AN INTERSECTION.

INTERSECTION SIGHT TRIANGLES



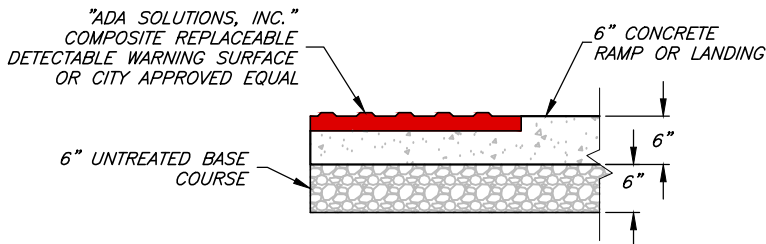
DRIVEWAY APPROACH W/ ADJACENT SIDEWALK
CITY STANDARD



DRIVEWAY APPROACH W/ PARK STRIP
DROP DOWN STYLE (ALTERNATE SIDEWALK LOCATION)

DETECTABLE WARNING SURFACE NOTES:

1. LOCATE THE DETECTABLE WARNING SURFACE SO THE OUTSIDE CORNER NEAREST THE STREET IS WITHIN 1" OF THE BACK OF CURB (TBC). PROVIDE 2'-0" MINIMUM DEPTH.
2. PROVIDE DETECTABLE WARNING SURFACE FOR FULL WIDTH OF CURB CUT.
3. THE DETECTABLE WARNING SURFACE DOMES SHALL BE ORIENTED SUCH THAT THE ROWS ARE PARALLEL WITH THE DIRECTION OF PEDESTRIAN TRAVEL TO THE RAMP ON THE OPPOSITE SIDE OF THE STREET.
4. THE STANDARD COLOR FOR THE DETECTABLE WARNING SURFACE SHALL BE RED OR PRE-APPROVED CONTRASTING COLOR. WHEN THE EXISTING SIDEWALK COLOR IS NOT STANDARD CONCRETE, THE COLOR OF THE DETECTABLE WARNING SURFACE SHALL BE DETERMINED BY THE CITY.
5. WHEN A DETECTABLE WARNING SURFACE DOME IS CUT, THE REMAINING PORTION OF THE DOME SHALL BE BEVELED TO A MAXIMUM SLOPE OF 1:2.



DETECTABLE WARNING SURFACE DETAIL

ADA RAMP NOTES:

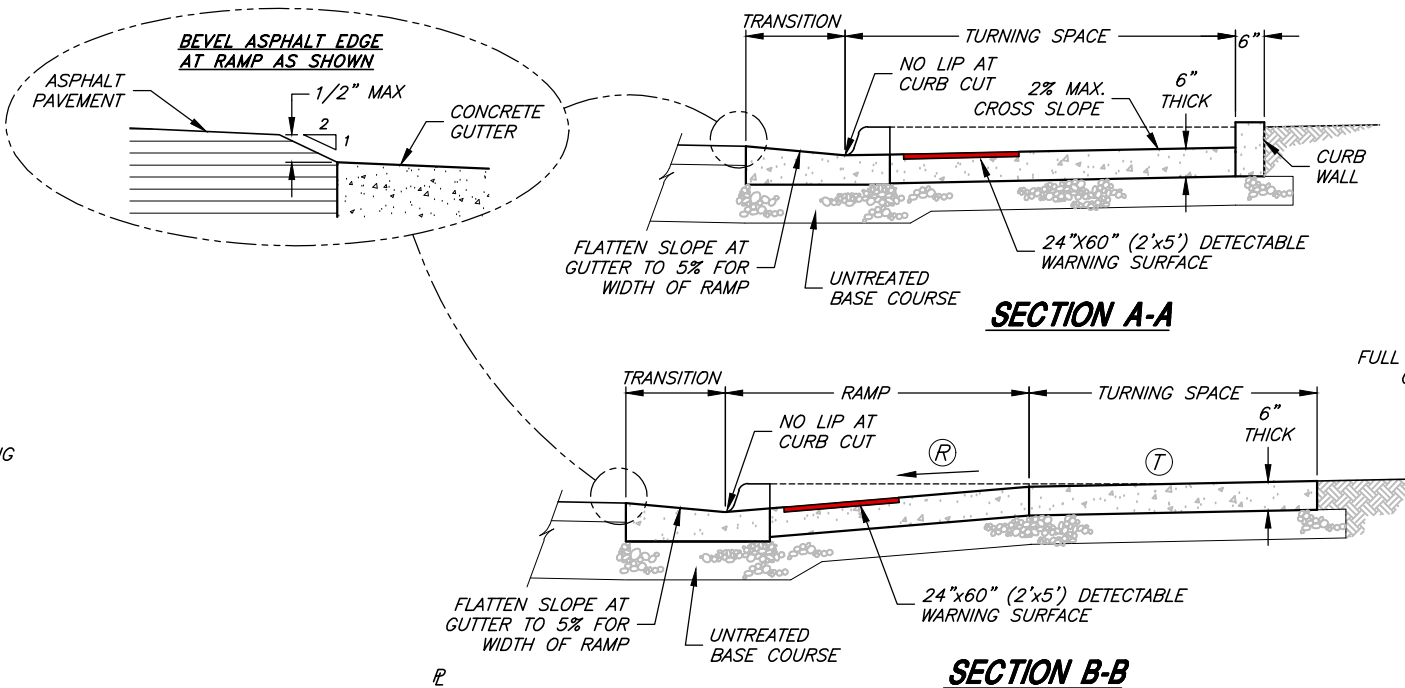
- A. WHERE DESIGNATED BY THE CITY, ALTERNATE UDOT OR APWA RAMP DESIGNS MAY BE USED WITH THE PRIOR APPROVAL OF THE CITY. SUBMIT ENGINEERED CONSTRUCTION PLANS TO THE CITY FOR REVIEW AND ACCEPTANCE PRIOR TO CONSTRUCTION.
- B. SITE CONDITIONS WILL VARY. CONFIGURATION OF RAMP, LANDING, AND TRANSITION MAY BE CHANGED, BUT THEY MUST MEET DIMENSIONS AND SLOPES AS SHOWN IN THE MOST RECENT EDITION OF THE U.D.O.T. STANDARDS & SPECIFICATIONS. THE USE OF FLARES, CURB WALLS, ETC. ARE AT THE DISCRETION OF THE ENGINEER.
- C. LOCATE CURB CUT WITHIN CROSSWALK.
- D. RAMP GRADE BREAK MUST BE PERPENDICULAR TO THE RUNNING SLOPE.
- E. DIRECTIONAL (DUAL PARALLEL) RAMPS ARE REQUIRED ON COLLECTOR AND ARTERIAL ROADS.

SLOPE TABLE			
	ITEM	MAX RUNNING SLOPE*	MAX. CROSS SLOPE*
T	TURNING SPACE ²	2% (1V:48H)	2% (1V:48H)
R	RAMP	8.3% (1V:12H)	2% (1V:48H)
S	SIDEWALK	5% (1:20) ¹	2% (1V:48H)
F1	TRAVERSABLE SURFACE	10% (1V:10H)	--
F2	NON-TRAVERSABLE SURFACE	25% (1V:4H)	--
B	BLENDED TRANSITION	5% (1V:20H) 2% MIN.	2% (1V:48H)

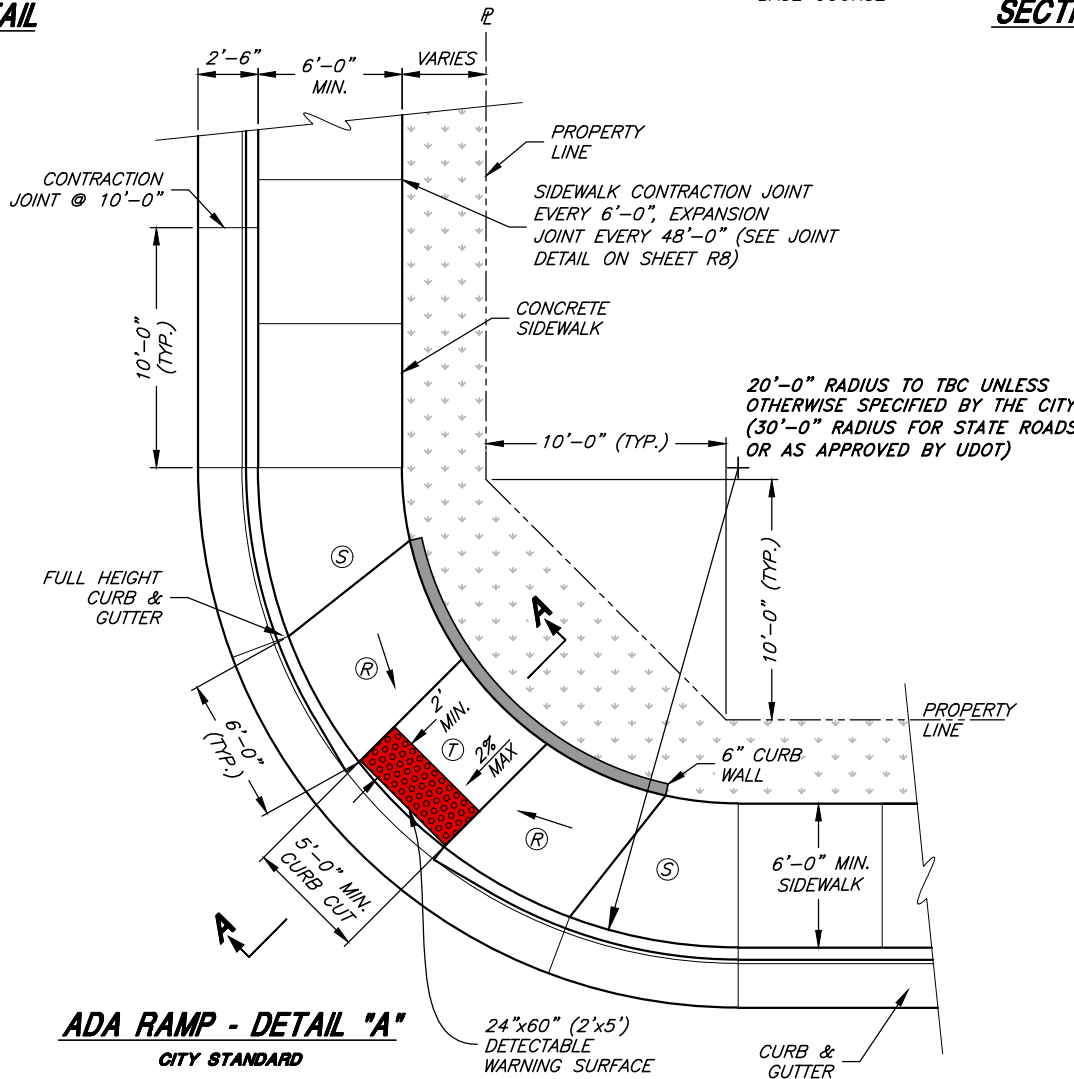
* RUNNING SLOPE IS IN THE DIRECTION OF PEDESTRIAN TRAVEL. CROSS SLOPE IS PERPENDICULAR TO PEDESTRIAN TRAVEL.

¹ 5% MAX OR NATURAL SLOPE OF LAND

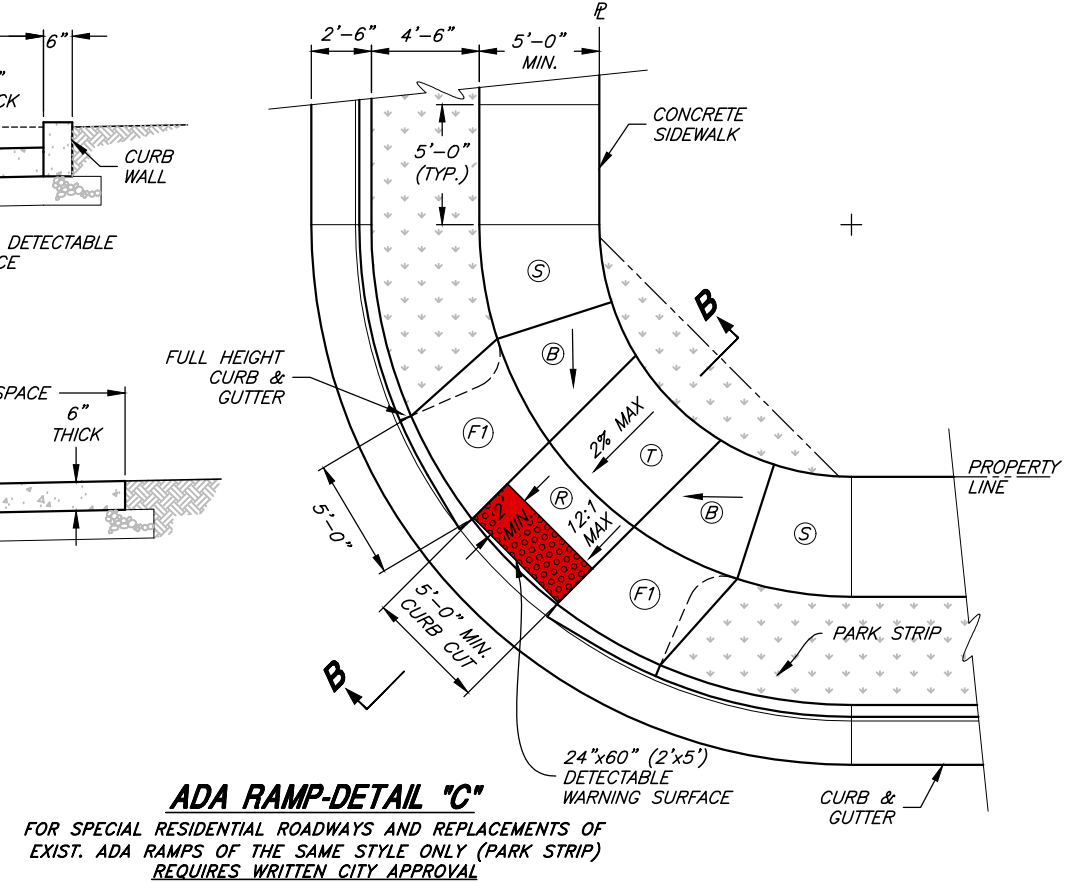
² NOT TO EXCEED 2% IN ANY DIRECTION



SECTION B-B

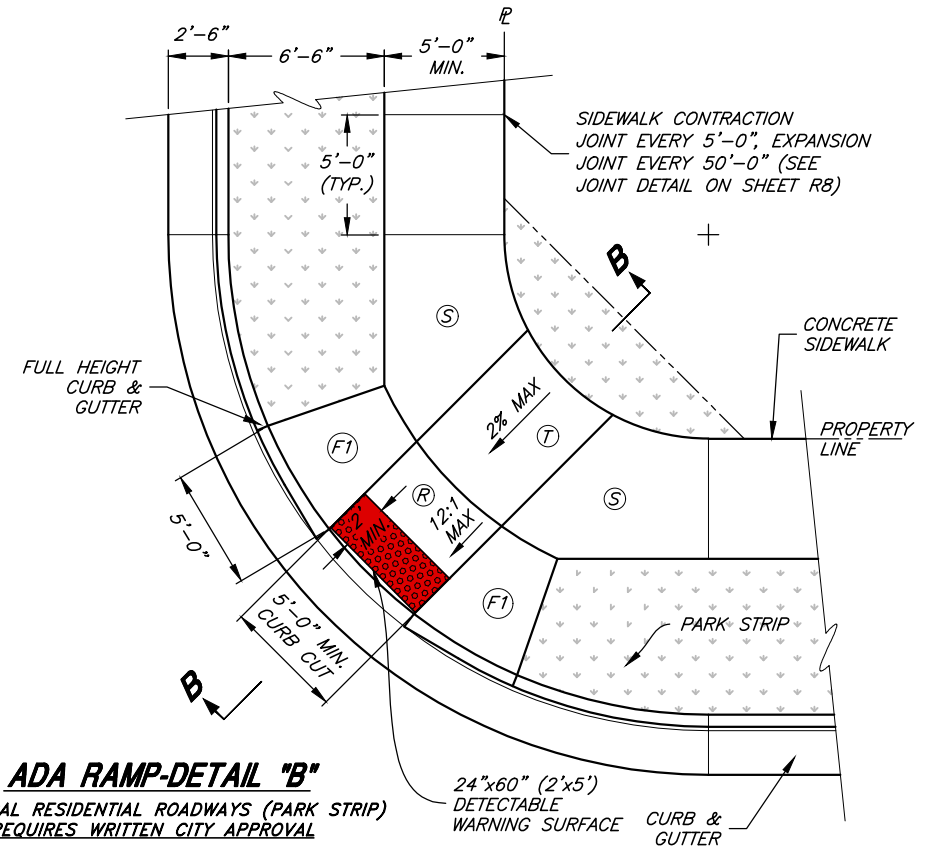


ADA RAMP - DETAIL "A"
CITY STANDARD



ADA RAMP-DETAIL "C"

FOR SPECIAL RESIDENTIAL ROADWAYS AND REPLACEMENTS OF EXIST. ADA RAMPS OF THE SAME STYLE ONLY (PARK STRIP) REQUIRES WRITTEN CITY APPROVAL



ADA RAMP-DETAIL "B"

FOR LOCAL RESIDENTIAL ROADWAYS (PARK STRIP) REQUIRES WRITTEN CITY APPROVAL

CITY ENGINEER	REV.	DATE	APPR.
APRIL 2024			
DATE			

SCALE:

N.T.S.



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South Ogden, Utah 84403 (801) 476-9767

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FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS - ROAD IMPROVEMENT STANDARDS

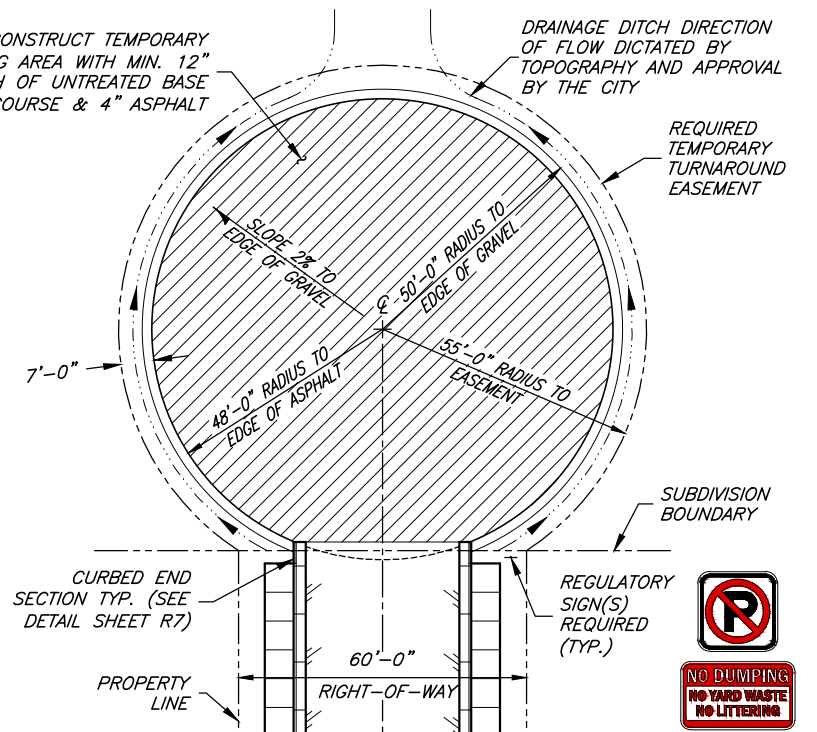
TYPICAL ADA RAMP DETAILS

SHEET:

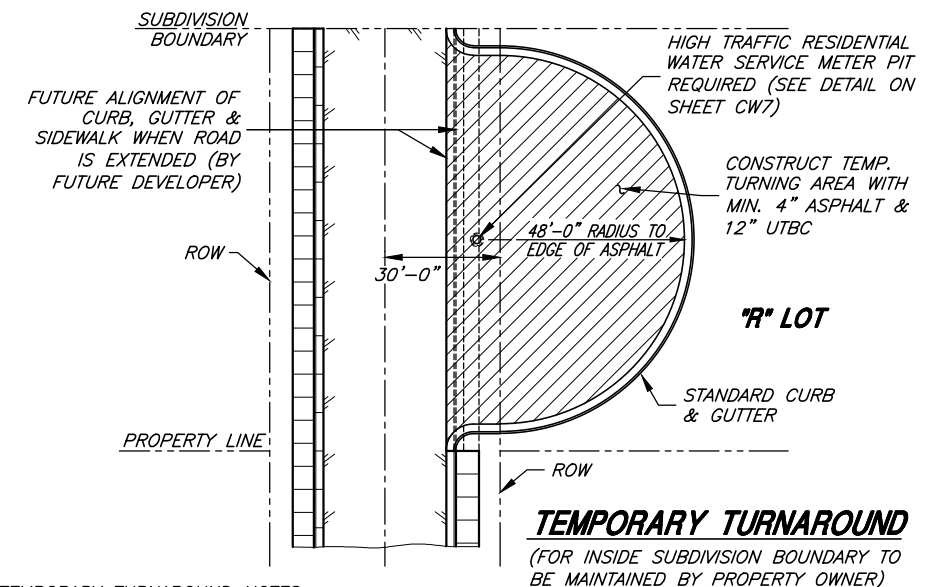
R4

OF 28 SHEETS

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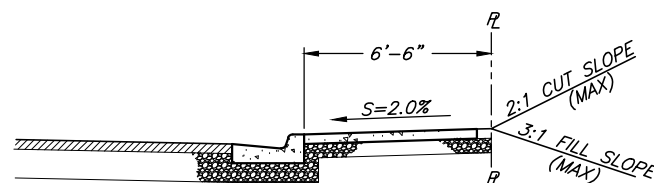
(FOR OUTSIDE OF SUBDIVISION BOUNDARY AND TO
BE MAINTAINED BY PROPERTY OR EASEMENT OWNER)



(FOR INSIDE SUBDIVISION BOUNDARY TO
BE MAINTAINED BY PROPERTY OWNER)

1. THE CIRCULAR CUL-DE-SAC LAYOUT ON THIS SHEET IS TO BE CONSIDERED AS THE CITY STANDARD DESIGN. OTHER ALTERNATE DESIGNS MAY BE CONSIDERED AS APPROVED BY THE CITY.
2. MODIFIED CUL-DE-SACS (KNUCKLE, EYEBROW, BULB, OR HALF CUL-DE-SACS) ARE NOT PERMITTED.
3. DEVELOPER SHALL PROVIDE AN AIR RELIEF OR BLOW-OFF AS DETERMINED BY THE SECONDARY WATER PROVIDER AND IN ACCORDANCE WITH THEIR STANDARDS AND APPROVED BY THE CITY.
4. NO DRIVEWAYS, FIRE HYDRANTS, OR MAILBOXES ARE PERMITTED WITHIN THE 50'-0" SNOW STORAGE AREA. THE 50'-0" SNOW STORAGE AREA SHALL BE SHOWN ON THE IMPROVEMENT/CONSTRUCTION PLANS PRIOR TO SUBDIVISION AND/OR CUL-DE-SAC APPROVAL.
5. REQUIREMENT FOR SIDEWALK ON CUL-DE-SAC WILL BE THE DETERMINATION OF THE CITY.
6. THE CUL-DE-SAC LENGTH SHALL BE A MAXIMUM OF 600'-0" AS MEASURED FROM THE CUL-DE-SAC CENTER MONUMENT TO THE CLOSEST INTERSECTING STREET CENTERLINE STREET MONUMENT.

50'-0" RIGHT-OF-WAY



REQUIRED GRADING BETWEEN TBC AND PROPERTY LINE

- A1. TEMPORARY TURNAROUND OR DEAD END DOES NOT CONSTITUTE A CUL-DE-SAC.
(SEE CUL-DE-SAC DETAIL THIS SHEET)
- A2. TEMPORARY TURNAROUND SHALL MEET FIRE CODE.
- A3. DEVELOPER EXTENDING THE ROAD IS REQUIRED TO PAY FOR THE REMOVAL OF
THE TEMPORARY TURNING AREA AND CONSTRUCTION OF THE EXTENSION OF THE
CURB & GUTTER AND SIDEWALK.
- A4. THE DRAINAGE DITCH SHALL HAVE A 4 HORZ. TO 1 VERT. (4:1) SIDE SLOPE
FROM THE EDGE OF GRAVEL TO THE FLOW LINE OF DITCH.
- A5. DRAINAGE DITCH MUST HAVE A MIN. GRADE OF 0.5%

SCALE:

N.T.S.



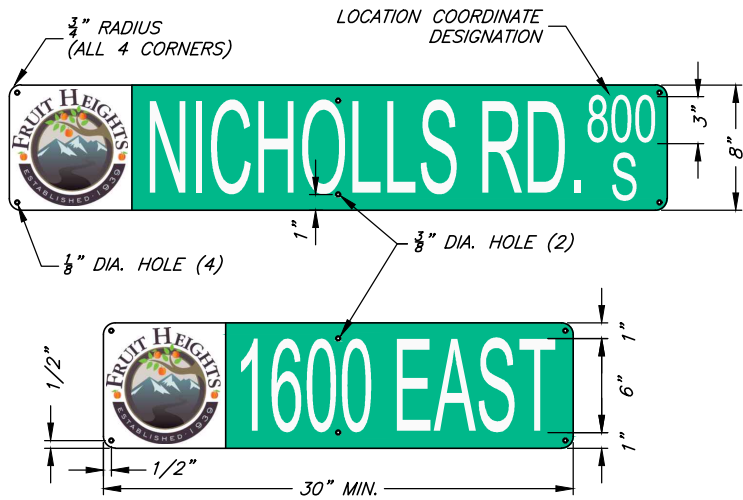
FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS - ROAD IMPROVEMENT STANDARDS

CUL-DE-SAC & TEMPORARY TURNAROUND DETAILS

SHEET:
25
SHEETS

STREET SIGN NOTES:

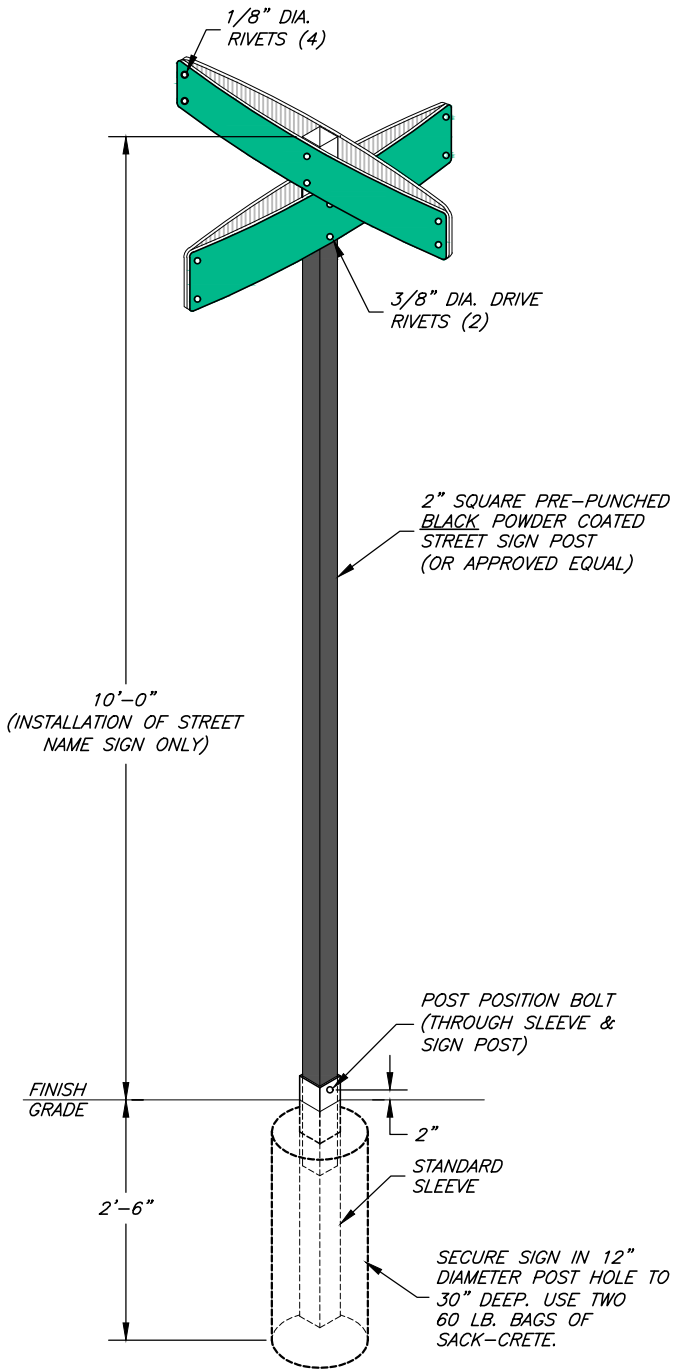
- A. ALL SIGNS TO BE PAID FOR AND INSTALLED BY THE DEVELOPER/CONTRACTOR AT LOCATIONS DESIGNATED BY THE CITY. INSTALLATION SHALL BE IN ACCORDANCE WITH CURRENT "MUTCD" STANDARDS. THE CITY IS RESPONSIBLE FOR ORDERING THE SIGNS.
- B. STREET SIGN BACKGROUND SHALL BE REGULATORY GREEN, BOTH STREET AND TRAFFIC SIGNS SHALL BE AT THE VERY LEAST HIGH INTENSITY REFLECTIVE SHEETING (9FP-85 TYPE IIIA)
- C. LEGEND SHALL BE WHITE LETTERS (FONT: HIGHWAY C), HIGH INTENSITY REFLECTIVE SHEETING (9FP-85 IIIA)
- D. SIGN BLANK SHALL BE 6081-T6 HEAT TREATED HIGH TENSILE DEGREASED ALUMINUM W/ ALODINE 1200 FINISH-THICKNESS SHALL BE 0.08"
- E. EACH SIGN SHALL CONSIST OF TWO PLATES RIVETED TOGETHER & MOUNTED AS SHOWN
- F. SIGNS ON PRIVATE ROADS SHALL MEET ALL SPECIFICATIONS FOR STANDARD SIGNS, EXCEPT BACKGROUND SHALL BE BLUE (PRIVATE SIGNS WILL NOT BE MAINTAINED BY THE CITY.)
- G. ALL STREETS WITH NAMES MUST ALSO SHOW COORDINATE DESIGNATION
- H. ALL SIGNS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES"
- I. CONTACT CITY PRIOR TO MAKING SIGN TO VERIFY PROPER NAMES AND COORDINATES



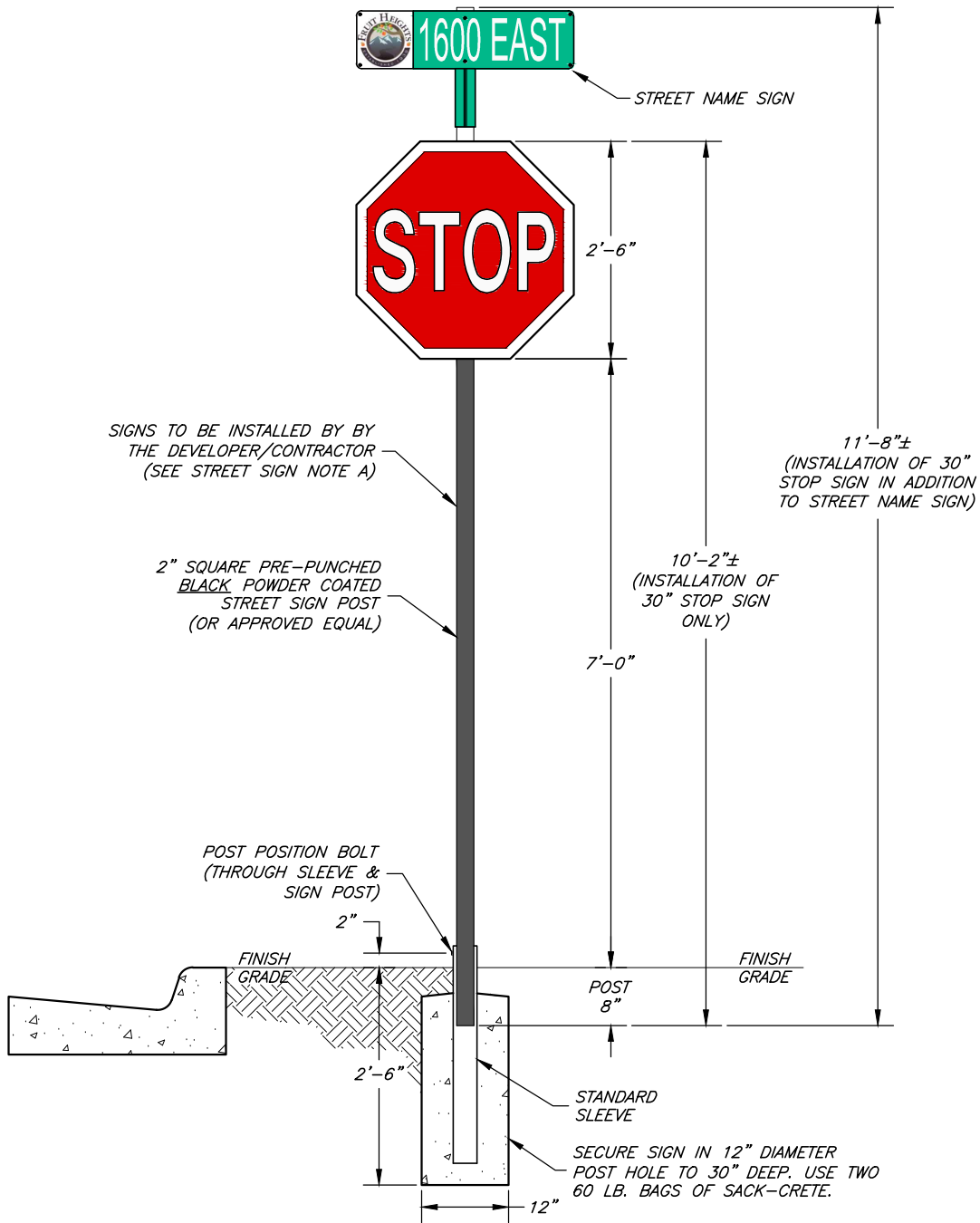
CITY STANDARD PLATE DETAILS



PRIVATE ROAD PLATE DETAIL
(SEE STREET SIGN NOTE F THIS SHEET)



STREET SIGN & POST



STREET / TRAFFIC
SIGN & POST

CITY ENGINEER	REV.	DATE	APPR.
APRIL 2024			
DATE			

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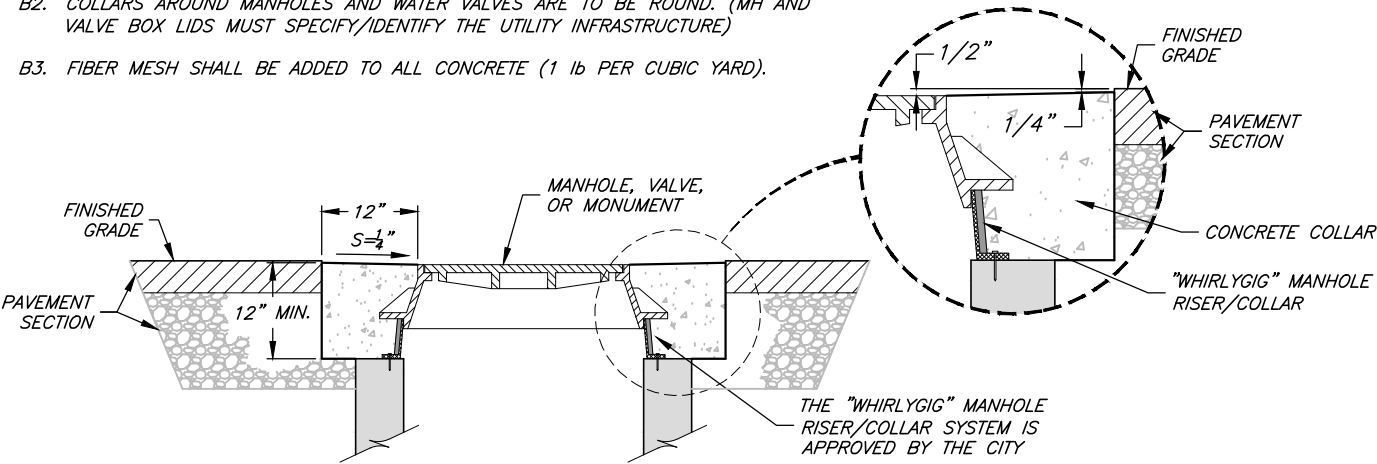
FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS - ROAD IMPROVEMENT STANDARDS

STREET SIGN DETAILS

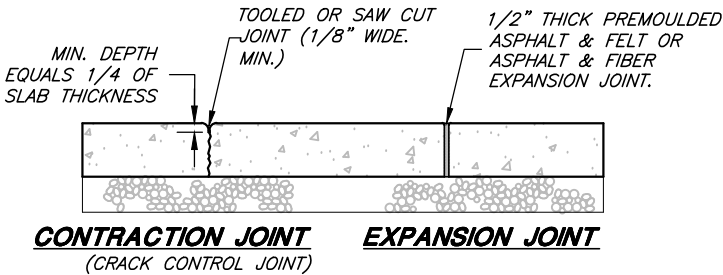
SHEET:
R6
OF 28 SHEETS
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CONCRETE COLLAR NOTES:

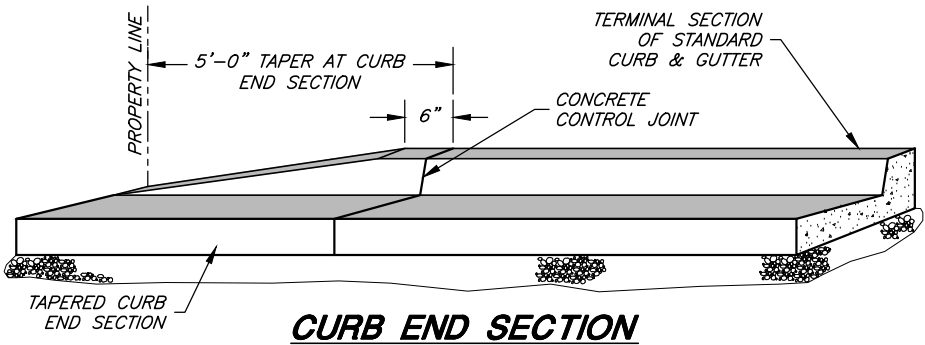
- B1. ALL CONCRETE COLLARS TO BE INSTALLED WITHIN 14 DAYS AFTER PAVING.
- B2. COLLARS AROUND MANHOLES AND WATER VALVES ARE TO BE ROUND. (MH AND VALVE BOX LIDS MUST SPECIFY/IDENTIFY THE UTILITY INFRASTRUCTURE)
- B3. FIBER MESH SHALL BE ADDED TO ALL CONCRETE (1 lb PER CUBIC YARD).



CONCRETE COLLAR DETAIL

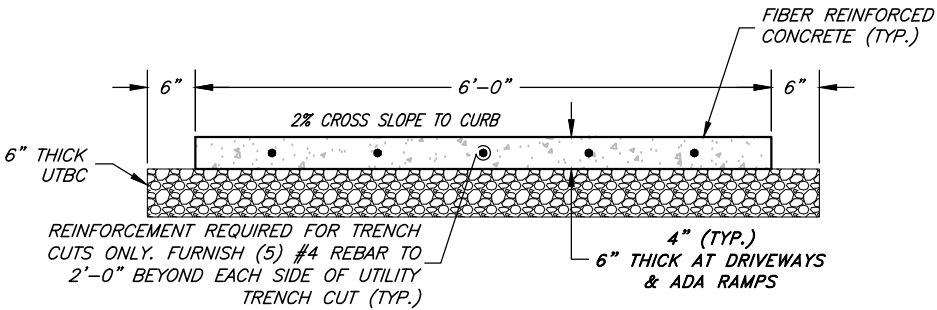


JOINT DETAIL

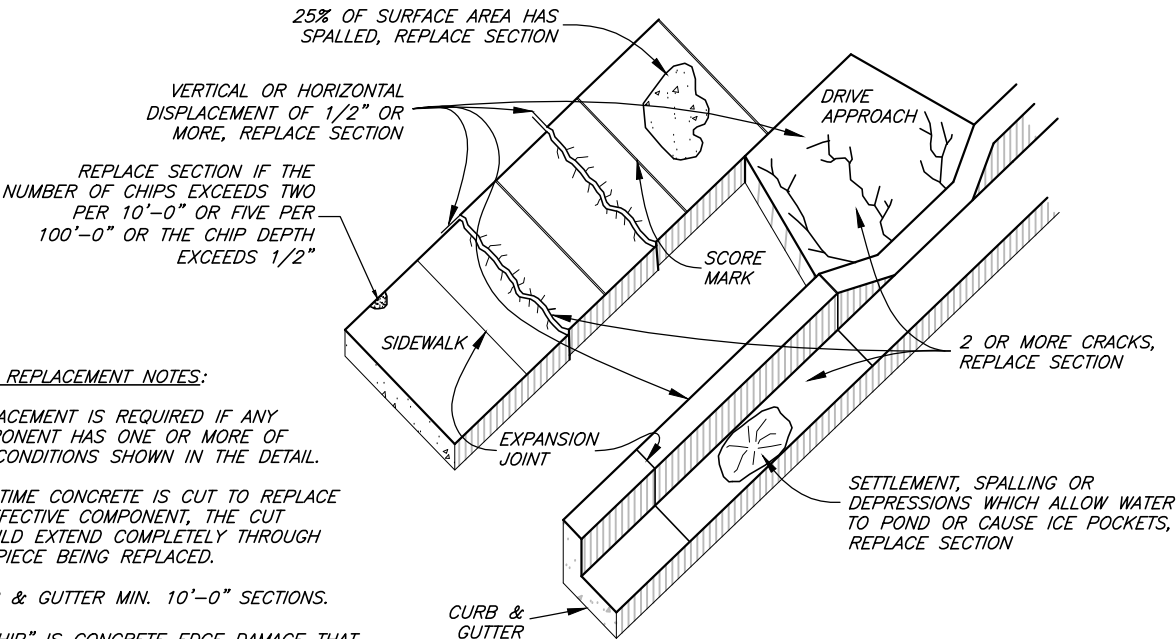


CURB END SECTION NOTE:

CONSTRUCT CURB END SECTION FOR IMPROVED SAFETY AND TO PREVENT SNOW PLOW DAMAGE. CONTRACTOR REQUIRED TO SAW-CUT AND REMOVE TAPERED CURB END SECTION AND CONSTRUCT NEW CURB AND GUTTER WHEN CURB AND GUTTER IS EXTENDED.



SIDEWALK SECTION
(CITY STANDARD)

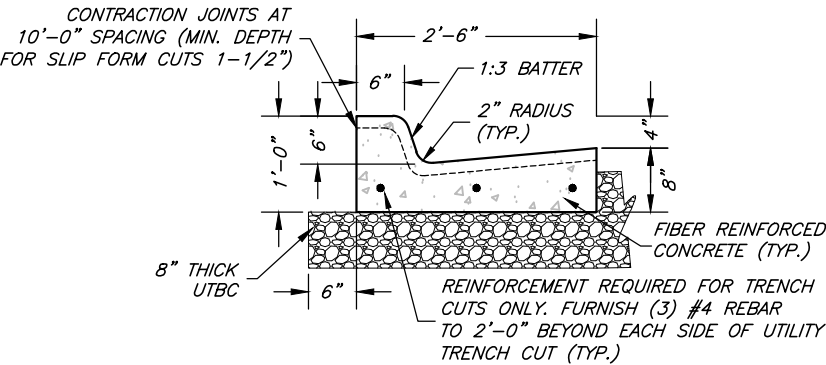


DEFECTIVE CONCRETE REPLACEMENT CRITERIA

GENERAL NOTES:

- A1. INSTALLATION TOLERANCES ON CURB & GUTTER AND SIDEWALK PER APWA 32 16 13 3.7
- A2. AS-BUILT SURVEY MAY BE REQUIRED TO VERIFY COMPLIANCE WITH TOLERANCES.
- A3. GRINDING OF CONCRETE, TO MEET TOLERANCES, WILL NOT BE ALLOWED.
- A4. CONCRETE CLASS: WHEN NOT SPECIFIED IN THE PLANS OR PROJECT SPECIFICATION, USE THE FOLLOWING TABLE TO SELECT THE CLASS OF CONCRETE REQUIRED FOR THE APPLICATION.

CONCRETE CLASS	APPLICATION
5,000	REINFORCED STRUCTURAL CONCRETE
4,000	SIDEWALKS, CURB, GUTTER, CROSS GUTTERS, WATERWAYS, PAVEMENTS, AND UNREINFORCED FOOTINGS AND FOUNDATIONS
3,000	THRUST BLOCKS
2,000	ANCHORS, MASS CONCRETE



CURB & GUTTER SECTION
(CITY STANDARD)

CURB & GUTTER NOTES:

1. WHEN REPLACING CURB DUE TO CONSTRUCTION ACTIVITY, NEW CURB MUST EXTEND 5'-0" MIN. PAST TRENCH ON EACH SIDE.
2. CONCRETE CURB TO BE CONSTRUCTED USING SLIPFORMS, HAND FORMED OR STATIONARY FORMS ARE ONLY ALLOWED FOR CURB TIE-INS.
3. THE SLOPE FOR CURB & GUTTER MUST BE A MINIMUM OF 0.5%.

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DATE			

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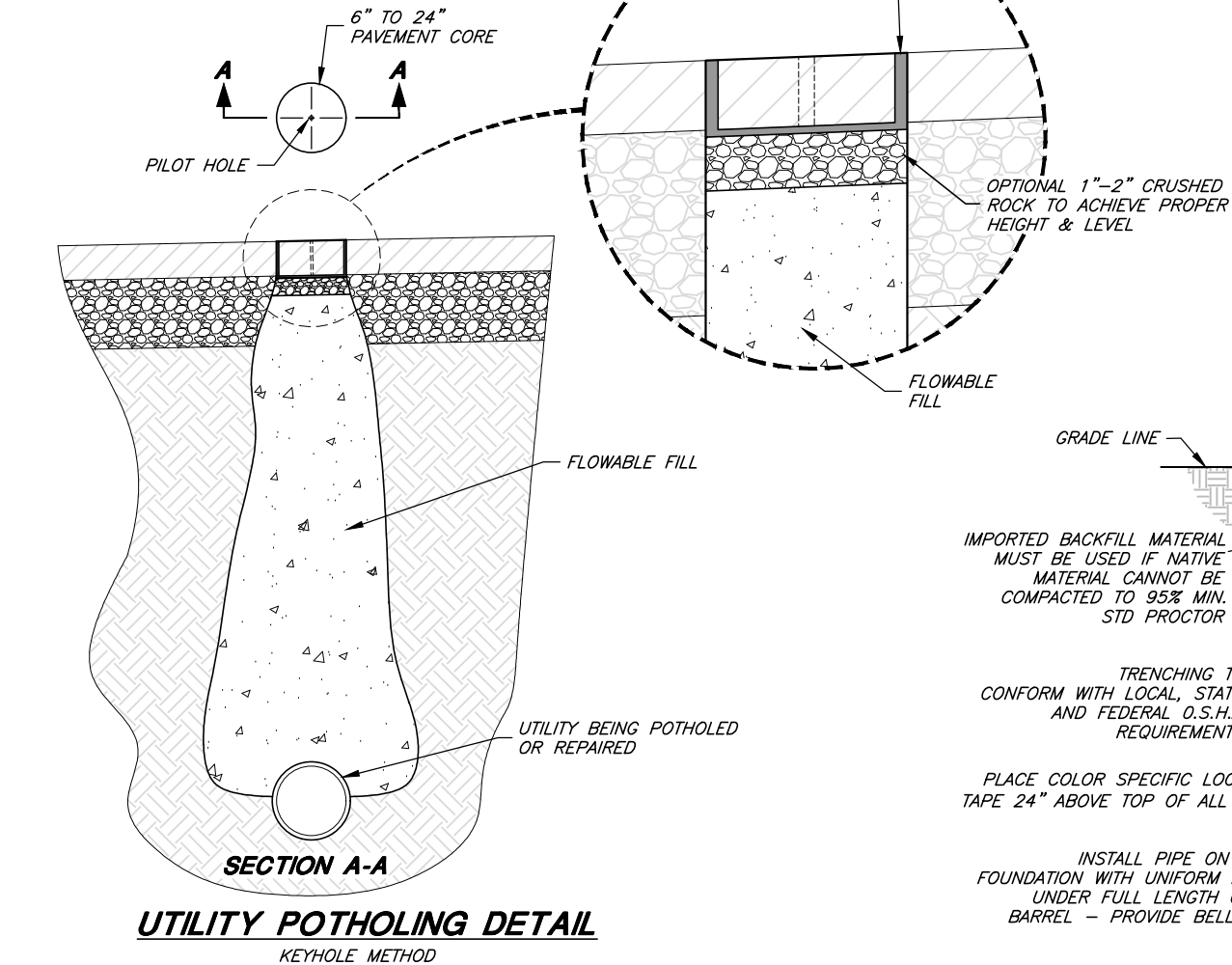
FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS - ROAD IMPROVEMENT STANDARDS
TYPICAL SIDEWALK, CURB & GUTTER, CONCRETE COLLAR, AND DEFECTIVE CONC. REPLACEMENT DETAILS

SHEET:

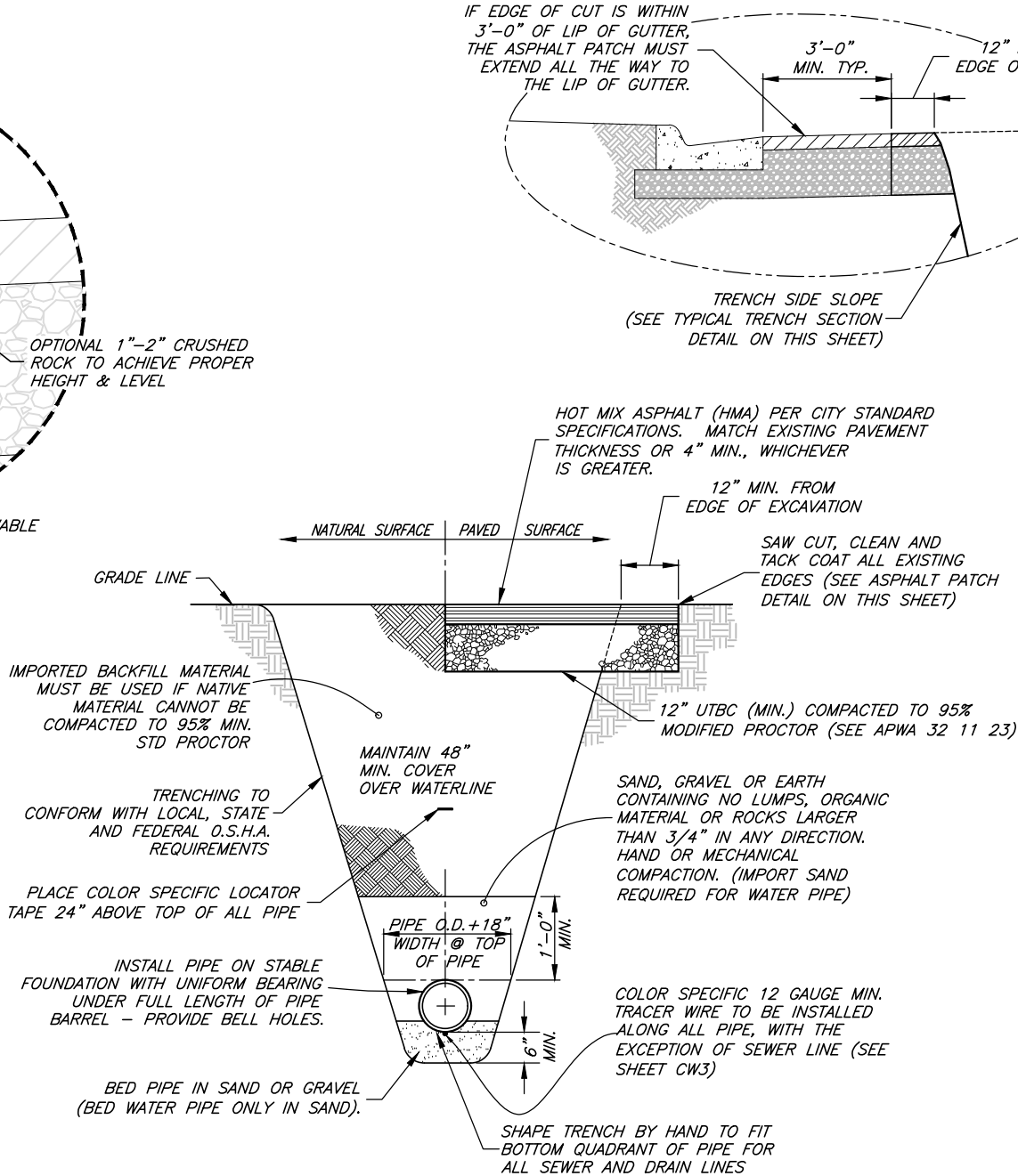
R7

OF 28 SHEETS
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BOND MATERIAL PROPERTIES		
PROPERTY	ASTM TEST METHOD	REQUIREMENTS
BOND STRENGTH, PSI (@ 70° F., 30 MIN. CURE)	C882	200 MIN.
COMPRESSIVE STRENGTH, PSI (@ 70° F., 60 MIN. CURE)	C109	1500 MIN.

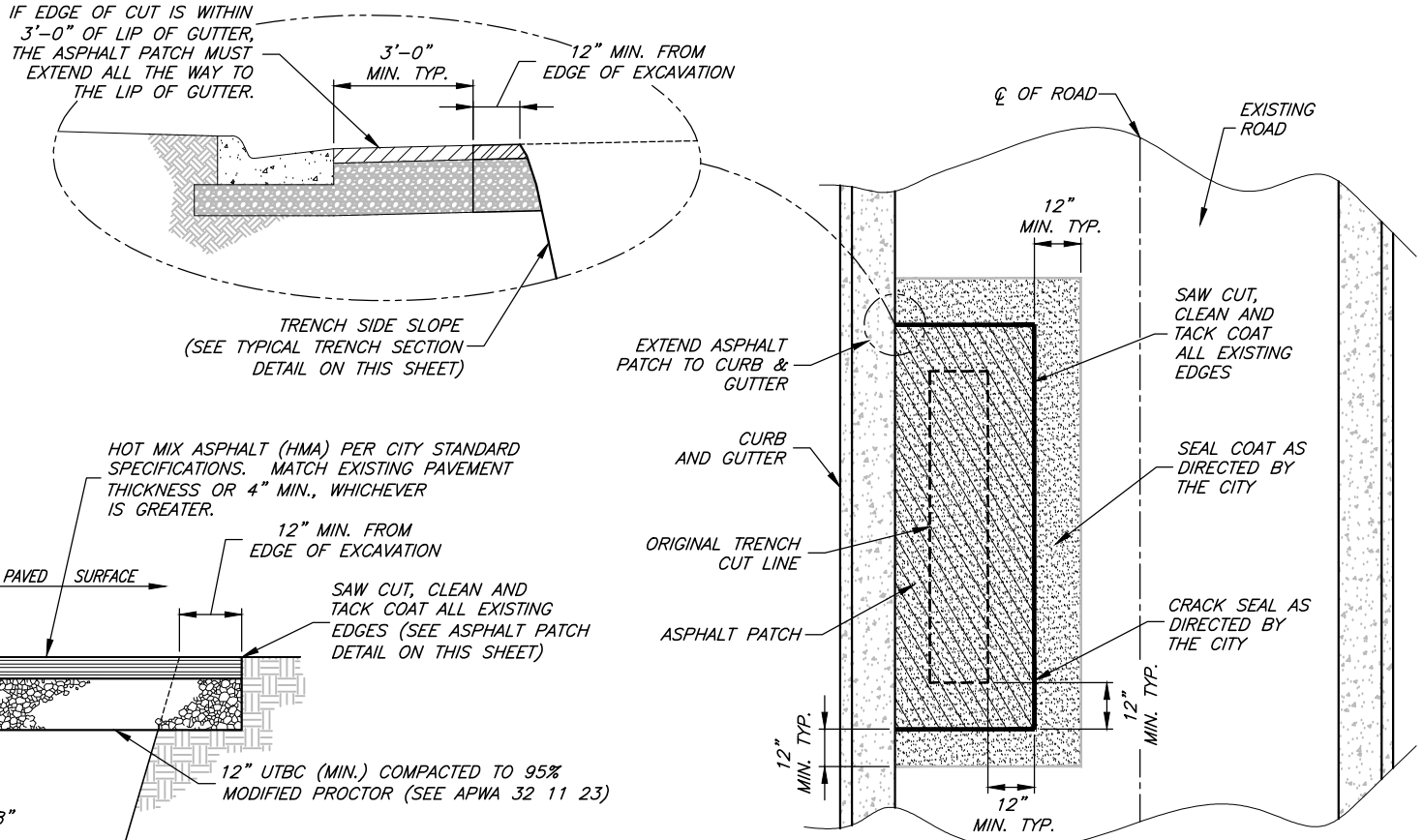


- UTILITY POTHOLE NOTES:**
- CONTRACTOR SHALL PLACE A TEMPORARY PAINT MARK ON THE PAVEMENT TO ASSURE CORE IS REPLACED IN THE SAME ORIENTATION.
 - CORING SHALL BE COMPLETED PERPENDICULAR TO THE HORIZON (NOT THE PAVEMENT), AND SHALL EXTEND THE FULL ASPHALT DEPTH. CORING SHALL BE COMPLETED USING A KEYHOLE CORING SAW CAPABLE OF REMOVING AN INTACT CORE OF PAVEMENT.
 - CORES SHALL NOT BE LESS THAN 6" IN DIAMETER AND NO MORE THAN 24" IN DIAMETER.
 - SOIL SHALL BE REMOVED USING AIR/VACUUM EXTRACTION METHODS AND DISPOSED PROPERLY OFF SITE.
 - FLOWABLE FILL SHALL BE USED TO BACKFILL THE HOLE TO WITHIN 1" TO 2" OF THE BOTTOM OF THE EXISTING PAVEMENT.
 - COMPACTED GRAVEL IF NECESSARY SHALL BE USED TO BRING THE POTHOLE TO THE BOTTOM OF PAVEMENT GRADE. THE TEMPORARY PAINT MARK SHALL BE USED TO ALIGN THE CORE TO ITS ORIGINAL POSITION AND THE GRAVEL SHALL BE USED TO LEVEL THE CORE SO THE FINISH GRADE IS FLUSH WITH THE SURROUNDING ASPHALT.
 - PAVEMENT BONDING COMPOUND SHALL BE USED TO RESTORE THE CORE TO ITS ORIGINAL CONDITION COMPLETELY FLUSH WITH THE SURROUNDING ASPHALT. THE COMPOUND SHALL BE POURED IN THE POTHOLE AND THE CORE PLACED IN AFTER CAUSING THE PAVEMENT BONDING COMPOUND TO FLOW TO THE SURFACE. ALL EXCESS BONDING AGENT SHALL BE REMOVED.
 - CORES SHALL BE ALLOWED TO CURE PER MANUFACTURER'S RECOMMENDATIONS PRIOR TO OPENING TO TRAFFIC.

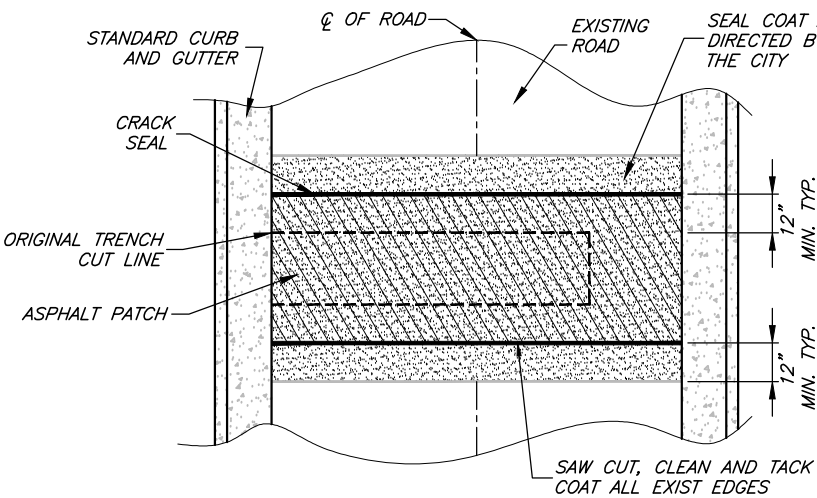


TYPICAL TRENCH SECTION
(WATER, IRRIGATION, SEWER, STORM DRAIN, AND LAND DRAIN)

- TRENCH NOTES:**
- BACKFILL PER APWA 33 05 20.
 - PAVEMENT RESTORATION PER APWA 33 05 25 AND CITY MODIFICATIONS.
 - GRAVEL SURFACED AREAS, SUCH AS ROADS AND SHOULDERS, PARKING AREAS, AND UNPAVED DRIVEWAYS, SHALL BE REPAIRED WITH 8" THICK (MIN.) 1" UNTREATED BASE COURSE COMPACTED TO 95% MODIFIED PROCTOR.
 - COMPACTION TEST REQUIRED AT SPRING-LINE FOR ALL P.V.C. OR H.D.P.E. PIPES.
 - COMPACTION TESTS SHALL BE REQUIRED AS SPECIFIED, OR AS DIRECTED BY PROJECT ENGINEER. ALL TESTS SHALL BE PERFORMED IN THE PRESENCE OF PROJECT INSPECTOR, IN LOCATIONS DETERMINED BY THEM. (MINIMUM NUMBER OF TESTS: 1 PER 200'-0", PER 2'-0" BACKFILL HEIGHT). MORE TESTS MAY BE REQUIRED BY THE CITY IF NECESSARY. CONTRACTOR/DEVELOPER TO SCHEDULE AND COORDINATE TESTING.
 - WATER & SEWER LINES, INCLUDING SERVICE LINES SHALL NOT BE INSTALLED IN THE SAME TRENCH.



TYPICAL PARALLEL ASPHALT PATCH PLAN



TYPICAL HORIZONTAL ASPHALT PATCH PLAN

- ASPHALT PATCH NOTE:**
- ON ANY ROAD PAVED OR OVERLAYED WITHIN THE LAST 10 YEARS, THE PATCH MUST BE COMPLETED PER APWA PLAN 255 BITUMINOUS PAVEMENT T-PATCH. (SEE SHEET R9)
 - NO ANGLED ASPHALT PATCHING ALLOWED.

CITY ENGINEER	REV.	DATE	APPR.
APRIL 2024			
DATE			

SCALE: N.T.S.

JAJONES & ASSOCIATES

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FRUIT HEIGHTS CITY CORPORATION

PUBLIC WORKS - ROAD IMPROVEMENT STANDARDS

UTILITY TRENCH, UTILITY POTHOLES, AND ASPHALT PATCH PLAN DETAILS

B1. FIRE HYDRANTS ARE TO BE INSTALLED IN LOCATIONS AS REQUIRED BY THE FIRE CODE AND APPROVED BY THE CITY.

B2. FIRE HYDRANTS ARE ALSO REQUIRED TO BE INSTALLED AT THE ENDS OF CUL-DE-SACS AND DEAD ENDS FOR BLOW-OFF PURPOSES.

B3. DEPENDING ON ITS LOCATION, A FIRE HYDRANT MAY SERVE FOR BOTH FIRE PROTECTIONS AND BLOW-OFF PURPOSES.

PROPERTY
LINE

1.5 CU. YD 1" WASHED
ROCK FOR DRAIN MEDIA
PLACED BELOW DRAIN
PLUG OPENINGS

HYDRANT DRAIN HOLES, KEEP
BLOCKING CLEAR, CUT POLY WRAP
TO ALLOW FREE DRAINAGE

HYDRANT DRAINS MUST BE 10'-0"
AWAY FROM ANY SEWER LINE OR
SERVICE; WHERE POSSIBLE, ALSO
10'-0" AWAY FROM ANY STORM DRAIN

CONCRETE
THRUST BLOCK

GENERAL NOTES:

1. ALL WATER MAIN AND HYDRANT GATE VALVES TO BE AWWA C509 RESILIENT WEDGE "MUELLER" A-2361 OR "CLOW" 2639 VALVES (ANY CHIPS IN THE VALVE FACTORY COATING DUE TO SHIPPING/INSTALLATION MUST BE REPAIRED USING AN APPROVED EPOXY COATING)
2. ALL PIPE, JOINTS, FITTINGS, VALVES AND FIRE HYDRANTS SHALL CONFORM TO ANSI/NSF STANDARD 61.
3. ALL WATER SYSTEM MATERIALS SHALL BE NEW. NO USED MATERIALS WILL BE ALLOWED.
4. ALL SPECIFIED BRANDS OF MATERIALS SHOWN ON THESE DRAWINGS ARE "CITY STANDARDS." OTHER EQUIVALENT BRANDS MAY BE USED WITH THE PRIOR APPROVAL OF THE CITY.
5. FIBER MESH SHALL BE ADDED TO ALL CONCRETE COLLARS ON VALVES AND MANHOLES.

6. **WATER SYSTEM – CORROSION PROTECTION REQUIREMENTS:**

- 6a. NONCORROSIVE "BLUE" BOLTS AND NUTS ARE REQUIRED BY THE CITY.
- 6b. POLYETHYLENE ENCASEMENT, HIGH DENSITY CROSS LAMINATED (HDCL) POLYETHYLENE FILM, AWWA C105 & AWWA C703E METHODS A & C. AWWA C703E METHOD A (4 MIL) AT PIPE AND AWWA C703E METHOD C (10 MIL) AT BOLT-TYPE JOINTS, FITTING AND VALVES. (CHRISTY'S OR APPROVED EQUAL)
- 6c. IN ADDITION TO THE REQUIRED POLYETHYLENE WRAP, APPLY A WAX TAPE COATING SYSTEM TO VALVE BONNET BOLTS AND ALL OTHER BURIED BOLTS, NUTS, CONNECTORS, RESTRAINER GLAND BOLTS, AND COUPLING HARDWARE, AWWA C217. COATING SYSTEM TO INCLUDE A 4-MIL MINIMUM WAX TAPE PRIMER, FILLER MATERIAL, 45-MIL MINIMUM WAX TAPE AND PROTECTIVE OUTER WRAP.
- 6d. WAX TAPE COATING MATERIALS:
TRENTON PRIMER, #1 WAX-TAPE, AND GUARD-WRAP OR APPROVED EQUAL
(SUBMITTAL TO CITY AND WRITTEN APPROVAL REQUIRED PRIOR TO INSTALLATION)

AIR/VACUUM RELIEF STATION NOTES:

- A1. THE USE OF AN "APCO" MODEL 145C OR "VAL-MATIC" MODEL 202C COMBINATION AIR/VACUUM VALVE IS ACCEPTED WHEN APPROVED BY THE CITY. UPSIZE VENT PIPE, AIR VENT AND FITTINGS (ITEMS D, E, F, H AND I) TO 2" DIA. AND GALVANIZED WHEN USING ALTERNATE VALVES.
- A2. RAISE ALL MANHOLES TO FINISH GRADE OF STREET FOLLOWING PAVING WITH A CONCRETE COLLAR; COLLAR TO BE HELD DOWN 1/4" BELOW TOP OF NEW ASPHALT. MANHOLE LID TO BE HELD DOWN 1/4" BELOW CONCRETE COLLAR.
- A3. NO MORE THAN 12" OF GRADE RINGS TO BE ALLOWED ON ANY MANHOLE

ADJUST ALL WATER VALVE BOXES TO GRADE
FOLLOWING PAVING WITH CONCRETE COLLAR. COLLAR
TO BE HELD DOWN 1/4" BELOW TOP OF NEW
ASPHALT. LID TO BE HELD DOWN 1/4" BELOW CONC.
COLLAR (LID MUST SPECIFY "FRUIT HEIGHTS WATER",
EAST JORDAN IRON WORKS 6800 VALVE BOX
COVER OR APPROVED EQUAL)

FIRE LINE NOTES:

FIRE LINE NOTES:
C1. NO WATER SERVICE OR FIRE LINES TO BUILDINGS
ARE PERMITTED TO CONNECT TO AUXILIARY LINES
SERVICING FIRE HYDRANTS.

C2. COMMERCIAL FIRE LINES FROM THE MAIN TO BUILDING SHALL BE SEPARATE LINES AND NOT PART OF THE WATER SERVICE LATERAL.

C3. FIRE LINES ARE TO BE MAINTAINED BY THE PROPERTY OWNER UP TO THE VALVE AT THE MAIN. THE CITY SHALL OWN AND MAINTAIN THE VALVE AT THE MAIN.

1 1/2" ALUMINUM
T-STYLE AIR VENT
"MORRISON BROS. CO."
MODEL # 155 (THR.)

20 MESH S.S.
SCREEN OVER
OPENING

DETAIL "A"

WELD #10 GA. PLATE TO 10" PIPE
COVER-GRIND/CHAMFER EXPOSED EDGES

$\frac{1}{8}$ "x10" DIA. STEEL PIPE (GALV. AFTER FABRICATION). COAT w/ EPOXY BASE PAINT - COLOR AS DETERMINED BY CITY. BOLT TO COUPLING AS SHOWN.

DRILL 8 COLUMNS OF 5 HOLES
EA, $\frac{1}{2}$ " ϕ HOLES, STAGGERED AS
SHOWN

10" GALV. STEEL COUPLING
CAST INTO CONC. BASE

1" CHAMFER ON
ALL EXPOSED EDGES

- FINISH GRADE

#4 HOOP
(4) #4'S V

PLACE 1 CU. YD.
2"+ DRAIN ROCK

WELD NUT
IN PLACE

DETAIL "B"

****LOCATION OF VENT
PIPE TO BE DETERMINED
BY THE CITY**

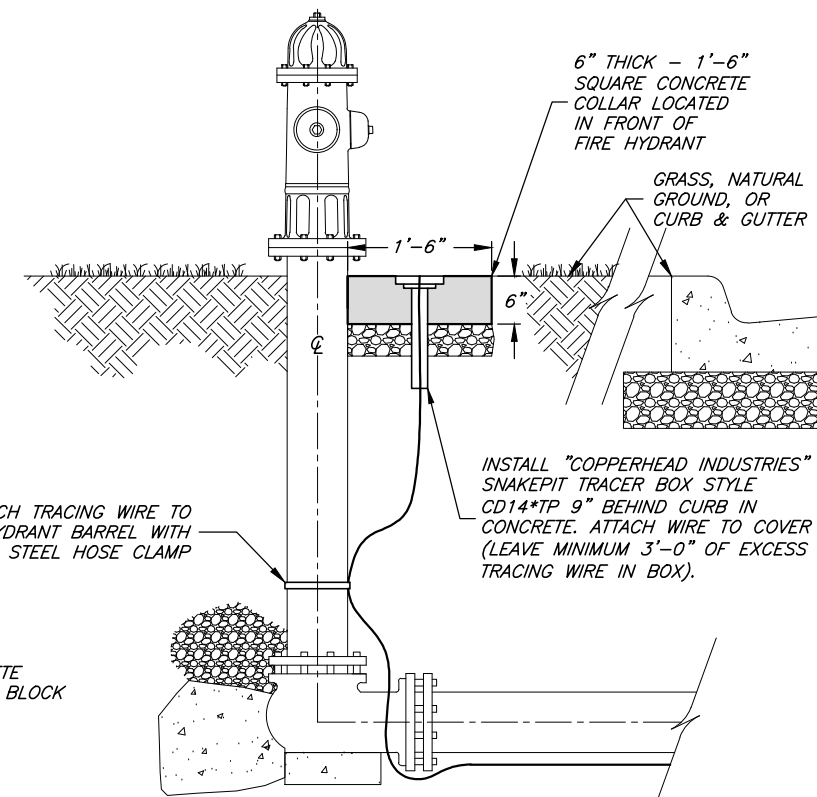
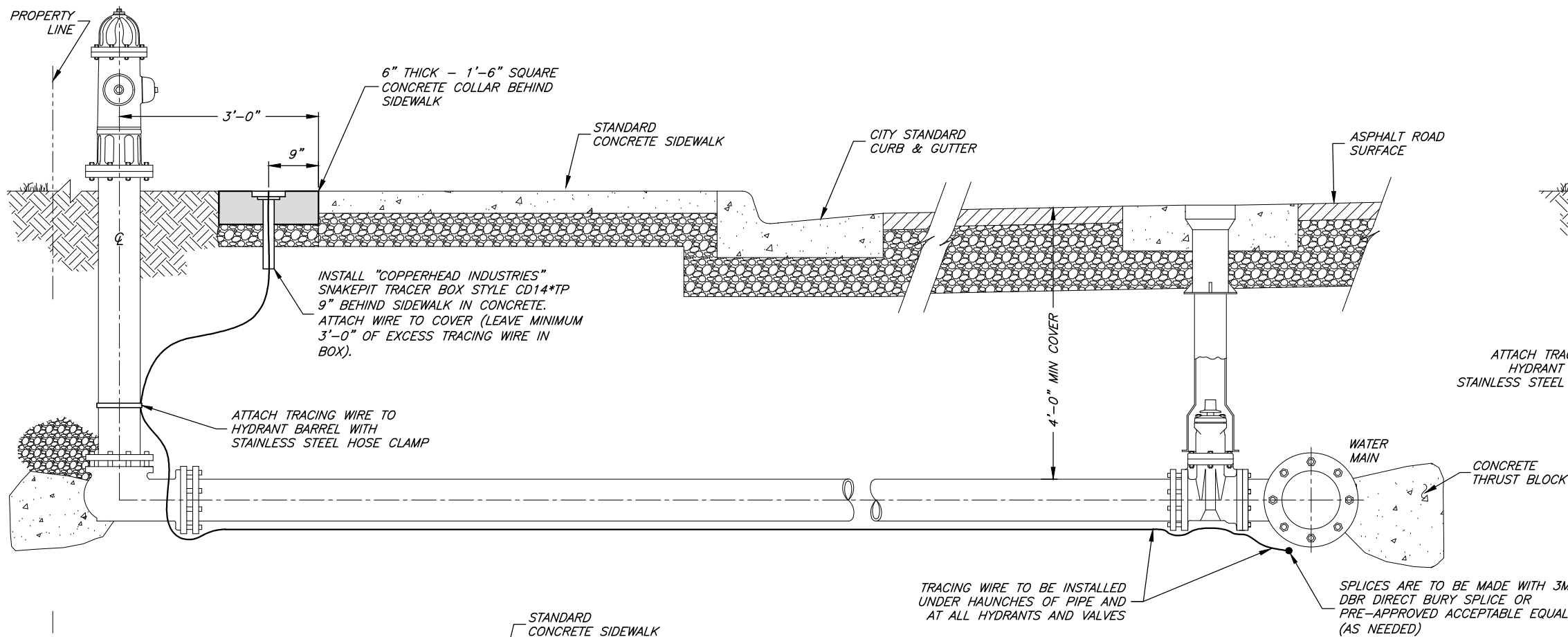
**FIRE HYDRANT &
GATE VALVE DETAIL**

AIR/VACUUM RELIEF STATION

(BURIED WATER MAIN APPLICATION)

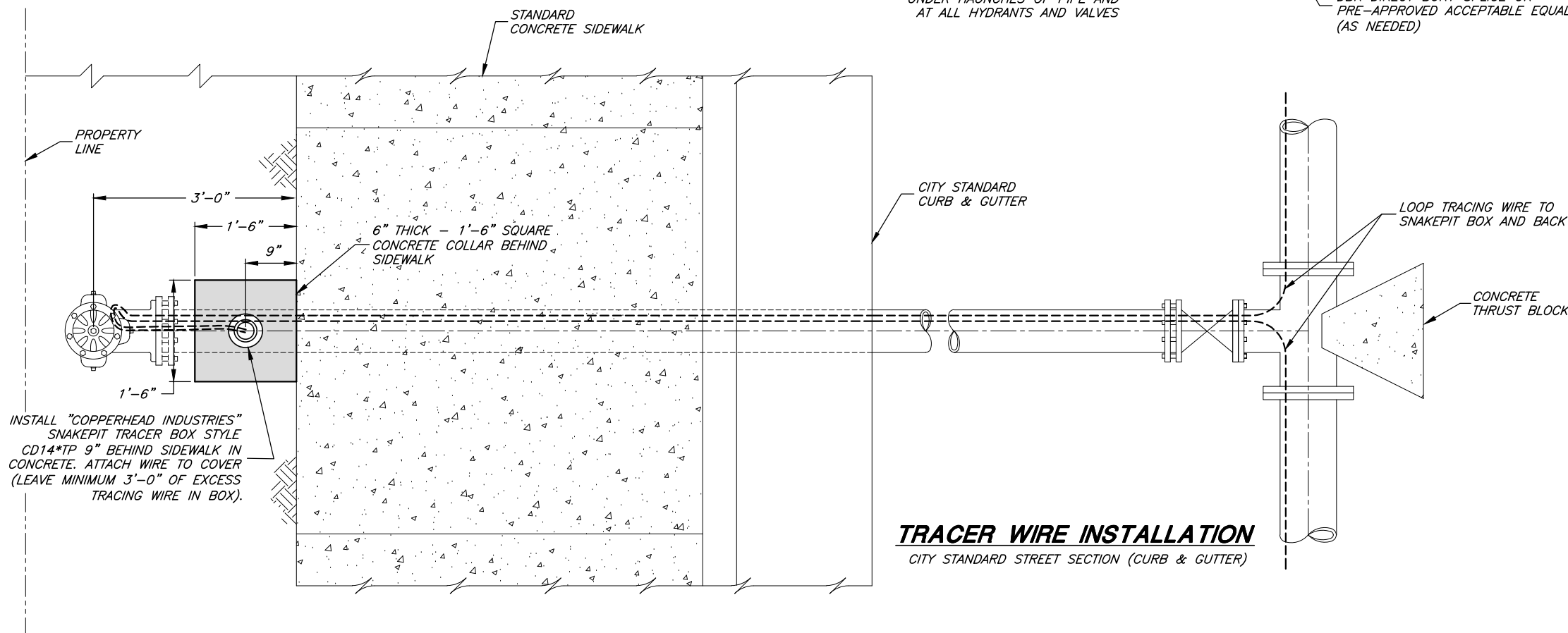
PIPE & FITTING SCHEDULE

NO.	DESCRIPTION	FITTING
A	2" COMBINATION AIR-VACUUM RELIEF VALVE "A.R.I." MODEL D-040 W/ NPT CONNECTIONS	THR.
B	2" BRASS BALL VALVE (1/4 TURN)	THR.
C	2" NYLON COATED OR BRASS WITH DOUBLE S.S. STRAPS SERVICE SADDLE	
D	1 1/2" SCH. 80 PVC PIPE	THR.
Da	1 1/2" POLY PIPE	THR.
E	1 1/2" GALV. STEEL 90° ELBOW	THR.
F	1 1/2" SCH. 80 PVC UNION	THR.
G	2" BRASS PIPE	THR.
H	1 1/2" SCH. 80 PVC TEE	THR.
I	1 1/2" GALV. STEEL PIPE	THR.



ALTERNATE TRACER WIRE INSTALLATION

WHERE APPROVED BY THE CITY ON STREET SECTIONS WITH NO CURB & GUTTER, OR WHEN HYDRANT IS PLACED IN PARK STRIP.



TRACER WIRE INSTALLATION

CITY STANDARD STREET SECTION (CURB & GUTTER)

NOTES:

1. ALL WATERLINES SHALL HAVE A MINIMUM 12 GA. INSULATED TRACING WIRE INSTALLED UNDER THE HAUNCHES OF THE PIPE PRIOR TO BACKFILLING.
2. TRACING WIRES SHALL TERMINATE AT ALL FIRE HYDRANTS. AT SERVICE SADDLES AND TAPPING SLEEVES, THE TRACING WIRE SHALL NOT BE ALLOWED TO BE PLACED BETWEEN THE SADDLE AND THE PIPE. A GROUNDING ROD SHALL BE INSTALLED AT ALL TRACER SYSTEM TERMINAL POINTS.
3. TRACING WIRE SHALL BE COPPER WIRE WITH BLUE INSULATION RATED FOR DIRECT BURIAL. ALL WIRE CONNECTORS SHALL BE 3M DBR DIRECT BURY SPLICE OR PRE-APPROVED ACCEPTABLE EQUAL AND SHALL BE WATERTIGHT TO PROVIDE ELECTRICAL CONTINUITY.
4. ALL TRACING WIRE SHALL BE TESTED FOR CONTINUITY IN THE PRESENCE OF THE PUBLIC WORKS INSPECTOR PRIOR TO ASPHALT PLACEMENT. ANY TRACING WIRE FOUND NOT TO BE CONTINUOUS AFTER TESTING SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR PRIOR TO ASPHALT PLACEMENT.

CITY ENGINEER					
APRIL 2024					
DATE	REV.	DATE	APPR.		

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FRUIT HEIGHTS CITY CORPORATION

PUBLIC WORKS - CULINARY WATER SYSTEM STANDARDS

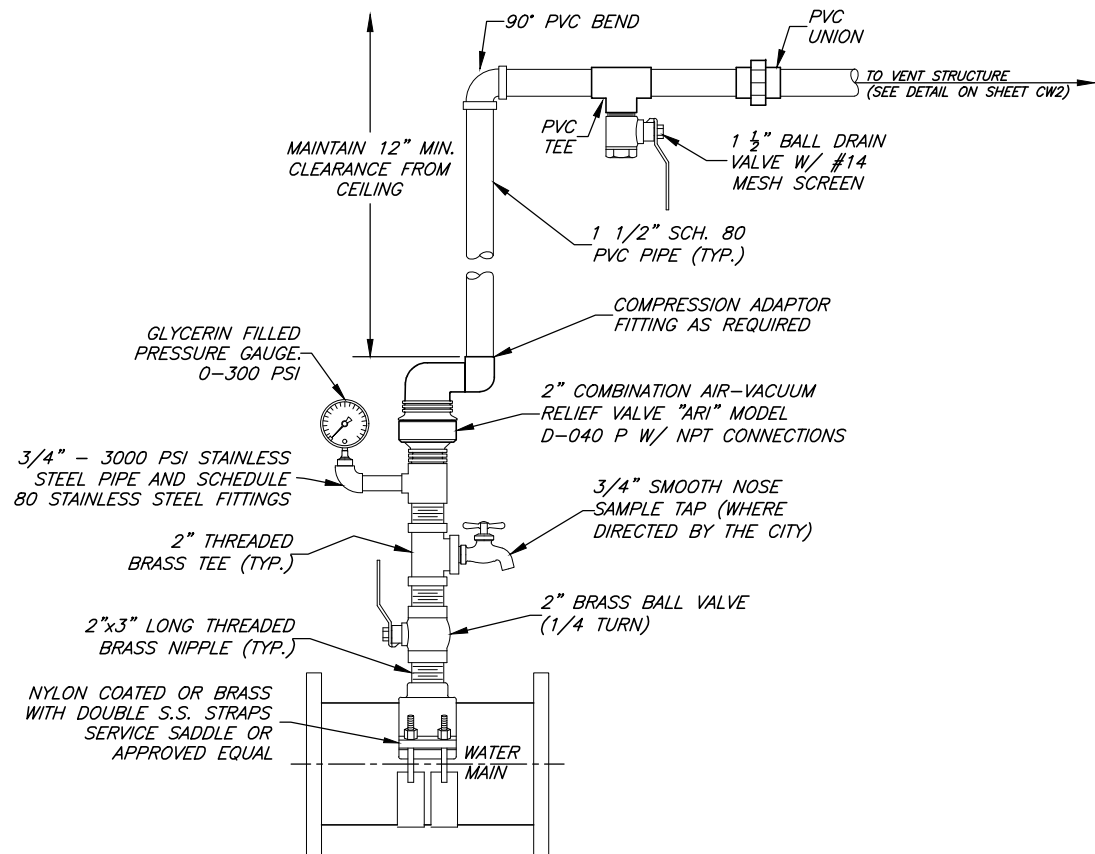
TRACER WIRE INSTALLATION DETAILS

SHEET:

CW3

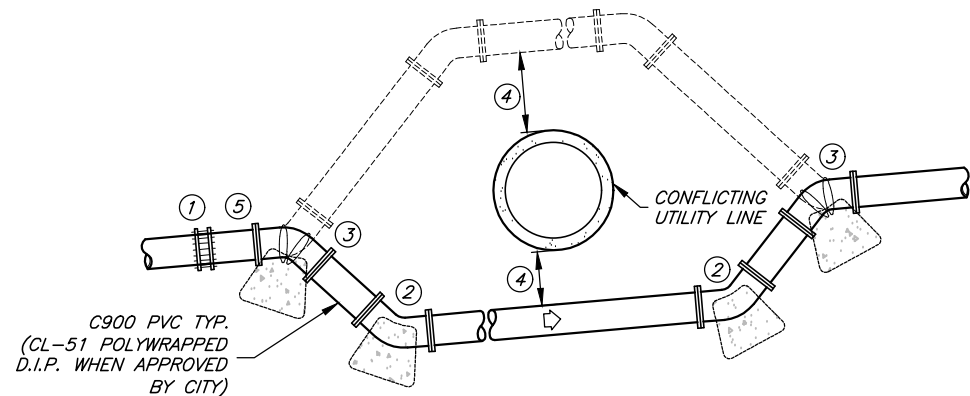
OF 28 SHEETS

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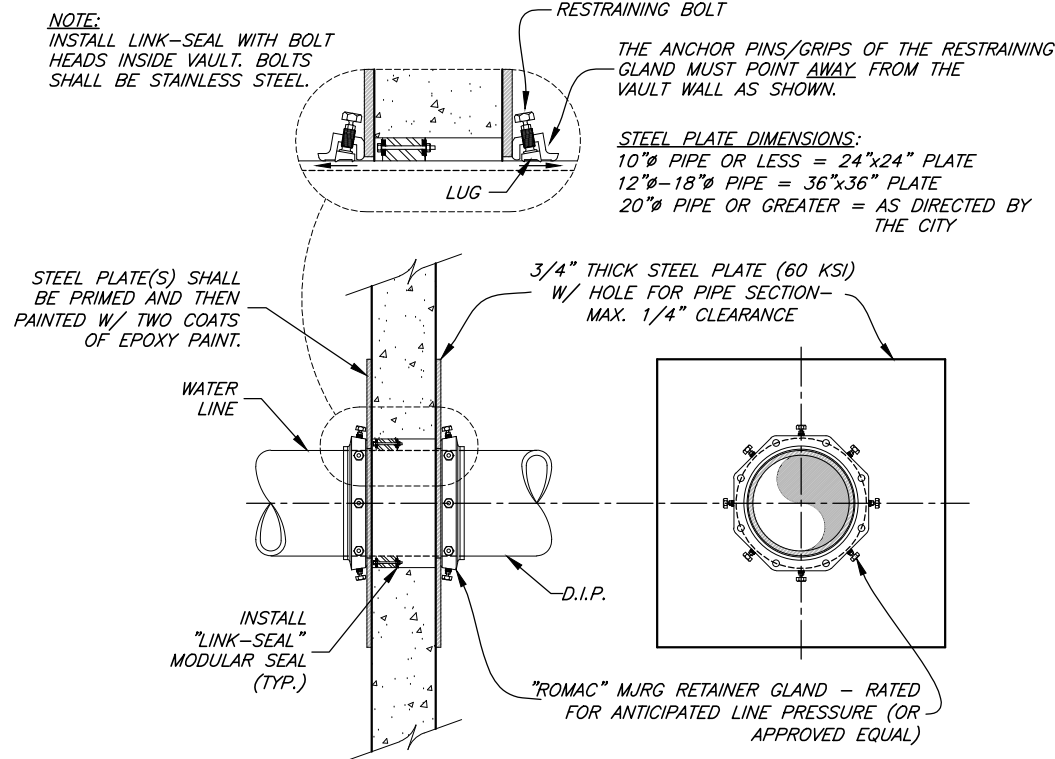
**PRV VAULT COMBINATION AIR-VAC
RELIEF VALVE ASSEMBLY**

N.T.S.



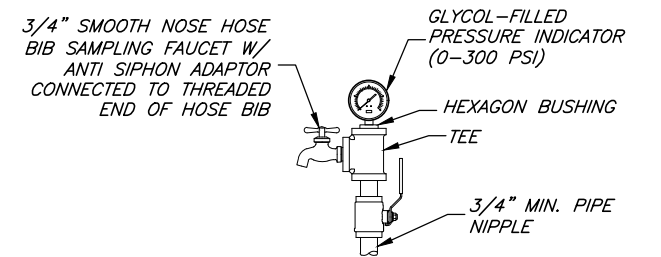
TYPICAL WATERLINE LOOP

- ① TRANSITION COUPLING; "ROMAC" ALPHA, "ROMAC" MACRO, OR APPROVED EQUAL
- ② MJ 45° BEND W/RETAINER GLANDS
- ③ CONSTRUCT THRUST BLOCKS AT EACH 45° BEND W/(3) #6 REBAR SECURING BLOCK TO FITTING (EPOXY COATING)
- ④ MINIMUM OF 12" COVER BETWEEN THE WATERLINE AND CONFLICTING UTILITY LINE TO BE CROSSED, EXCEPT LOOPS INVOLVING SEWER MAINS WHERE A MINIMUM OF 18" VERTICAL COVER ABOVE THE SEWER MAIN IS REQUIRED. EXCEPTIONS MUST BE APPROVED BY THE UTAH DIVISION OF DRINKING WATER (DDW).
- ⑤ AN AIR/VACUUM RELIEF VALVE MAY BE REQUIRED ON A CASE BY CASE BASIS AS DIRECTED BY THE CITY.



WALL PENETRATION DETAIL

FOR PRECAST VAULT (TYP)



PRESSURE GAUGE ASSEMBLY

N.T.S.

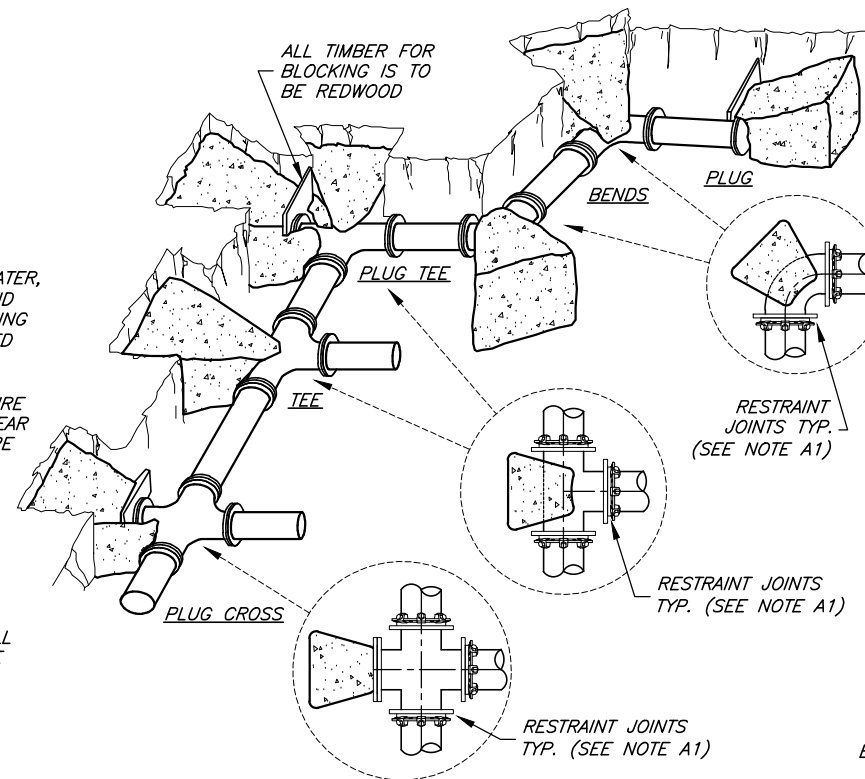
PIPE RESTRAINT

A1. FOR NOMINAL PIPE DIAMETERS 6" AND GREATER, ALL BENDS, CROSSES, TEES, REDUCERS, AND VALVES SHALL BE INSTALLED WITH RESTRAINING JOINTS ("MEGA-LUG", "ALPHA" OR APPROVED EQUAL).

A2. DESIGN SHALL ALSO BE REQUIRED TO ENSURE ADEQUATE RESTRAINT FOR PIPING JOINTS NEAR FITTINGS BASED ON PIPE DIAMETER AND PIPE PRESSURE.

THRUST BLOCKING NOTES:

- B1. CONCRETE SHALL NOT BE PLACED WITHIN 1-1/2" OF JOINTS AND BOLTS. COVER ALL METAL CONTACT AREAS WITH A POLY WRAP PRIOR TO CONCRETE PLACEMENT.
- B2. IN THE ABSENCE OF A SOILS REPORT, ALL THRUST BLOCKS SHALL BE SIZED ON THE BASIS OF A MAXIMUM LATERAL BEARING VALUE FOR 2000 P.S.F. AND A THRUST RESULTING FROM 200% OF THE WATER LINE STATIC LINE TEST.
- B3. THRUST BLOCKS ARE REQUIRED AT ALL BENDS OF 22-1/2" OR MORE. 11-1/4" BENDS SHALL HAVE RETAINER GLANDS.
- B4. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI IN 28 DAYS.



**TYPICAL RETAINER GLANDS
& THRUST BLOCKING**

THRUST PER PSI OF WATER PRESSURE AT VARIOUS FITTINGS				
PIPE SIZE (IN.)	DEAD END OR TEE (LB.)	90° ELBOW (LB.)	45° ELBOW (LB.)	22-1/2° ELBOW (LB.)
4	19	27	15	7
6	39	55	30	15
8	67	94	51	26
10	109	154	84	43
12	155	218	119	61
14	210	296	161	82
16	272	383	209	106
18	351	494	269	137
20	434	611	333	169
24	623	878	487	244
30	947	1,332	722	377
36	1,356	1,905	1,032	542

NOTES:

C1. IN USING THE ABOVE TABLE, USE THE MAXIMUM INTERNAL PRESSURE ANTICIPATED (I.E. HYDROSTATIC TEST PRESSURE, POSSIBLE SURGE PRESSURE DUE TO PUMP SHUT OFF, ETC.).

C2. SEE SOILS REPORT FOR BEARING STRENGTH OF SOIL. IN THE ABSENCE OF A SOILS REPORT, AN AVERAGE SOIL (SPADABLE MEDIUM CLAY) CAN BE ASSUMED TO HAVE A BEARING STRENGTH OF 2000 P.S.F.

EXAMPLE:

8" 90° ELBOW, PRESSURE 200 LB./SQ. IN.
FROM TABLE: THRUST = 94 X 200 = 18,800 LB.
ASSUME BEARING STRENGTH = 2,000 LB./SQ. FT.

$$\frac{18,800}{2,000} = 9.4 \text{ SQ. FT. AREA OF BEARING REQUIRED FOR THRUST BLOCK}$$

REV.	DATE	APPR.

SCALE:

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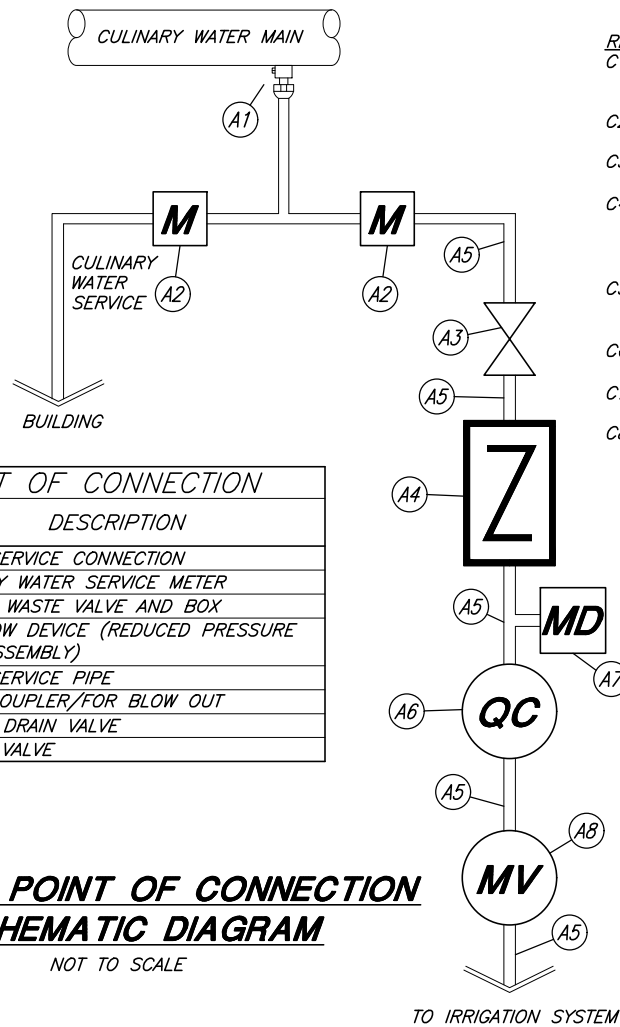
FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS - CULINARY WATER SYSTEM STANDARDS

THRUST BLOCK, WATERLINE LOOP, AND MISC. VAULT DETAILS

SHEET:

CW5

OF 28 SHEETS
0



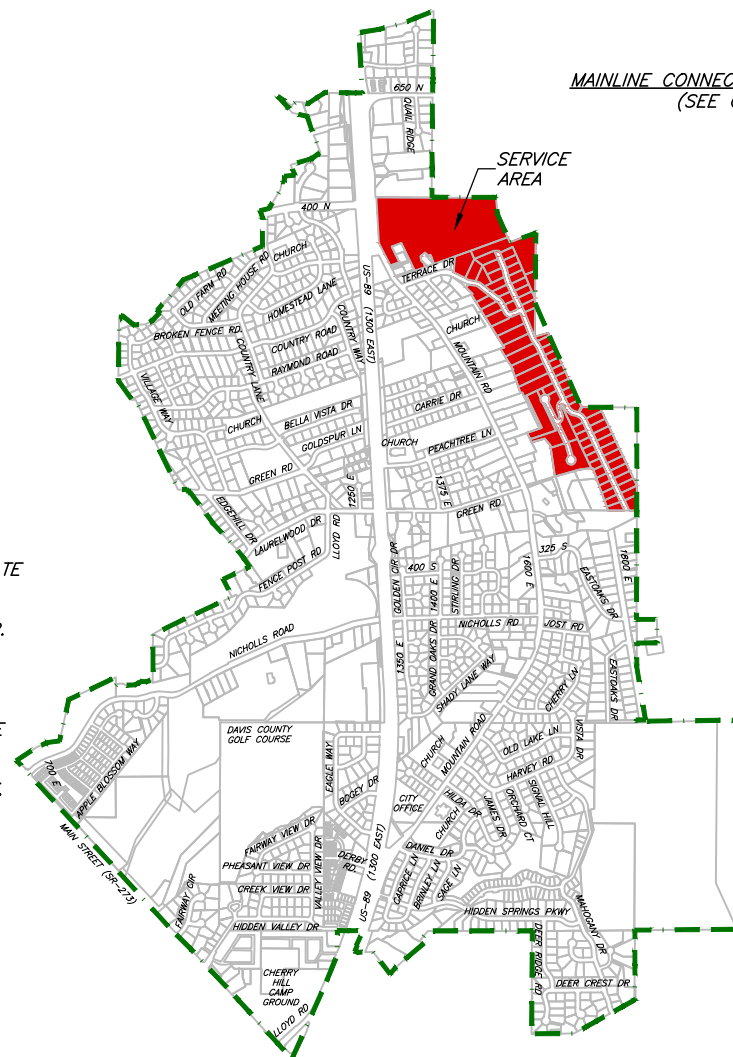
POINT OF CONNECTION	
NO.	DESCRIPTION
A1	WATER SERVICE CONNECTION
A2	CULINARY WATER SERVICE METER
A3	STOP & WASTE VALVE AND BOX
A4	BACKFLOW DEVICE (REDUCED PRESSURE ZONE ASSEMBLY)
A5	WATER SERVICE PIPE
A6	QUICK COUPLER/FOR BLOW OUT
A7	MANUAL DRAIN VALVE
A8	MASTER VALVE

TYPICAL POINT OF CONNECTION SCHEMATIC DIAGRAM
NOT TO SCALE

GENERAL NOTES:

- DESIGN, CONSTRUCTION, AND INSTALLATION SHALL BE DONE ACCORDING TO AND COMPLY WITH ALL CURRENT ADOPTED BUILDING AND PLUMBING CODES, AND TO MANUFACTURERS WRITTEN INSTRUCTIONS AND RECOMMENDATIONS.
- ALL TESTING, MAINTENANCE, AND/OR REPAIR SHALL BE PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TECHNICIAN.
- THE ASSEMBLY MUST BE THOROUGHLY DRAINED AND WINTERIZED EACH WINTER.
- THE RP ASSEMBLY SHALL BE PROTECTED FROM FREEZING AND VANDALISM WHERE APPLICABLE.
- ABOVE GROUND FITTINGS TO BE EPOXY PAINTED BLUE ON THE CULINARY SIDE AND PURPLE ON THE SECONDARY SIDE.
- PROVIDE BOLLARDS OR OTHER PROTECTION IF AND AS DIRECTED BY THE CITY.
- RP ASSEMBLY DESIGN AND CONSTRUCTION DETAILS/DRAWINGS TO BE SUBMITTED TO THE CITY FOR APPROVAL PRIOR TO INSTALLATION.
- LOCATION OF BACKFLOW ASSEMBLY SHALL BE APPROVED BY THE CITY PRIOR TO INSTALLATION.
- ALL BACKFLOW PREVENTION ASSEMBLIES SHALL BE TESTED WITHIN 10 DAYS OF INITIAL USE BY A LICENSED BACKFLOW DEVICE TESTER.
- ALL BACKFLOW PREVENTION ASSEMBLIES ARE TO BE TESTED ANNUALLY BY A CERTIFIED TESTER AND REPAIRS OR MAINTENANCE COMPLETED AS NEEDED. ANNUALLY SUBMIT TEST RESULTS TO THE CITY.
- ALL COMPRESSION-TYPE CONNECTIONS REQUIRE STAINLESS STEEL INSERT STIFFENERS.

- REDUCED PRESSURE ASSEMBLY (RP) NOTES:**
- AN RP ASSEMBLY IS REQUIRED AND SHALL BE INSTALLED WHEN A SECONDARY SERVICE IS CONNECTED TO THE CULINARY WATER SYSTEM.
 - THE RP ASSEMBLY SHALL BE INSTALLED IN A HORIZONTAL POSITION ONLY.
 - RP ASSEMBLIES SHALL NOT BE INSTALLED IN A PIT.
 - THE BODY OF THE RP ASSEMBLY SHALL BE A MINIMUM OF 12" FROM ANY WALLS, CEILINGS, OR ENCUMBRANCES AND SHALL BE READILY ACCESSIBLE FOR TESTING, REPAIR AND/OR MAINTENANCE.
 - THE BOTTOM OF THE RP ASSEMBLY SHALL BE A MINIMUM OF 12" ABOVE THE GROUND FLOOR.
 - RP VALVE ASSEMBLY AND PIPES TO MATCH SECONDARY LATERAL/MAIN SIZE.
 - THE BACKFLOW PREVENTER SHALL BE BRONZE FOR 6" AND SMALLER VALVES.
 - BACKFLOW PREVENTION DEVICES SHALL BE SELECTED FROM A LIST OF APPROVED DEVICES SET FORTH BY THE UTAH DIVISION OF DRINKING WATER. REDUCED PRESSURE ASSEMBLIES (RP) AND CITY APPROVED DOUBLE CHECK VALVE ASSEMBLIES (DCA) WILL BE THE ONLY ACCEPTED STYLES OF BACKFLOW PREVENTION DEVICES.

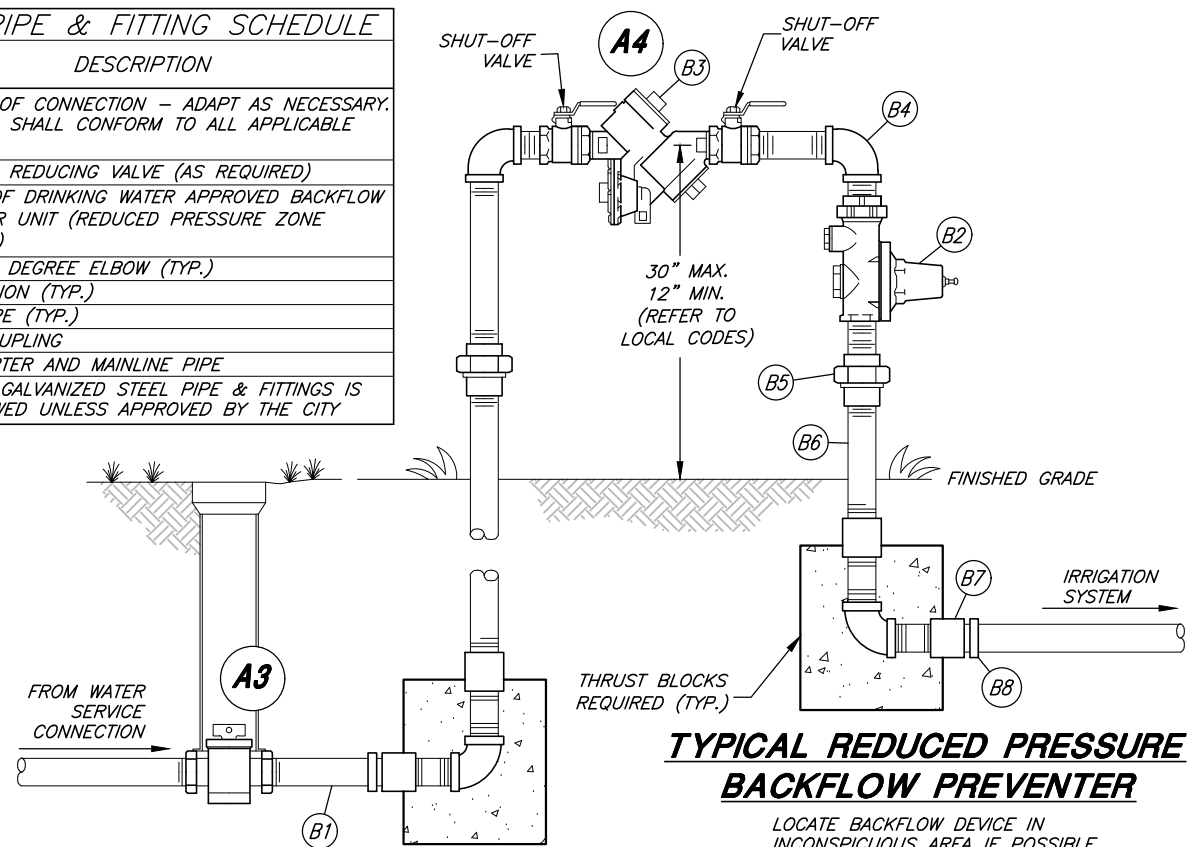


DOUBLE SERVICE AREA MAP

DOUBLE SERVICE LATERALS SHALL ONLY BE INSTALLED WHERE APPROVED BY THE CITY AND IN LOCATIONS IDENTIFIED IN THE MAP ABOVE

DOUBLE SERVICE PLAN VIEW

TYPICAL PIPE & FITTING SCHEDULE	
NO.	DESCRIPTION
B1	TO POINT OF CONNECTION - ADAPT AS NECESSARY. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES
B2	PRESSURE REDUCING VALVE (AS REQUIRED)
B3	DIVISION OF DRINKING WATER APPROVED BACKFLOW PREVENTER UNIT (REDUCED PRESSURE ZONE ASSEMBLY)
B4	BRASS 90 DEGREE ELBOW (TYP.)
B5	BRASS UNION (TYP.)
B6	BRASS PIPE (TYP.)
B7	BRASS COUPLING
B8	PIPE ADAPTER AND MAINLINE PIPE
THE USE OF GALVANIZED STEEL PIPE & FITTINGS IS NOT ALLOWED UNLESS APPROVED BY THE CITY	



TYPICAL REDUCED PRESSURE BACKFLOW PREVENTER

LOCATE BACKFLOW DEVICE IN INCONSPICUOUS AREA IF POSSIBLE

CITY ENGINEER	REV.	DATE	APPR.
APRIL 2024			
DATE			

SCALE:
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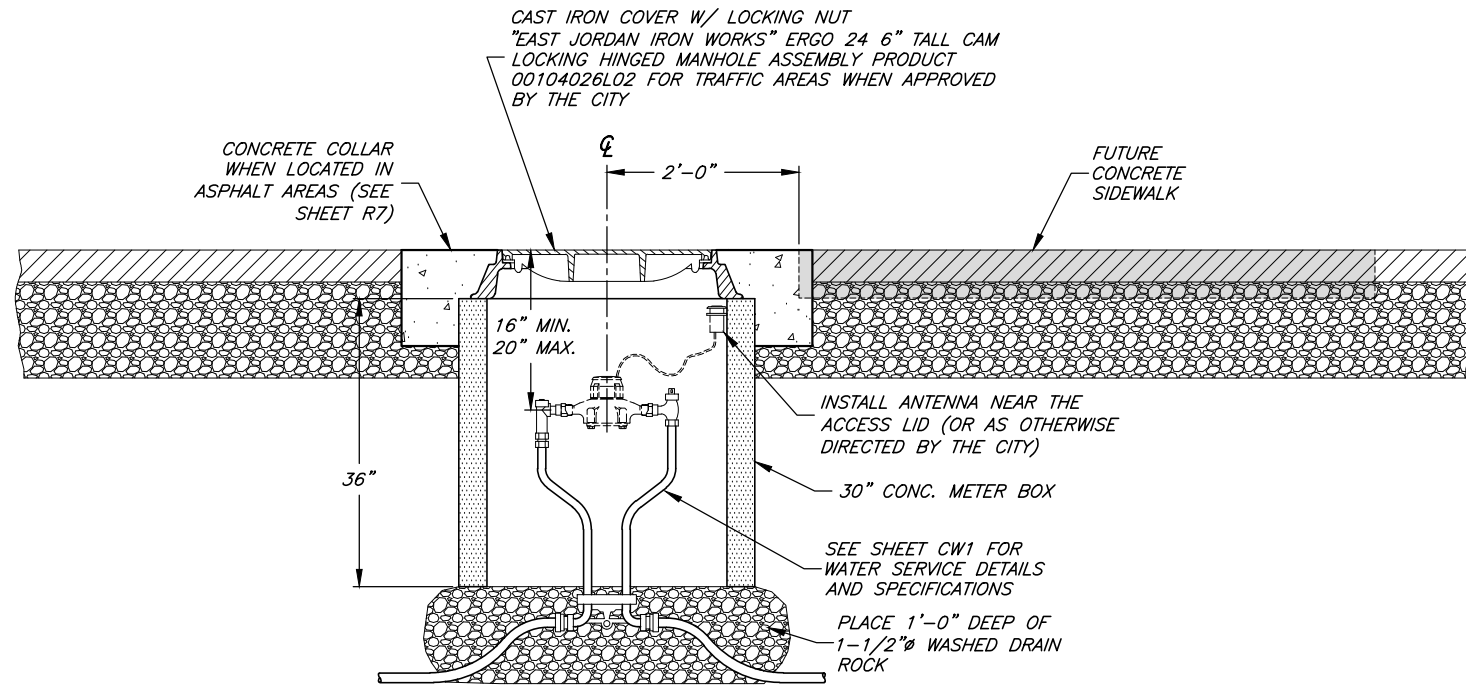


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PUBLIC WORKS - CULINARY WATER SYSTEM STANDARDS
CULINARY & IRRIGATION DOUBLE WATER SERVICE METER LATERAL W/ RP BACKFLOW PREVENTION ASSEMBLY DETAILS

SHEET:
CW6
OF 28 SHEETS
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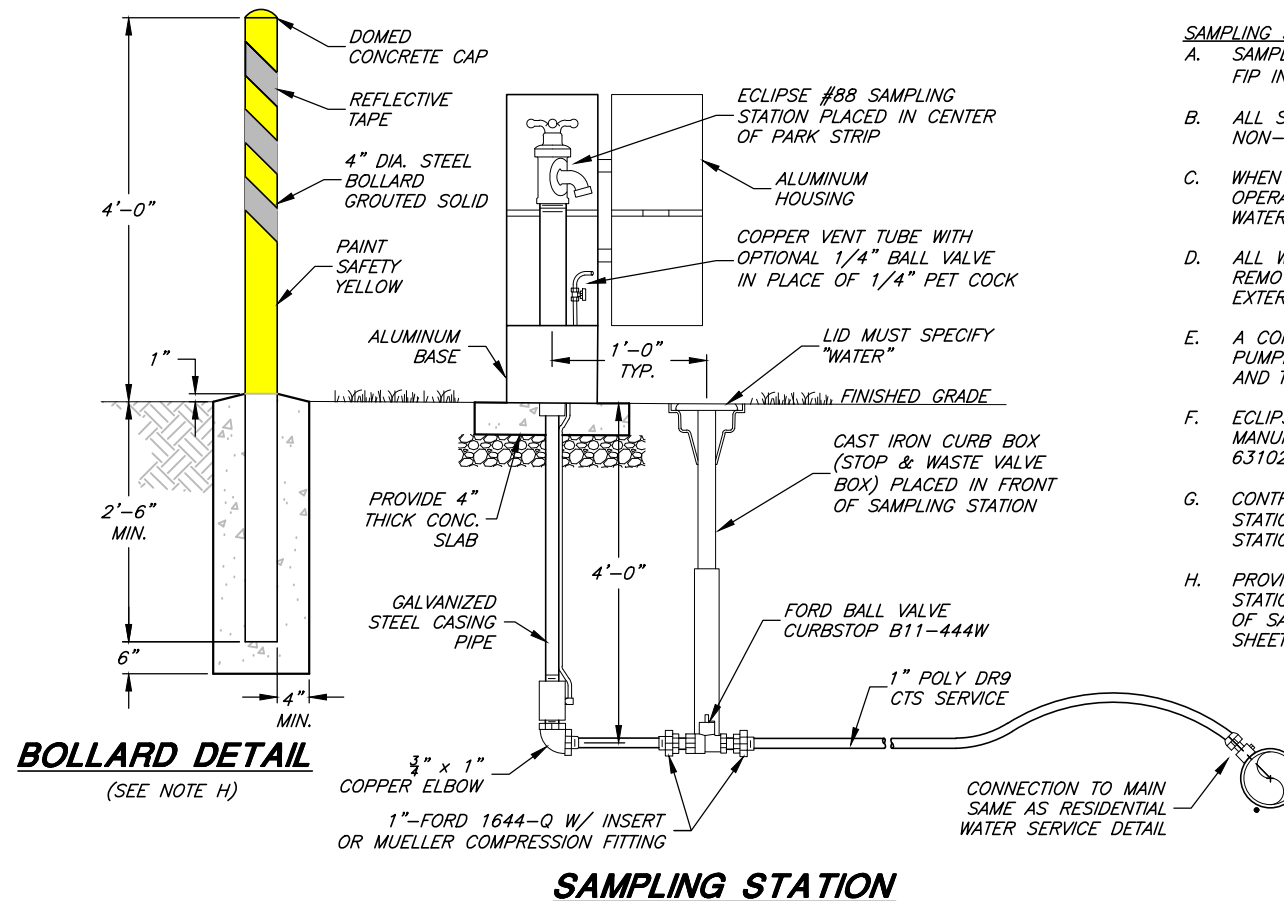
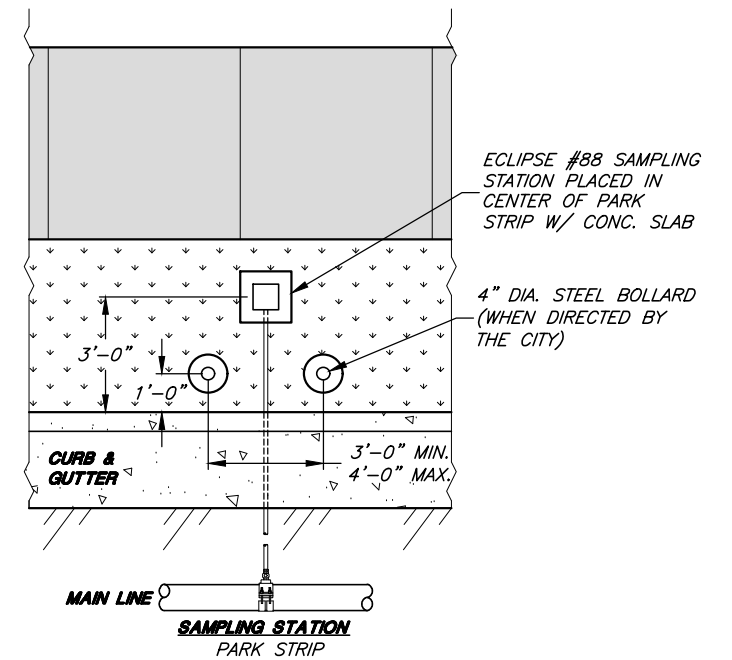
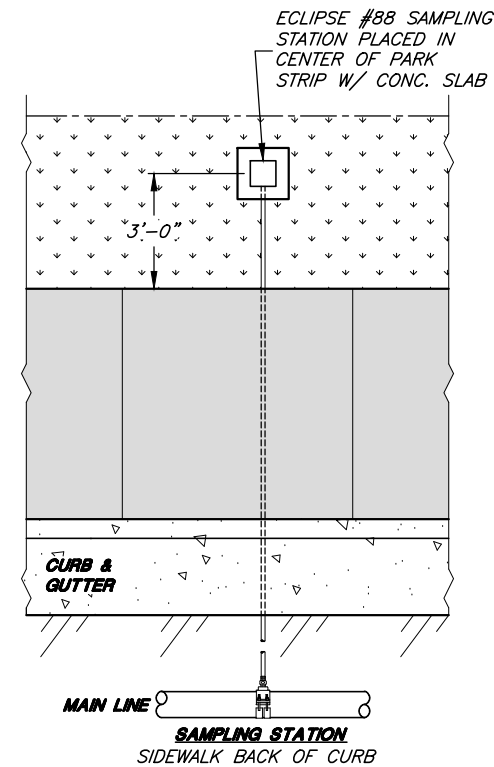


HIGH TRAFFIC RESIDENTIAL METER PIT DETAIL

THE USE OF A HIGH TRAFFIC RESIDENTIAL SERVICE METER PIT IS
SITE SPECIFIC AND REQUIRES WRITTEN APPROVAL FROM THE CITY
PRIOR TO INSTALLATION

METER LOCATION NOTES:

1. CULINARY WATER METERS SHALL NOT BE LOCATED
WITHIN THE DRIVEWAY AREA.
2. IF A DRIVEWAY IS PLACED OVER AN EXISTING METER
THE "ENTIRE" SERVICE LINE, CORP STOP, AND
METER SHALL BE RELOCATED AT THE OWNER'S
EXPENSE.
3. THE HIGH TRAFFIC RESIDENTIAL METER PIT IS TO BE
USED IN TEMPORARY TURNAROUNDS (SEE DETAIL ON
SHEET R5) OR AS OTHERWISE APPROVED BY THE CITY.

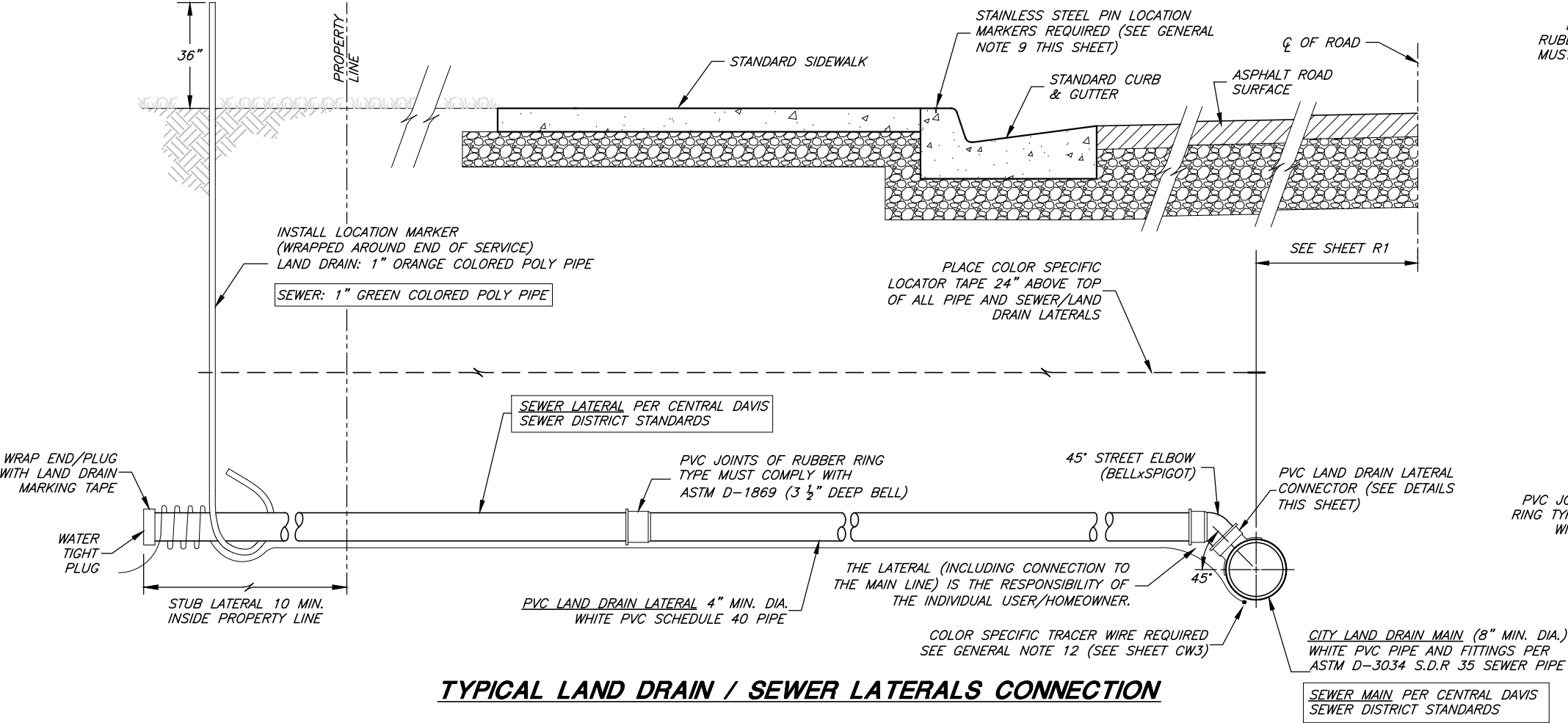


SAMPLING STATION NOTES:

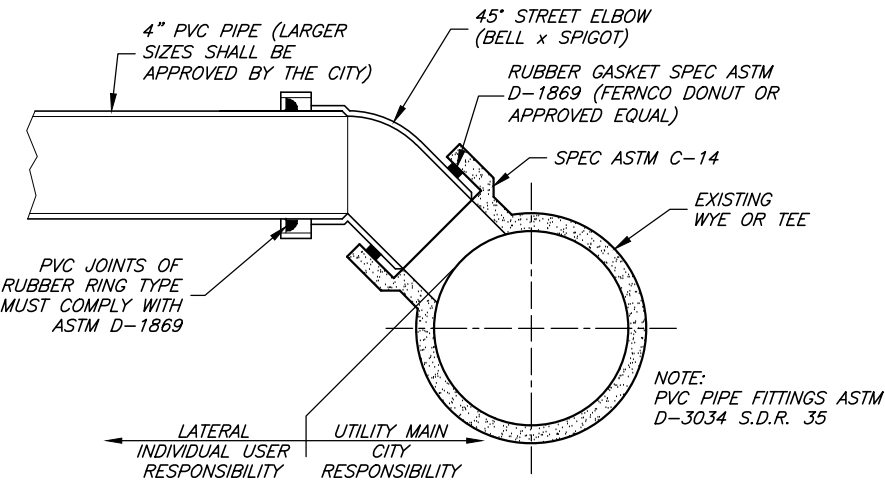
- A. SAMPLING STATIONS SHALL BE 4'-0" BURY, WITH A 3/4" FIP INLET, AND A 3/4" UNTHREADED NOZZLE.
- B. ALL STATIONS SHALL BE ENCLOSED IN A LOCKABLE, NON-REMOVABLE, ALUMINUM-CAST HOUSING.
- C. WHEN OPENED, THE STATION SHALL REQUIRE NO KEY FOR OPERATION, AND THE WATER WILL FLOW IN AN ALL BRASS WATERWAY.
- D. ALL WORKING PARTS WILL ALSO BE OF BRASS AND BE REMOVABLE FROM ABOVE GROUND WITH NO DIGGING. EXTERIOR PIPING SHALL BE BRASS PIPE.
- E. A COPPER VENT TUBE WILL ENABLE EACH STATION TO BE PUMPED FREE OF STANDING WATER TO PREVENT FREEZING AND TO MINIMIZE BACTERIA GROWTH.
- F. ECLIPSE NO. 88 SAMPLING STATION SHALL BE MANUFACTURED BY KUPFERLE FOUNDRY, ST. LOUIS, MO 63102
- G. CONTRACTOR/DEVELOPER TO PROVIDE/INSTALL SAMPLING STATIONS WHEN DIRECTED BY THE CITY. SAMPLING STATION LOCATIONS SHALL BE DESIGNATED BY THE CITY.
- H. PROVIDE 2 STEEL BOLLARDS TO PROTECT SAMPLING STATION WHEN DIRECTED BY THE CITY. PLACE IN FRONT OF SAMPLING STATION AS SHOWN IN THE DETAIL ON THIS SHEET.

GENERAL NOTES:

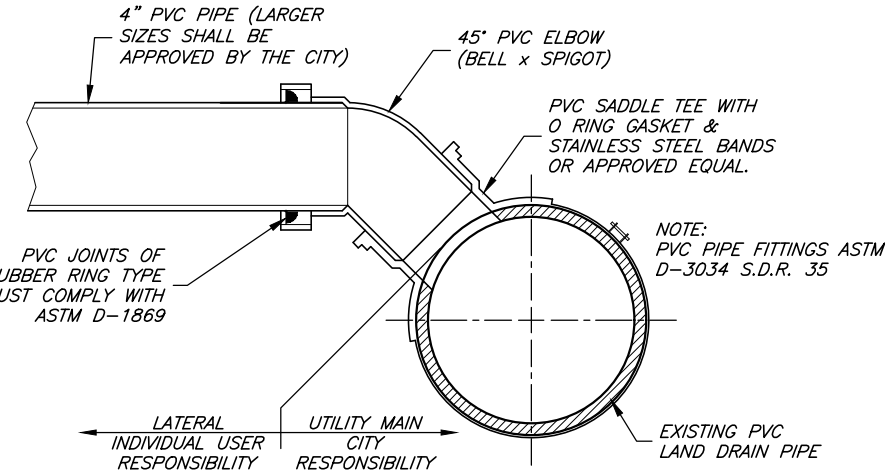
- ALL LAND DRAIN LATERAL CONNECTIONS ON MAINS IN NEW SUBDIVISIONS SHALL BE MADE WITH IN LINE PRE-FORMED WYES OR TEES UNLESS OTHERWISE APPROVED BY THE CITY.
- FLOWLINE ELEVATION OF LATERALS SHALL EQUAL THE INSIDE TOP OF PIPE ON MAINLINE AT THE CONNECTING POINT (THE LATERAL TAP SHALL BE IN THE TOP QUARTER OF THE MAIN LINE PREFERABLY IN THE 10:00 OR 2:00 POSITION).
- LATERAL CONNECTIONS SHALL NOT BE ALLOWED IN MANHOLES.
- LAND DRAIN MAIN LINES SHALL BE "WHITE" IN COLOR AND LAND DRAIN LATERAL LINES SHALL BE "WHITE" IN COLOR. IRRIGATION PIPES SHALL BE "PURPLE" IN COLOR. SANITARY SEWER PIPES SHALL BE SPECIFIED BY CENTRAL DAVIS SEWER DISTRICT. PREVIOUS YEARS PIPE COLORS VARY THROUGHOUT THE CITY. CONTRACTOR TO VERIFY EXISTING PIPE PRIOR TO MAKING ANY CONNECTION.
- INSERTA TEE PRODUCT IS NOT APPROVED BY THE CITY
- THE LOCATION OF THE SEWER LATERAL MUST BE DOCUMENTED AND SUBMITTED TO THE CITY AND/OR CENTRAL DAVIS SEWER DISTRICT ON SCALED AS-BUILT DRAWINGS.
- ALL CULINARY WATER MAINS AND SERVICES MUST MAINTAIN A MINIMUM SEPARATION ABOVE ALL SEWER MAINS AND LATERALS OF 18" VERTICAL AND 10'-0" HORIZONTAL IN ACCORDANCE WITH THE STATE OF UTAH DIVISION OF DRINKING WATER (DDW) RULES SECTION R309-550-7. EXCEPTIONS MUST BE APPROVED BY DDW.
- ALL LAND DRAIN LINES SHALL BE INSPECTED BY MEANS OF VIDEO CAMERA WHEN CONSTRUCTED. PRIOR TO VIDEO, PIPE SHALL BE FLUSHED WITH A PRESSURIZED CLEANING TRUCK. ALL WATER & DEBRIS SHALL BE SUCKED OUT & REMOVED FROM THE LOW END MANHOLE. CONNECTIONS TO EXISTING LINES SHALL BE BLOCKED TO PREVENT FLUSHED DEBRIS FROM ENTERING SYSTEM. CLEAN WATER SHALL BE ADDED TO LINE WHILE VIDEOING. ALL PROBLEMS FOUND AND CORRECTED TO BE RE-INSPECTED BY THE SAME PROCEDURE. VIDEOS TO BE RETAINED BY CITY.
- STAMPED STAINLESS STEEL PINS USED FOR LATERAL LOCATING ARE REQUIRED BY THE CITY. BLANK S.S. PINS SHALL BE PROVIDED BY THE CITY AND INSTALLED AND STAMPED BY THE CONTRACTOR DURING ALL NEW CONSTRUCTION OR RESTORED WHEN REPLACING DAMAGED CURB & GUTTER DUE TO ANY CONSTRUCTION RELATED ACTIVITY. S.S. PINS SHALL BE STAMPED "S" FOR SANITARY SEWER, "W" FOR CULINARY WATER, AND "L" FOR LAND DRAIN.
- DOWNSTREAM LAND DRAIN CONNECTION TO AN EXISTING STORM DRAIN SYSTEM IS REQUIRED.
- TAPPING INTO EXIST. PIPE TO BE WITH A CITY APPROVED TAPPING MACHINE. TAPPING INTO EXIST. PIPE AND CONNECTION SADDLE TO BE INSPECTED BY THE CITY AND PAID FOR BY THE OWNER, IN ADDITION TO THE CONNECTION FEE.
- TRACER WIRE SHALL BE INSTALLED ON ALL LAND DRAIN MAINS AND LATERALS.



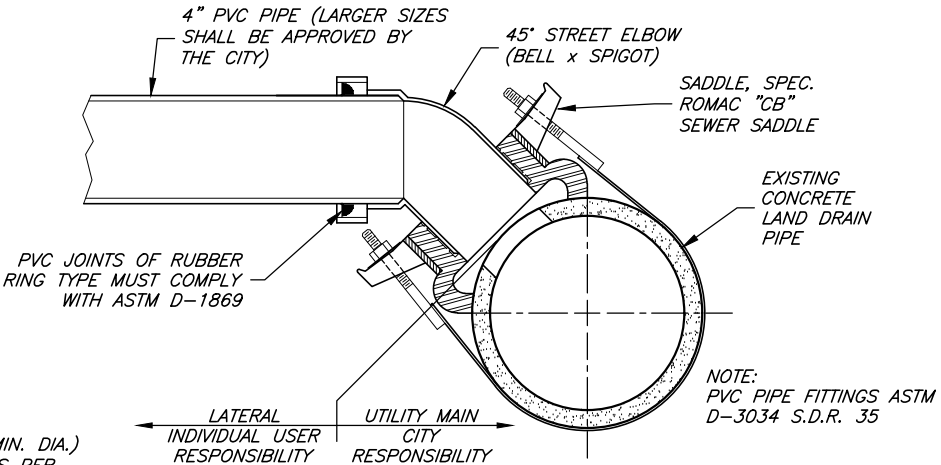
TYPICAL LAND DRAIN / SEWER LATERALS CONNECTION



CONNECTING INTO EXISTING WYE OR TEE



TAPPING INTO EXISTING PVC PIPE



TAPPING INTO EXISTING CONCRETE PIPE

CITY ENGINEER	REV.	DATE	APPR.
APRIL 2024			
DATE			

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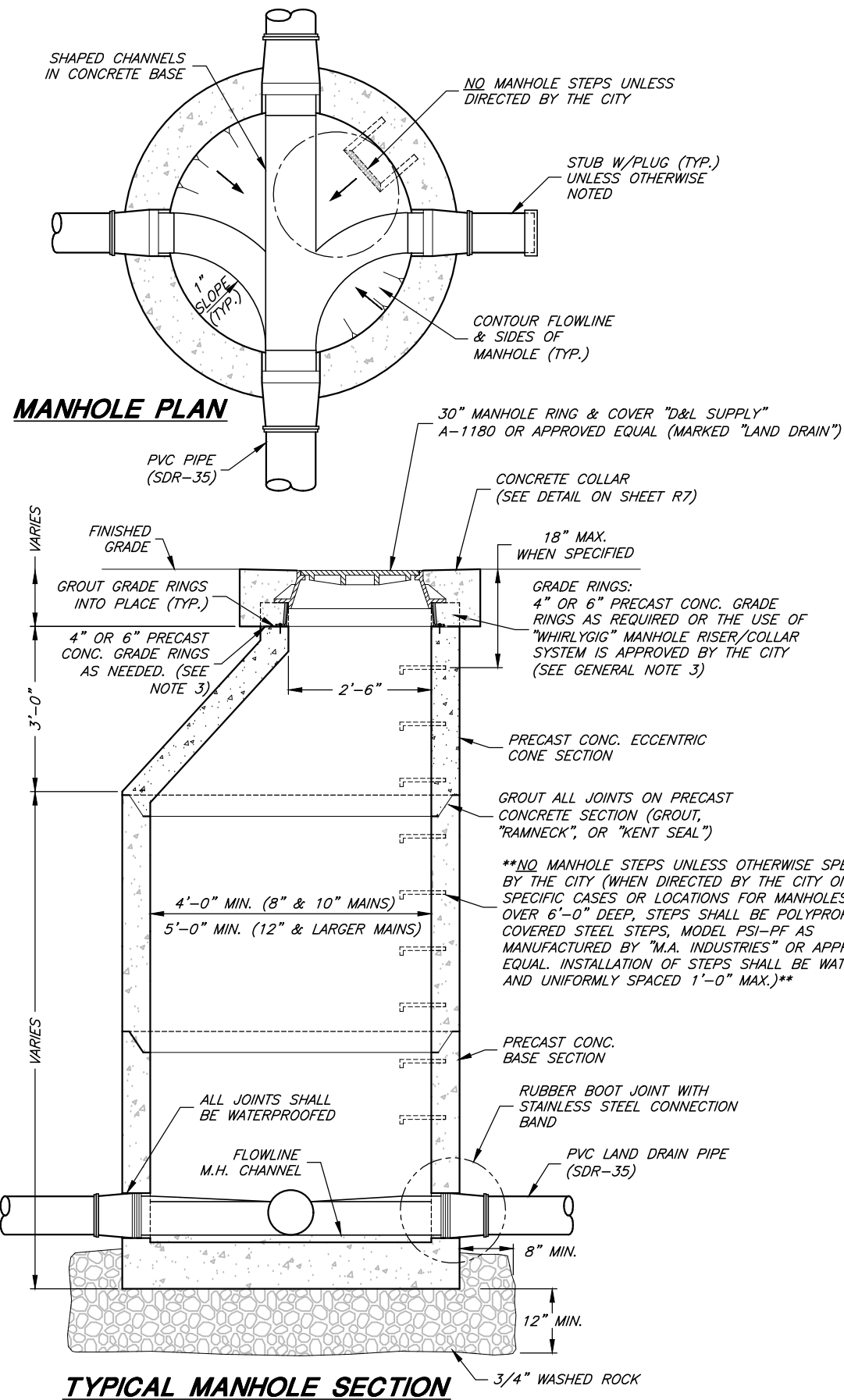


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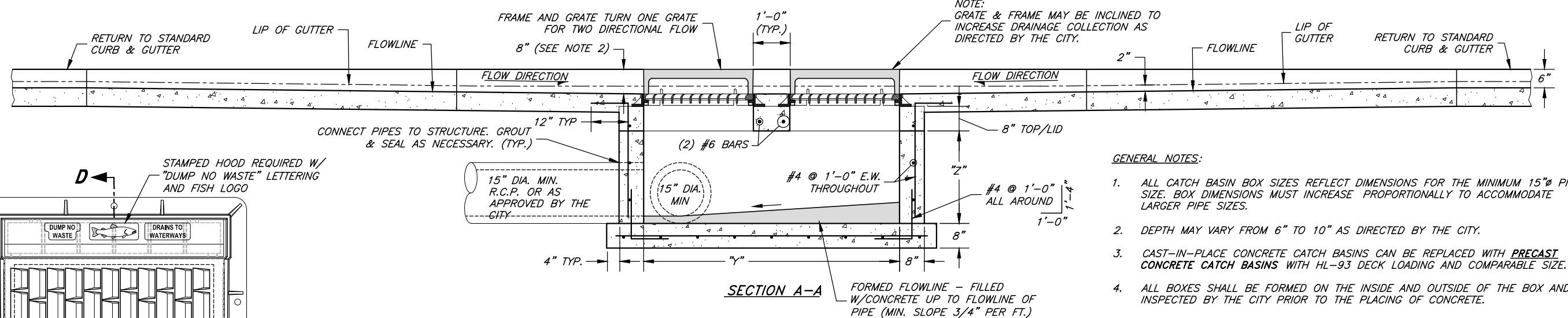
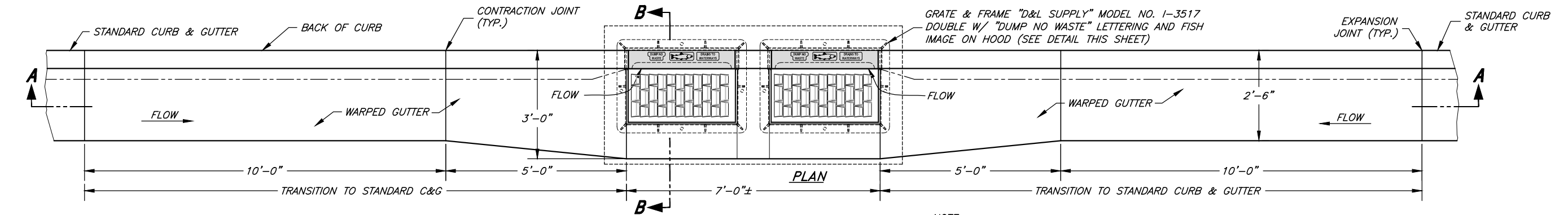


FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS - LAND DRAIN SYSTEM STANDARDS
LAND DRAIN / SANITARY SEWER LATERAL &
MAIN LINE CONNECTION DETAILS

SHEET:
LD1
OF 28 SHEETS
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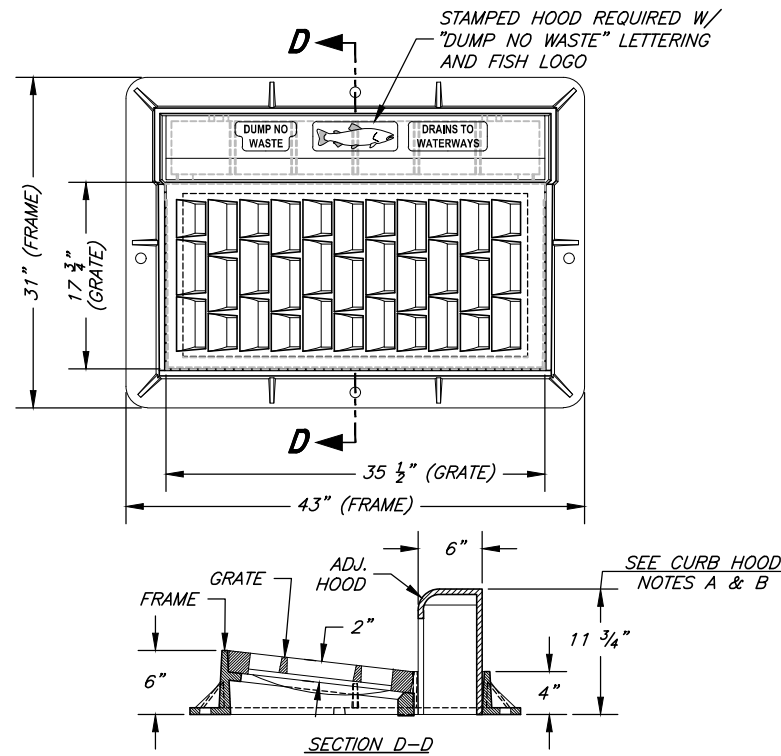
- GENERAL NOTES:**
1. SECURE INVERTS IN ALL MANHOLES DURING CONSTRUCTION SO AS TO PREVENT GRAVEL AND OTHER DEBRIS FROM COLLECTING INSIDE.
 2. A LARGER DIAMETER MANHOLE MAY BE REQUIRED BY THE CITY AFTER EVALUATION OF THE NUMBER, SIZE, AND ANGLE OF THE PIPES THAT CONNECT TO THE MANHOLE.
 3. NO MORE THAN 12" OF GRADE RINGS TO BE ALLOWED ON ANY MANHOLE.
 4. ALL TERMINATING LAND DRAIN MAINS SHALL END WITH A CITY STANDARD MANHOLE.
 5. SERVICE LATERAL CONNECTIONS SHALL NOT BE ALLOWED IN MANHOLES.
 6. FIBER MESH SHALL BE ADDED TO ALL CONCRETE COLLARS ON VALVES AND MANHOLES.
 7. FLAT MANHOLE RINGS & COVERS (SLAB CONSTRUCTION) ARE NOT ALLOWED ON ANY MANHOLE CONE SECTION



DOUBLE HOODED CATCH BASIN

GENERAL NOTES:

- ALL CATCH BASIN BOX SIZES REFLECT DIMENSIONS FOR THE MINIMUM 15"Ø PIPE SIZE. BOX DIMENSIONS MUST INCREASE PROPORTIONALLY TO ACCOMMODATE LARGER PIPE SIZES.
- DEPTH MAY VARY FROM 6" TO 10" AS DIRECTED BY THE CITY.
- CAST-IN-PLACE CONCRETE CATCH BASINS CAN BE REPLACED WITH **PRECAST CONCRETE CATCH BASINS** WITH HL-93 DECK LOADING AND COMPARABLE SIZE.
- ALL BOXES SHALL BE FORMED ON THE INSIDE AND OUTSIDE OF THE BOX AND INSPECTED BY THE CITY PRIOR TO THE PLACING OF CONCRETE.
- DOUBLE CATCH BASINS WILL BE REQUIRED IN LOCATIONS SPECIFIED BY THE CITY (TYPICALLY IN LOW SPOTS OR WHERE ADDITIONAL INLET CAPACITY IS NEEDED).
- STORM DRAIN LINES SHALL BE 15" MINIMUM DIAMETER REINFORCED CONCRETE PIPE (RCP), OF APPROPRIATE CLASS.
- ALTERNATE STRUCTURE (E.G. COMBO BOXES) MAY BE USED WITH APPROVAL OF THE CITY. STRUCTURES SHALL FOLLOW APWA STANDARD PLANS AND BE A COMMON SIZE.

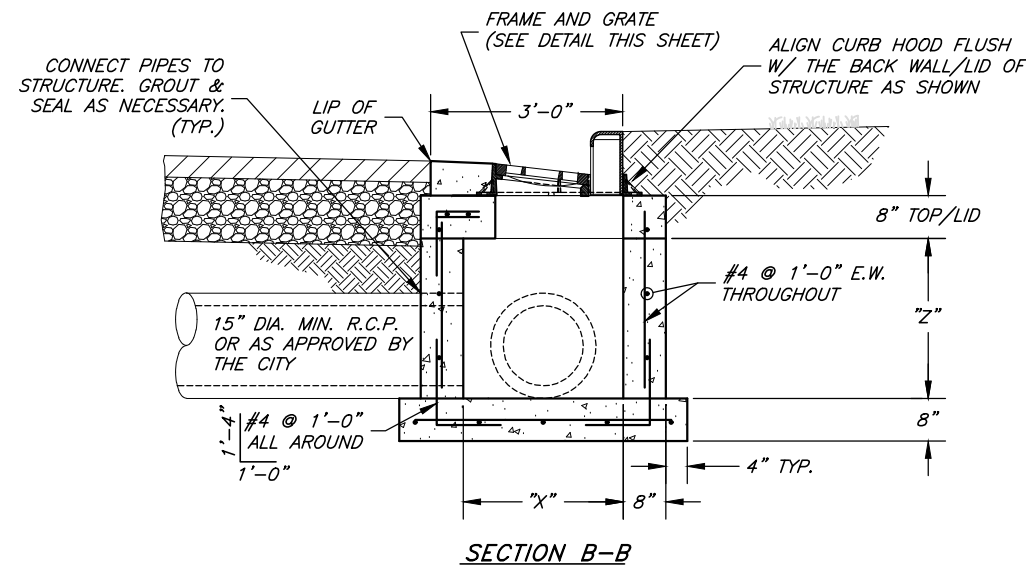


CURB HOOD INLET FRAME & TYPE "L" GRATE

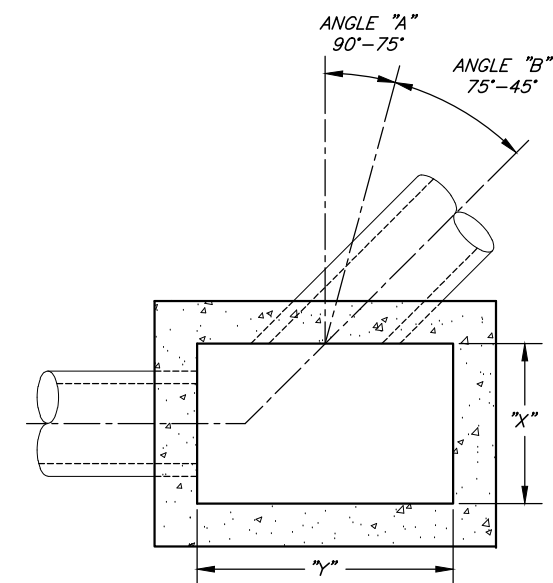
"D&L SUPPLY" I-3517	
PRODUCT NUMBER:	
GRATE:	I-3517-02
ADJ HOOD:	I-3516-13
FRAME:	I-3516-R8

CURB HOOD NOTES:

- A. 13 1/8" APPROXIMATE MAXIMUM HEIGHT FOR THE ADJUSTABLE HOOD.
B. 9 5/8" APPROXIMATE MINIMUM HEIGHT FOR THE ADJUSTABLE HOOD.



CATCH BASIN DIMENSION TABLE				
PIPE SIZE (IN.)	"X"	"Y" MIN. (ANGLE A)	"Y" MIN. (ANGLE B)	"Z" MIN.
15	2'-6"	6'-11"	6'-11"	2'-0"
18	2'-6"	6'-11"	6'-11"	2'-6"
21	4'-0"	6'-11"	6'-11"	3'-0"
24	4'-0"	6'-11"	6'-11"	3'-0"
30	4'-0"	6'-11"	6'-11"	3'-6"
36	4'-0"	6'-11"	6'-11"	4'-0"
42	6'-0"	6'-11"	8'-0"	5'-0"
48	6'-0"	6'-11"	8'-0"	5'-6"



CITY ENGINEER				
APRIL 2024				
DATE	REV.	DATE	APPR.	

SCALE:
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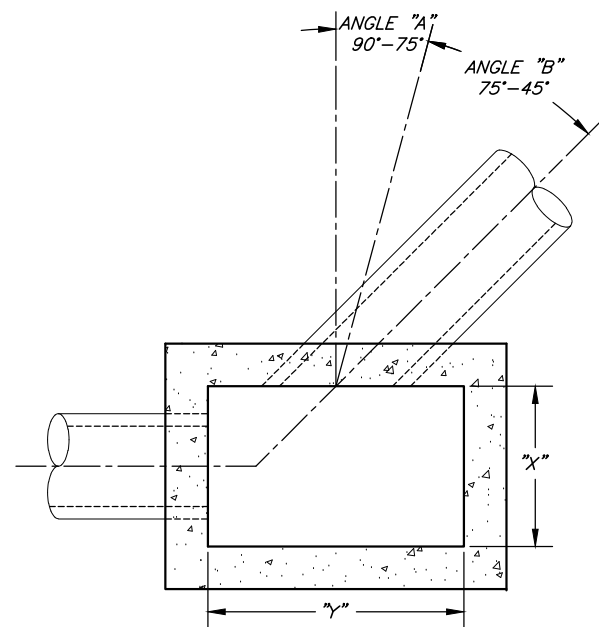


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FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS - STORM DRAIN SYSTEM STANDARDS
DOUBLE HOODED CATCH BASIN DETAILS

SHEET:
SD2
OF 28 SHEETS
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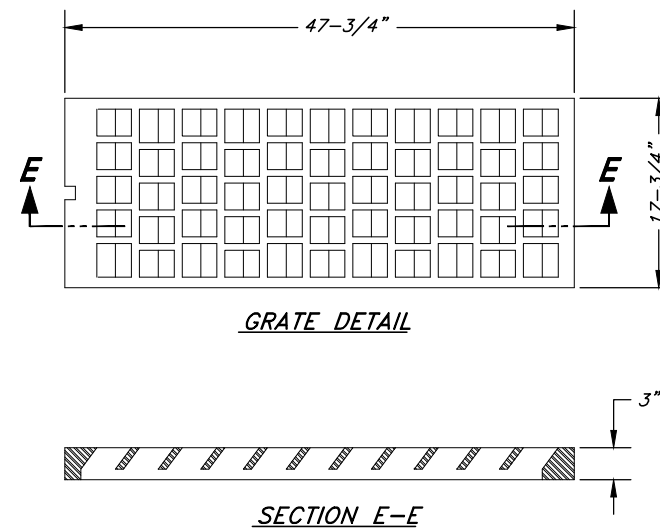
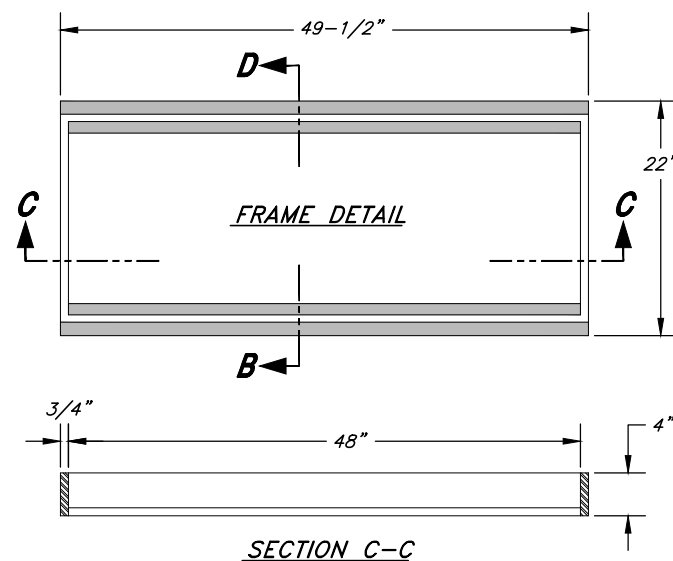
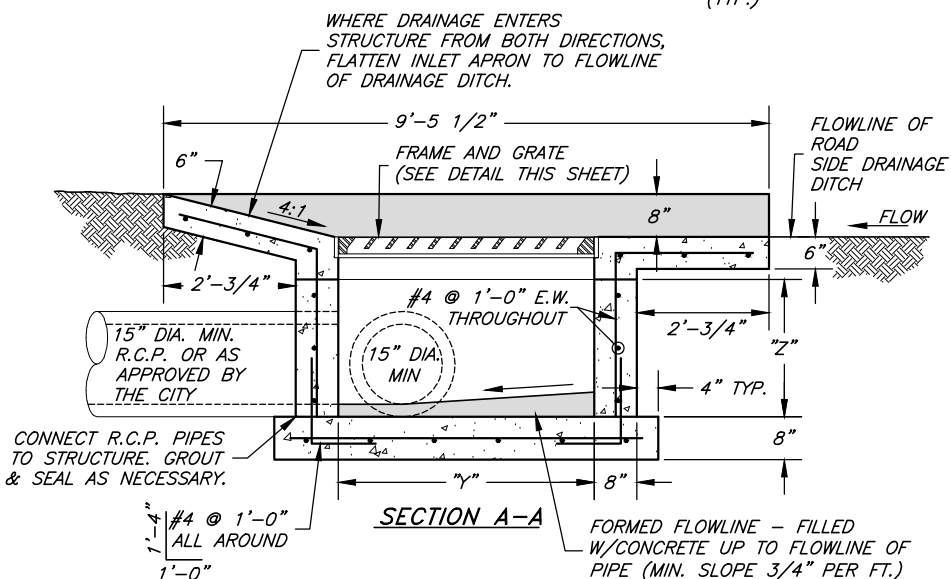
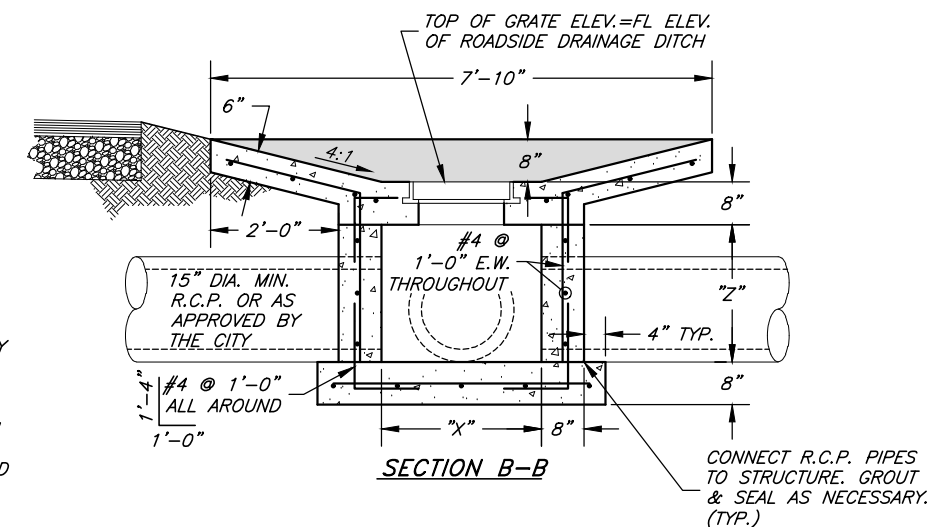
PIPE SIZE (IN.)	"X"	INLET BOX		"Z" MIN.
		"Y" (ANGLE A)	"Y" (ANGLE B)	
15	2'-6"	4'-0"	4'-0"	2'-0"
18	2'-6"	4'-0"	4'-0"	2'-6"
21	4'-0"	4'-0"	4'-0"	3'-0"
24	4'-0"	4'-0"	5'-0"	3'-0"
30	4'-0"	4'-0"	6'-0"	3'-6"
36	4'-0"	4'-0"	6'-0"	4'-0"
42	6'-0"	6'-0"	7'-0"	5'-0"
48	6'-0"	6'-0"	8'-0"	5'-6"

GENERAL NOTE:

STORM DRAIN LINES SHALL BE 15" MINIMUM DIAMETER REINFORCED CONCRETE PIPE (RCP), OF APPROPRIATE CLASS.

DRAINAGE BOX NOTES:

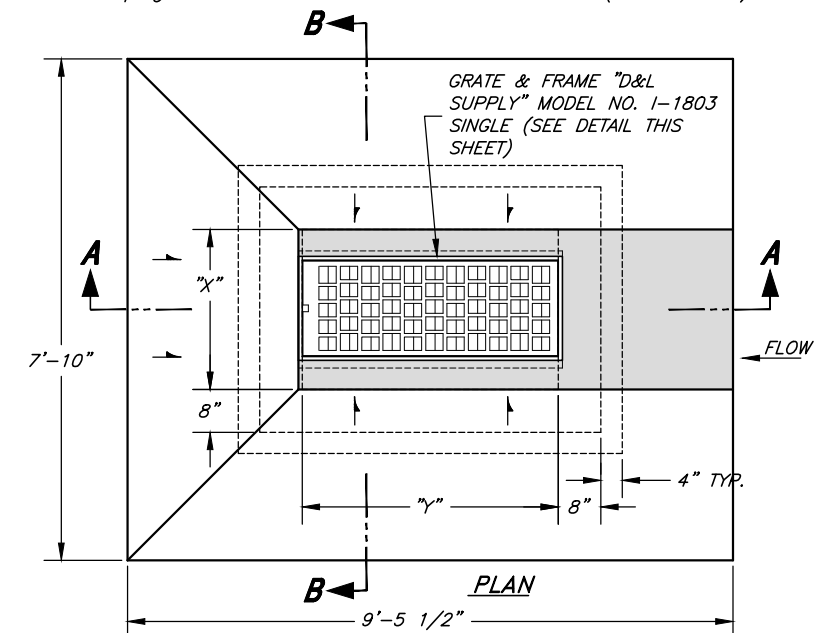
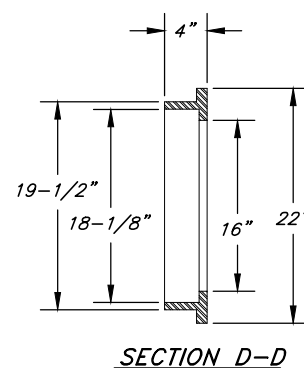
- ALL BOX SIZES REFLECT DIMENSIONS FOR THE MINIMUM 15"Ø PIPE SIZE. BOX DIMENSIONS MUST INCREASE PROPORTIONALLY TO ACCOMMODATE LARGER PIPE SIZES. (SEE TABLE THIS SHEET)
- CAST-IN-PLACE CONCRETE STRUCTURES CAN BE REPLACED WITH PRECAST CONCRETE STRUCTURES WITH HL-93 DECK LOADING AND COMPARABLE SIZE.
- ALL BOXES SHALL BE FORMED ON THE INSIDE AND OUTSIDE OF THE BOX AND INSPECTED BY THE CITY PRIOR TO THE PLACING OF CONCRETE.



FRAME & GRATE DETAILS

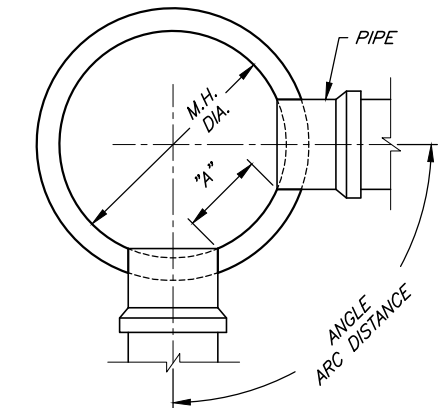
FRAME AND GRATE NOTES:

- GRATE AND FRAME SHALL BE MANUFACTURED BY "D&L SUPPLY" I-1803
- BICYCLE SAFE GRATE REQUIRED.
- "OR EQUAL" GRATES AND FRAMES WILL BE CONSIDERED AS APPROVED BY THE CITY.



DRAINAGE DITCH / SWALE INLET BOX

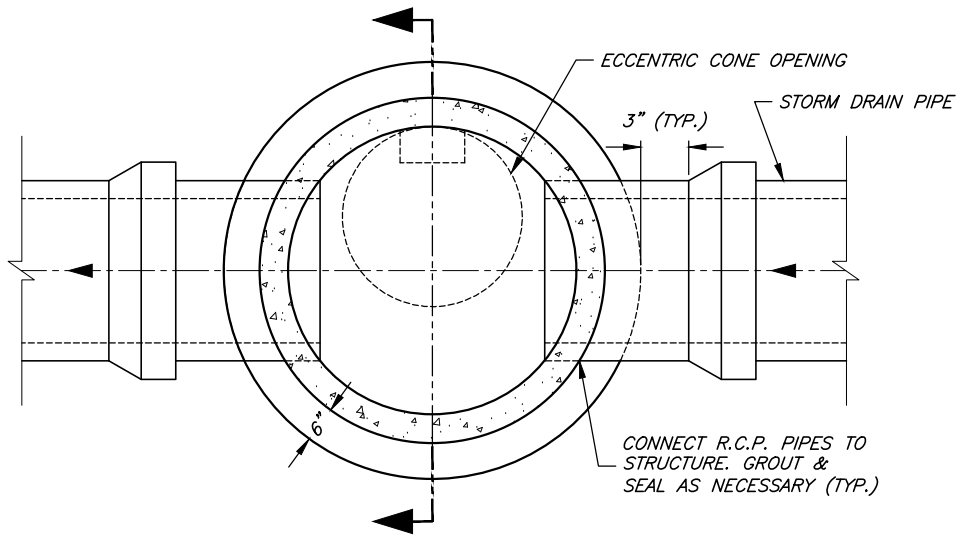
PIPE SIZES												
M.H. SIZE	IN-LINE M.H. 180°	JUNCTION MANHOLE (ANGLE / ARC DISTANCE)										
		90°	85°	80°	75°	70°	65°	60°	55°	50°	45°	
4' M.H.	15"-24"	15"-18"	15"-18"	15"	15"	15"-18"	15"-18"	15"	---	---	---	
5' M.H.	27"-30"	21"-24"	21"-24"	18"-21"	18"-21"	15"-18"	15"-18"	15"	---	---	---	
6' M.H.	36"-48"	27"-30"	27"-30"	24"-27"	24"	21"-24"	21"	18"	15"-18"	15"	---	
7' M.H.	54"	36"	36"	30"	27"-30"	27"	24"	21"-24"	21"	18"	15"	
8' M.H.	60"	42"	42"	36"	36"	30"	27"-30"	27"	24"	21"	18"	



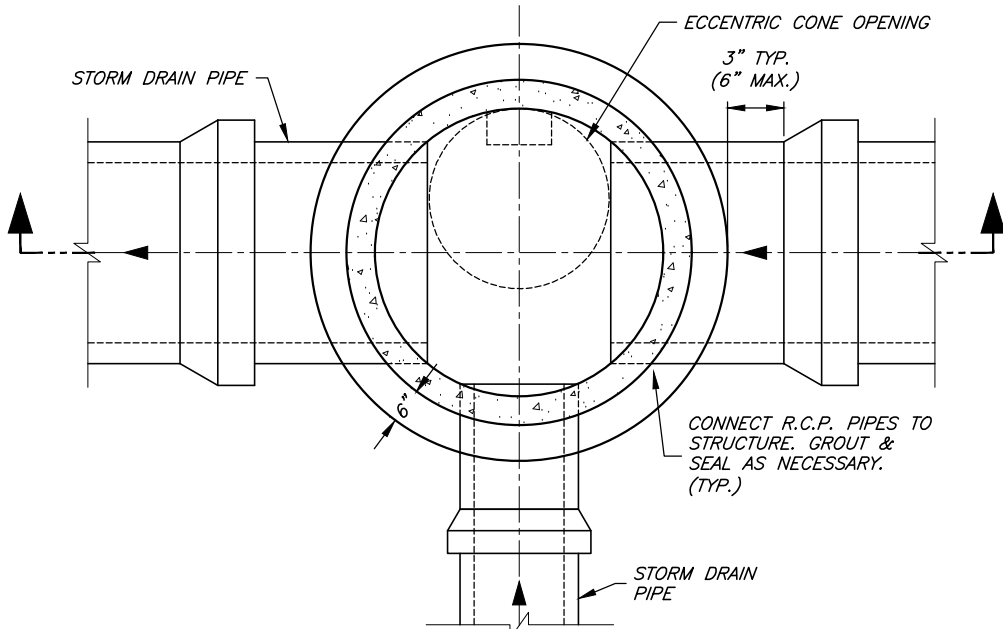
- MANHOLE SIZING NOTES:**
1. SUGGESTED "A" DISTANCE IS 6" OR GREATER FOR 48", 60" AND 72" DIAMETER MANHOLES
 2. SUGGESTED "A" DISTANCE IS 8" OR GREATER FOR 84" AND 96" DIAMETER MANHOLES

GENERAL NOTES:

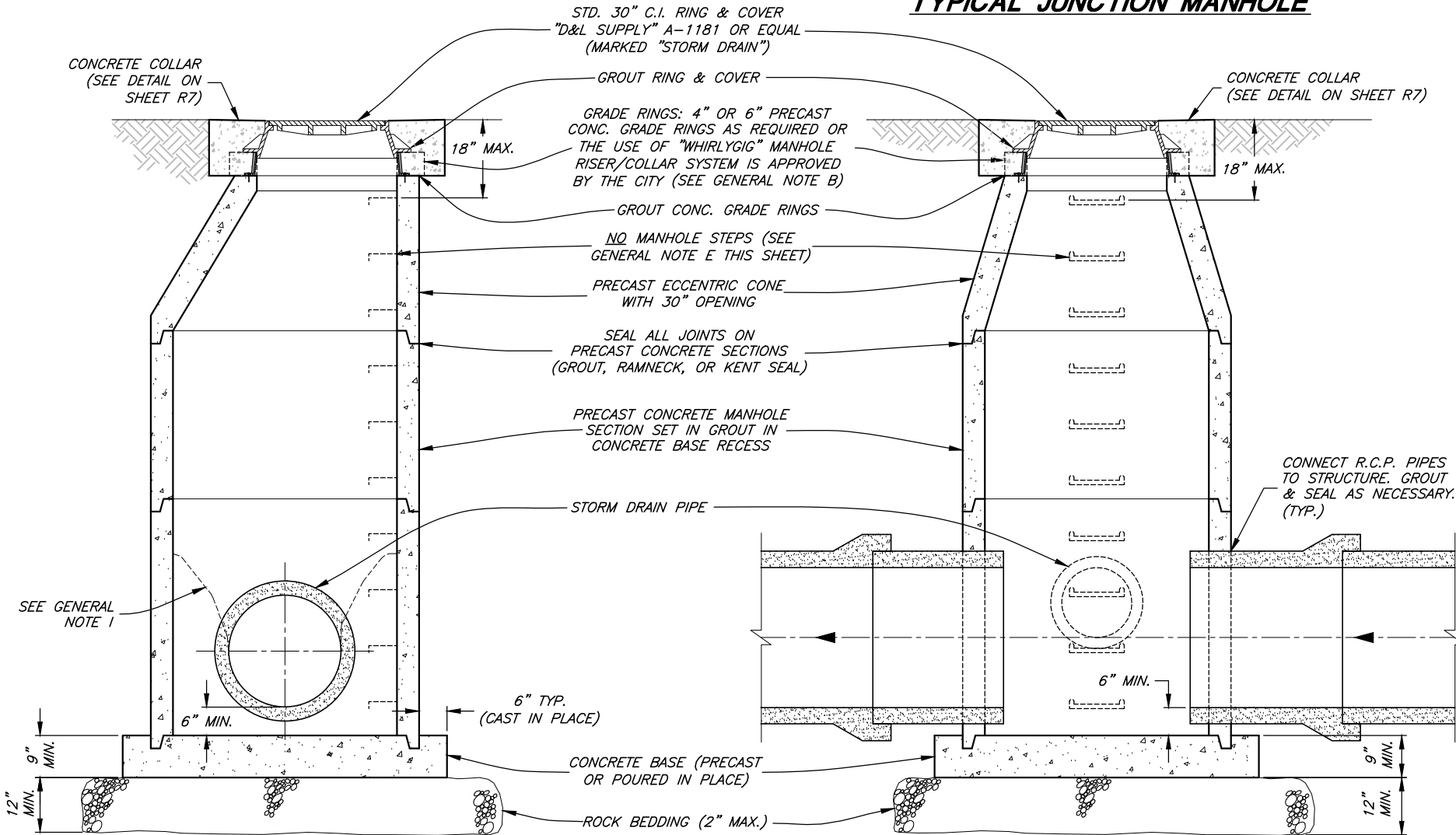
- A. LARGER DIAMETER MANHOLE MAY BE REQUIRED BY THE CITY ENGINEER AFTER EVALUATION OF THE NUMBER, SIZE, AND ANGLE OF THE PIPES THAT CONNECT TO THE MANHOLE.
- B. NO MORE THAN 12" OF GRADE RINGS TO BE ALLOWED ON ANY MANHOLE
- C. PLYWOOD COVERS SHALL BE USED AT MANHOLE FLOOR TO COVER FLOWLINE DURING CONSTRUCTION AND MAINTENANCE ACTIVITIES.
- D. ALL INTERIOR JOINTS SHALL BE SMOOTH AND EVENLY GROUTED WITH NON-SHRINK GROUT MIX.
- E. **NO MANHOLE STEPS UNLESS OTHERWISE SPECIFIED BY THE CITY (WHEN DIRECTED BY THE CITY ON SPECIFIC CASES OR LOCATIONS FOR MANHOLES OVER 6'-0" DEEP, STEPS SHALL BE POLYPROPYLENE COVERED STEEL STEPS, MODEL PSI-PF AS MANUFACTURED BY "M.A. INDUSTRIES" OR APPROVED EQUAL. STEPS SHALL BE WATERPROOF AND UNIFORMLY SPACED 1'-0" MAX.)**
- F. STORM DRAIN LINES SHALL BE 15" MINIMUM DIAMETER REINFORCED CONCRETE PIPE (RCP), OF APPROPRIATE CLASS.
- G. FLAT MANHOLE RINGS & COVERS (SLAB CONSTRUCTION) ARE NOT ALLOWED ON ANY MANHOLE CONE SECTION.
- H. THE USE OF STORM DRAIN UTILITY VAULTS (BOXES) WITH STD. 30" C.I. RING & COVER ("D&L SUPPLY" A-1181 MARKED "STORM DRAIN") AND A CONCRETE COLLAR IS ACCEPTED WHEN APPROVED BY THE CITY.
- I. CONTOUR THE FLOWLINE & SIDES OF ANY LINE OR JUNCTION MANHOLES WHEN DIRECTED BY THE CITY.



TYPICAL LINE MANHOLE



TYPICAL JUNCTION MANHOLE



CITY ENGINEER	REV.	DATE	APPR.
APRIL 2024			
DATE			

SCALE:
N.T.S.



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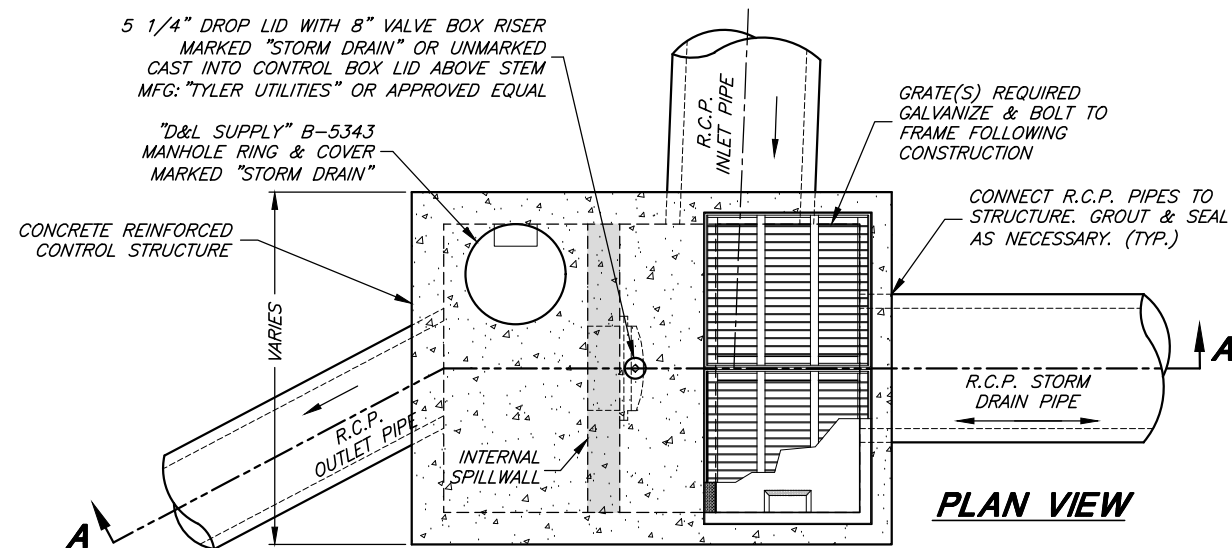
FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS - STORM DRAIN SYSTEM STANDARDS

STORM DRAIN MANHOLE DETAILS

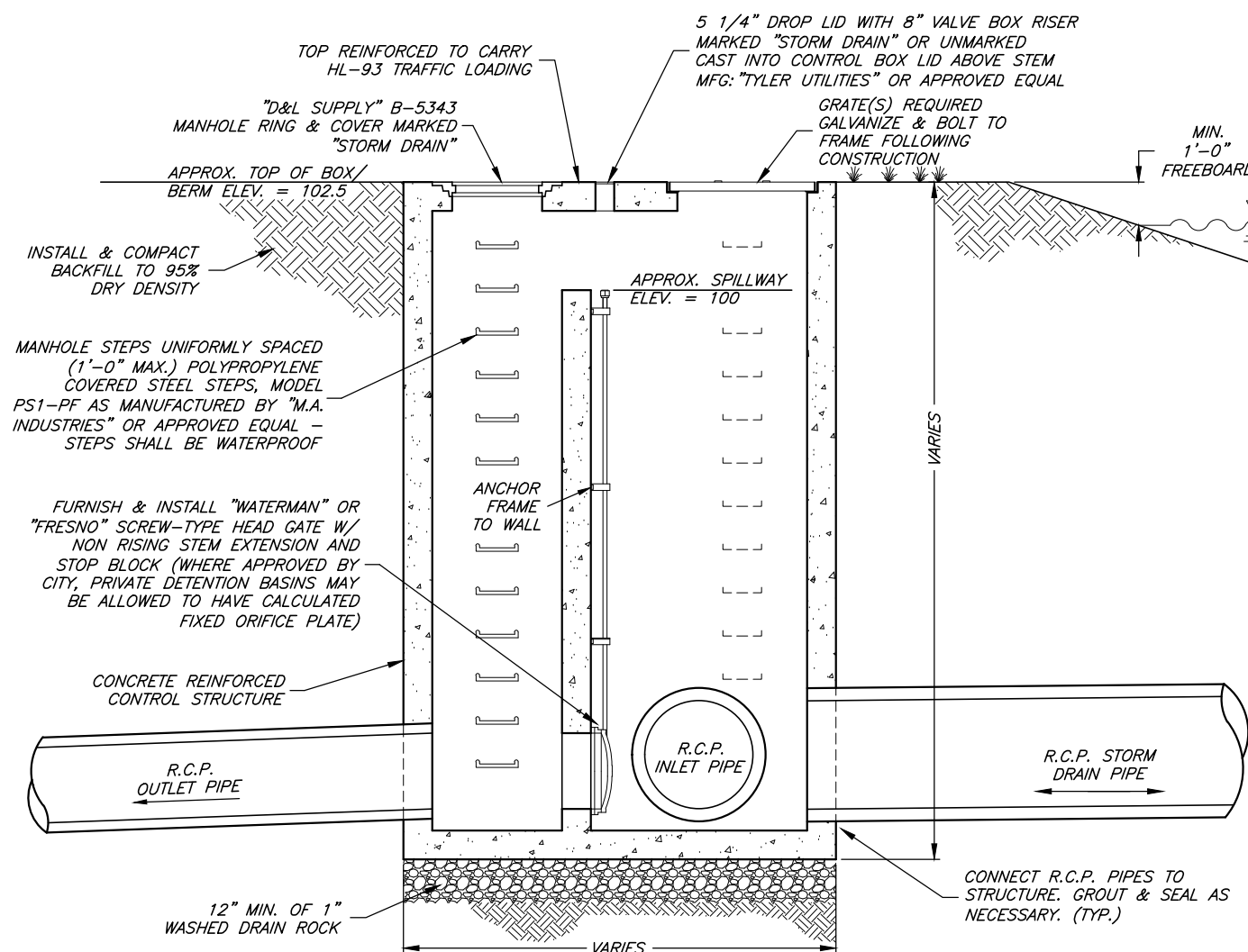
SHEET:

SD4

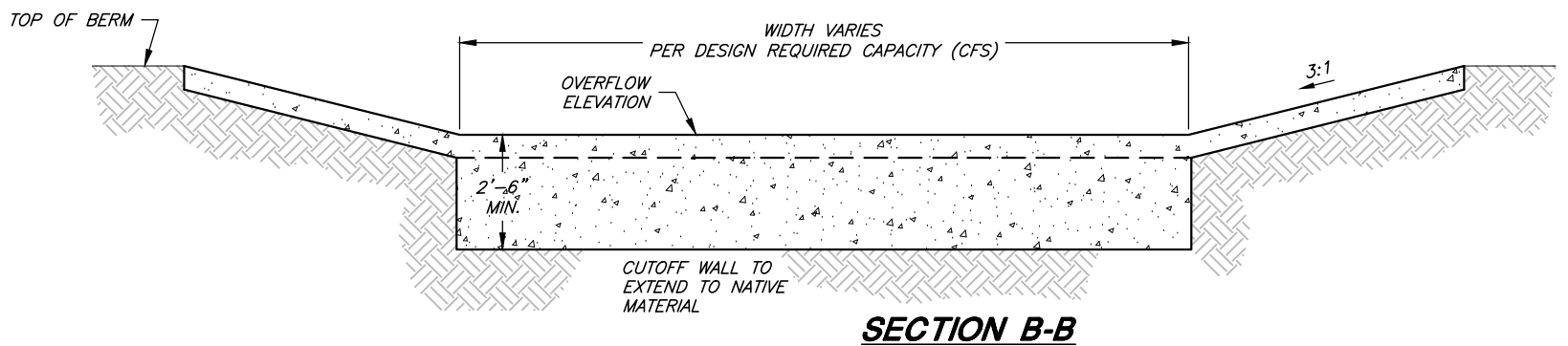
OF 28 SHEETS
0



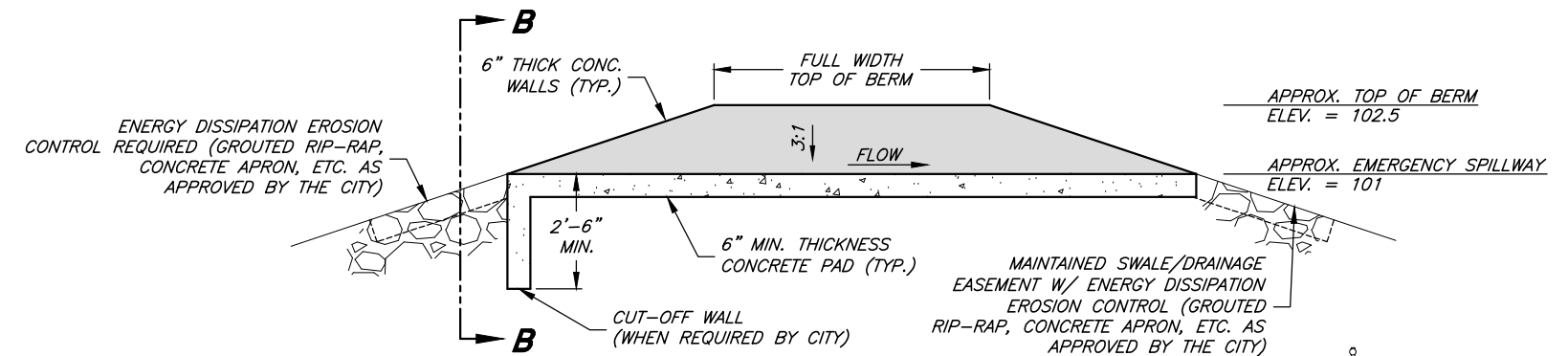
DETENTION INLET/OUTLET CONTROL STRUCTURE
(PRECAST OR CAST-IN-PLACE)



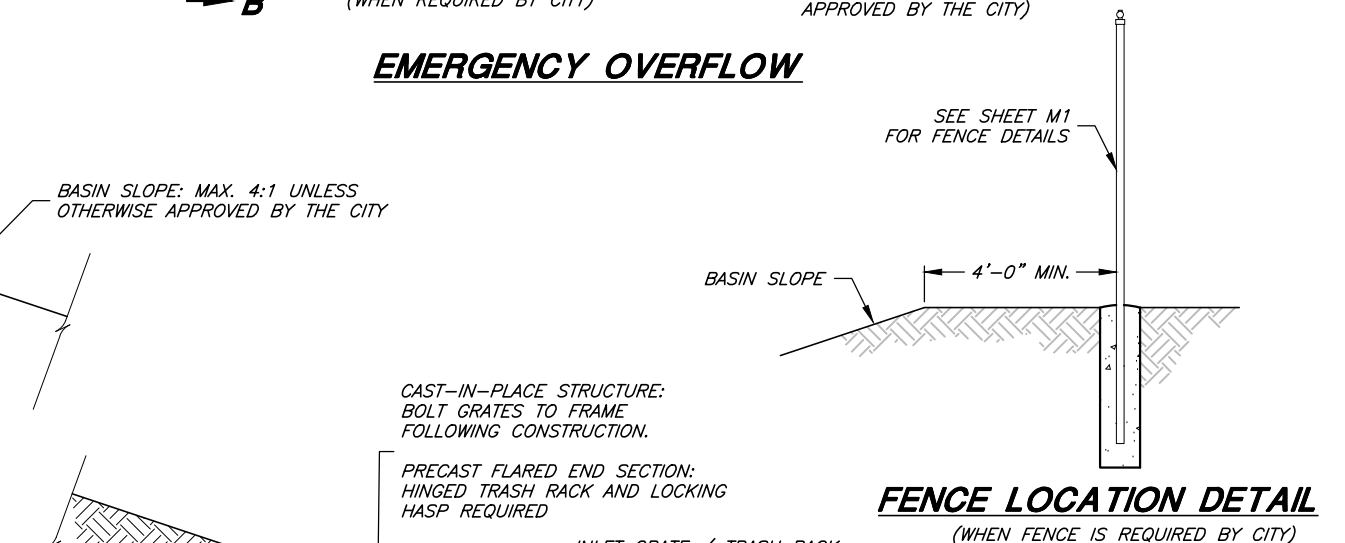
SECTION A-A



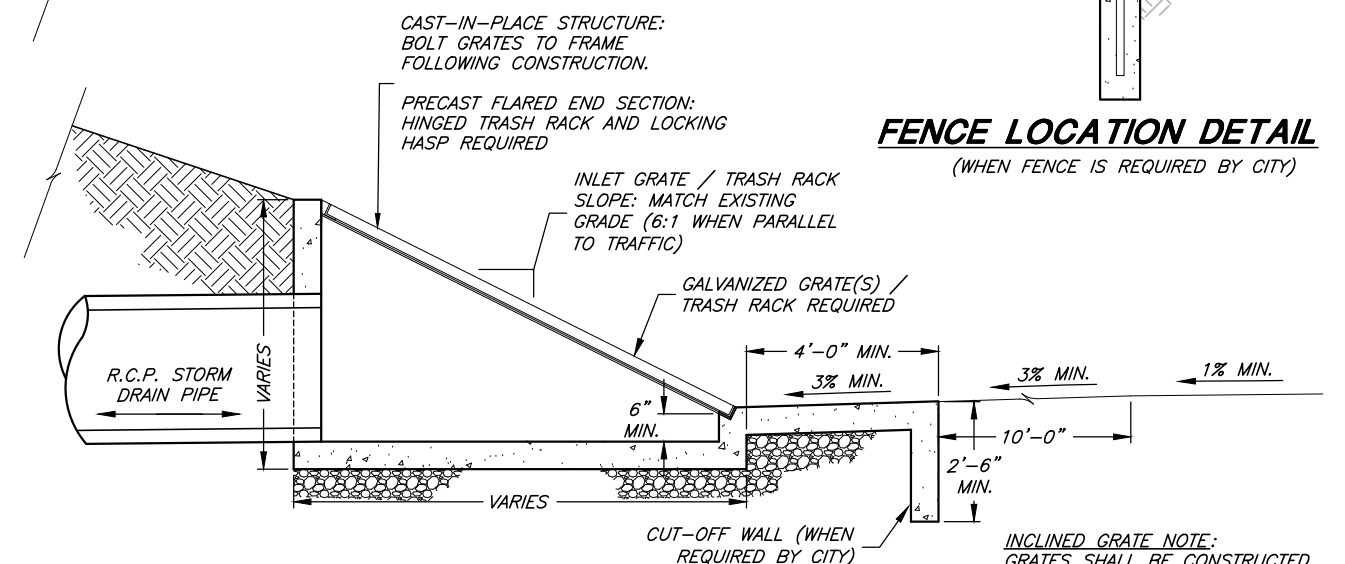
SECTION B-B



EMERGENCY OVERFLOW



FENCE LOCATION DETAIL
(WHEN FENCE IS REQUIRED BY CITY)



INCLINED GRATE STORM DRAIN INLET

**INCLINED GRATES ARE REQUIRED ON ALL PIPES/INLETS WHERE OPEN CHANNELS, DITCHES, OR PONDS DISCHARGE DIRECTLY INTO THE STORM DRAIN SYSTEM.

GENERAL AND STRUCTURAL NOTES:
SEE SHEET SD6

CITY ENGINEER	REV.	DATE	APPR.
APRIL 2024			
DATE			

SCALE:
N.T.S.

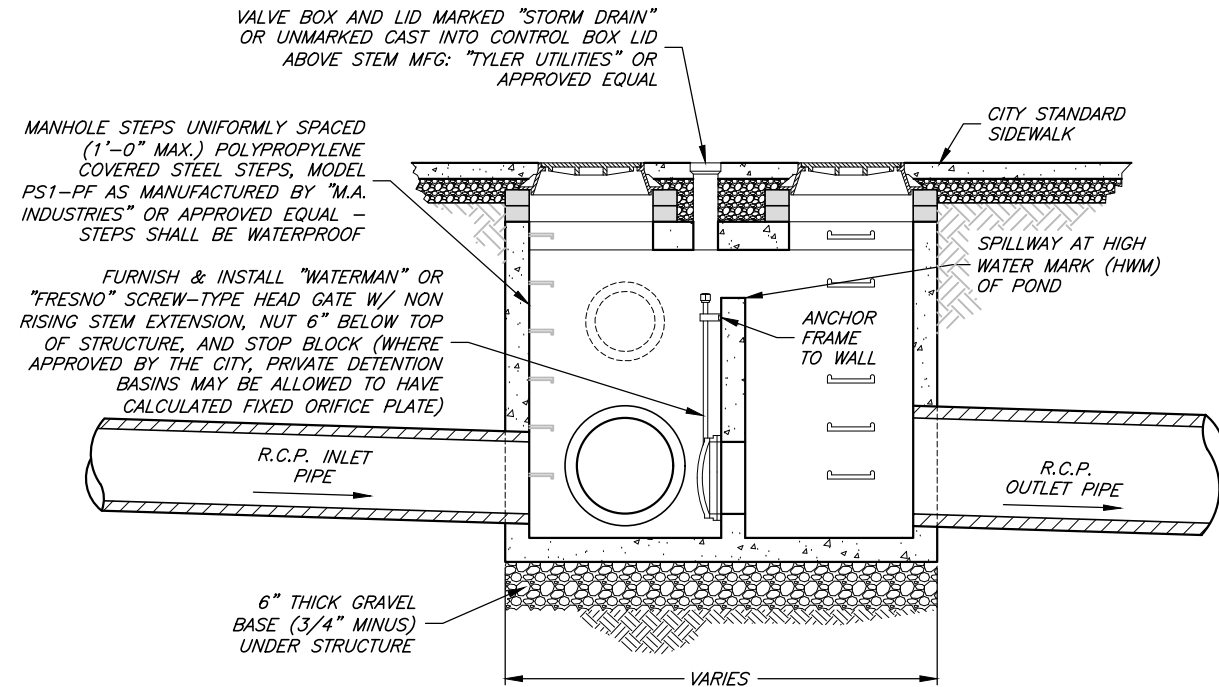


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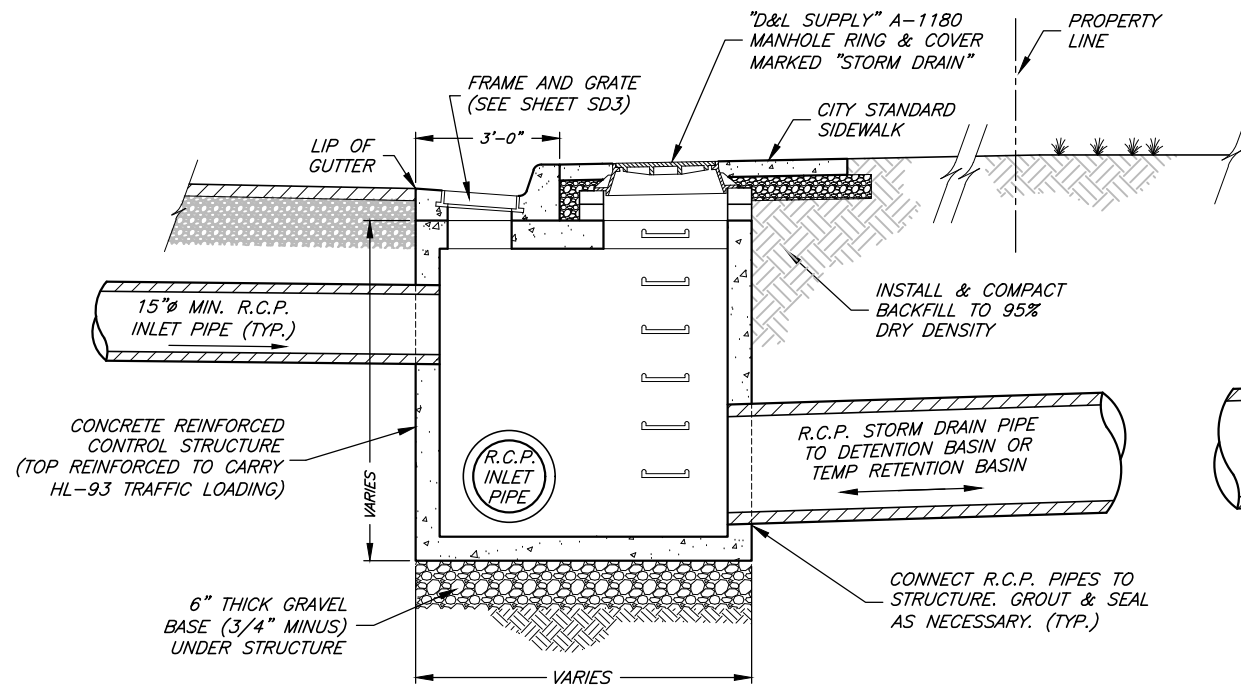


FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS - STORM DRAIN SYSTEM STANDARDS
LARGE DETENTION BASIN DETAILS

SHEET:
SD5
OF 28 SHEETS
0



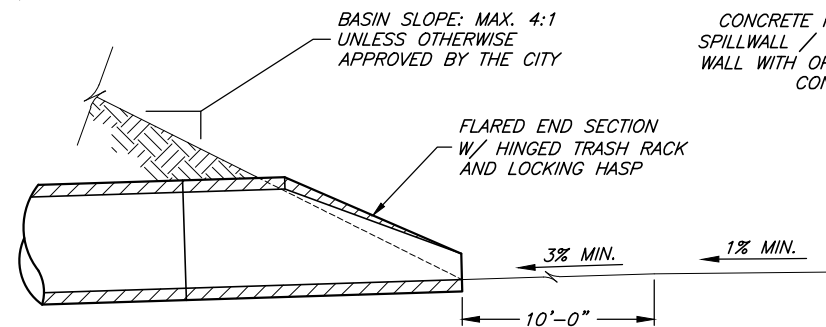
SECTION B-B



SECTION A-A

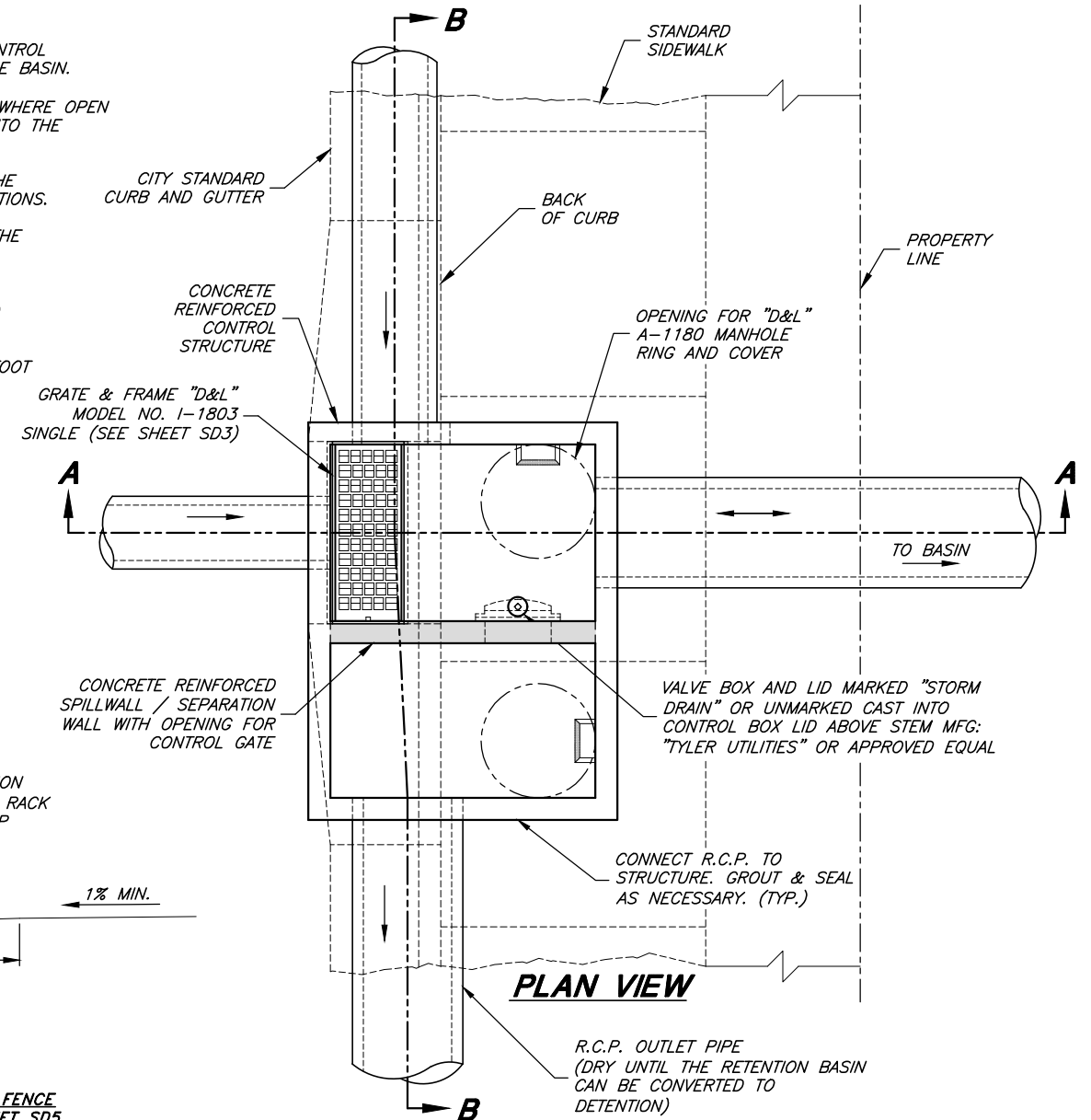
GENERAL NOTES:

1. ALL BASINS REGARDLESS OF LOCAL OR REGIONAL SHALL BE DESIGNED TO ACCOMMODATE A 100 YEAR STORM EVENT.
2. A DAM SAFETY (UTAH DIVISION OF WATER RIGHTS) HAZARD PERMIT MAY BE REQUIRED.
3. STRUCTURE DESIGN AND FLOW CALCULATIONS MUST BE APPROVED BY THE CITY PRIOR TO CONSTRUCTION.
4. STORM DRAIN LINES SHALL BE 15" MINIMUM DIAMETER REINFORCED CONCRETE PIPE (RCP), OF APPROPRIATE CLASS.
5. THE SURFACE AREA OF THE BASIN SHALL BE SODDED AND SHALL BE PROVIDED WITH AN AUTOMATED SPRINKLER SYSTEM APPROVED BY THE CITY.
6. GRATES SHALL BE REMOVABLE FOR MAINTENANCE PURPOSES
7. GRATES SHALL BE HOT DIPPED GALVANIZED WITH BARS AT MAXIMUM 3" SPACING.
8. LOW FLOWS MUST BE PIPED CONTINUOUSLY TO THE CONTROL STRUCTURE. NO OPEN FLOW IS PERMITTED THROUGH THE BASIN.
9. INCLINED GRATES ARE REQUIRED ON ALL PIPES/INLETS WHERE OPEN CHANNELS, DITCHES, OR PONDS DISCHARGE DIRECTLY INTO THE STORM DRAIN SYSTEM.
10. AN INTERNAL SPILLWAY MAY BE CONSTRUCTED INSIDE THE STRUCTURE DEPENDING ON SITE CONDITIONS AND ELEVATIONS.
11. BASIN STRUCTURES ARE DETERMINED BY THE SIZE OF THE DETENTION BASIN OR AS REQUIRED BY THE CITY. (SEE SHEET SD5 AND THIS SHEET)
 - a. SMALL DETENTION BASIN: LESS THAN OR EQUAL TO 1 ACRE FOOT
 - b. LARGE DETENTION BASIN: GREATER THAN 1 ACRE FOOT
12. ALTERNATE BASIN AND STRUCTURE DESIGNS MAY BE APPROVED BY THE CITY BASED UPON CONDITIONS IN THE FIELD.



STRUCTURAL NOTES:

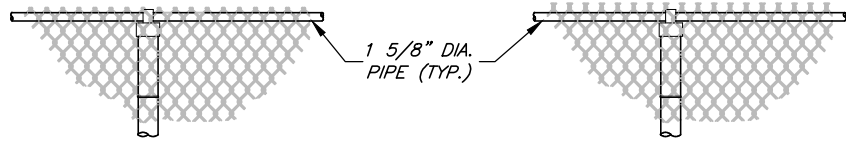
- A. PRECAST CONCRETE STRUCTURE CAN BE REPLACED WITH CAST-IN-PLACE CONCRETE VAULT. SUBMIT ENGINEERED CONSTRUCTION PLANS WITH REBAR DETAILS TO THE CITY FOR REVIEW AND ACCEPTANCE PRIOR TO CONSTRUCTION.
- B. ADD REINFORCEMENT AROUND OPENINGS EQUAL TO REINFORCEMENT DISPLACED BY OPENING.
- C. THE PRECAST VAULT MANUFACTURER IS RESPONSIBLE FOR DESIGN RELATED TO TRAFFIC LOADING AND THRUST. VERIFICATION OF PROPER DESIGN MUST BE PROVIDED TO THE CITY BY THE DEVELOPER, CONTRACTOR, OR PROPERTY OWNER AS THE CASE MAY BE.
- D. REINFORCEMENT TO CONFORM WITH ASTM A 615 GRADE 60
- E. CONCRETE SHALL HAVE A 28-DAY COMPRESSIVE STRENGTH OF 5,000 PSI
- F. USE AN AIR-ENTRAINING AGENT ON ALL CONCRETE EXPOSED TO THE WEATHER.
- G. HL-93 LOADING



PLAN VIEW

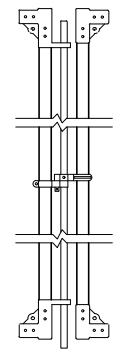
INLET/OUTLET CONTROL STRUCTURE

(PRECAST OR CAST-IN-PLACE)



**KNUCKLED SELVAGE
TYPE I**

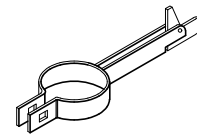
**TWISTED & BARBED SELVAGE
TYPE II**



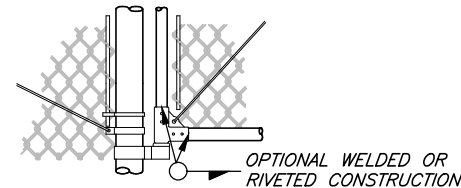
**DROP ROD
ASSEMBLY**



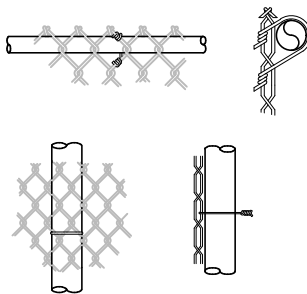
TOP GATE HINGE



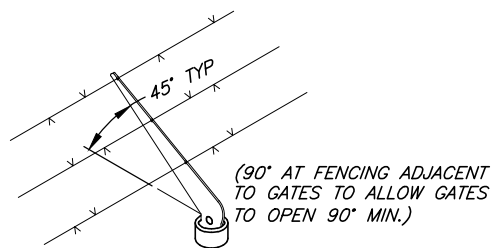
GATE KEEPER



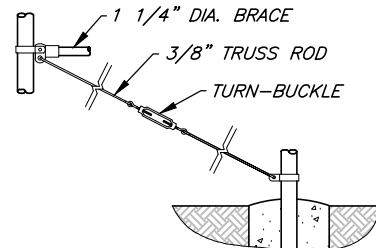
**BOTTOM GATE HINGE
AND GATE DETAIL**



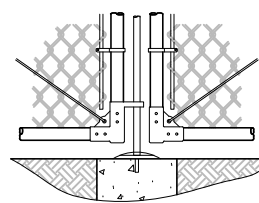
PIPE POST TIE



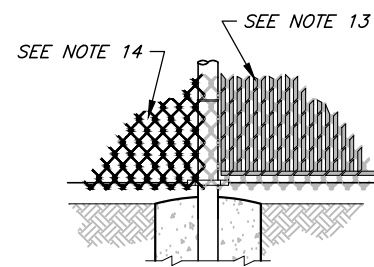
**COMBINATION CAP AND
BARBED WIRE SUPPORTING ARM**



BRACE & TRUSS CONNECTIONS



**CENTER GATE STOP
AND GATE DETAIL**



**SLATS & VINYL
COATING DETAIL**

GENERAL NOTES:

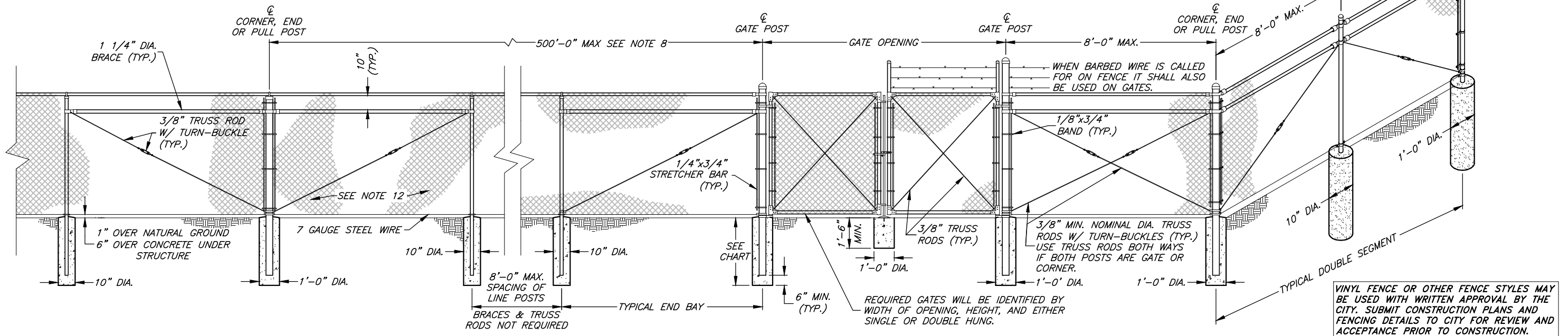
1. MATERIALS, CONSTRUCTION, AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
2. TOP SUPPORT: TUBULAR RAIL (SEE SECTION 32 31 13M)
3. BARB WIRE SHALL ONLY BE USED WHEN APPROVED BY THE CITY.
4. TWISTED AND BARBED SELVAGE TOP AND BOTTOM SHALL BE USED ON FENCES 5'-0" HIGH OR GREATER.
5. KNUCKLED SELVAGE ON TOP AND TWISTED AND BARBED ON BOTTOM SHALL BE USED ON FENCES LESS THAN 5'-0".
6. ALL STEEL PIPE MEMBERS SHALL CONFORM TO ASTM A53 HOT DIPPED ZINC COATED HIGH TENSILE STEEL PIPE.
7. POSTS SHALL BE SCHEDULE 40 PIPE.
8. LINE POSTS SHALL BE LOCATED AT EQUAL SPACING FOR EACH SEGMENT WITH A MAXIMUM SPACING AS FOLLOWS:

a.	TANGENT SECTIONS TO 500'-0" RADIUS NOT MORE THAN 8'-0".
b.	UNDER 500'-0" RADIUS TO 200'-0" RADIUS NOT MORE THAN 8'-0".
c.	UNDER 200'-0" RADIUS TO 100'-0" RADIUS NOT MORE THAN 6'-0".
d.	UNDER 100'-0" RADIUS NOT MORE THAN 5'-0".

9. TRUSS RODS AND BRACES SHALL NOT BE REQUIRED FOR FABRIC HEIGHT LESS THAN 5'-0".
10. TENSION WIRE SHALL BE 7 GAUGE ZINC OR ALUMINUM-COATED COIL SPRING STEEL TENSION WIRE.
11. ALL POSTS SHALL BE SET IN 3000 PSI CONCRETE AND SHALL BE TOPPED WITH BALL TYPE OR OTHER APPROVED ORNAMENT.
12. ALL FABRIC SHALL BE 2" GALVANIZED 9 GAUGE MESH.
13. VERTICAL SEMI-PRIVACY VINYL SLATS WITH BOTTOM-LOCKING SLAT, WHEN REQUIRED BY THE CITY. COLOR AS APPROVED BY THE CITY.
14. VINYL COATED CHAIN LINK FENCING WHEN REQUIRED BY THE CITY. COLOR AS APPROVED BY THE CITY.
15. ALL FENCING SHALL CONFORM TO LOCATION AND HEIGHT LIMITATIONS AS STATED IN FRUIT HEIGHTS CITY ORDINANCE.

HEIGHT	GATE OPENING	GATE POST	GATE FRAME
UNDER 6'-0"	SINGLE TO 6'-0" OR DOUBLE TO 12'-0"	2"	1"
	SINGLE OVER 6'-0" TO 8'-0" OR DOUBLE OVER 12'-0" TO 16'-0"	2 1/2"	
	SINGLE OVER 8'-0" TO 12'-0" OR DOUBLE 16'-0" TO 24'-0"	4"	1 1/2"
6'-0" AND OVER	SINGLE TO 6'-0" OR DOUBLE TO 12'-0"	3 1/2"	
	SINGLE OVER 6'-0" TO 12'-0" OR DOUBLE OVER 12'-0" TO 24'-0"	4"	
	SINGLE OVER 12'-0" TO 18'-0" OR DOUBLE OVER 24'-0" TO 36'-0"	6"	1 1/2"
	SINGLE OVER 18'-0" OR DOUBLE OVER 36'-0"	8"	

HEIGHT OF FABRIC	DEPTH OF POSTS	LENGTH OF END, CORNER OR PULL POST	LENGTH OF LINE POST	SIZE OF POSTS	
				END, CORNER, & PULL POSTS	LINE POST
				NOM. SIZE	NOM. SIZE
7'-0"	3'-0"	10'-0"	9'-8"	2 1/2"	2"
6'-0"	3'-0"	9'-0"	8'-8"	2 1/2"	2"
5'-0"	3'-0"	8'-0"	7'-8"	2"	1 1/2"
4'-0"	2'-0"	6'-0"	5'-8"	2"	1 1/2"
3'-0"	2'-0"	5'-0"	4'-8"	2"	1 1/2"



VINYL FENCE OR OTHER FENCE STYLES MAY BE USED WITH WRITTEN APPROVAL BY THE CITY. SUBMIT CONSTRUCTION PLANS AND FENCING DETAILS TO CITY FOR REVIEW AND ACCEPTANCE PRIOR TO CONSTRUCTION.

CITY ENGINEER	REV.	DATE	APPR.
APRIL 2024			
DATE			

SCALE:
N.T.S.



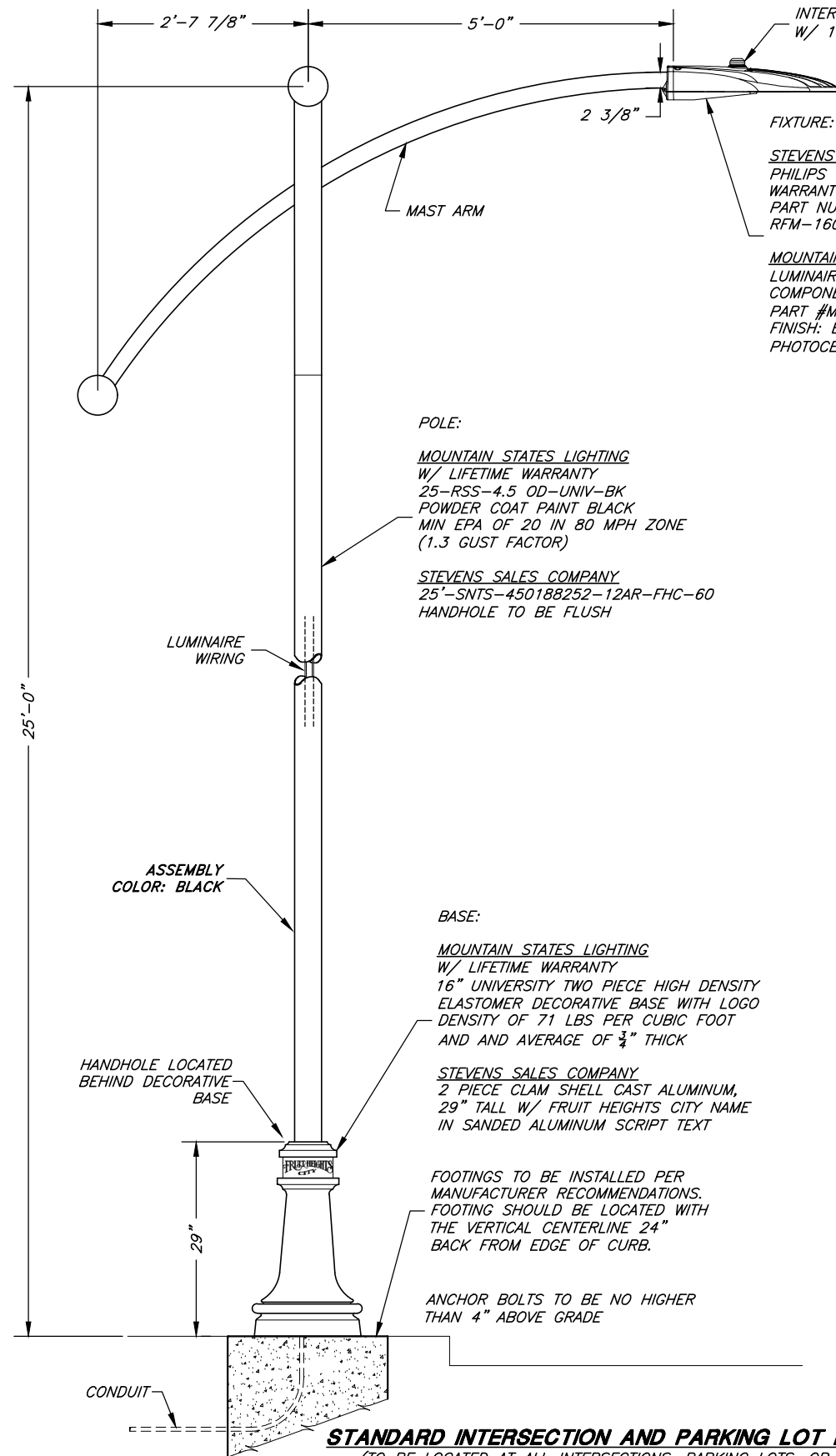
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6080 Fashion Point Drive
South Ogden, Utah 84403 (801) 476-9767
www.jonescivil.com



FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS - MISCELLANEOUS CONSTRUCTION STANDARDS

CHAIN LINK FENCE STANDARD DETAILS

SHEET:
M1
OF 28 SHEETS
0



STANDARD INTERSECTION AND PARKING LOT LIGHT
(TO BE LOCATED AT ALL INTERSECTIONS, PARKING LOTS, OR AS DIRECTED BY THE CITY)

INTERMATIC OR RIPLEY PHOTOCELL
W/ 10 YR WARRANTY

FIXTURE:
STEVENS SALES COMPANY
PHILIPS COBRA HEAD LED FIXTURE W/ 10 YEAR
WARRANTY BY STEVENS SALES COMPANY
PART NUMBER:
RFM-160W48LED4K-G2-R3M-UNV-DMG-FAWS-RCD7-BK

MOUNTAIN STATES LIGHTING
LUMINAIRE W/ 10 YEAR WARRANTY FIXTURE &
COMPONENTS BY MOUNTAIN STATES LIGHTING
PART #MSL3X12507
FINISH: BLACK
PHOTOCELL: RIPLEY #RD8645-BK

GENERAL NOTES:

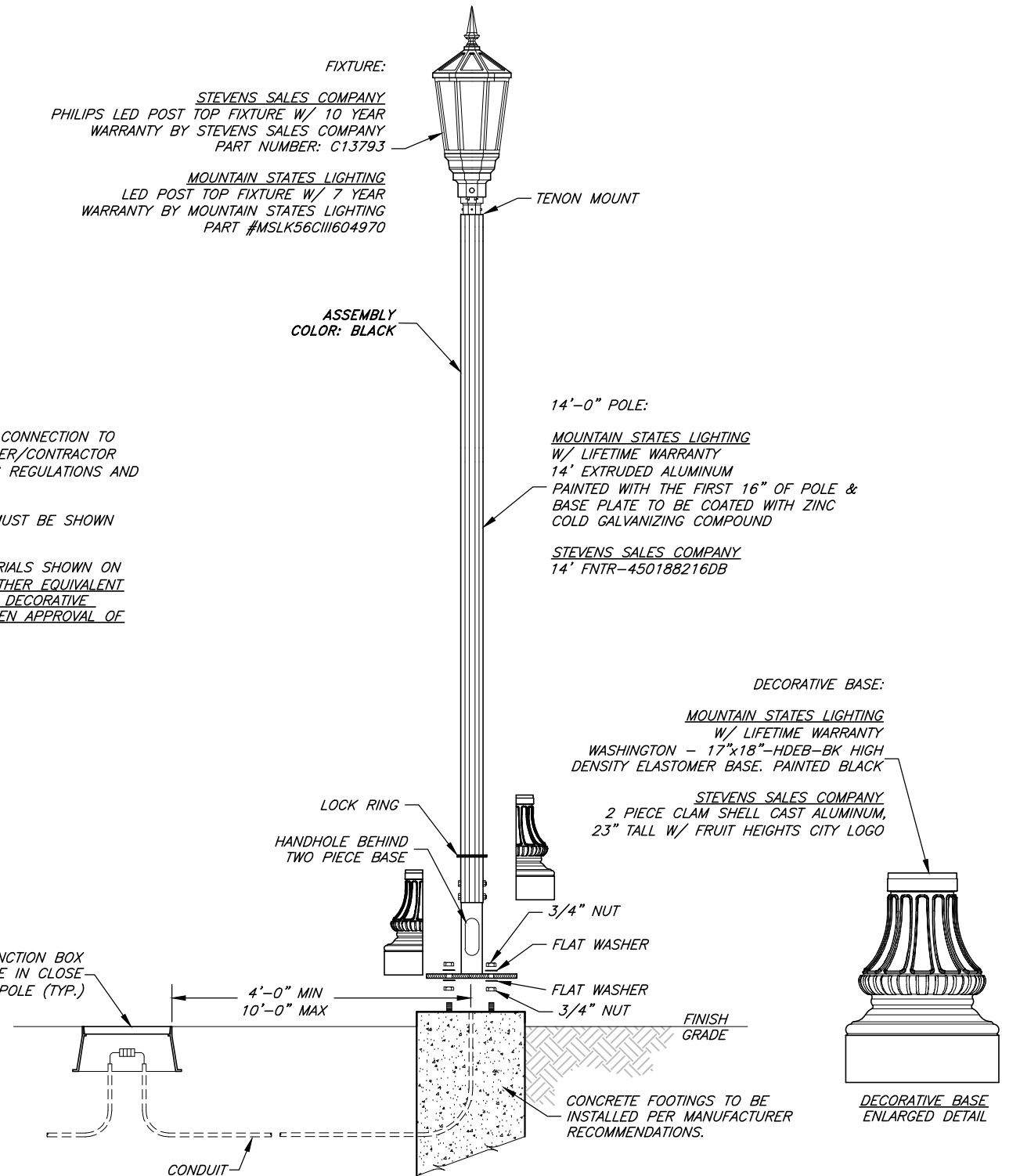
- STREET LIGHTS AND THE REQUIRED POWER CONNECTION TO BE FURNISHED AND INSTALLED BY DEVELOPER/CONTRACTOR IN ACCORDANCE WITH THE MANUFACTURER'S REGULATIONS AND SPECIFICATIONS.
 - ALL PROPOSED/REQUIRED STREET LIGHTS MUST BE SHOWN ON THE APPROVED CONSTRUCTION PLANS.
 - ALL SPECIFIED BRANDS, STYLES, AND MATERIALS SHOWN ON THESE DRAWINGS ARE "CITY STANDARDS." OTHER EQUIVALENT BRANDS IN THE SAME STYLE OF POLE AND DECORATIVE BASE MAY BE USED WITH THE PRIOR WRITTEN APPROVAL OF THE CITY.
 - STEVENS SALES COMPANY
2010 S. MILSTONE DRIVE
SALT LAKE CITY, UTAH 84014
PHONE: 801-487-8971
- MOUNTAIN STATES LIGHTING
609 KRISTA COURT
MURRAY, UTAH 84123
PHONE: 801-268-4879

ATTENTION

DEVELOPER/CONTRACTOR SHALL NOTIFY ROCKY MOUNTAIN POWER DESIGN OFFICE PRIOR TO LIGHTING INSTALLATION TO ARRANGE FOR POWER TO BE PROVIDED ON SITE.

ROCKY MOUNTAIN POWER
1-888-221-7070

ALL FINAL WORK AND MATERIALS TO BE APPROVED BY THE CITY.



STANDARD RESIDENTIAL STREET LIGHT
LOCAL STREET LIGHTS MUST BE SPACED AT A MAXIMUM 400 FOOT SPACING AND SHOULD ALTERNATE EACH SIDE OF THE STREET ON THE PROPERTY LINE.

CITY ENGINEER	REV.	DATE	APPR.
APRIL 2024			
DATE			

SCALE:
N.T.S.

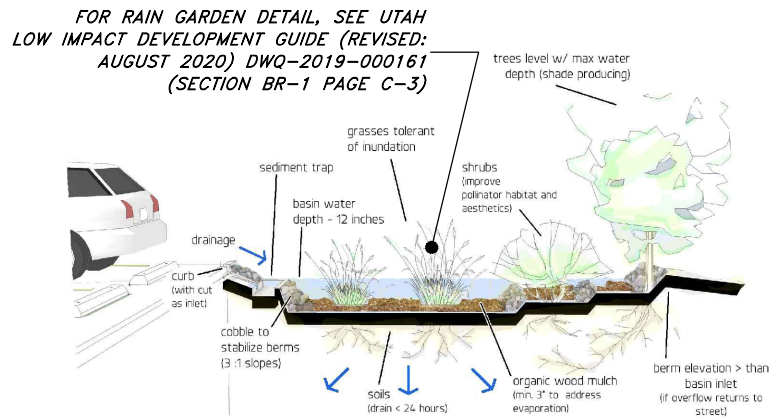


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FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS - STREET LIGHTING STANDARDS
GENERAL STREET LIGHTING POLES AND FIXTURES

SHEET:
SL1
OF 28 SHEETS
0



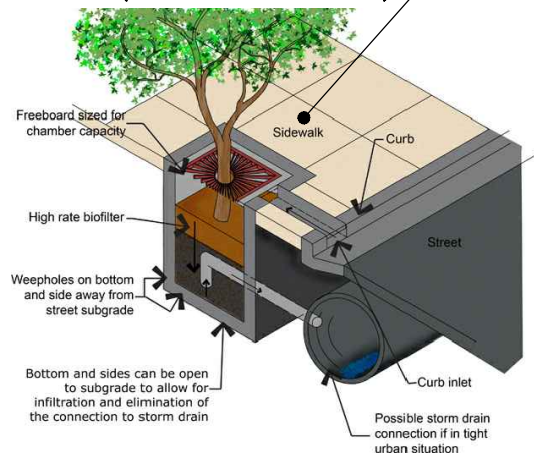
Basic Basin Design Considerations

diagram by
Paul Navrot
for SUH

RAIN GARDEN

*** http://www.lid-stormwater.net/site_map.htm ***

FOR TREE BOX FILTER DETAIL, SEE UTAH LOW IMPACT DEVELOPMENT GUIDE (REVISED: AUGUST 2020) DWQ-2019-000161 (SECTION BR-5 PAGE C-28)



TREE BOX FILTER

From www.wbdg.org

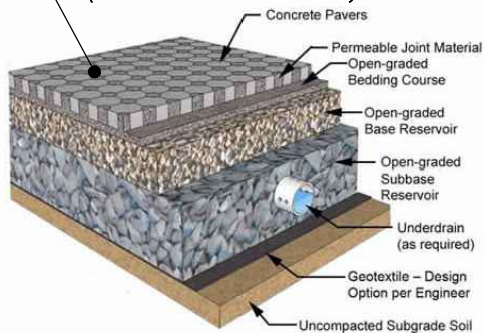


RAIN BARREL

<http://www.goodideasinc.com/products/rain-barrels/rain-wizard-50/>

FOR RAIN BARREL SEE UTAH LOW IMPACT DEVELOPMENT GUIDE (REVISED: AUGUST 2020) DWQ-2019-000161 (SECTION HR-1 PAGE C-62)

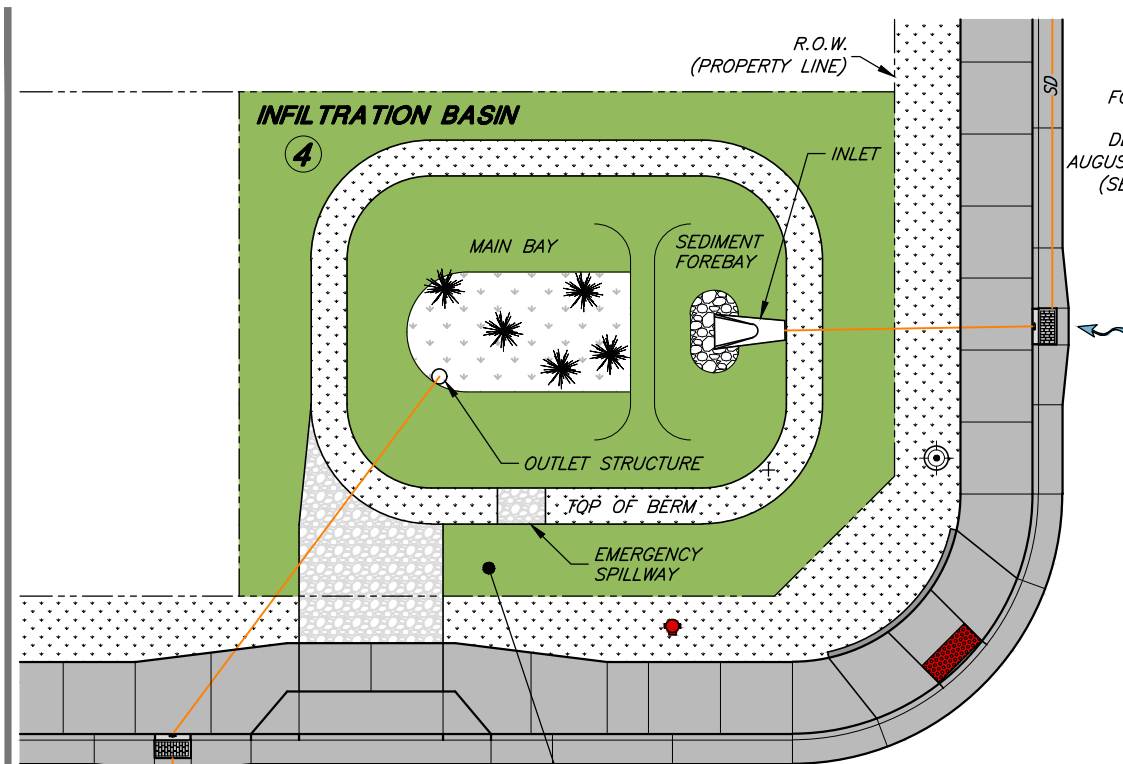
FOR PERVIOUS SURFACES SEE UTAH LOW IMPACT DEVELOPMENT GUIDE (REVISED: AUGUST 2020) DWQ-2019-000161 (SECTION PS-1 PAGE C-36)



PERMEABLE PAVER

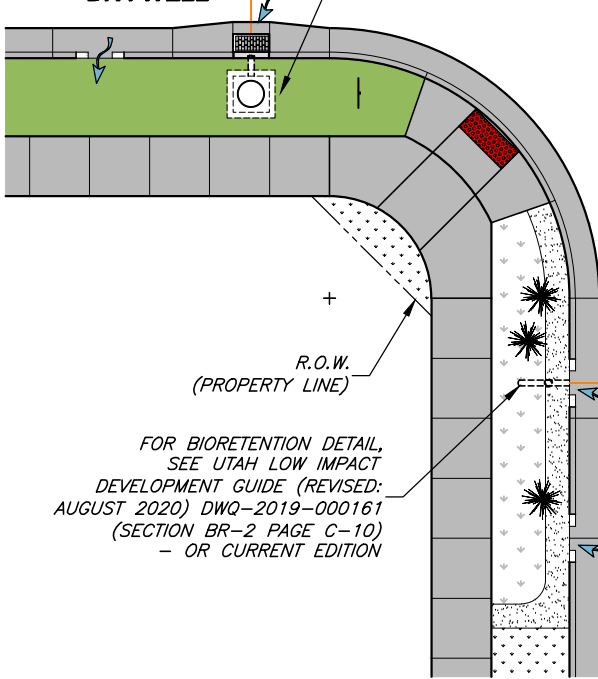
From Smith, D. 2006. *Permeable Interlocking Concrete Pavement—selection design, construction and maintenance*. Third Edition. Interlocking Concrete Pavement Institute. Herndon, VA

OTHER LID BMPs

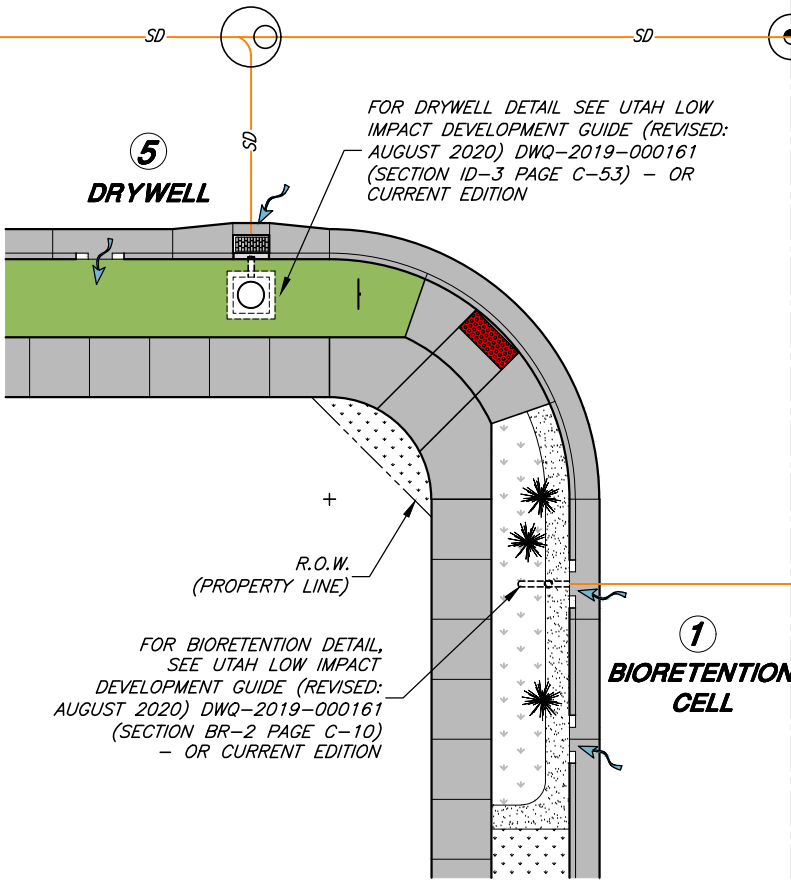


FOR INFILTRATION BASIN CRITERIA, SEE UTAH LOW IMPACT DEVELOPMENT GUIDE (REVISED: AUGUST 2020) DWQ-2019-000161 (SECTION ID-1 PAGE C-41) - OR CURRENT EDITION

FOR DRYWELL DETAIL SEE UTAH LOW IMPACT DEVELOPMENT GUIDE (REVISED: AUGUST 2020) DWQ-2019-000161 (SECTION ID-3 PAGE C-53) - OR CURRENT EDITION



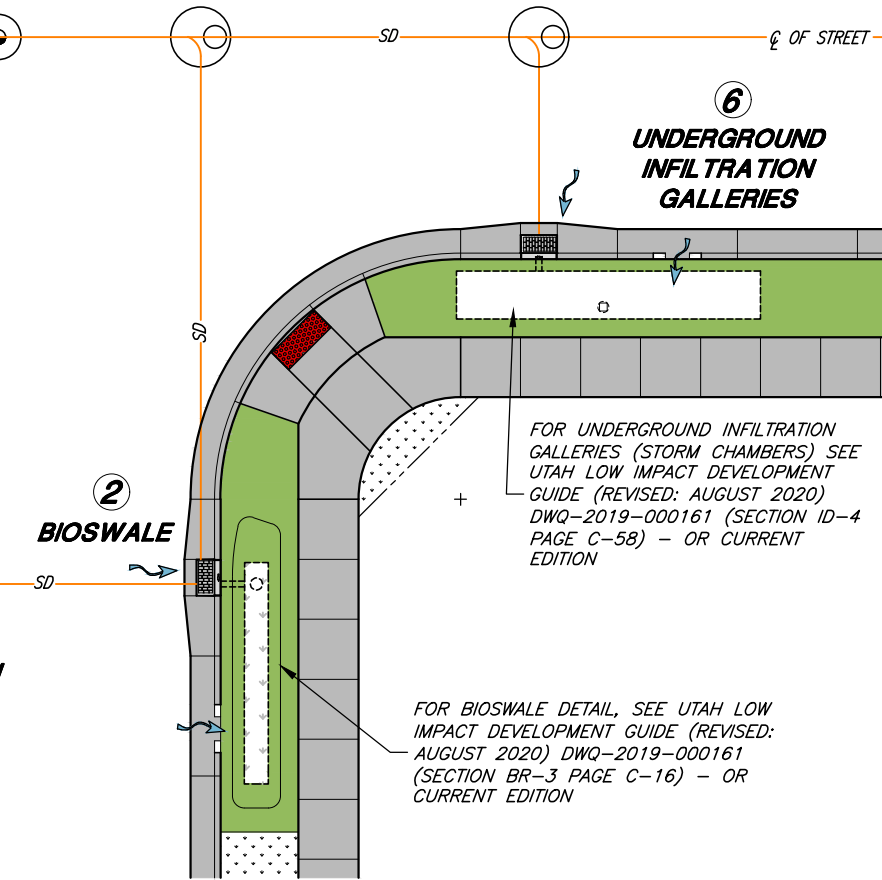
FOR BIORETENTION DETAIL, SEE UTAH LOW IMPACT DEVELOPMENT GUIDE (REVISED: AUGUST 2020) DWQ-2019-000161 (SECTION BR-2 PAGE C-10) - OR CURRENT EDITION



FOR VEGETATED STRIPS DETAIL, SEE UTAH LOW IMPACT DEVELOPMENT GUIDE (REVISED: AUGUST 2020) DWQ-2019-000161 (SECTION BR-4 PAGE C-23) - OR CURRENT EDITION

VEGETATED STRIPS

STANDARD LOCAL STREET SECTION LID BMPs



DISCLAIMER:
ALL LID EXAMPLES SHOWN ON THIS SHEET ARE FOR REFERENCE PURPOSES ONLY. ANY SPECIFIC WEBSITES, COMMERCIAL PRODUCTS, PROCESS OR SERVICE BY TRADE NAME, TRADEMARK, MANUFACTURER, OR OTHERWISE, DOES NOT CONSTITUTE OR IMPLY ITS ENDORSEMENT, RECOMMENDATION, OR FAVORING BY FRUIT HEIGHTS CITY. THE PURPOSE OF PROVIDING SPECIFIC PRODUCT INFORMATION IS TO ENSURE THAT THE CONTRACTOR AND/OR DEVELOPER HAS ALL THE APPROPRIATE INFORMATION AND REFERENCES TO ASSESS THE USEFULNESS OF THE PRODUCT.

THE LID EXAMPLES LISTED ON THIS SHEET ARE POSSIBLE RECOMMENDATIONS FOR USE WITHIN THE CITY. OTHER LID REQUIREMENTS OR TYPES WILL BE CONSIDERED ON A CASE BY CASE BASIS.

FOR UNDERGROUND INFILTRATION GALLERIES (STORM CHAMBERS) SEE UTAH LOW IMPACT DEVELOPMENT GUIDE (REVISED: AUGUST 2020) DWQ-2019-000161 (SECTION ID-4 PAGE C-58) - OR CURRENT EDITION

FOR BIOSWALE DETAIL, SEE UTAH LOW IMPACT DEVELOPMENT GUIDE (REVISED: AUGUST 2020) DWQ-2019-000161 (SECTION BR-3 PAGE C-16) - OR CURRENT EDITION

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DATE			

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FRUIT HEIGHTS CITY CORPORATION

PUBLIC WORKS - LID (LOW IMPACT DEVELOPMENT) STANDARDS

GENERAL LID (LOW IMPACT DEVELOPMENT) EXAMPLES

SHEET:

LID1

OF 28 SHEETS

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