

Fruit Heights City Corporation

Development, Design, & Construction Standards



September 2018
(Revision 1 - April 9, 2019)



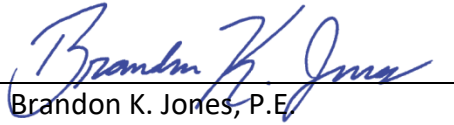
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DEVELOPMENT, DESIGN, AND
CONSTRUCTION STANDARDS
for
FRUIT HEIGHTS CITY

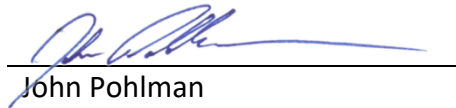


SUBMITTED & RECOMMENDED:



Brandon K. Jones, P.E.
City Engineer

9-4-2018
Date

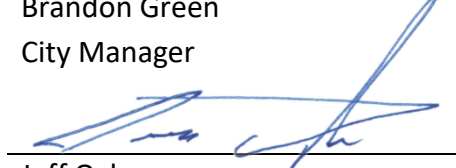
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Attest, City Treasurer

9/13/18
Date

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SECTION 1 GENERAL

1.01 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.

1.02 Conformance with Federal, State, and Local Laws

Nothing in this document shall relieve the Developer, Engineer, or Contractor from abiding by any and all Federal, State, and local laws.

1.03 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
- 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 From EJCDC® C-700, Standard General Conditions of the Construction Contract.

1.04 Acronyms

- A. BMP – Best Management Practice
- B. CFP – Capital Facilities Plan
- C. DDW – Division of Drinking Water
- D. DWQ – Division of Water Quality
- E. DWRI – Division of Water Rights
- F. FEMA – Federal Emergency Management Agency
- G. HOA – Homeowners’ Association
- H. LID – Low Impact Development
- I. RCP – Reinforced Concrete Pipe
- J. FHC – Fruit Heights City
- K. UDEQ – Utah Department of Environmental Quality
- L. UDOT – Utah Department of Transportation
- M. UPDES – Utah Pollutant Discharge Elimination System
- N. USACE – United States Army Corps of Engineers

1.05 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:
- B. 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.
 - 1. The City shall first receive a written request for a modification to the standards from any interested party.
 - 2. 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.

3. 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. Others as applicable
- C. Improvements
 - 1. The required improvements shall include all street improvements in front of all lots along all 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. See Title 11.06 for more information.
 - 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 will be responsible for paying difference in cost between the master planned infrastructure size and the minimum infrastructure size required for the development.
 - 3. Seal Coat – See Municipal Code.
 - 4. Street Lighting – See Municipal Code.

5. Street Signage – See Municipal Code.
6. Survey of Existing Improvements – Developer shall reimburse City for City Engineer’s time spent surveying in locations of new improvements.

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.

SECTION 3 DESIGN STANDARDS

3.01 Required Improvements

- A. See Chapter 11.06 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) construction plans and drawings of improvements shall be submitted to the City for the review by the City Engineer prior to receiving final plat approval and prior to commencing construction. Per Title 11, no construction shall begin until plans have been checked and approved by the City Engineer, and final approval is granted by the City Council.
- B. 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.
- C. 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 City Engineer.
- D. Separate drawings of elements of the Fruit Heights 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.
- E. 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.

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 Utah Administrative Code R309.
- 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 [Utah Administrative Code R309-550-5(8)].
- C. At dead end lines, including temporary dead ends, provide fire hydrant at termination point.
- D. All fire lines shall meet public works standards, but shall remain privately owned and maintained.
- E. Fire hydrants are to be installed in locations as required by the fire code and approved by the Fire Marshal and City Engineer, with a minimum spacing of 500-ft.
- F. When crossing a stream or other body of water the design must comply with Utah Administrative Code R309-550-8(8) Surface Water Crossings.

3.05 Street/Road Design

- A. Design
 - 1. Streets shall be designed in accordance with these Standards, standard engineering practices, and AASHTO and MUTCD guidelines.
 - 2. No changes of grade in excess of 1.5% shall be permitted without a vertical curve.
 - 3. Sight triangles shall be shown at the request of the City Engineer.
 - 4. Cul-de-Sacs
 - a. Length of cul-de-sac shall not exceed 600-ft as shown in the Standard Drawings.
 - 5. Temporary Turnarounds
 - a. When turnaround cannot be constructed outside of subdivision, it shall be located on a portion of the subdivision lots (as needed), with restrictions (platted "R" lot) required on the lot. The adjacent property being developed will be required to remove the curb, gutter and sidewalk creating the turnaround and extend the street with the standard street section and improvements.

- b. Drainage onto adjacent property must be by written approval (easement) of adjacent property owner.

6. Landscaping

- a. When landscaping is required to be designed/installed, refer to the Standard Drawings.

7. UDOT

- a. 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.

3.06 Storm Drain Design

- A. See Appendix A for Storm Drain and Drainage Design Standards.

3.07 Low Impact Development

- A. [SECTION RESERVED]

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 right-of-ways 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: 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. All projects shall be "Blue Staked" prior to construction.
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 Utah Administrative Code R156-55a (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

1. 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:
2. 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.
3. USACE/DWRi Stream Alteration – Stream Alteration

4. UPDES
5. Dam Safety (DWRi)
6. UDOT
7. Davis County Surveyor's Monument
8. Excavation Operations
 - a. Blue Stakes: Before commencing excavation operations, the permittee shall call "Blue Stakes" at 811.
9. Traffic control devices: Traffic control devices such as construction signs, barricades, and cones must be in place before excavation begins.
10. 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.
11. Open trench limits: Open trenches will be limited to one block at a time or 660 feet, whichever is less.
12. 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.
13. Environmental Controls
 - a. 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.
 - b. Noise: The permittee or contractor shall keep neighborhood free of noise nuisance in accordance with the Noise Ordinance.
14. 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.
15. 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 in the Fruit Heights City Offices.

4.02 Pre-Construction Conference

- A. The pre-construction conference shall not be held until the City Engineer 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 will include:
 - 1. City Engineer
 - 2. Developer or Project Manager
 - 3. Subdivision or Project Engineer
 - 4. All contractors and subcontractors involved with installing the subdivision or project improvements (license verification provided prior to meeting)
 - 5. Representatives of affected Fruit Heights City Departments
 - 6. Representatives of local utility companies (invited to attend).
- 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. Deviations from such shall be reviewed and authorized by the City Engineer 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. Deviations from such shall be reviewed and authorized by the City Engineer on a case-by-case basis.
- 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 utilities shall be raised to grade with concrete collars 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 insure that inspections take place where and when required. Certain types of construction shall have continuous inspection, while others may have only periodic inspections.

E. Requests for Inspections

1. Requests for inspections shall be made to the Public Works Department by the person responsible for the construction.
2. Requests for inspection on work requiring continuous inspection shall be made three (3) working days prior to the commencing of the work.
3. Notice shall also be given one (1) day in advance of the starting of work requiring periodic inspection, unless specific approval is given otherwise by the City Engineer, or his duly authorized representatives.

F. Continuous Inspection

1. May be required on (but not limited to) the following types of work:
 - a. Laying of street surfacing
 - b. Placing of concrete for curb and gutter, sidewalks, and other structures
 - c. Laying of sewer pipe, irrigation pipe, drainage pipe, water mains, water service laterals and testing.
2. 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.

G. Periodic inspections

1. Shall be required on (but not limited to) the following types of work:
 - a. Street grading and gravel base
 - b. Excavations for curb and gutter and sidewalks
 - c. Excavations for structures
 - d. Trenches for laying pipe
 - e. Forms for curb and gutter, sidewalks and structures

H. Substantial and Final Completion Inspections

1. 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.

2. 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.

I. Testing

1. Contractor shall be responsible for all testing in accordance with the Technical Specifications per Section 5 of this document.
2. 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.
3. Testing reports shall be submitted to City weekly for review. Areas with failed tests shall be corrected and retested.
4. Failure to submit testing reports to the City shall be cause for work stoppage or rejection by City.

J. 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 B)

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 C)
- 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

- 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

APPENDIX A – STORM DRAIN AND DRAINAGE DESIGN STANDARDS

APPENDIX A

STORM DRAIN AND DRAINAGE DESIGN STANDARDS

A1. General Provisions

- A. Fruit Heights faces unique storm water challenges because the City sits at the toe of the mountain with some hillside areas and has the potential to receive a large amount of runoff in a short time. Fruit Heights still has potential for residential growth, thus increasing the amount of impervious surfaces leading to increased runoff.
- B. This document represents the design and construction standards for private and public design and construction as it relates to storm drainage within the City. All efforts have been made for this policy to conform to the requirements of the Clean Water Act, Phase II; and the Storm Water Management Plan of the City.
- C. The following information is organized in such a way to follow the natural flow of storm water – from the initial rainfall hydrology (A2), to conveyance of the rain water (A3) to a basin (A4), then discharge to a natural outlet location (A5).

A2. 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. All basins regardless of local or regional, or retention or detention, shall be designed to accommodate a 100-year storm event, including all piping into the basin.
 - 3. The storm duration used for the sizing of basins shall be based upon the worst case scenario and not the time of concentration.
 - 4. Volume in pipes, ditches, or roadside swales shall not be considered in the volume calculation for detention and retention basins.
- C. Rainfall Intensity – When using the Rational Method, use the rainfall intensity table included as Exhibit 1 to this document.
- D. Calculation Basis – For developments less than 20 acres, the Rational Method may be used. For developments larger than 20 acres, a City Engineer-approved computer model shall be used.
- E. Rainfall Pattern and Depth – For the use of computer models, 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

A3. 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. Piping – Storm drain lines shall be reinforced concrete pipe (RCP), of appropriate class. Minimum size for storm sewer mains shall be 15-inch diameter. Pipe specifications are included in the Section 5 of the Development, Design, and Construction Standards. 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 to 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.

C. 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.

D. Sump Drains are not allowed except as approved by the City Engineer on a case-by-case basis. Proper permitting is required.

A4. Detention and Retention Basins**A. Definitions**

1. **Detention Basin** – An open 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 control which controls the rate of flow out of the pond into the receiving storm drain or water body. The basin is intended to drain the storm water within a period of time to make the volume available for the next storm event.

2. Retention Basin - An open water storage pond designed to store the runoff volume of a storm. The basin is intended to dispose of water through infiltration and evaporation within a period of time to make the volume available for the next storm event.
- B. Storm drainage basins are required for all development; however, developments less than one (1) acre are not required to have detention except when determined by the City Engineer.
 - C. Location – Detention basins shall be located with convenient access for maintenance and repair by maintenance personnel. This generally means that the basin property has frontage along a public roadway.
 - D. Parking lots – Storage of water shall not be allowed in parking lots.
 - E. Underground Storage – Underground storage will be considered for private basins only.
 - F. All detention basin designs and calculations shall be reviewed by the City Engineer for approval.
 - G. Maintenance and Ownership
 1. Private Basins – When approved, private detention basins shall be owned and maintained by the property owner.
 2. Local Public Basins – Local detention basins shall be constructed by the developer. Following acceptance of the construction, the ownership, operation, and maintenance shall be conveyed to the City.
 3. Regional Detention Basins – Regional basins shall be owned and maintained by the City, constructed according to the criteria herein, and approved of the City Engineer. Actual ownership and responsibility shall be specifically defined in the Owner's Dedication Certificates, Development Agreements, or by Deed.
 - H. Basin Easement and Access
 1. Public Basins – The developer shall provide the City permanent access to any public basin.
 2. Private Basin – The City shall be provided an easement for emergency access, operation, and/or repair for a private basin.
 3. Access – Each basin shall be constructed with sufficient drivable access, outside of the basin, to any structure from a city street.
 - I. Detention and Retention Basin Elements

1. Side slopes – Side slopes shall not be steeper than 4:1 (horizontal to vertical).
2. 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. The preferred minimum slope is 2%.
3. Freeboard – At least one (1) foot of vertical elevation is required between the spillwall in the outlet control structure (high water mark) and the emergency spillway. Additionally, at least one (1) foot of vertical elevation is required between the emergency spillway and the lowest elevation of the berm surrounding the basin.
4. Spillways – All basins are required to have an emergency spillway. The purpose of this spillway is to provide a location for additional stormwater to spill safely out of the basin in the event of a storm larger than the 100-year storm.
 - a. 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.
 - b. Spillways shall introduce flows back into the pipe or stream downstream of the outlet control.
 - c. Spillways shall include a maintained swale and drainage easement to a safe location.
 - d. The spillway shall be designed to prevent erosion.
 - e. All spillways shall be designed to protect adjacent embankments, nearby structures, and surrounding properties.
5. Ground Covers – The surface area of the basin shall be sodded. A minimum of 4-inches of top soil must be installed prior to sod placement. The basin shall be provided with an automated sprinkler system approved by the City Engineer.
6. 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.
7. 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. Additionally, the floor of the basin shall be a minimum of one (1) vertical foot higher than the highest groundwater elevation as determined by a geotechnical evaluation.
8. 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.

J. Detention Basins

1. Percolation – No reduction due to percolation for detention basins volumes shall be permitted.
2. Spillwall – All detention basins shall provide a spillwall inside the outlet control structure. The elevation of this spillwall is considered the high water mark. The spillwall functions as a weir. Flows larger than the 100-year storm are carried over the spillwall until the elevation in the basin reaches the emergency spillway (see Freeboard and Spillways).
3. Outlet Control – Private detention basins may have a calculated fixed orifice plate mounted on the outlet of the basin. 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.
4. 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.)

K. Retention Basins

1. Retention basins must be specifically approved by the City Engineer.
2. Retention basins shall not be permitted within zones 1, 2, or 3 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. Volume shall be based upon the 100-year, 3 hour storm. See Exhibits 1 and 2 for rainfall data.
5. Retention Basin Criteria – Retention basins may be permitted if all of the following conditions apply:
 - a. The distance between the nearest City storm drain and the length of piping required to serve the development is greater than:
 - i. 800 feet for subdivisions of 10 lots or less;
 - ii. 1,600 feet for subdivisions greater than 10 lots.
 - iii. *if the piping distance is less than what is stated above, a retention basin will not be allowed; a detention basin and outlet piping will be required.*
 - 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. Recommendation by the City Engineer.
- 6. 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. The groundwater elevation and its proximity to the floor of the basin must be taken into account when evaluating the long-term function of the retention basin and the soils ability to percolate the required volume.
 - c. Due to degradation of soils ability to percolate over time, only 80% of the percolation rate shall be used in the calculations for the retention basins.
- 7. Retention basins shall be designed to completely drain within 72 hours of the primary storm event.

A5. Discharge**A. Allowable Discharge Design**

- 1. Calculations shall be based on the 100-year storm event.
- 2. Calculations shall be based on the total acreage of the development draining to the basin.
- 3. Pass-through of offsite drainage through the development will be allowed, but must be accounted for.
- 4. Discharge shall not exceed pre-development runoff with pre-development meaning the condition of the land prior to settlement.
 - a. Alternatively, a standard discharge rate of 0.1 cubic feet per second per total acre may be used on a case by case basis, if approved by the City Engineer.
- 5. Controlled discharge will be established as described in A4. J.2 and J.3, of this document.

B. Water Quality

- 1. 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.
- 2. Construction BMPs shall be implemented per the City's Storm Water Management Plan.

- C. Discharge to Irrigation Ditches – No discharge shall be permitted to irrigation ditches and canals unless express written permission is obtained from the responsible irrigation company or ditch owners.

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

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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

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APPENDIX B – MODIFICATIONS AND ADDITIONS TO 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 3.5 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
---------------	----------------

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)**

1.2 REFERENCES

Add the following paragraph to Section 1.2:

- A. **Utah Department of Transportation (UDOT)**
Quality Management Plan 514 Hot-Mix Asphalt

1.3 DEFINITIONS

Add the following paragraph to Section 1.3:

H. **Road Class**

- Class I: Includes maintenance mixes, bike paths, and residential driveways. (ESAL < 10⁴ per year)
- Class II: Includes non-industrial parking lots, local and residential streets, and low volume (minor) collectors. (ESAL between 10⁴ and 10⁶ per year)
- Class III: Includes high volume (major) collectors, arterials, and industrial parking lots (primary load from 3-axle or greater vehicles). (ESAL > 10⁶ per year)

1.4 SUBMITTALS

A. **General:**

Add the following paragraph:

4. Submit plant certification documentation (see 3.1.A)

B. **Quality Assurance:**

Revise paragraph 3 to read as follows:

1. Testing Report: Submit Quality Control data to the Engineer within one (1) working day after completion of each day of paving and prior to the start of the next paving day.

Add the following paragraph:

2. Plant Production Report: Submit daily plant productions records to the Engineer within one (1) working day after completion of each day of paving and prior to the start of the next paving day. Report shall include the following information:
- 2.1 Plant Location
 - 2.2 Production Date and Times
 - 2.3 Mix Designation
 - 2.4 Total Mix Tonnage
 - 2.5 Virgin Aggregate Tonnage

- 2.6 Virgin Asphalt Tonnage
- 2.7 RAP Aggregate Tonnage
- 2.8 Lime Tonnage
- 2.9 Water Tonnage

Revise Section 2.3 to read as follows:

2.3 ADDITIVES

- A. Mineral Filler: None
- B. Recycle Agent: None
- C. Anti-strip Agent: 1% Lime Slurry, minimum, meeting the HWT requirements for Superpave mixes
- D. RAP or ROSP (By weight or binder, whichever is lesser): Allowed up to 15%
 - 1. Free of detrimental quantities of deleterious materials
 - 2. No change in specified binder grade
 - 3. Determine RAP binder content by chemical extraction

2.4 MIX DESIGN

Replace paragraph A with the following:

- A. Project Specific Requirements:
 - 1. **Less than 3-inch depth (including overlays)**
 - a. Option 1 – Superpave
 - i. Mix Designator (Compaction Effort): 75 gyrations (75 N_d)
 - ii. Binder Grade: PG 58-28
 - iii. Master Grading Band: SP ½
 - b. Option 2 – Marshall
 - i. Mix Designator (Compaction Effort): 50 blow
 - ii. Binder Grade: PG 58-28
 - iii. Master Grading Band: DM ½
 - 2. **3-inch and greater depth**
 - a. Superpave
 - i. Mix Designator (Compaction Effort): 75 gyrations (75 N_d)
 - ii. Binder Grade: PG 58-28
 - iii. Master Grading Band: SP ½

3.1 CONSTRUCTION EQUIPMENT

Revise paragraph A to read as follows:

- A. Mixing Plant: ASTM D995. Use a UDOT Quality Management Plan 514 certified asphalt mixing plant. Provide:
 - 1. Positive means to determine the moisture content of aggregate.
 - 2. Positive means to sample all material components.
 - 3. Sensors to measure the temperature of the mix at discharge.
 - 4. Ability to maintain discharge temperature of mix.
 - 5. Capability of maintaining plus or minus five (5) percent tolerance on component percentages in final mix.
 - 6. Oil Sand Introduction System: Do not burn off the light oils in Bitumen Binder (oil sand).

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

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

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.

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.

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
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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

2.10 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 C - FRUIT HEIGHTS CITY PUBLIC WORKS STANDARD DRAWINGS

FRUIT HEIGHTS CITY CORPORATION PUBLIC WORKS STANDARD DRAWINGS


Index of Drawings




SUBMITTED & RECOMMENDED

 9-4-2018
BRANDON K. JONES P.E.
FRUIT HEIGHTS CITY ENGINEER DATE


APPROVAL

 9/13/18
JOHN POHLMAN
FRUIT HEIGHTS CITY MAYOR DATE


 9/4/18
BRANDON GREEN
FRUIT HEIGHTS CITY MANAGER DATE

 9/4/18
DARREN FRANDSEN
FRUIT HEIGHTS CITY PUBLIC WORKS SUPERINTENDENT DATE

 9/13/18
CRYSTAL KUNKEL
ATTEST, CITY DEPUTY RECORDER DATE



**ADOPTED
SEPTEMBER 4, 2018**

 **REVISION 1 - APRIL 9, 2019**

CS-01....TITLE PAGE & INDEX OF DRAWINGS

 **CS-02....PUBLIC ROADS - TYPICAL STREET SECTIONS & UTILITY LATERAL
CONFIGURATION DETAILS**

CS-03....PUBLIC ROADS - TYPICAL INTERSECTION & STREET DETAILS

**CS-04....PUBLIC ROADS - TYPICAL DRIVE APPROACH, ASPHALT PATCH &
DEFECTIVE CONCRETE REPLACEMENT DETAILS**

 **CS-04A..PUBLIC ROADS - APWA PLAN 255 BITUMINOUS PAVEMENT T-PATCH**

**CS-05....PUBLIC ROADS - TYPICAL ADA RAMP, SIDEWALK, CURB & GUTTER,
AND CONCRETE JOINT DETAILS**

CS-06....PUBLIC ROADS - CUL-DE-SAC & TEMP. TURNAROUND DETAILS

**CS-07....CULINARY WATER - RESIDENTIAL WATER SERVICE & STANDARD
METER STATION DETAILS**

**CS-08....CULINARY WATER - AIR/VACUUM RELIEF STATION, FIRE HYDRANT &
GATE VALVE DETAILS, AND CORROSION PROTECTION NOTES**

CS-09....CULINARY WATER - TRACING WIRE INSTALLATION DETAILS

CS-10.....CULINARY WATER - PRESSURE REDUCTION STATION I

CS-11.....CULINARY WATER - PRESSURE REDUCTION STATION II

**CS-12.....CULINARY WATER - THRUST BLOCK, WATERLINE LOOP, PIPE TRENCH
& MISC. VAULT DETAILS**

CS-13.....LAND DRAIN / SANITARY SEWER - LATERAL & CONNECTION DETAILS

CS-14.....LAND DRAIN - TYPICAL MANHOLES & DETAILS

CS-15.....STORM DRAIN - SINGLE AND DOUBLE CATCH BASIN DETAILS

**CS-16.....STORM DRAIN - DRAINAGE INLET BOX & GENERAL GRATE AND
FRAME DETAILS**

CS-17.....STORM DRAIN - MANHOLE DETAILS

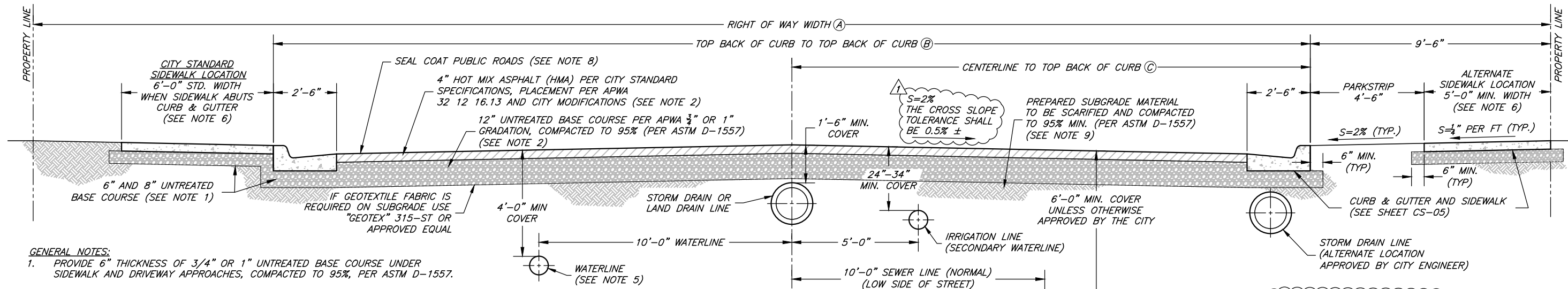
CS-18.....STORM DRAIN - LARGE DETENTION BASIN DETAILS

CS-19.....STORM DRAIN - SMALL DETENTION BASIN DETAILS

CS-20....GENERAL - CHAIN LINK FENCE DETAILS

CS-21.....GENERAL - STREET LIGHTING STANDARDS

CS-22....GENERAL - LID (LOW IMPACT DEVELOPMENT) EXAMPLES

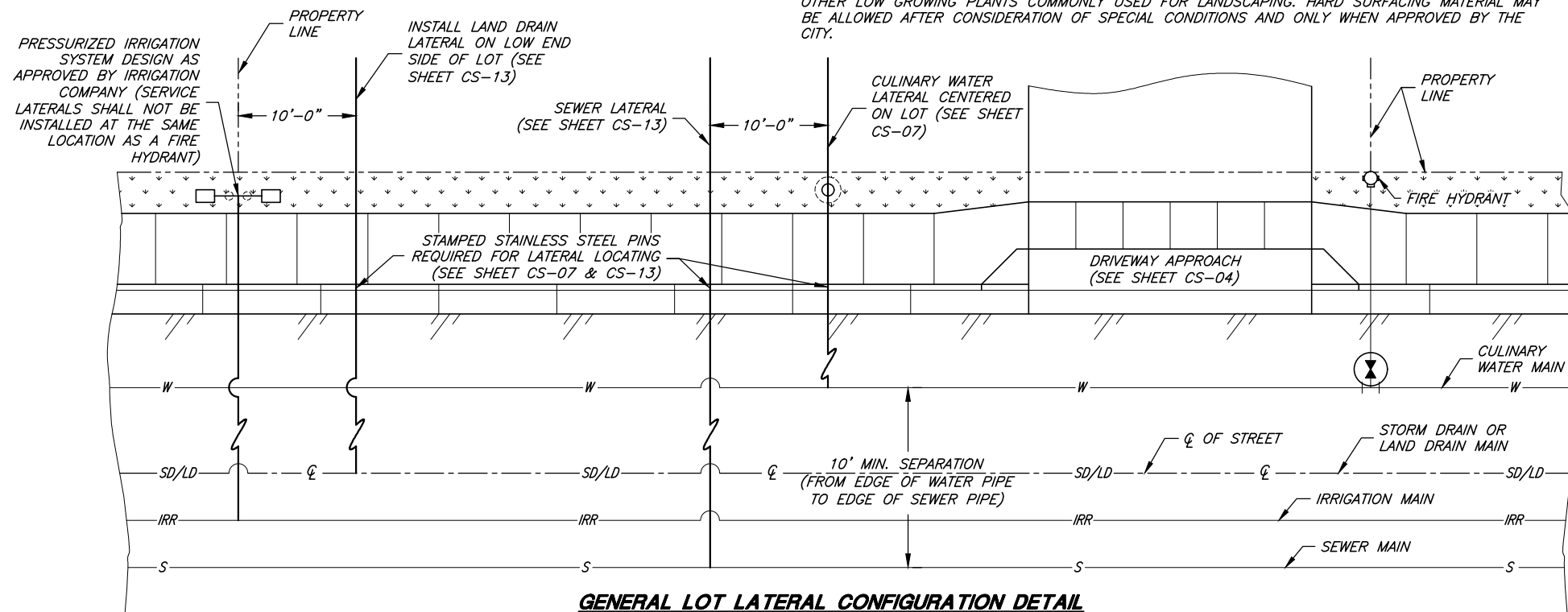


GENERAL NOTES:

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. THESE PAVEMENT THICKNESS SHALL BE CONSIDERED AS CITY MINIMUMS AND MAY BE INCREASED BY THE CITY ENGINEER WHEN A GREATER DEPTH IS NECESSARY TO PROVIDE SUFFICIENT STABILITY. DESIGNER AND/OR DEVELOPER MAY SUBMIT AN ALTERNATIVE PAVEMENT DESIGN BASED ON A DETAILED SOILS ANALYSIS FOR APPROVAL BY THE CITY ENGINEER WHICH MAY MODIFY PAVEMENT THICKNESS, BUT IN NO CASE SHALL THE BITUMINOUS SURFACE COURSE BE LESS THAN 4" AND UNTREATED BASE COURSE LESS THAN 12" THICK.
3. ALL ROAD CUTS SHALL BE PATCHED PER CS-04 AND CS-12
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

GENERAL NOTES CONT.:

6. THE 6'-0" SIDEWALK AGAINST THE BACK OF CURB 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.
7. NATURAL GAS TYPICALLY LOCATED BEHIND THE SIDEWALK OR IN THE PARKSTRIP, 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 AND CITY MODIFICATIONS.
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.



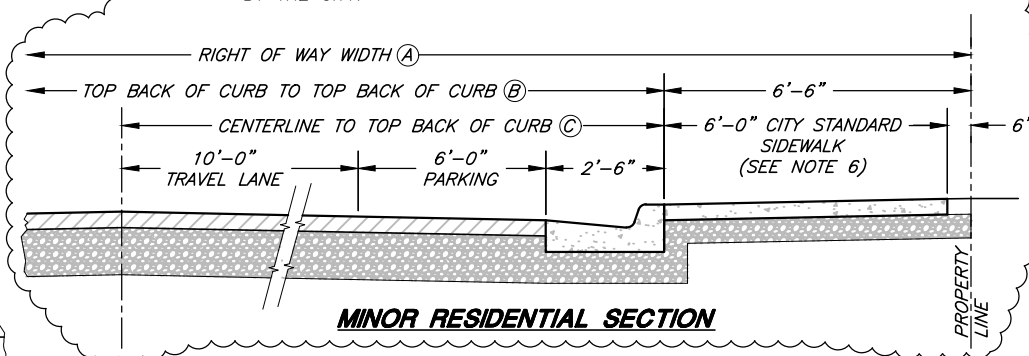
GENERAL LOT LATERAL CONFIGURATION DETAIL

CURBED ROAD SECTION

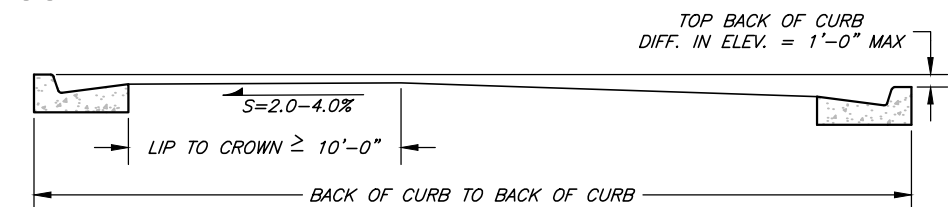
STREET DESIGNATION	R.O.W. WIDTH (A)	T.B.C. TO T.B.C. (B)	Q TO T.B.C. (C)
MINOR RESIDENTIAL (SEE NOTE B1 & DETAIL THIS SHEET)	50'	37'	18.5'
STANDARD RESIDENTIAL	60'	41'	20.5'
COLLECTOR	66'	47'	23.5'

CURBED ROAD SECTION NOTES:

- A1. ROAD SECTION USED AS DETERMINED BY THE CITY ENGINEER & PLANNING COMMISSION BASED UPON ZONING, GENERAL PLAN, SIZE OF DEVELOPMENT, ESTIMATED TRAFFIC VOLUME, & AMOUNT OF OPEN SPACE ASSOCIATED WITH DEVELOPMENTS PROXIMITY TO HIGH VOLUME ROADS OR COMMERCIAL ZONING.
- B1. CAN ONLY BE USED FOR CUL-DE-SACS, WHERE RECOMMENDED AND APPROVED BY THE CITY.



MINOR RESIDENTIAL SECTION



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 ARTERIAL STREETS AND CERTAIN STREETS APPROVED BY THE CITY COUNCIL, THE CITY ENGINEER WILL PROVIDE A PAVEMENT DESIGN. LOCATION OF SIDEWALK AND CURB & GUTTER MAY VARY PER DIRECTION OF THE CITY ENGINEER.
- C. ALL OTHER PROPOSED STREET CROSS SECTIONS SHALL BE AS APPROVED BY THE CITY ENGINEER.



BRANDON KENT JONES
No. 5148758
PROJECT ENGINEER
9-4-2018
DATE

REV.	DATE	APPR.
1	4-9-2019	BKJ
REVISED STREET CROSS SLOPE & ADDED 50' R.O.W.		

SCALE:
N.T.S.

DESIGNED _____
DRAWN _____
CHECKED _____



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South Ogden, Utah 84403 (801) 476-9767
www.jonescivil.com

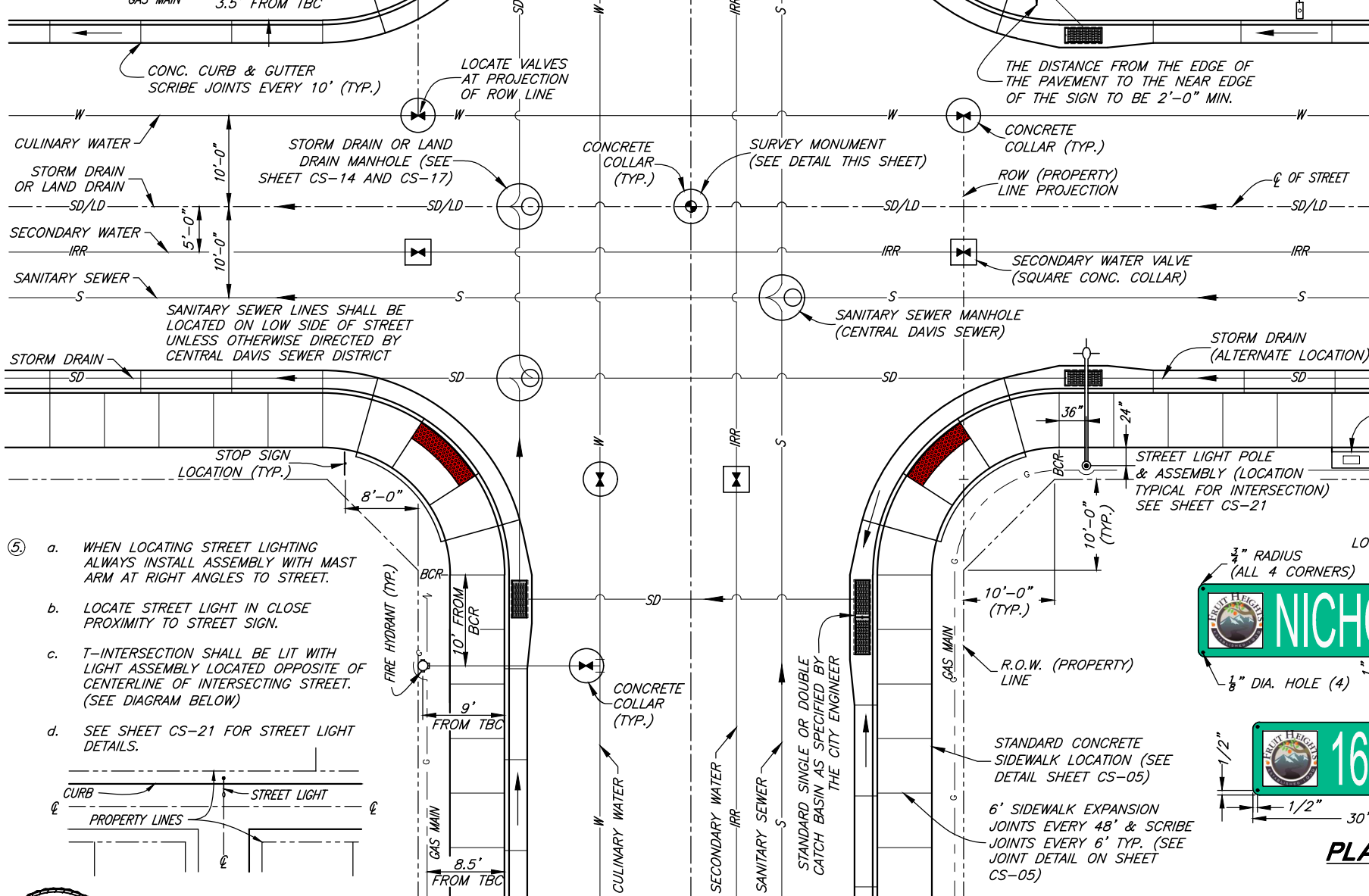
FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS STANDARDS
PUBLIC ROADS - TYPICAL STREET SECTIONS
& UTILITY LATERAL CONFIGURATION DETAILS

SHEET:
CS-02
OF 22 SHEETS
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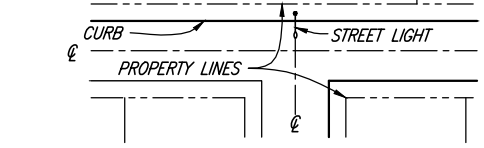
- ①. PRESSURIZED IRRIGATION SYSTEM DESIGN AS APPROVED BY HIGHTS CREEK IRRIGATION COMPANY, FRUIT HEIGHTS CITY, OR BENCHLAND WATER DISTRICT.
- ②. EXACT LOCATION OF STREET AND REGULATORY SIGNS SHALL BE SPECIFIED BY THE PUBLIC WORKS DIRECTOR FOR SPECIFIC INTERSECTIONS.
- ③. THE NUMBER OF VALVES REQUIRED AT EACH INTERSECTION SHALL BE DETERMINED BY THE CITY ENGINEER.
- ④. CITY UTILITY LINES MUST BE LOCATED IN A PUBLIC RIGHT-OF-WAY. NO CITY UTILITIES MAY BE CONSTRUCTED ON PRIVATE PROPERTY. ANY UTILITY LINES MAINTAINED BY THE CITY MUST ALSO BE IN A PUBLIC RIGHT-OF-WAY.



GENERAL
ORIENTATION



5. a. *WHEN LOCATING STREET LIGHTING ALWAYS INSTALL ASSEMBLY WITH MAST ARM AT RIGHT ANGLES TO STREET.*
- b. *LOCATE STREET LIGHT IN CLOSE PROXIMITY TO STREET SIGN.*
- c. *T-INTERSECTION SHALL BE LIT WITH LIGHT ASSEMBLY LOCATED OPPOSITE OF CENTERLINE OF INTERSECTING STREET. (SEE DIAGRAM BELOW)*
- d. *SEE SHEET CS-21 FOR STREET LIGHT DETAILS.*



- A1. MAILBOXES SHALL NOT BE PLACED IN THE SIDEWALK.
- B1. CONTACT THE LOCAL POSTMASTER FOR APPROVAL ON THE LOCATION OF THE MAILBOX OR CBU PRIOR TO INSTALLATION.
- C1. FOLLOW USPS GUIDELINES & POLICIES FOR THE PLACEMENT, INSTALLATION, AND ACCESS REQUIREMENTS FOR ALL MAILBOX AND CBU UNITS.

INDIVIDUAL MAILBOXES ALLOWED ONLY
FOR SINGLE HOMES BEING BUILT IN
SUBDIVISIONS THAT WERE PREVIOUSLY
ALLOWED INDIVIDUAL BOXES

[illegible]

MAILBOX/CBU
(SEE NOTES
A1-C1 THIS
SHEET)

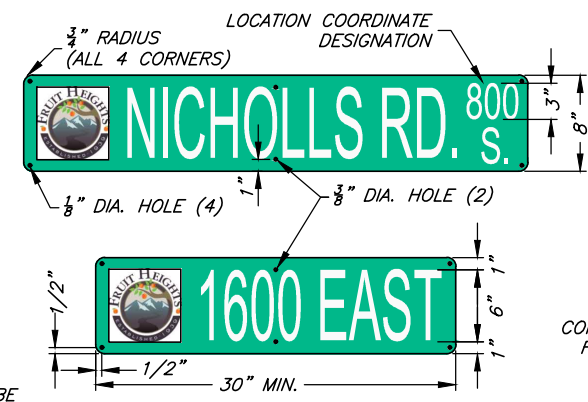
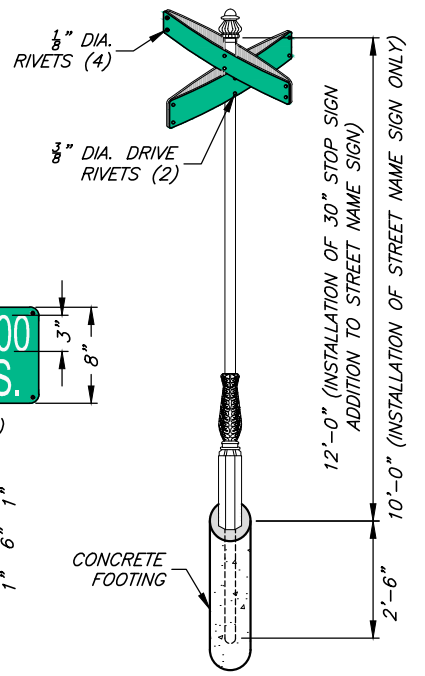


PLATE DETAIL



STREET SIGN & POST

3" DIA. BRASS SURVEY MONUMENT POST - "D&L SUPPLY" K-9090

PEA GRAVEL SUMP

(3) #5 REBAR ASTM A615 GRADE 60

12"Ø x 9 3/4" LONG P.V.C. C-900 PIPE SECTION

CONC. COLLAR RECESSED 1/2" FOR TOP OF MONUMENT BOX

ASPHALT SURFACE

ROAD BASE

12"Ø x 9 3/4" LONG P.V.C. C-900 PIPE SECTION

WASHED PEA GRAVEL

CONCRETE BASE CLASS 4000 CONCRETE per APWA SECTION 03304

(3) #5 REBAR ASTM A615 GRADE 60

12" TYP.

10-1/2"Ø

5"

7"

18" MIN

9"

"D&L SUPPLY" MODEL K-6313 MONUMENT RING & COVER

3" DIA. BRASS SURVEY MONUMENT POST - "D&L SUPPLY" K-9090

BACKFILL ALL SIDES (COMPACT per APWA SECTION 02322)

COMPACT BOTTOM OF EXCAVATED HOLE BEFORE PLACING MONUMENT POST

PURPOSE: TO BE USED TO MARK THE CENTER POINT OF A MONUMENT.

CONSTRUCTION: THE MONUMENT SHALL BE CONSTRUCTED OF A 3" DIA. BRASS SURVEY MONUMENT POST - "D&L SUPPLY" K-9090. THE POST SHALL BE SET IN A 12" DIA. HOLE. THE HOLE SHALL BE EXCAVATED TO A DEPTH OF 18" MIN. THE BOTTOM OF THE HOLE SHALL BE COMPACTED BEFORE PLACING THE MONUMENT POST. THE HOLE SHALL BE BACKFILLED WITH WASHED PEA GRAVEL AND COMPACTED PER APWA SECTION 02322. A CONCRETE BASE CLASS 4000 CONCRETE per APWA SECTION 03304 SHALL BE PLACED UNDER THE POST. THE BASE SHALL BE 10-1/2" DIA. AND 5" THICK. A CONC. COLLAR RECESSED 1/2" FOR TOP OF MONUMENT BOX SHALL BE PLACED ON TOP OF THE POST. A PEA GRAVEL SUMP SHALL BE PLACED AROUND THE POST. A 12" DIA. BRASS SURVEY MONUMENT POST - "D&L SUPPLY" K-9090 SHALL BE SET IN THE HOLE. THE POST SHALL BE SET TO A DEPTH OF 7" IN THE GRAVEL. A 12"Ø x 9 3/4" LONG P.V.C. C-900 PIPE SECTION SHALL BE PLACED AROUND THE POST. A 12" TYP. ASPHALT SURFACE SHALL BE PLACED OVER THE GRAVEL. A ROAD BASE SHALL BE PLACED UNDER THE ASPHALT SURFACE.

PROTECTION: THE MONUMENT SHALL BE PROTECTED BY A 12" DIA. BRASS SURVEY MONUMENT POST - "D&L SUPPLY" K-9090. THE POST SHALL BE SET IN A 12" DIA. HOLE. THE HOLE SHALL BE EXCAVATED TO A DEPTH OF 18" MIN. THE BOTTOM OF THE HOLE SHALL BE COMPACTED BEFORE PLACING THE MONUMENT POST. THE HOLE SHALL BE BACKFILLED WITH WASHED PEA GRAVEL AND COMPACTED PER APWA SECTION 02322. A CONCRETE BASE CLASS 4000 CONCRETE per APWA SECTION 03304 SHALL BE PLACED UNDER THE POST. THE BASE SHALL BE 10-1/2" DIA. AND 5" THICK. A CONC. COLLAR RECESSED 1/2" FOR TOP OF MONUMENT BOX SHALL BE PLACED ON TOP OF THE POST. A PEA GRAVEL SUMP SHALL BE PLACED AROUND THE POST. A 12" DIA. BRASS SURVEY MONUMENT POST - "D&L SUPPLY" K-9090 SHALL BE SET IN THE HOLE. THE POST SHALL BE SET TO A DEPTH OF 7" IN THE GRAVEL. A 12"Ø x 9 3/4" LONG P.V.C. C-900 PIPE SECTION SHALL BE PLACED AROUND THE POST. A 12" TYP. ASPHALT SURFACE SHALL BE PLACED OVER THE GRAVEL. A ROAD BASE SHALL BE PLACED UNDER THE ASPHALT SURFACE.

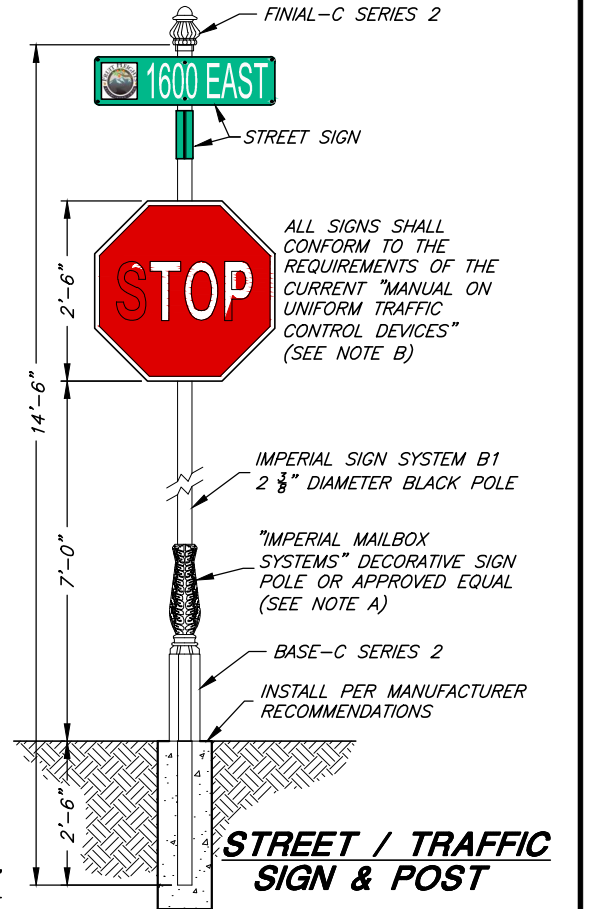
MAINTENANCE: THE MONUMENT SHALL BE MAINTAINED BY THE USER. THE USER SHALL BE RESPONSIBLE FOR THE PROTECTION AND MAINTENANCE OF THE MONUMENT. THE USER SHALL BE RESPONSIBLE FOR THE PROTECTION AND MAINTENANCE OF THE MONUMENT.

NOTES:

A2. MARK POINT WITH AN "X" CENTER PUNCH ON BRASS SURVEY MONUMENT CAP


B2. FIBER MESH SHALL BE ADDED TO ALL CONCRETE COLLARS.

SURVEY MONUMENT DETAIL



STREET / TRAFFIC
SIGN & POST




 PROJECT ENGINEER
 9-4-2018
 DATE

[illegible]

SCALE:
N.T.S.

DESIGNED _____

DRAWN _____

CHECKED _____

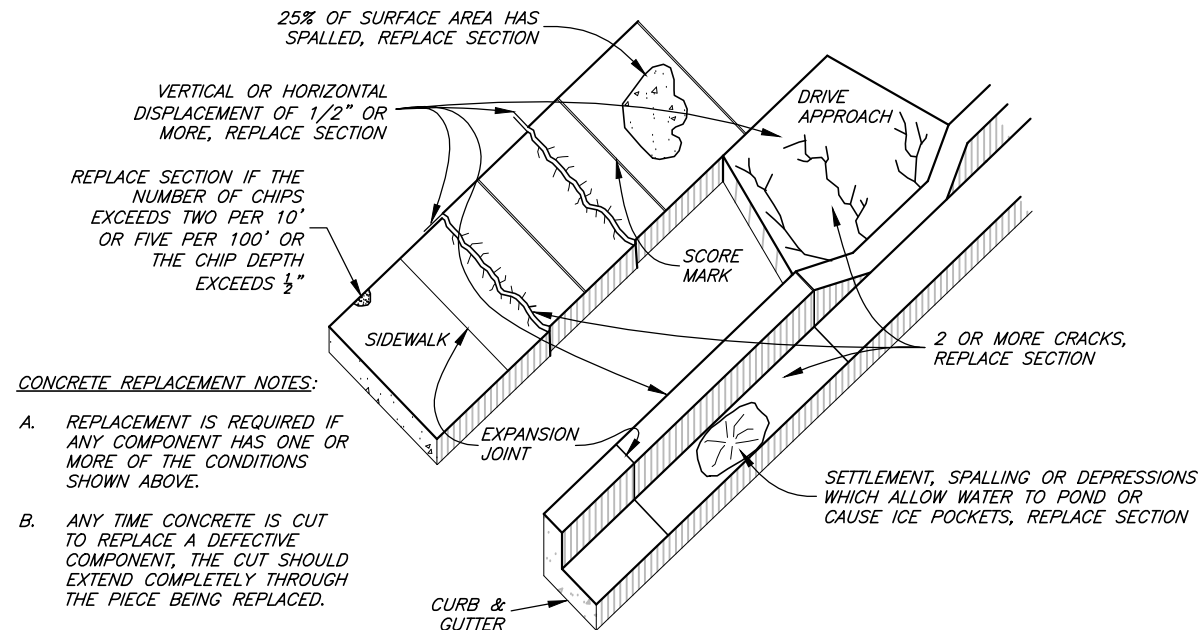


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FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS STANDARDS

PUBLIC ROADS - TYPICAL INTERSECTION & STREET DETAILS

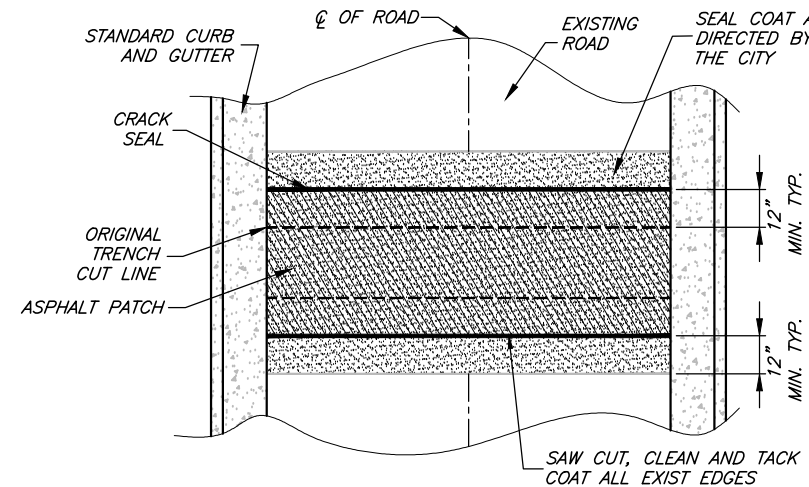
SHEET:
CS-03
OF 22 SHEETS



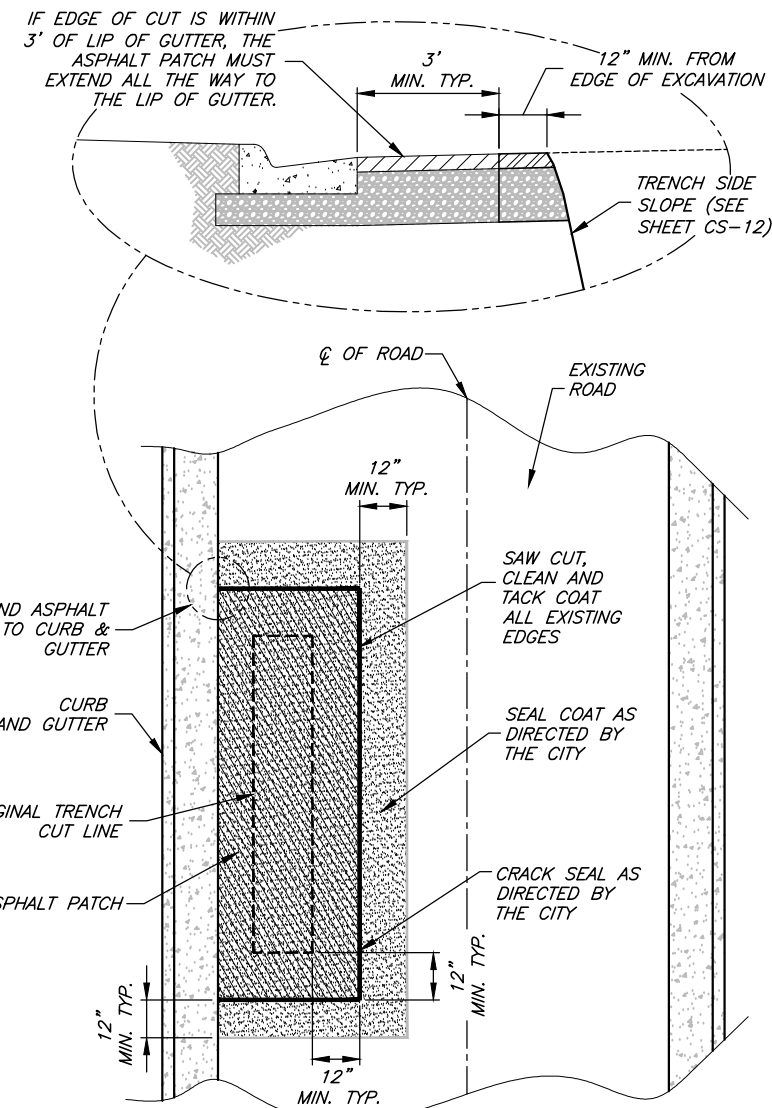
CONCRETE REPLACEMENT NOTES:

- REPLACEMENT IS REQUIRED IF ANY COMPONENT HAS ONE OR MORE OF THE CONDITIONS SHOWN ABOVE.
- ANY TIME CONCRETE IS CUT TO REPLACE A DEFECTIVE COMPONENT, THE CUT SHOULD EXTEND COMPLETELY THROUGH THE PIECE BEING REPLACED.
- CURB & GUTTER MIN. 10'-0" SECTIONS.
- A "CHIP" IS CONCRETE EDGE DAMAGE THAT IS DEEPER THAN 1/4" AND LARGER THAN 2" DIA.

DEFECTIVE CONCRETE REPLACEMENT CRITERIA

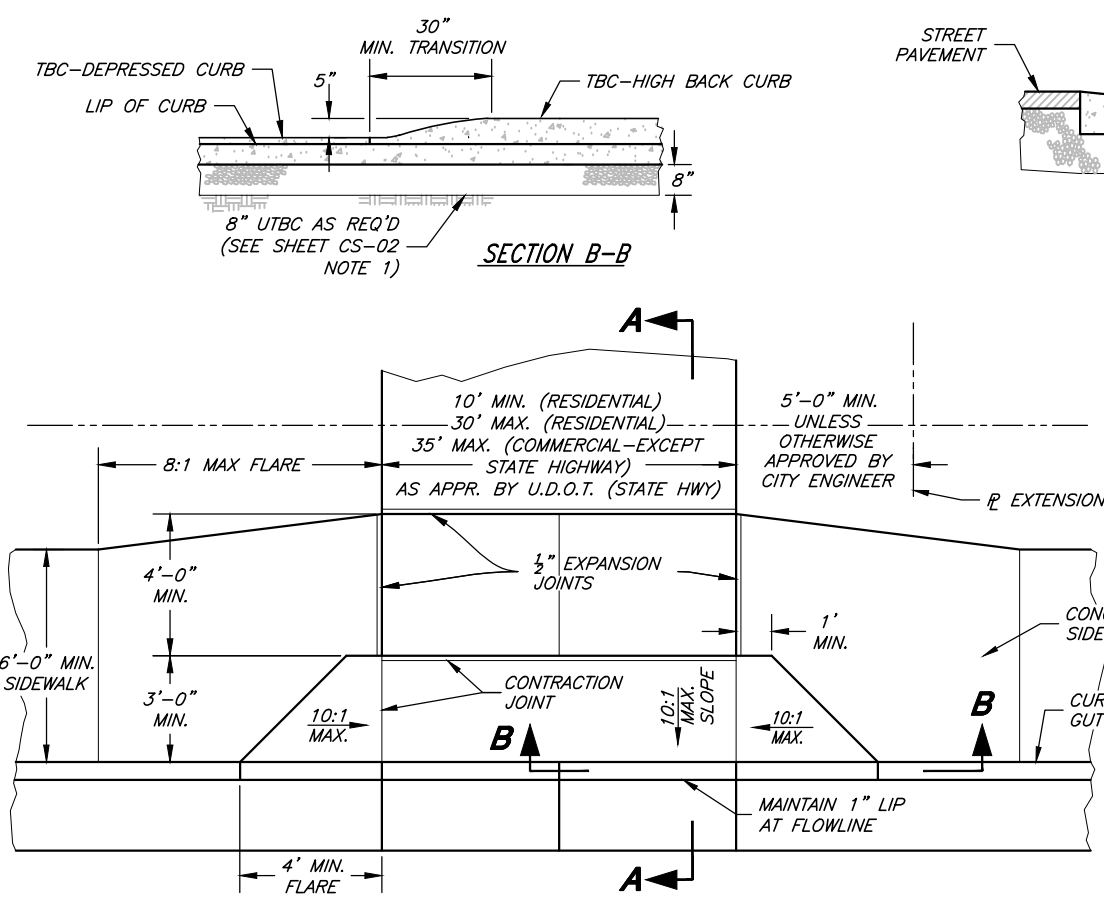


TYPICAL HORIZONTAL ASPHALT PATCH PLAN

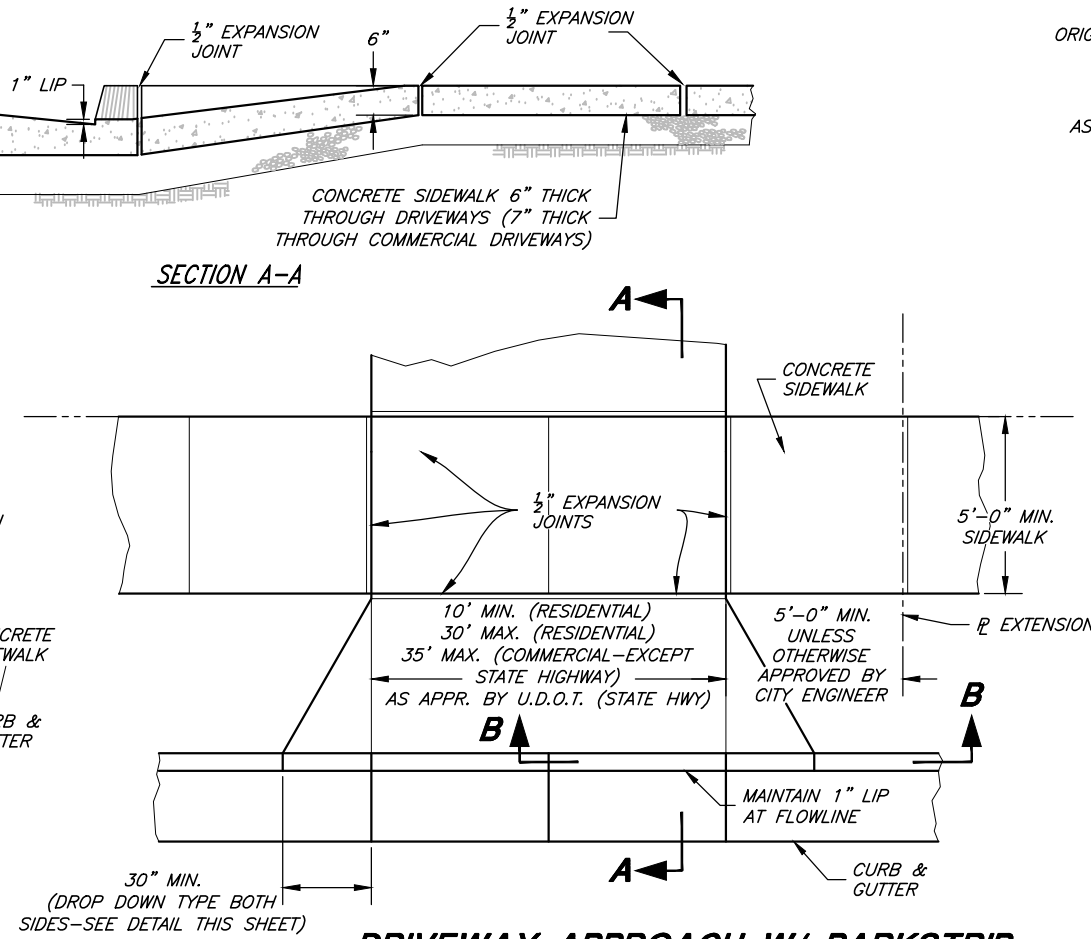


TYPICAL PARALLEL ASPHALT PATCH PLAN

- 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 CS-04A)



DRIVEWAY APPROACH W/ ADJACENT SIDEWALK
CITY STANDARD



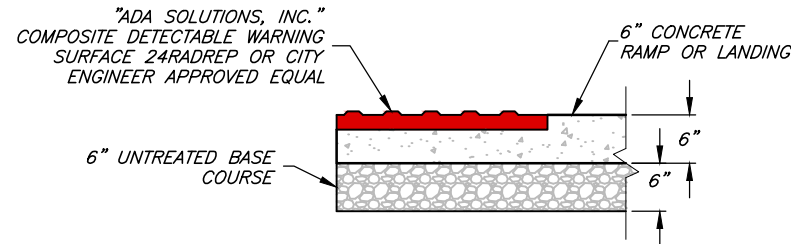
DRIVEWAY APPROACH W/ PARKSTRIP
DROP DOWN STYLE (ALTERNATE SIDEWALK LOCATION)

- DRIVEWAY APPROACH AND SIDEWALK NOTES:**
- IN NEW SUBDIVISIONS 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.
 - 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 AT 5'-0" MAX. SPACING.
 - STAMPED CONCRETE OR PAVERS ARE NOT ALLOWED WITHIN THE DRIVE APPROACH AREA.

SHEET:
C-04A
22 SHEETS

DETECTABLE WARNING SURFACE NOTES:

1. LOCATE THE DETECTABLE WARNING SURFACE SO THE OUTSIDE CORNER NEAREST THE STREET IS WITHIN 1 INCH OF THE BACK OF CURB (TBC). PROVIDE 2-FOOT 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 ENGINEER OR AUTHORIZED REPRESENTATIVE.
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:

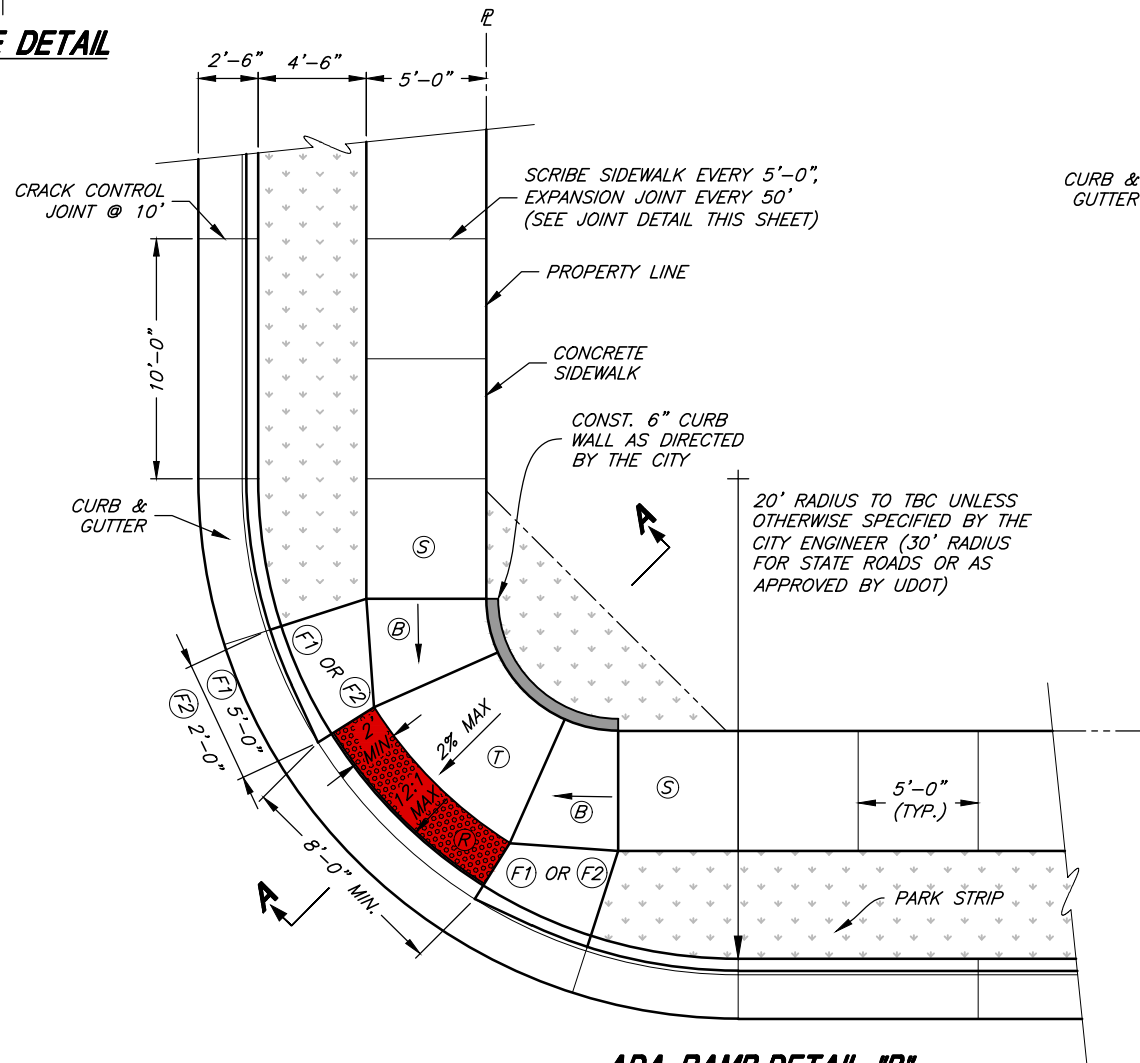
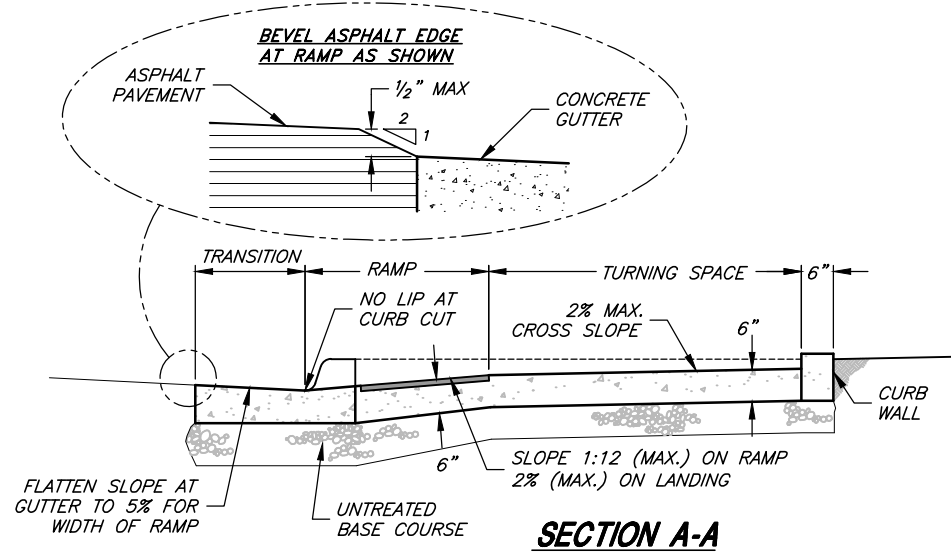
- A. WHERE DESIGNATED BY THE CITY, ALTERNATE UDOT OR APWA RAMP DESIGNS MAY BE USED WITH THE PRIOR APPROVAL OF THE CITY ENGINEER AND THE CITY PUBLIC WORKS DEPARTMENT. SUBMIT ENGINEERED CONSTRUCTION PLANS TO CITY ENGINEER FOR REVIEW AND ACCEPTANCE PRIOR TO CONSTRUCTION.
- B. SITE CONDITIONS WILL VARY. 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 (SHEETS PA1 THROUGH PA5). 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.

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)

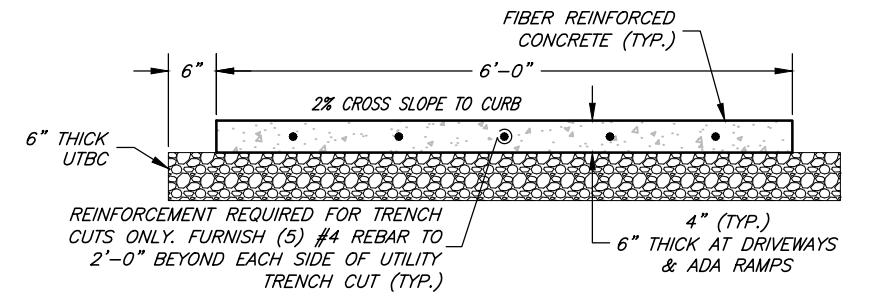
* RUNNING SLOPE IS IN THE DIRECTION OF PEDESTRIAN TRAVEL. CROSS SLOPE IS PERPENDICULAR TO PEDESTRIAN TRAVEL.

¹ 5% MAX OR NATURAL SLOPE OF LAND

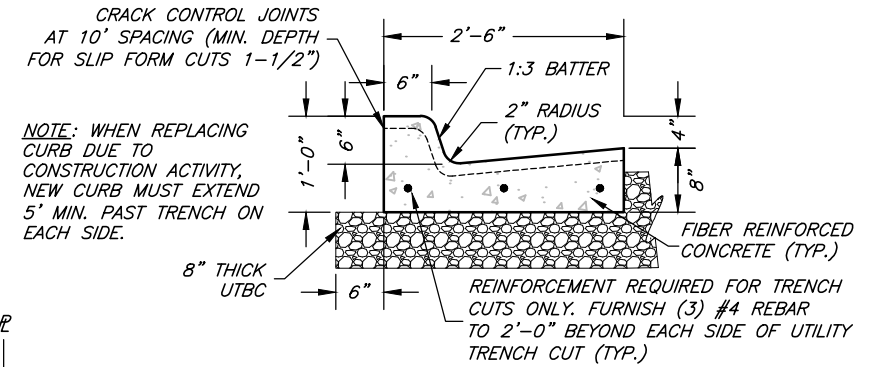
² NOT TO EXCEED 2% IN ANY DIRECTION



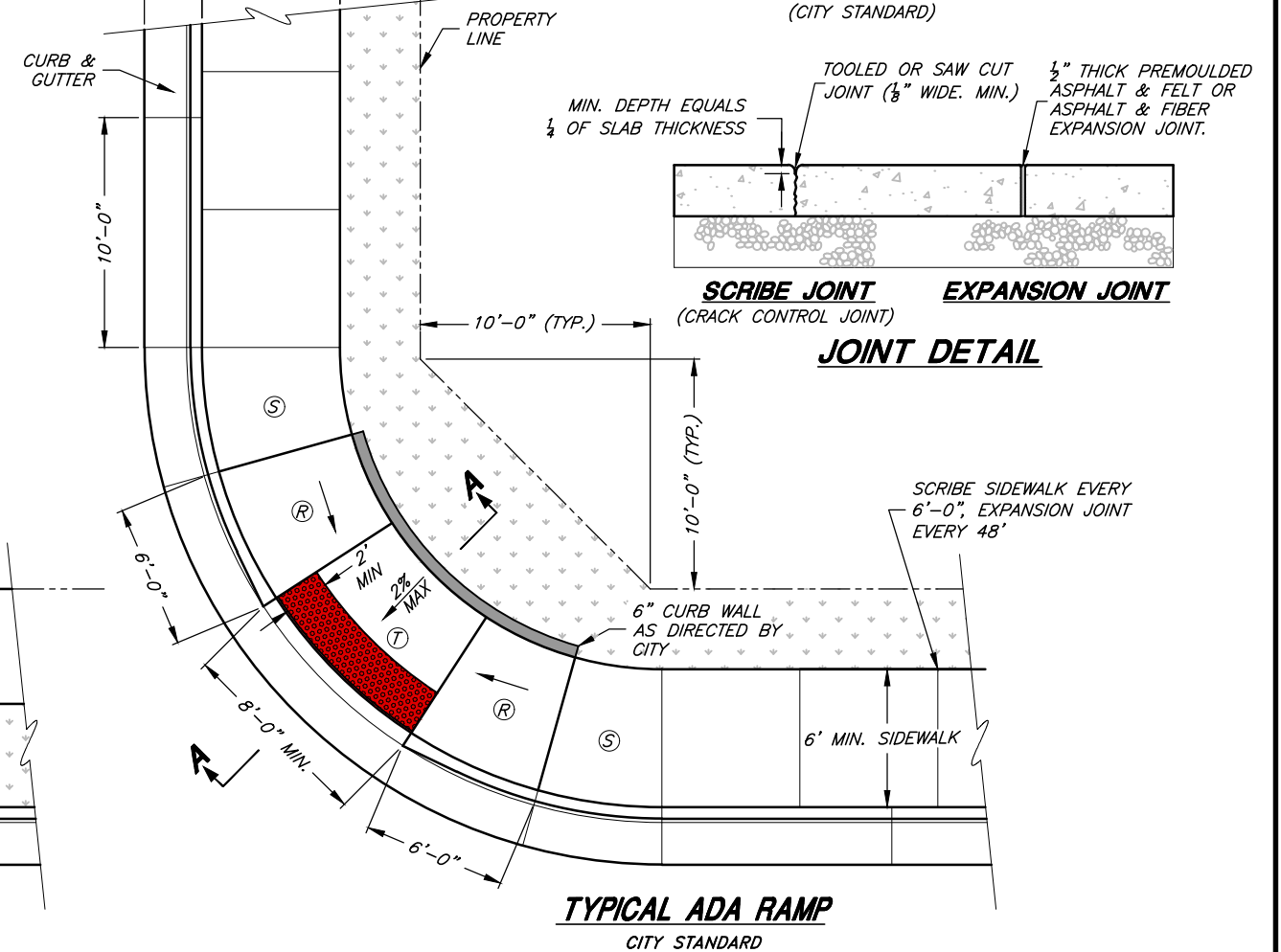
REQUIRES WRITTEN CITY APPROVAL (PARK STRIP)



SIDEWALK SECTION
(CITY STANDARD)



CURB & GUTTER SECTION
(CITY STANDARD)



BRANDON K. JONES
No. 5148758
PROJECT ENGINEER
9-4-2018
DATE

REV.	DATE	APPR.

SCALE:
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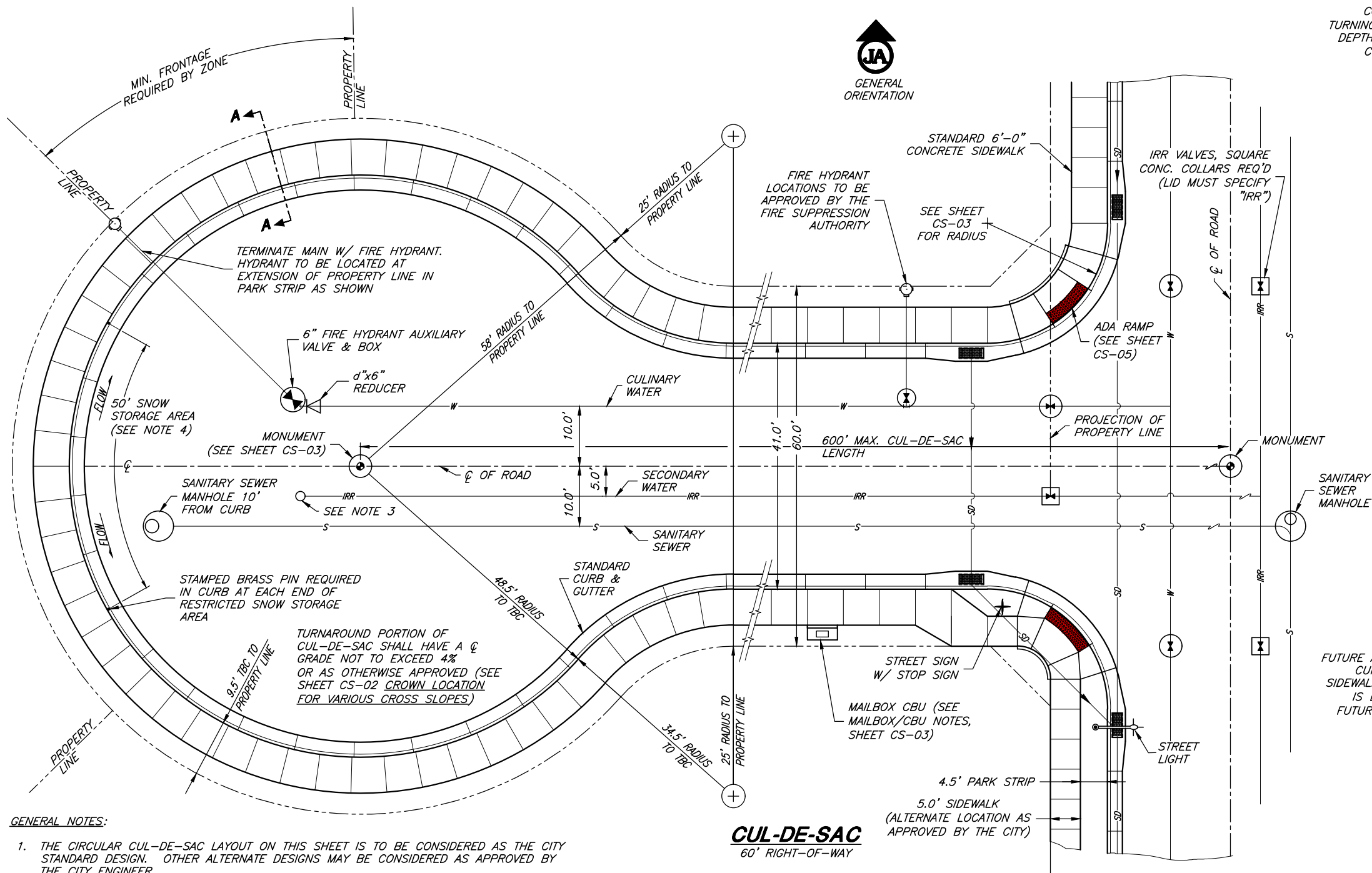
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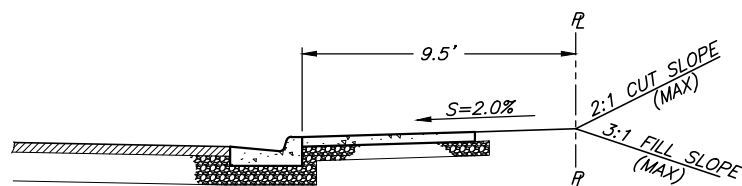
FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS STANDARDS
PUBLIC ROADS - TYPICAL ADA RAMP, SIDEWALK,
CURB & GUTTER, AND CONCRETE JOINT DETAILS

SHEET:
CS-05
OF 22 SHEETS
0



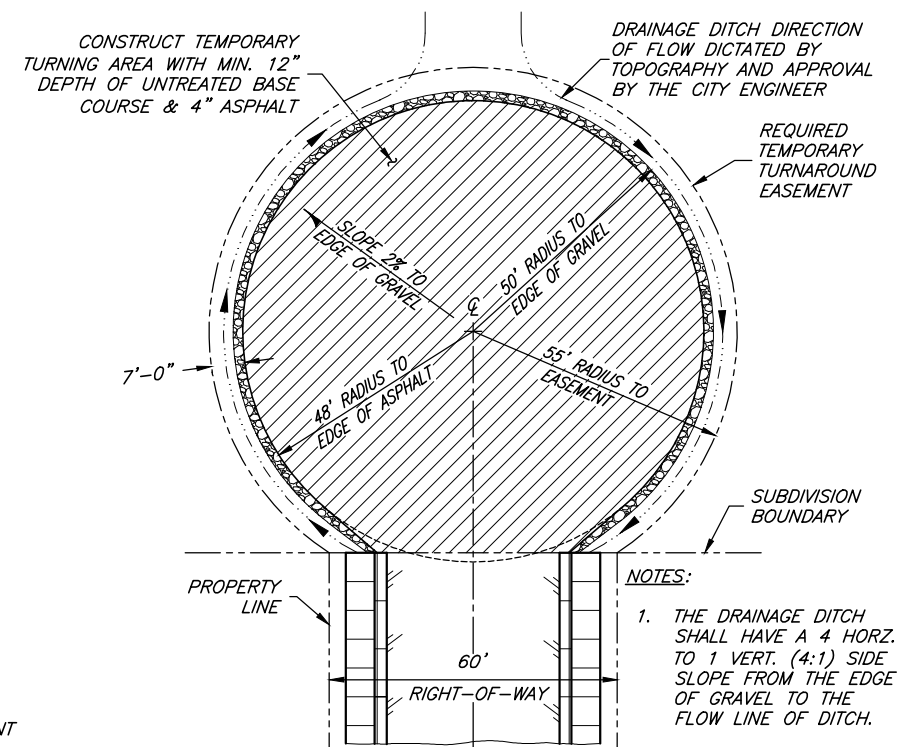
GENERAL NOTES:

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 ENGINEER.
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 ENGINEER.
4. NO DRIVEWAYS, FIRE HYDRANTS, OR MAIL BOXES ARE PERMITTED WITHIN THE 50' SNOW STORAGE AREA. THE 50' 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 FRUIT HEIGHTS CITY.

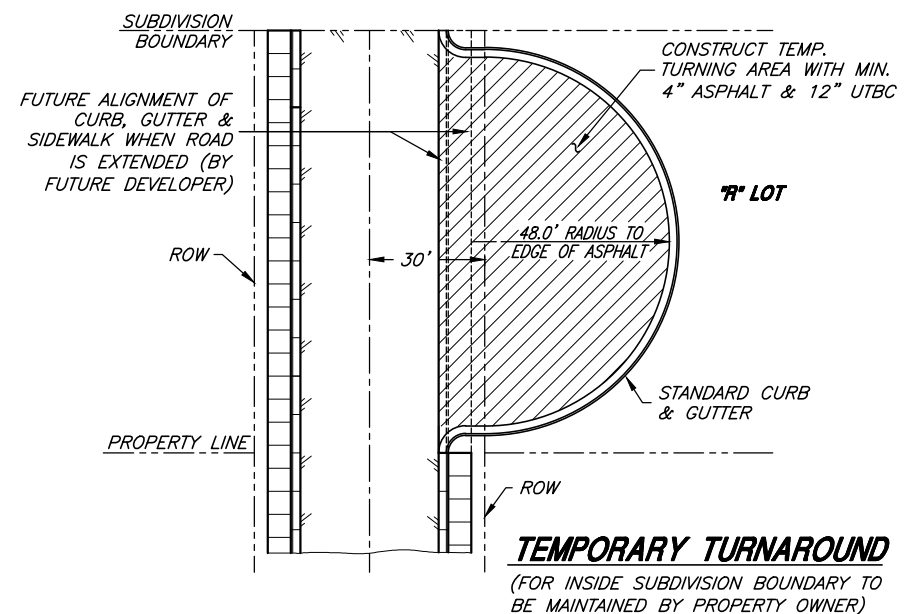


SECTION A-A

REQUIRED GRADING BETWEEN TBC AND PROPERTY LINE



**CITY STANDARD
TEMPORARY TURNAROUND**
(FOR OUTSIDE OF SUBDIVISION BOUNDARY AND TO BE MAINTAINED BY PROPERTY OR EASEMENT OWNER)



BRANDON K. JONES
No. 5148758
PROJECT ENGINEER
9-4-2018
DATE

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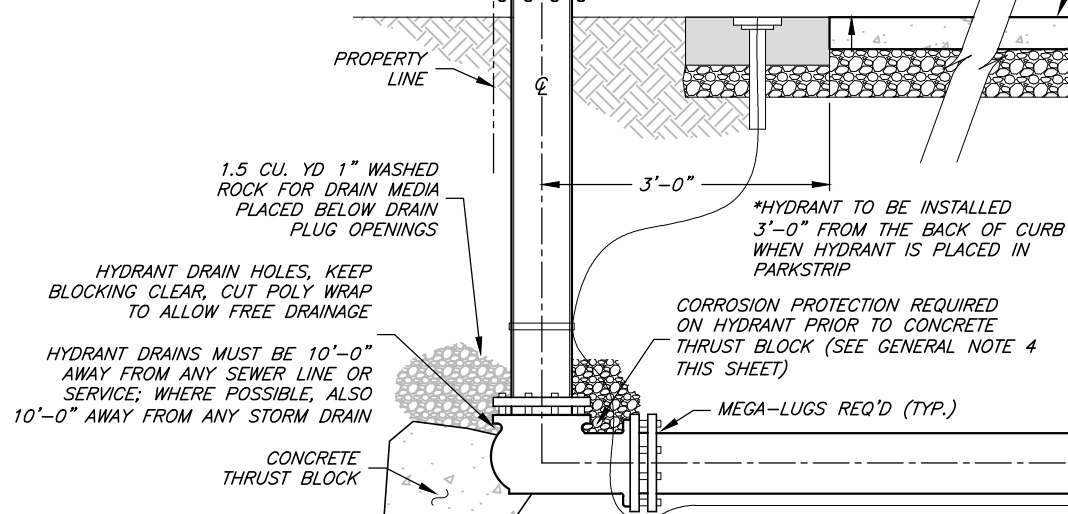
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FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS STANDARDS
PUBLIC ROADS - CUL-DE-SAC & TEMP. TURNAROUND DETAILS

SHEET:
CS-06
OF 22 SHEETS
0

FIRE HYDRANT NOTES:

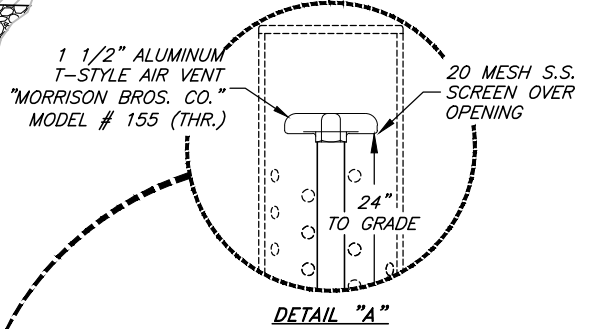
- B1. FIRE HYDRANTS ARE TO BE INSTALLED IN LOCATIONS AS REQUIRED BY THE FIRE CODE AND APPROVED BY THE FIRE CHIEF AND CITY ENGINEER.
- B2. FIRE HYDRANTS ARE ALSO REQUIRED TO BE INSTALLED AT THE ENDS OF CUL-DE-SACS AND DEAD ENDS FOR BLOW-OFF PURPOSES.
- B3. DEPENDING ON ITS LOCATION, A FIRE HYDRANT MAY SERVE FOR BOTH FIRE PROTECTIONS AND BLOW-OFF PURPOSES.



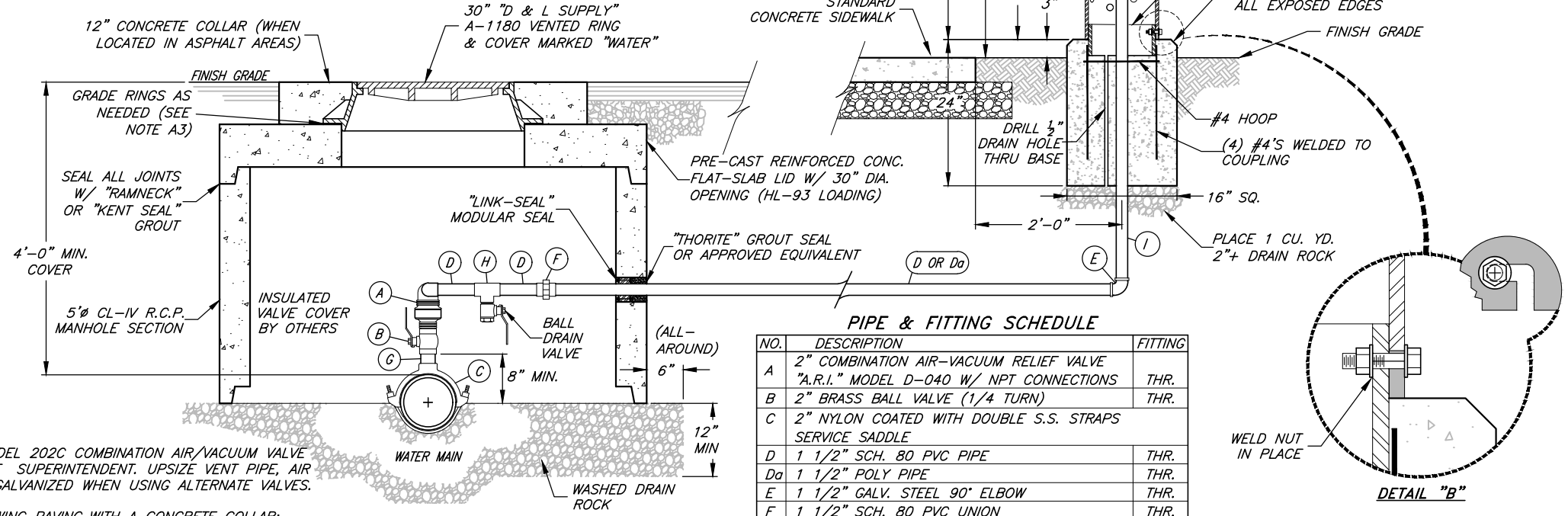
ADJUST ALL WATER VALVE BOXES TO GRADE FOLLOWING PAVING WITH CONCRETE COLLAR. COLLAR TO BE HELD DOWN 1/4" BELOW TOP OF NEW ASPHALT. LID TO BE HELD DOWN 1/4" BELOW CONC. COLLAR (LID MUST SPECIFY "FRUIT HEIGHTS WATER", EAST JORDAN IRON WORKS 6800 VALVE BOX COVER OR APPROVED EQUAL)

FIRE LINE NOTES:

- 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.

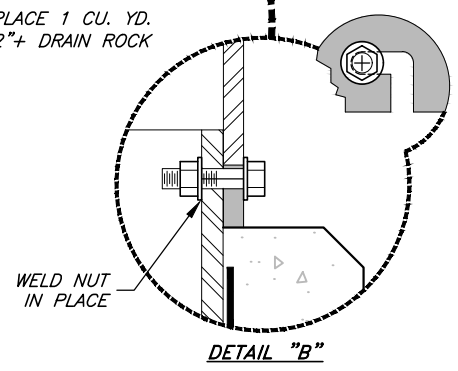


FIRE HYDRANT & GATE VALVE DETAIL



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 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.



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 WATER DEPARTMENT SUPERINTENDENT. 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

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 ENGINEER AND THE CITY WATER SYSTEM SUPERINTENDENT.
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:
 - d1. DENSO NORTH AMERICA DENSO PRIMER, DENSYL TAPE AND/OR MASTIC, DENSO FIBER-WRAP
 - d2. TRENTON PRIMER, #1 WAX-TAPE, AND GUARD-WRAP
 - d3. OR APPROVED EQUAL (SUBMITTAL TO CITY AND WRITTEN APPROVAL REQUIRED PRIOR TO INSTALLATION)



BRANDON K. JONES
PROJECT ENGINEER
9-4-2018
DATE

REV.	DATE	APPR.

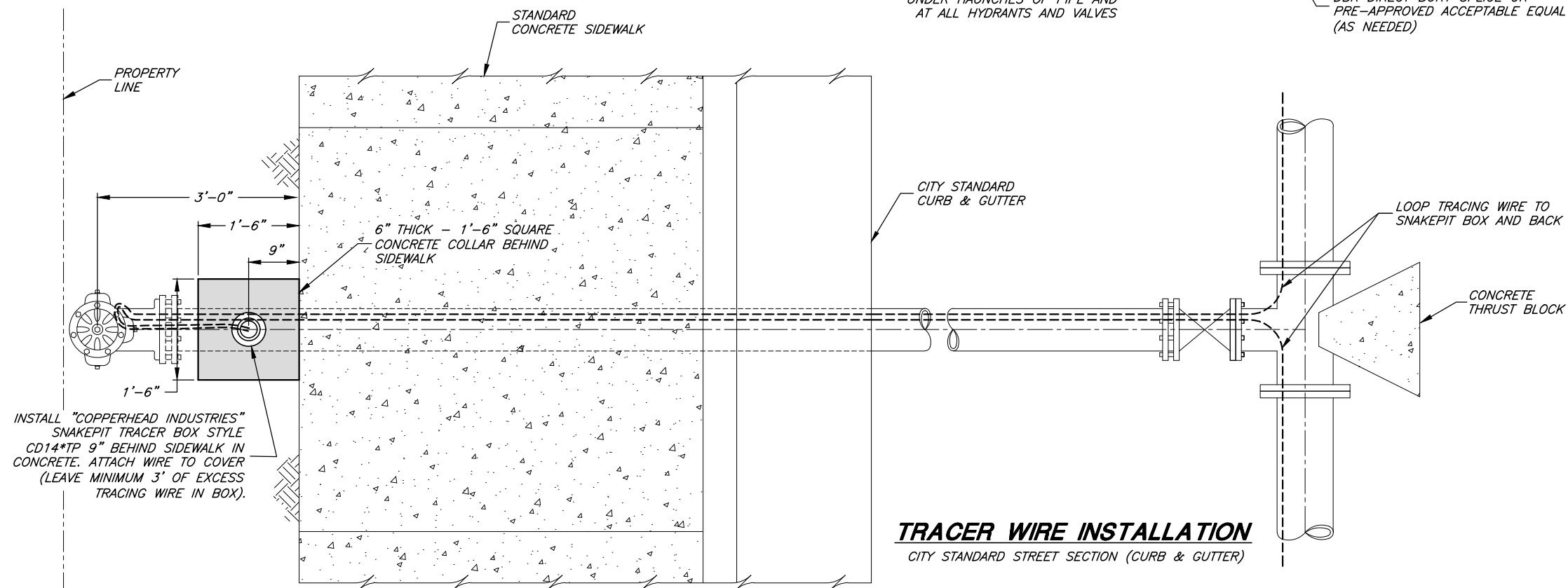
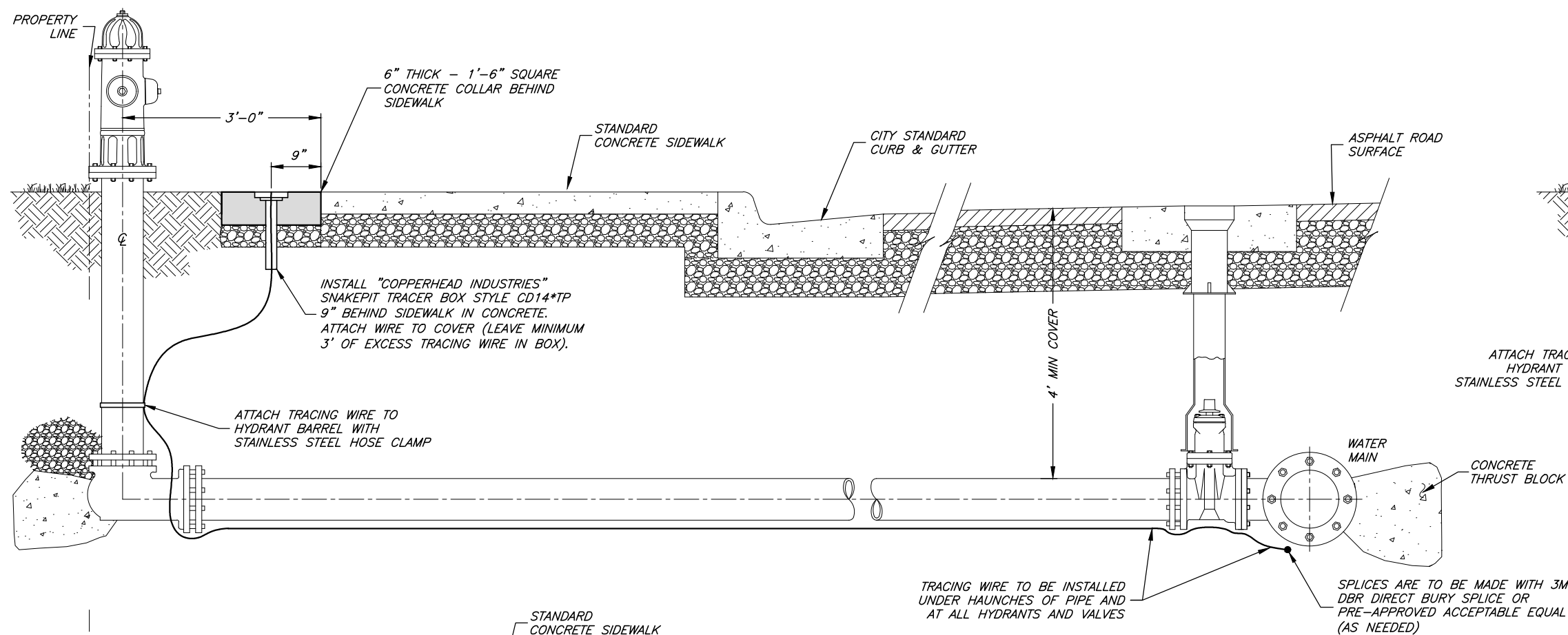
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FRUIT HEIGHTS CITY
PUBLIC WORKS STANDARDS
CULINARY WATER - AIR/VACUUM RELIEF STATION, FIRE HYDRANT & GATE VALVE DETAILS, AND CORROSION PROTECTION NOTES

SHEET:
CS-08
OF 22 SHEETS
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- 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.



Brandon K. Jones
PROJECT ENGINEER
9-4-2018
DATE

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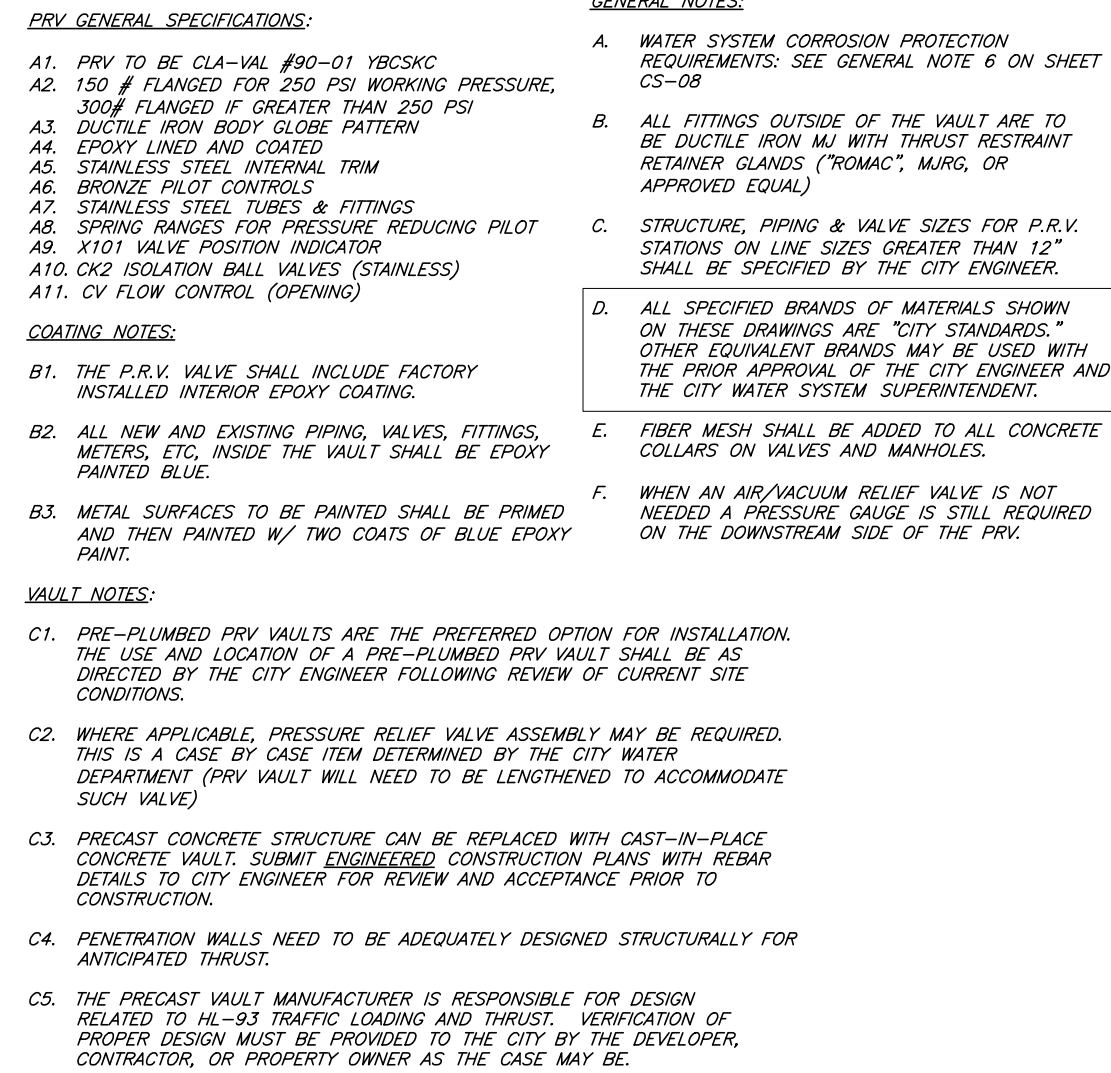
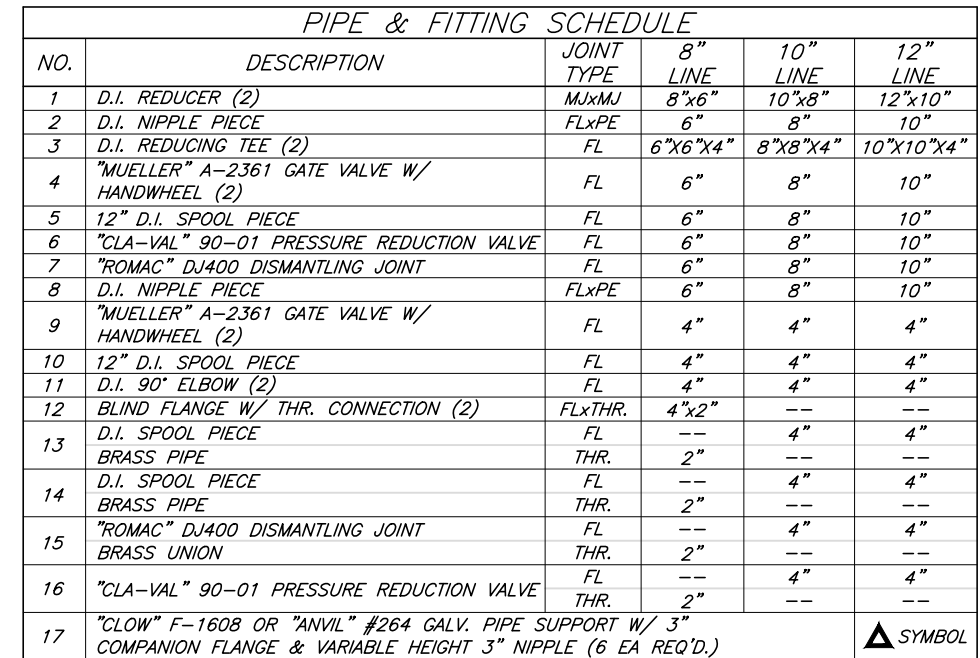
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FRUIT HEIGHTS CITY
PUBLIC WORKS STANDARDS
CULINARY WATER - TRACING WIRE
INSTALLATION DETAILS

SHEET:
S-09
22 SHEETS
0



SHEET:
CS-10
OF 22 SHEETS
0



- TRENCH NOTES:

-
- Diagram illustrating the components of a glycol sampling assembly:
- GLYCOL FILLED GAUGE (0-300 P.S.I.)
 - BALL VALVE
 - $\frac{3}{2} \times \frac{3}{8}$ REDUCING TEE
 - SMOOTH NOSE HOSE BIB SAMPLING FAUCET W/ ANTI-SIPHON ADAPTOR CONNECTED TO THREADED END OF HOSE BIB.
 - $\frac{3}{4}$ inch CORPORATION VALVE

PRESSURE GAUGE

W/SAMPLING FAUCET DETAIL

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:

-
- VARIES
- 12" (MP.)
- 1'-4"
- 8"
- 3"
- 2 1/2" x 3/4"
- 3/4" DIA.
- 3/4" DIA.
- THE ANCHOR PINS OF THE RESTRAINING GLAND MUST POINT AWAY FROM THE VAULT WALL AS SHOWN.
- STEEL PLATE DIMENSIONS:
 10"Ø PIPE OR LESS = 24"x24" PLATE
 12"Ø-18"Ø PIPE = 36"x36" PLATE
 20"Ø PIPE OR GREATER = AS DIRECTED BY CITY ENGINEER
- 3/4" THICK STEEL PLATE (60 KSI) W/
 HOLE FOR PIPE SECTION- MAX. 1/4" CLEARANCE
- D.I.P.
- INSTALL "LINK-SEAL" MODULAR SEAL AND GROUT AROUND PIPE
- "ROMAC" MJRG RETAINER GLAND - RATED FOR ANTICIPATED LINE PRESSURE (OR APPROVED EQUAL)
- WALL PENETRATION DETAIL

WALL PENETRATION DETAIL

FOR PRECAST VAULT (TYP)

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

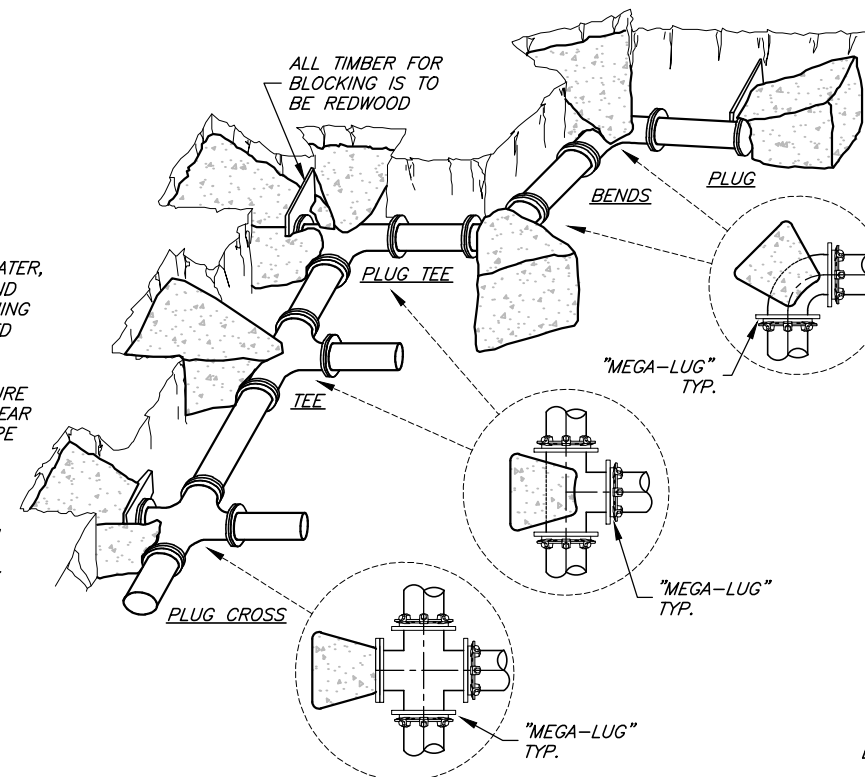
NOTES:

- 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-INCH 90° ELBOW, PRESSURE 200 LB./SQ. IN.
FROM TABLE: THRUST = $94 \times 200 = 18,800$ LB.
ASSUME BEARING STRENGTH = 2,000 LB./SQ. FT.

$$\frac{18,8000}{2,000} = 9.4 \text{ SQ. FT.} \quad \text{AREA OF BEARING REQUIRED FOR THRUST BLOCK}$$



TYPICAL RETAINER GLANDS & THRUST BLOCKING



Brandon K. Jones
PROJECT ENGINEER
9-4-2018
DATE

SCALE:

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FRUIT HEIGHTS CITY CORPORATION

PUBLIC WORKS STANDARDS

**CULINARY WATER - THRUST BLOCK, WATERLINE LOOP,
PIPE TRENCH & MISC. VAULT DETAILS**

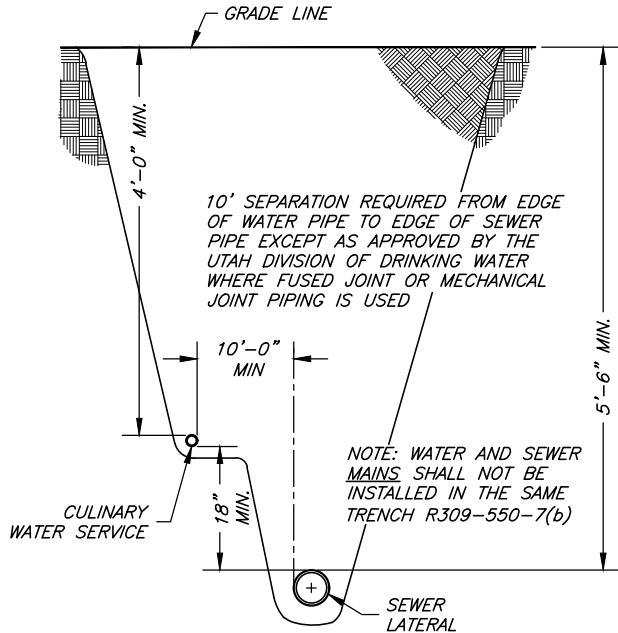
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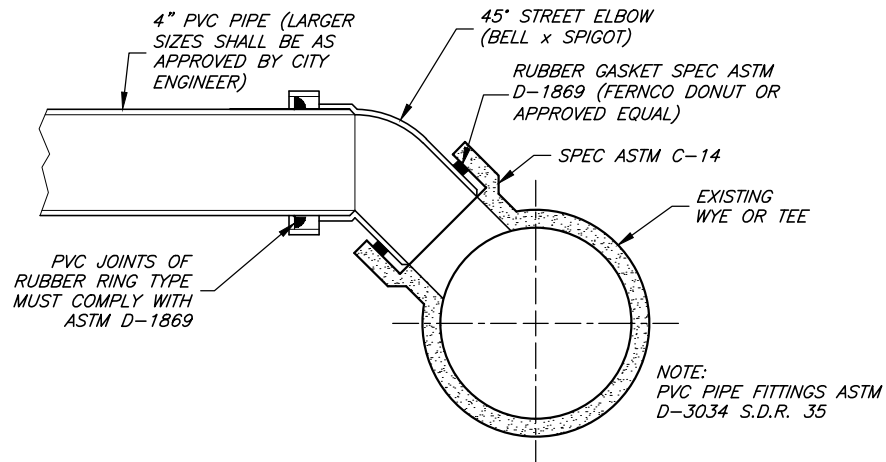
22 SHEETS

GENERAL NOTES:

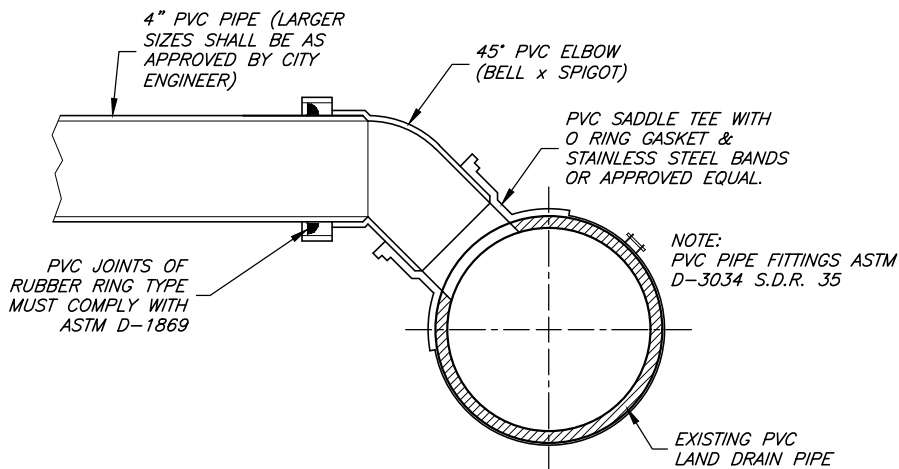
1. ALL LAND DRAIN LATERAL CONNECTIONS ON MAINS IN NEW SUBDIVISIONS SHALL BE MADE WITH IN LINE PRE-FORMED WYES OR TEES UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
2. FLOWLINE ELEVATION OF LATERALS SHALL EQUAL THE INSIDE TOP OF PIPE ON MAINLINE AT THE CONNECTING POINT (THE LATERAL TAP SHALL BE IN THE TOP QUARTER OF THE MAIN LINE PREFERABLY IN THE 10:00 OR 2:00 POSITION).
3. LATERAL CONNECTIONS SHALL NOT BE ALLOWED IN MANHOLES.
4. LAND DRAIN MAIN LINES SHALL BE "GREEN" IN COLOR AND LAND DRAIN LATERAL LINES SHALL BE "WHITE" IN COLOR. IRRIGATION PIPES SHALL BE "PURPLE" IN COLOR. SANITARY SEWER PIPES SHALL BE AS SPECIFIED BY CENTRAL DAVIS SEWER DISTRICT. PREVIOUS YEARS PIPE COLORS VARY THROUGHOUT THE CITY. CONTRACTOR TO VERIFY EXISTING PIPE PRIOR TO MAKING ANY CONNECTION.
5. INSERTA TEE PRODUCT IS NOT APPROVED BY THE CITY
6. 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.
7. ALL CULINARY WATER MAINS AND SERVICES MUST MAINTAIN A MINIMUM SEPARATION ABOVE 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
8. 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.
9. 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.
10. DOWNSTREAM LAND DRAIN CONNECTION TO AN EXISTING STORM DRAIN SYSTEM IS REQUIRED.
11. 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.



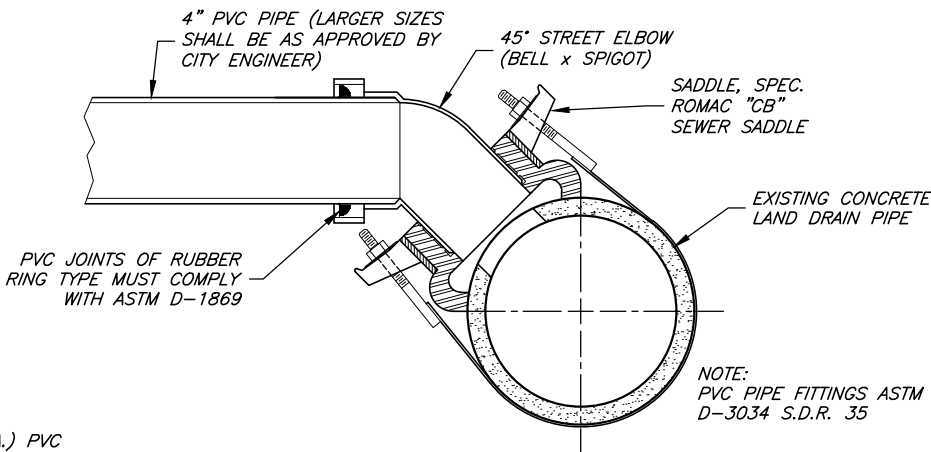
COMBINED WATER SERVICE & SEWER LATERAL TRENCH SECTION



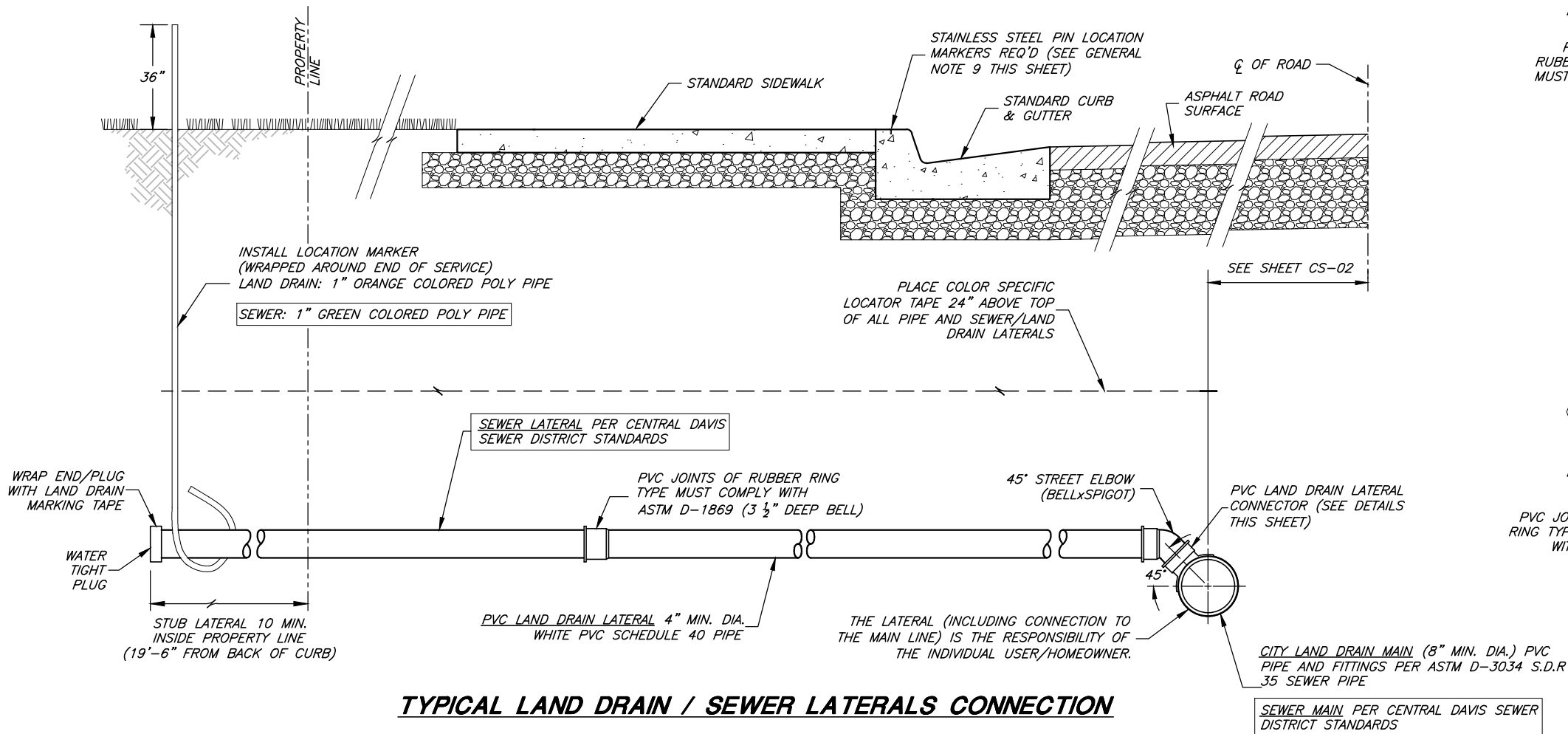
CONNECTING INTO EXISTING WYE OR TEE



TAPPING INTO EXISTING PVC PIPE



TAPPING INTO EXISTING CONCRETE PIPE



TYPICAL LAND DRAIN / SEWER LATERALS CONNECTION



BRANDON K. JONES
No. 5148758
State of Utah
PROJECT ENGINEER
9-4-2018
DATE

REV.	DATE	APPR.

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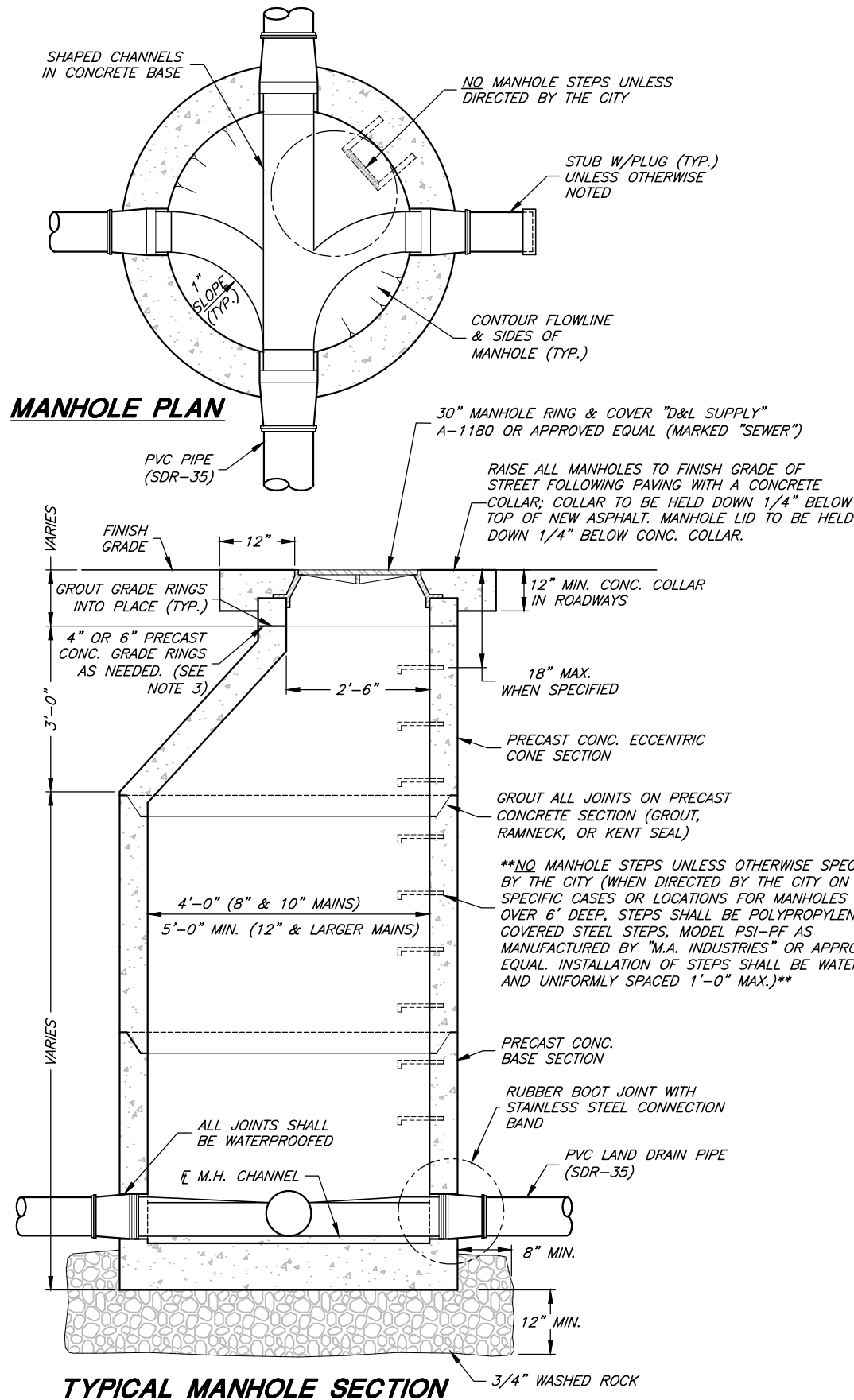
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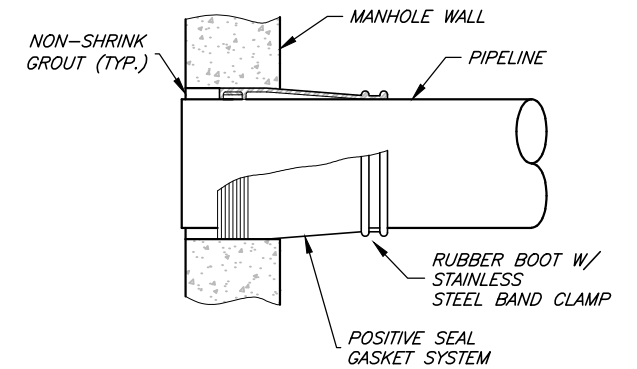
FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS STANDARDS
LAND DRAIN / SANITARY SEWER - LATERAL & CONNECTION DETAILS

SHEET:
CS-13
OF 22 SHEETS
0



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 DESIGN ENGINEER 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.



RUBBER BOOT DETAIL



Brandon K. Jones
PROJECT ENGINEER
9-4-2018
DATE

REV.	DATE	APPR.

SCALE:
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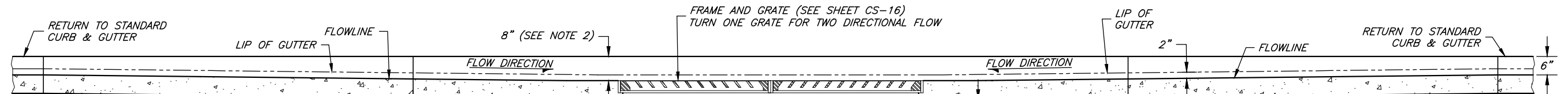
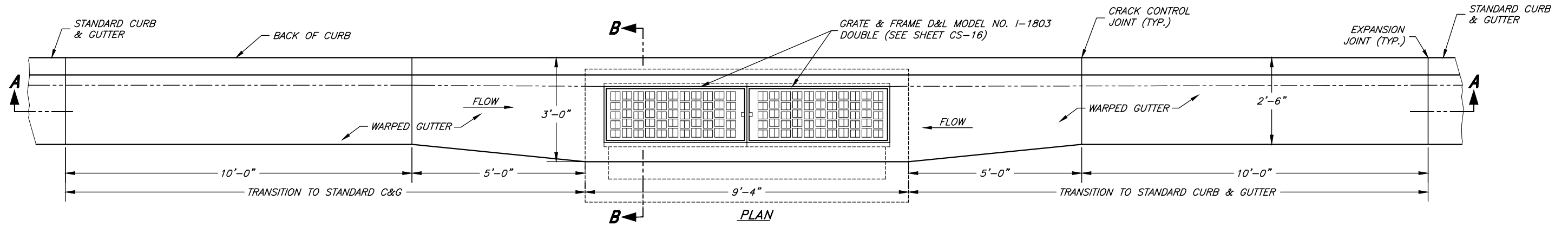
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FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS STANDARDS
LAND DRAIN - TYPICAL MANHOLES & DETAILS

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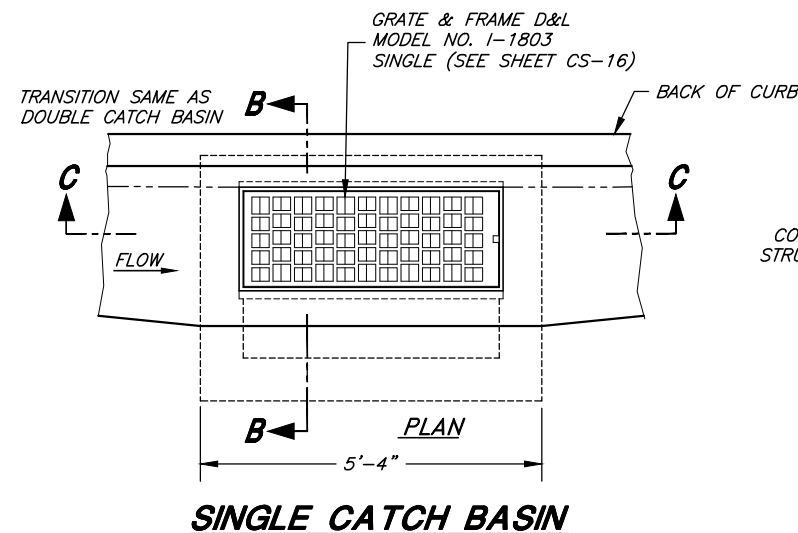
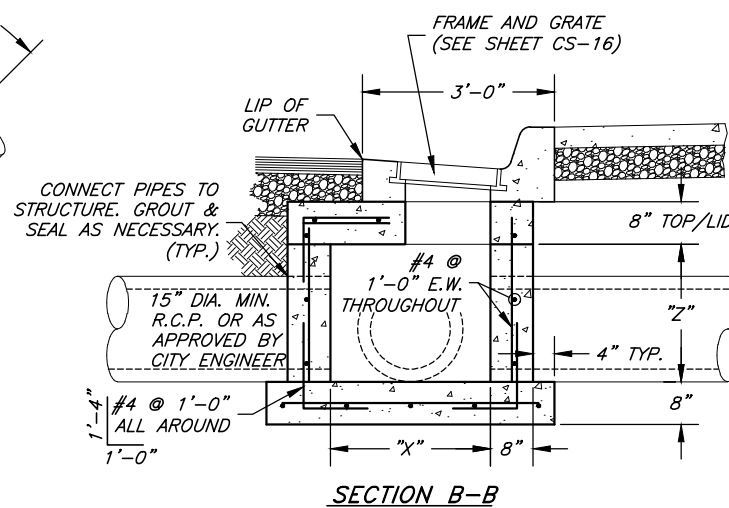
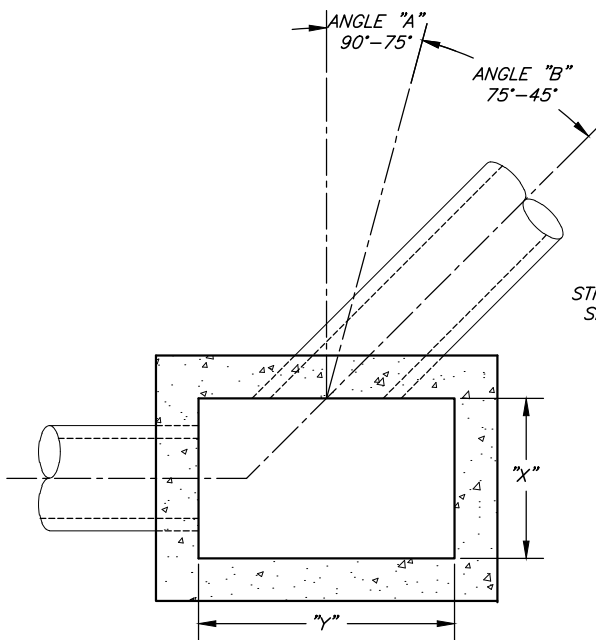


STANDARD CATCH BASIN DIMENSION TABLE					
PIPE SIZE (IN.)	"X"	SINGLE CATCH BASIN		DOUBLE	"Z" MIN.
		"Y" (ANGLE A)	"Y" (ANGLE B)	"Y"	
15	2'-6"	4'-0"	4'-0"	8'-0"	2'-0"
18	2'-6"	4'-0"	4'-0"	8'-0"	2'-6"
21	4'-0"	4'-0"	4'-0"	8'-0"	3'-0"
24	4'-0"	4'-0"	5'-0"	8'-0"	3'-0"
30	4'-0"	4'-0"	6'-0"	8'-0"	3'-6"
36	4'-0"	5'-0"	6'-0"	8'-0"	4'-0"
42	6'-0"	6'-0"	7'-0"	8'-0"	5'-0"
48	6'-0"	6'-0"	8'-0"	8'-0"	5'-6"

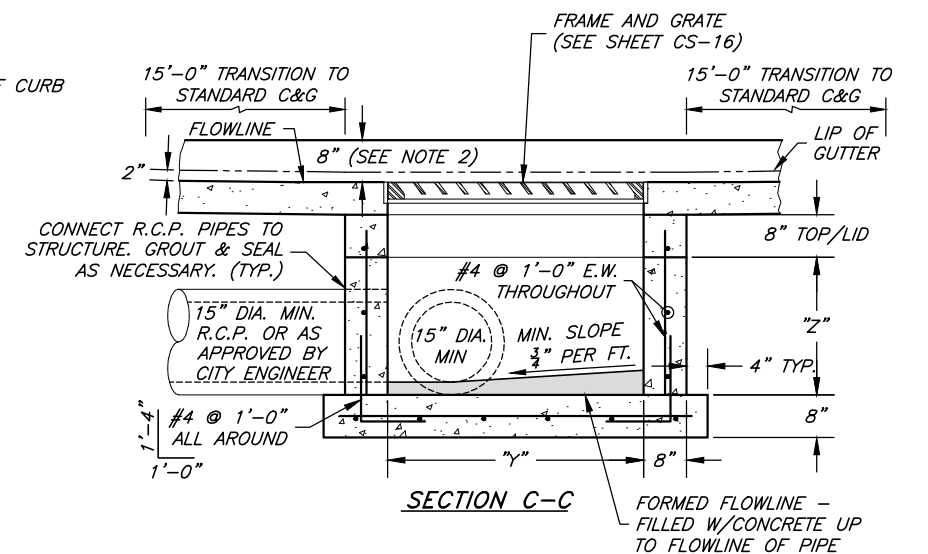
DOUBLE CATCH BASIN

GENERAL NOTES:

1. ALL CATCH BASIN BOX SIZES REFLECT DIMENSIONS FOR THE MINIMUM 15" PIPE SIZE. BOX DIMENSIONS MUST INCREASE PROPORTIONALLY TO ACCOMMODATE LARGER PIPE SIZES.
2. DEPTH MAY VARY FROM 6" TO 10" AS DIRECTED BY THE CITY ENGINEER
3. CAST-IN-PLACE CONCRETE CATCH BASINS CAN BE REPLACED WITH PRECAST CONCRETE CATCH BASINS WITH HL-93 DECK LOADING AND COMPARABLE SIZE.
4. ALL BOXES SHALL BE FORMED ON THE INSIDE AND OUTSIDE OF THE BOX AND INSPECTED BY THE CITY PRIOR TO THE PLACING OF CONCRETE.
5. DOUBLE CATCH BASINS WILL BE REQUIRED IN LOCATIONS SPECIFIED BY THE CITY ENGINEER (TYPICALLY IN LOW SPOTS OR WHERE ADDITIONAL INLET CAPACITY IS NEEDED).
6. STORM DRAIN LINES SHALL BE 15 INCH MINIMUM DIAMETER REINFORCED CONCRETE PIPE (RCP), OF APPROPRIATE CLASS.
7. CURB INLET WITH A GRATE & CURB HOOD MAY BE USED AS REQUIRED AND/OR APPROVED BY THE CITY.



SINGLE CATCH BASIN



BRANDON K. JONES
PROJECT ENGINEER
9-4-2018
DATE

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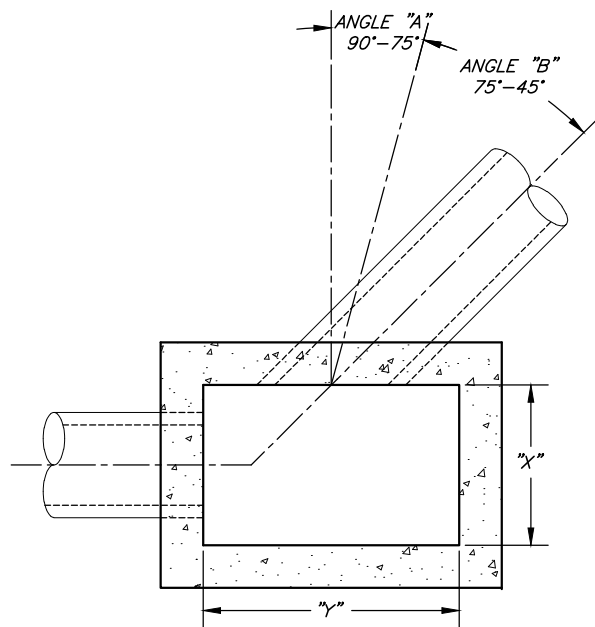
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PUBLIC WORKS STANDARDS
STORM DRAIN - SINGLE & DOUBLE CATCH BASIN DETAILS

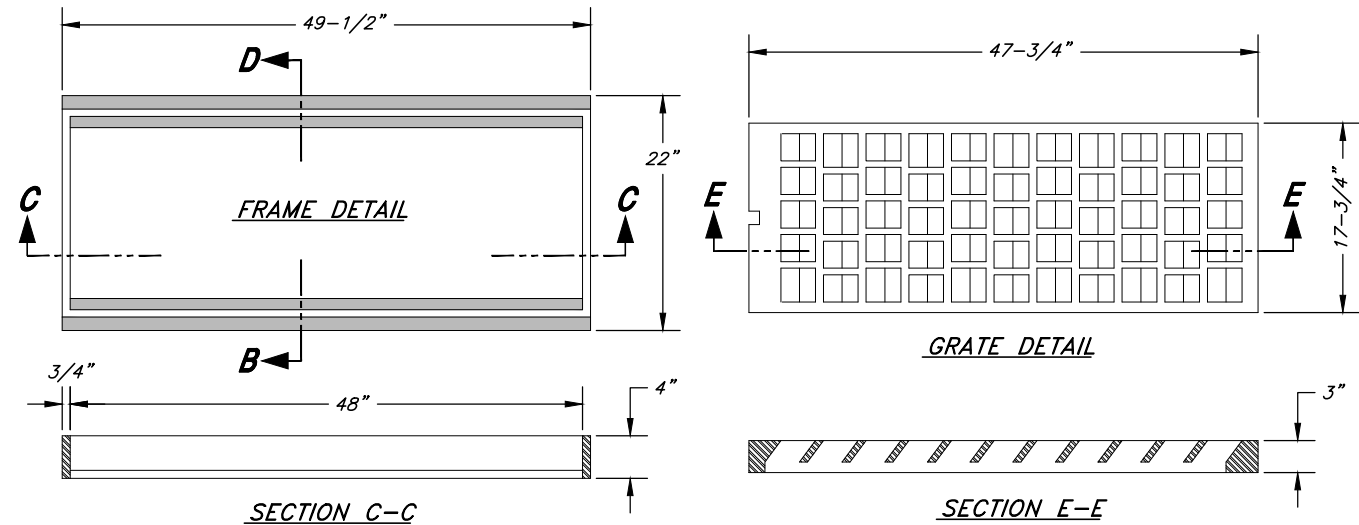
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CS-15
OF 22 SHEETS
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PIPE SIZE (IN.)	INLET BOX			"Z" MIN.
	"X"	"Y" (ANGLE A)	"Y" (ANGLE B)	
15	2'-6"	4'-0"	4'-0"	2'-0"
18	2'-6"	4'-0"	4'-0"	2'-6"
21	4'-0"	4'-0"	4'-0"	3'-0"
24	4'-0"	4'-0"	5'-0"	3'-0"
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:

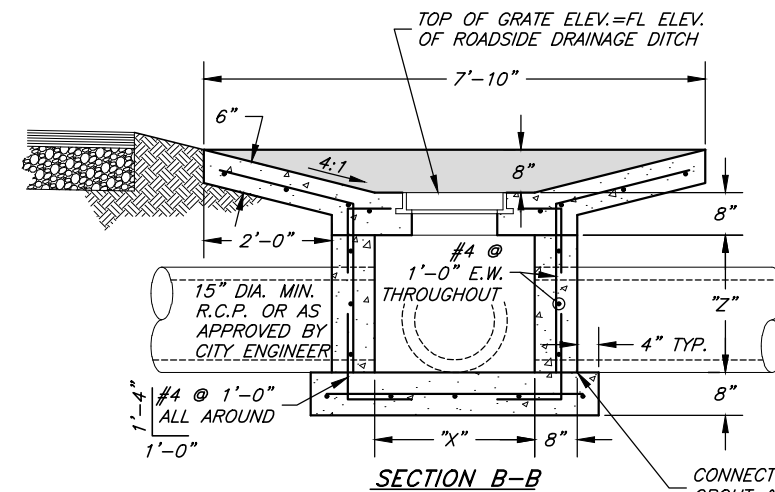
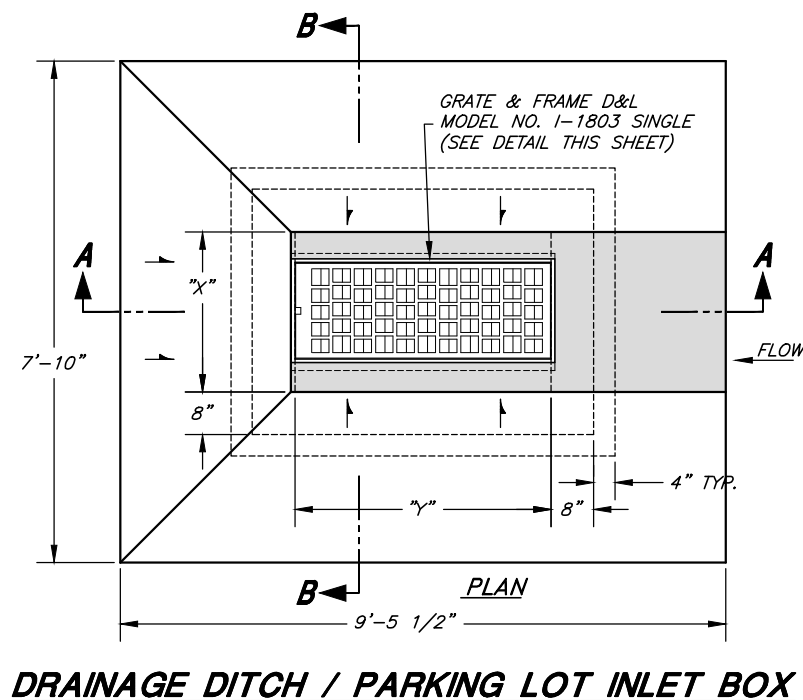
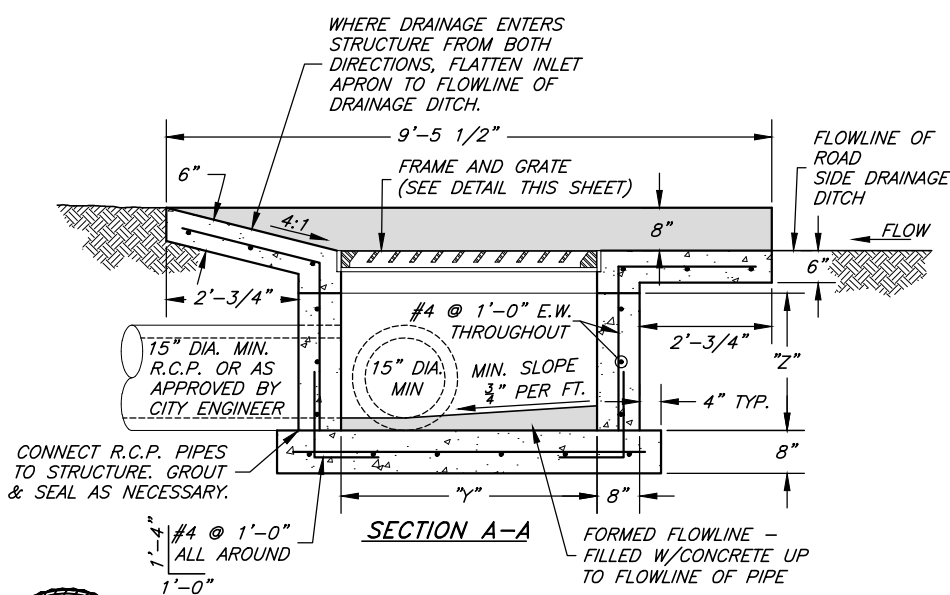
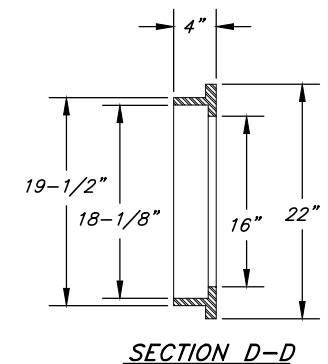
STORM DRAIN LINES SHALL BE 15 INCH MINIMUM DIAMETER REINFORCED CONCRETE PIPE (RCP), OF APPROPRIATE CLASS.



FRAME & GRATE DETAILS

FRAME AND GRATE NOTES:

- A1. GRATE AND FRAME SHALL BE AS MANUFACTURED BY "D&L SUPPLY" I-1803
- B1. BICYCLE SAFE GRATE REQUIRED.
- C1. "OR EQUAL" GRATES AND FRAMES WILL BE CONSIDERED AS APPROVED BY THE CITY ENGINEER.



DRAINAGE BOX NOTES:

1. 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)
2. CAST-IN-PLACE CONCRETE STRUCTURES CAN BE REPLACED WITH PRECAST CONCRETE STRUCTURES WITH HL-93 DECK LOADING AND COMPARABLE SIZE.
3. ALL BOXES SHALL BE FORMED ON THE INSIDE AND OUTSIDE OF THE BOX AND INSPECTED BY THE CITY PRIOR TO THE PLACING OF CONCRETE.



PROJECT ENGINEER
Brandon K. Jones
9-4-2018
DATE

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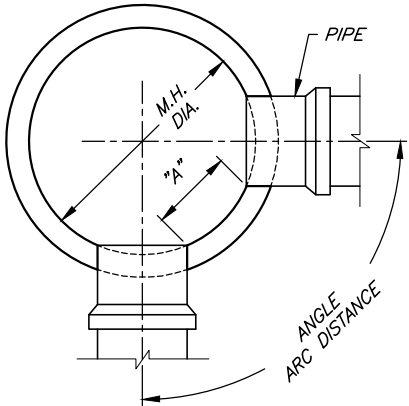


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FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS STANDARDS
STORM DRAIN - DRAINAGE INLET BOX & GENERAL GRATE AND FRAME DETAILS

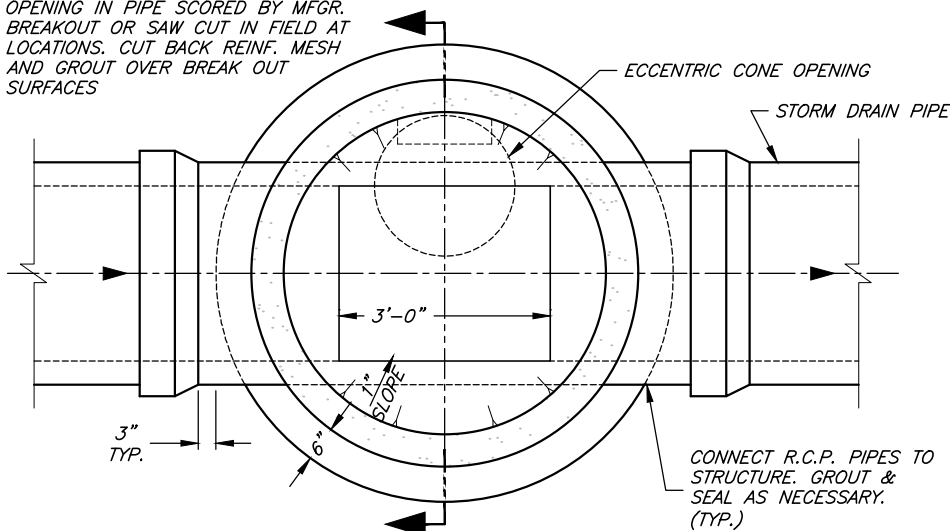
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OF 22 SHEETS
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PIPE SIZES												
M.H. SIZE	IN-LINE M.H. 180°	JUNCTION MANHOLE (ANGLE / ARC DISTANCE)										
		90°	85°	80°	75°	70°	65°	60°	55°	50°	45°	
4' M.H.	15"-24"	15"-18"	15"-18"	15"	15"	--	--	--	--	--	--	
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"	

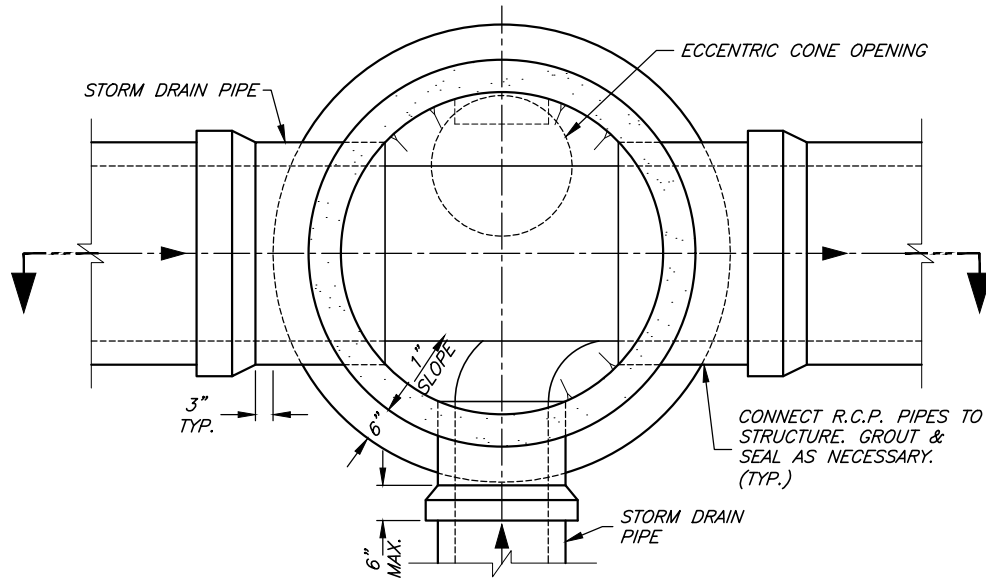


- SIZING NOTES:**
- SUGGESTED "A" DISTANCE IS 6" OR GREATER FOR 48", 60" AND 72" DIAMETER MANHOLES
 - SUGGESTED "A" DISTANCE IS 8" OR GREATER FOR 84" AND 96" DIAMETER MANHOLES

OPENING IN PIPE SCORED BY MFR. BREAKOUT OR SAW CUT IN FIELD AT LOCATIONS. CUT BACK REINF. MESH AND GROUT OVER BREAK OUT SURFACES

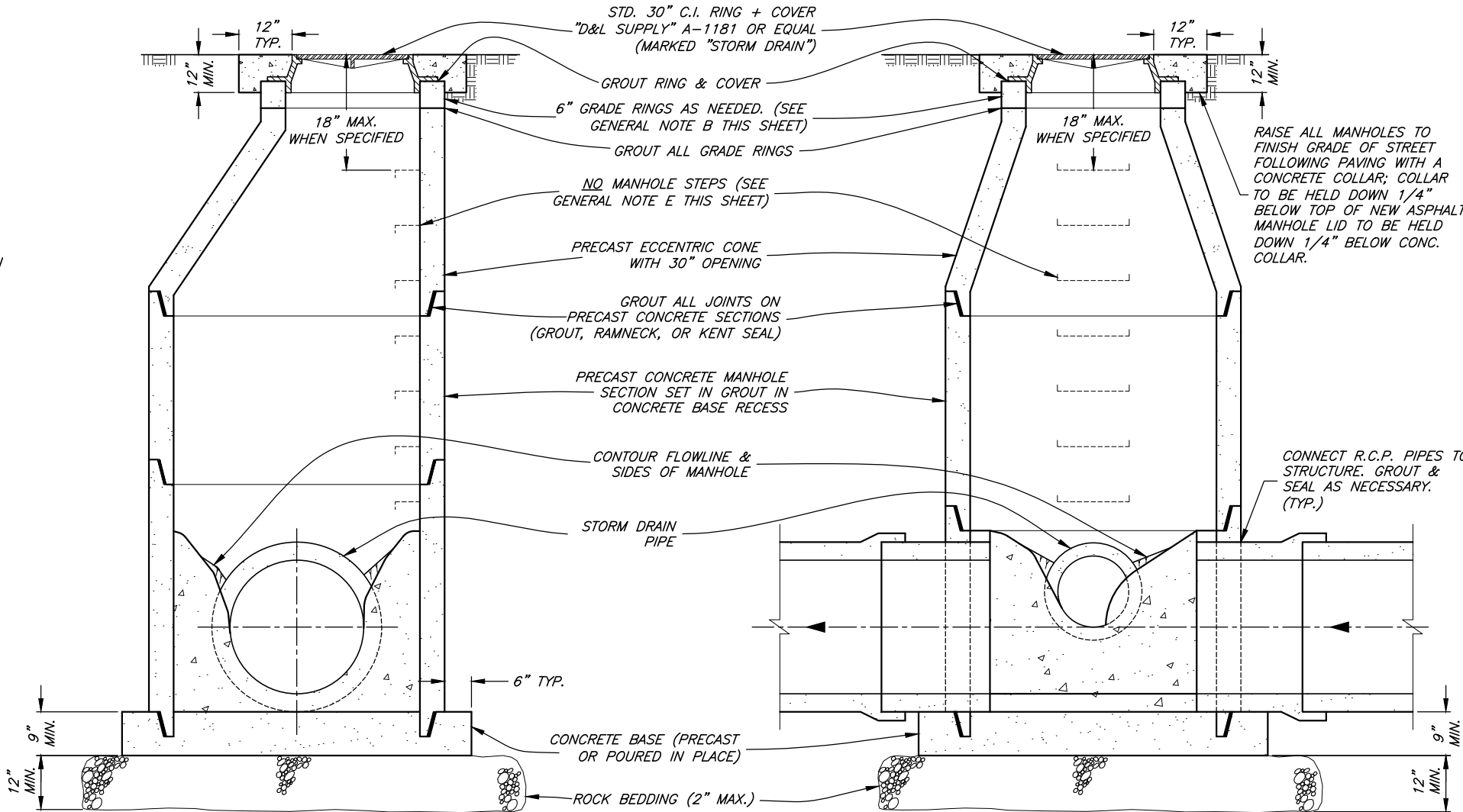


TYPICAL LINE MANHOLE



TYPICAL JUNCTION MANHOLE

- GENERAL NOTES:**
- STORM DRAIN MANHOLE DIAMETER TO BE DETERMINED BY THE DESIGN ENGINEER AFTER EVALUATION OF THE NUMBER, SIZE, AND PIPE ENTRY ANGLE OF THE PIPES THAT CONNECT TO THE MANHOLE.
 - NO MORE THAN 12" OF GRADE RINGS TO BE ALLOWED ON ANY MANHOLE
 - PLYWOOD COVERS SHALL BE USED AT MANHOLE FLOOR TO COVER FLOWLINE DURING CONSTRUCTION AND MAINTENANCE ACTIVITIES.
 - ALL INTERIOR JOINTS SHALL BE SMOOTH AND EVENLY GROUTED WITH NON-SHRINK GROUT MIX.
 - **NO MANHOLE STEPS UNLESS OTHERWISE SPECIFIED BY THE CITY (WHEN DIRECTED BY THE CITY ON SPECIFIC CASES OR LOCATIONS FOR MANHOLES OVER 6' DEEP, STEPS SHALL BE POLYPROPYLENE COVERED STEEL STEPS, MODEL PSI-PF AS MANUFACTURED BY "M.A. INDUSTRIES" OR APPROVED EQUAL. INSTALLATION OF STEPS SHALL BE WATERPROOF AND UNIFORMLY SPACED 1'-0" MAX.)****
 - STORM DRAIN LINES SHALL BE 15" MINIMUM DIAMETER REINFORCED CONCRETE PIPE (RCP), OF APPROPRIATE CLASS.
 - FIBER MESH SHALL BE ADDED TO ALL CONCRETE COLLARS ON VALVES AND MANHOLES.



PROJECT ENGINEER
 9-4-2018
 DATE

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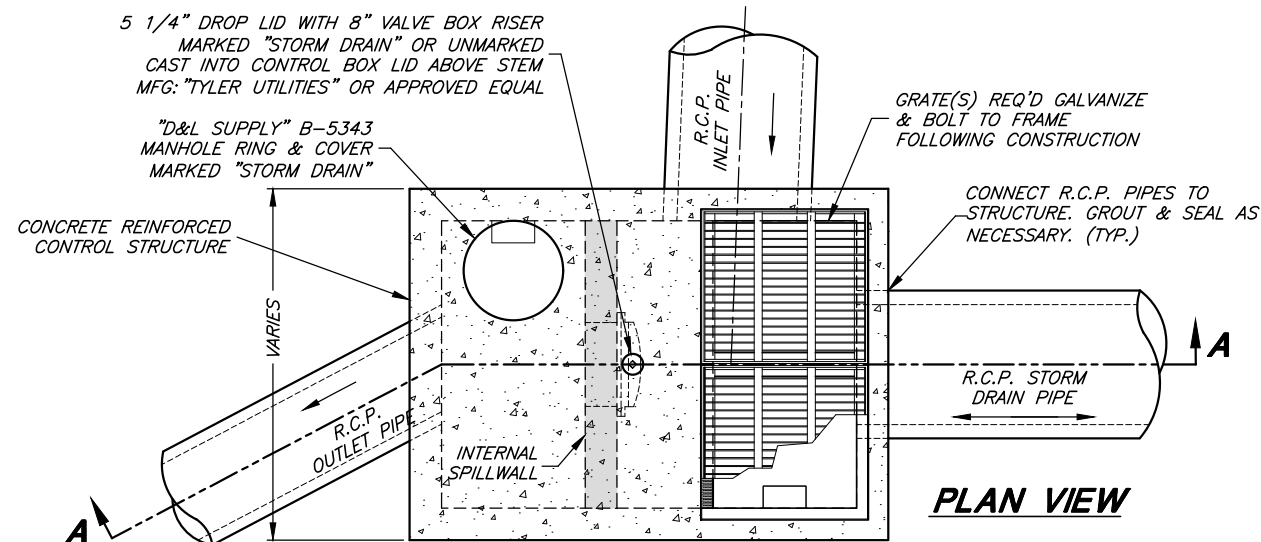
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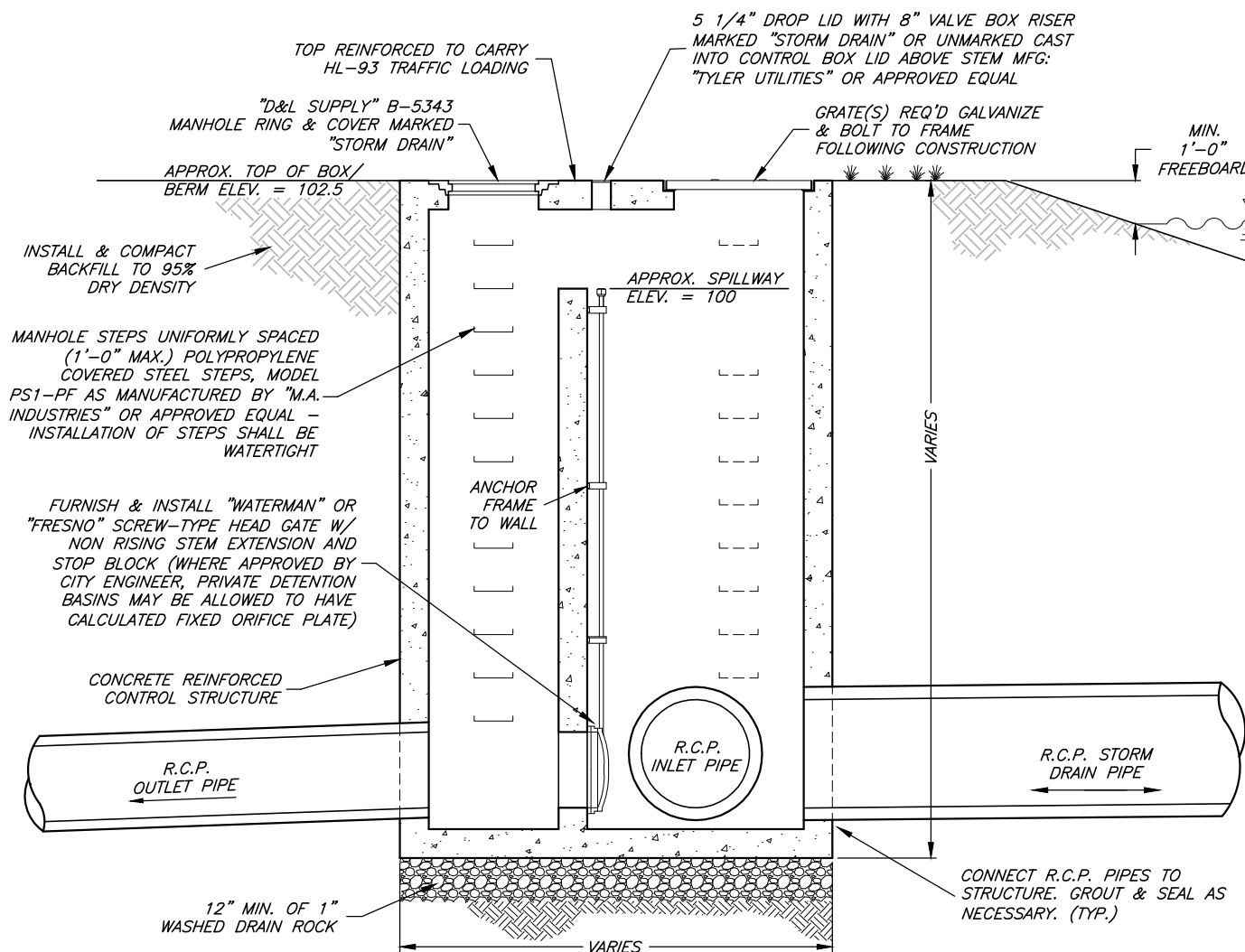
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FRUIT HEIGHTS CITY CORPORATION
PUBLIC WORKS STANDARDS
STORM DRAIN - MANHOLE DETAILS

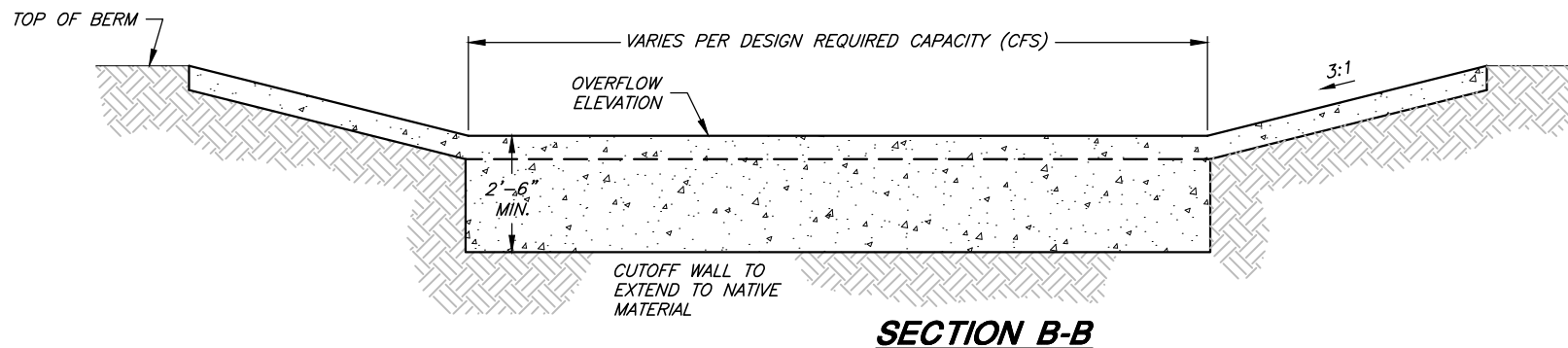
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CS-17
 OF 22 SHEETS
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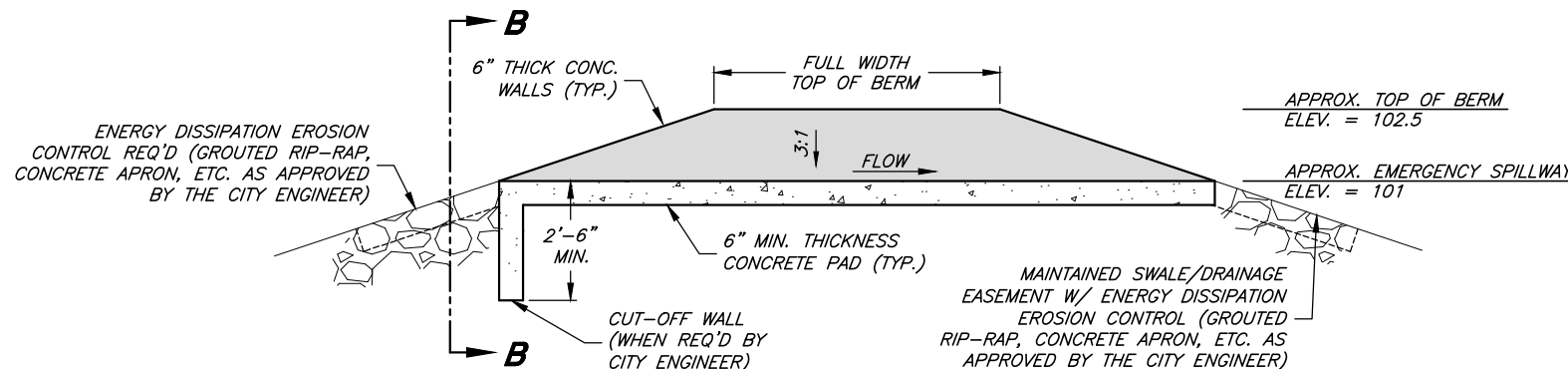
DETENTION INLET/OUTLET CONTROL STRUCTURE
(PRECAST OR CAST-IN-PLACE)



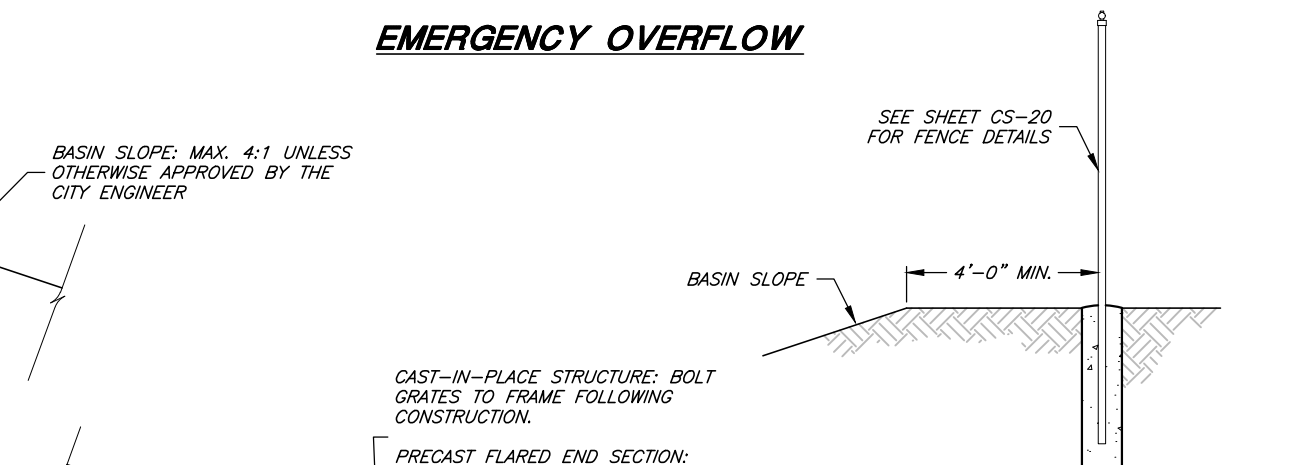
SECTION A-A



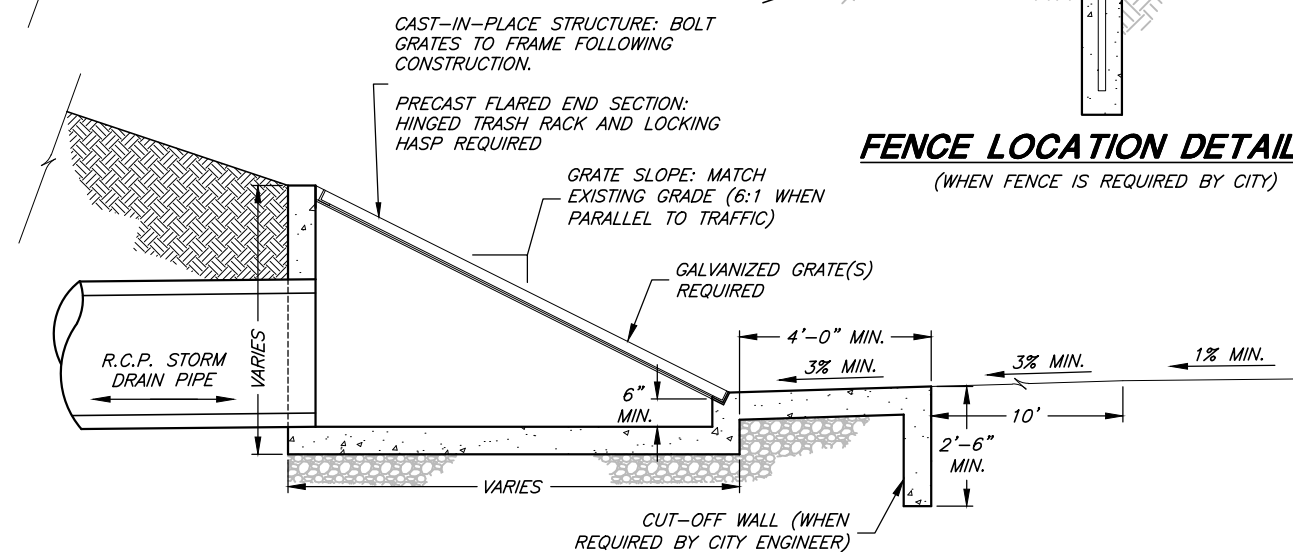
SECTION B-B



EMERGENCY OVERFLOW



FENCE LOCATION DETAIL
(WHEN FENCE IS REQUIRED BY CITY)



INCLINED GRATE STORM DRAIN INLET

GENERAL AND STRUCTURAL NOTES:
SEE SHEET CS-19



Brandon K. Jones
PROJECT ENGINEER
9-4-2018
DATE

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

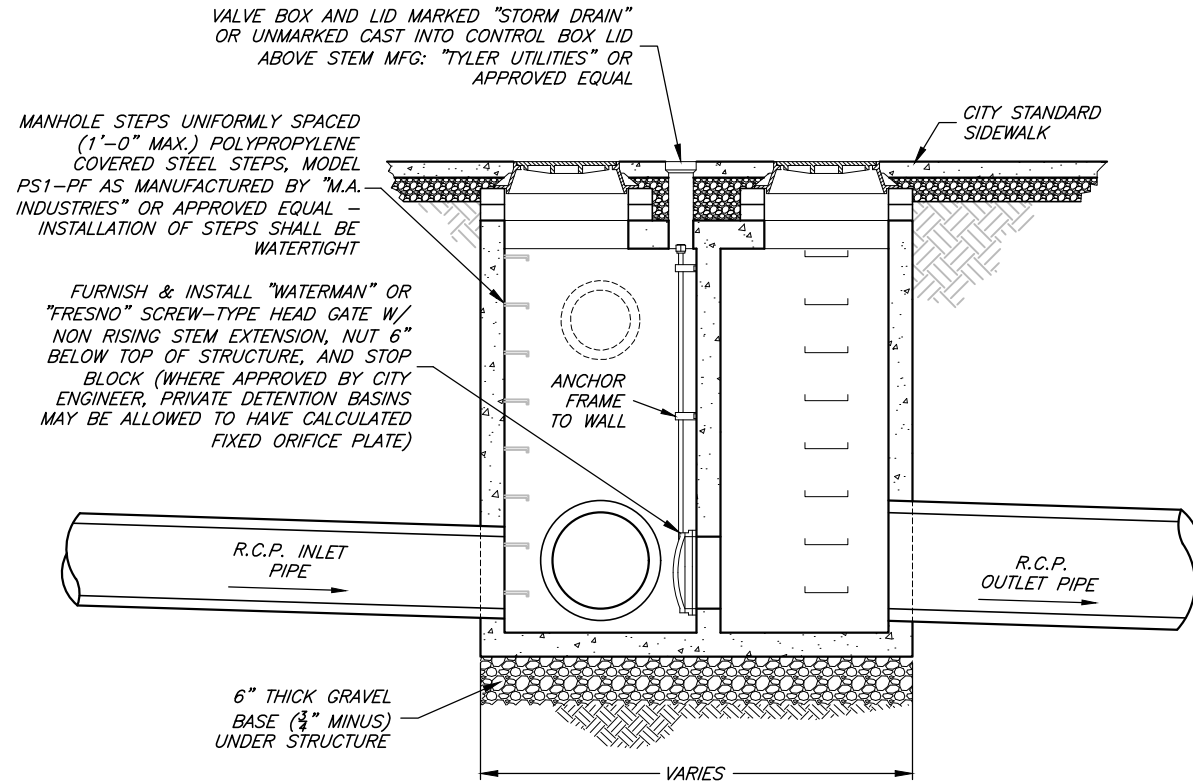
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OF 22 SHEETS
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GENERAL NOTES:

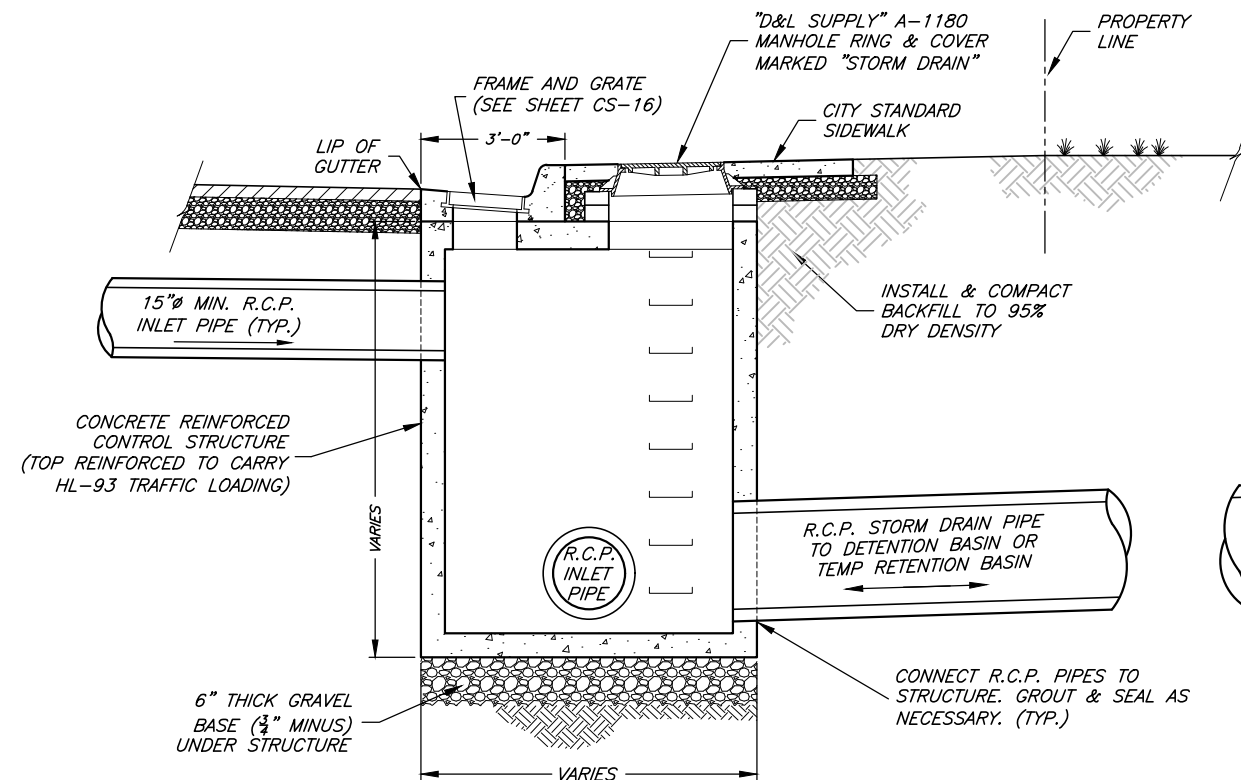
- ALL BASINS REGARDLESS OF LOCAL OR REGIONAL SHALL BE DESIGNED TO ACCOMMODATE A 100 YEAR STORM EVENT.
- A DAM SAFETY (UTAH DIVISION OF WATER RIGHTS) HAZARD PERMIT MAY BE REQUIRED.
- STRUCTURE DESIGN AND FLOW CALCULATIONS MUST BE APPROVED BY CITY ENGINEER PRIOR TO CONSTRUCTION.
- STORM DRAIN LINES SHALL BE 15 INCH MINIMUM DIAMETER REINFORCED CONCRETE PIPE (RCP), OF APPROPRIATE CLASS.
- THE SURFACE AREA OF THE BASIN SHALL BE SODDED AND SHALL BE PROVIDED WITH AN AUTOMATED SPRINKLER SYSTEM APPROVED BY THE CITY ENGINEER.
- GRATES SHALL BE REMOVABLE FOR MAINTENANCE PURPOSES
- GRATES SHALL BE HOT DIPPED GALVANIZED WITH BARS AT MAXIMUM 3 INCH SPACING.
- LOW FLOWS MUST BE PIPED CONTINUOUSLY TO THE CONTROL STRUCTURE. NO OPEN FLOW IS PERMITTED THROUGH THE BASIN.
- INCLINED GRATES ARE REQUIRED ON ALL PIPES/INLETS WHERE OPEN CHANNELS, DITCHES, OR PONDS DISCHARGE DIRECTLY INTO THE STORM DRAIN SYSTEM.
- AN INTERNAL SPILLWAY MAY BE CONSTRUCTED INSIDE THE STRUCTURE DEPENDING ON SITE CONDITIONS AND ELEVATIONS.
- BASIN STRUCTURES ARE DETERMINED BY THE SIZE OF THE DETENTION BASIN OR AS REQUIRED BY THE CITY ENGINEER. (SEE SHEET CS-18 OR CS-19)
 - SMALL DETENTION BASIN: LESS THAN OR EQUAL TO 1 ACRE FOOT
 - LARGE DETENTION BASIN: GREATER THAN 1 ACRE FOOT

STRUCTURAL NOTES:

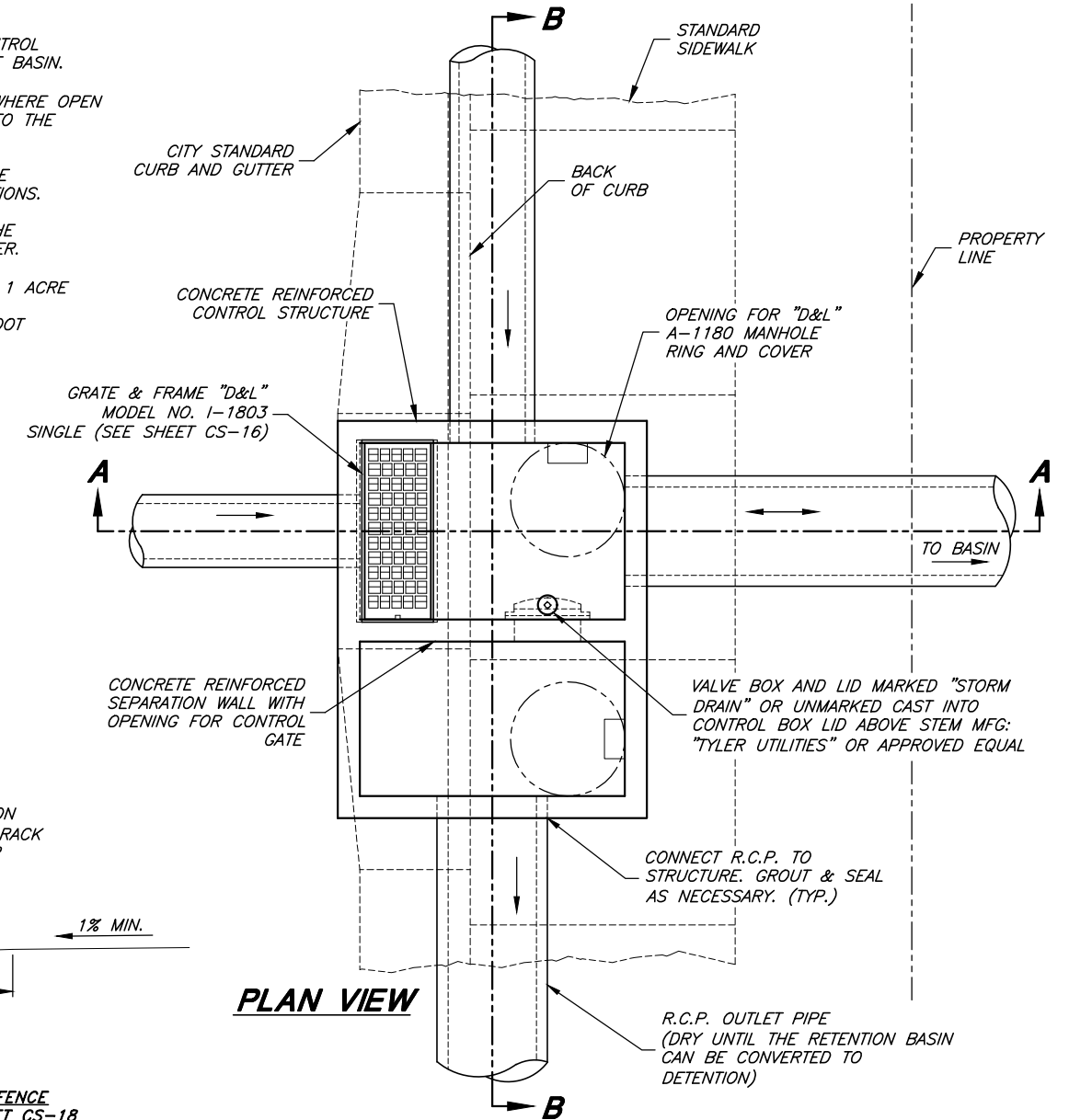
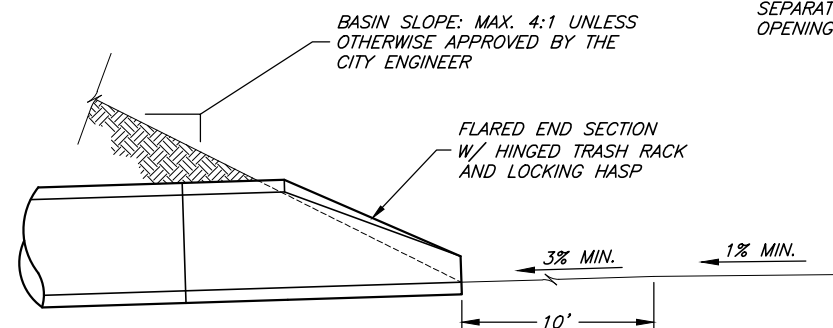
- PRECAST CONCRETE STRUCTURE CAN BE REPLACED WITH CAST-IN-PLACE CONCRETE VAULT. SUBMIT ENGINEERED CONSTRUCTION PLANS WITH REBAR DETAILS TO CITY ENGINEER FOR REVIEW AND ACCEPTANCE PRIOR TO CONSTRUCTION.
- ADD REINFORCEMENT AROUND OPENINGS EQUAL TO REINFORCEMENT DISPLACED BY OPENING.
- THE PRECAST VAULT 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.
- REINFORCEMENT TO CONFORM WITH ASTM A 615 GRADE 60
- CONCRETE SHALL HAVE A 28-DAY COMPRESSIVE STRENGTH OF 5,000 PSI
- USE AN AIR-ENTRAINING AGENT ON ALL CONCRETE EXPOSED TO THE WEATHER.
- HL-93 LOADING



SECTION B-B



SECTION A-A



INLET/OUTLET CONTROL STRUCTURE

(PRECAST OR CAST-IN-PLACE)



BRANDON KENT JONES
No. 5148758
PROJECT ENGINEER
9-4-2018
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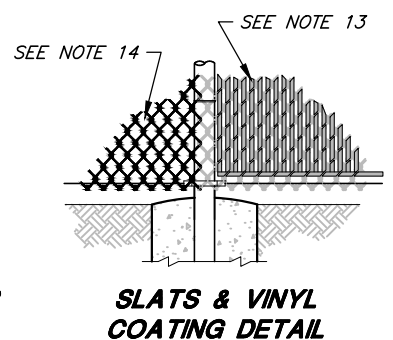
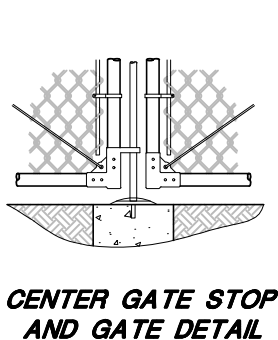
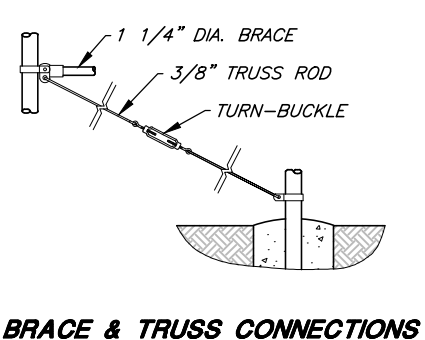
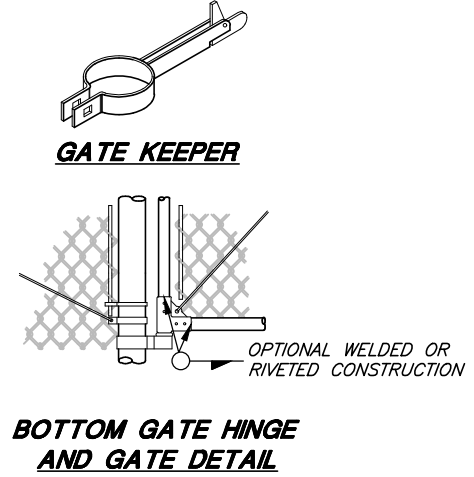
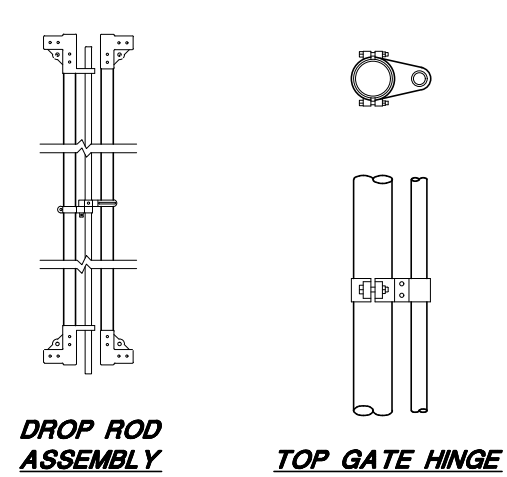
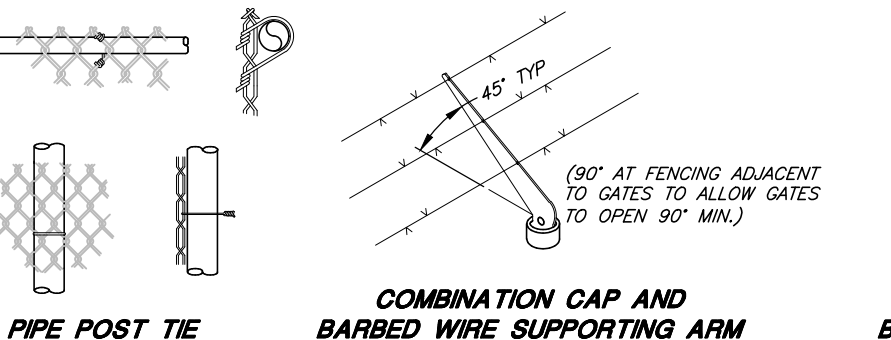
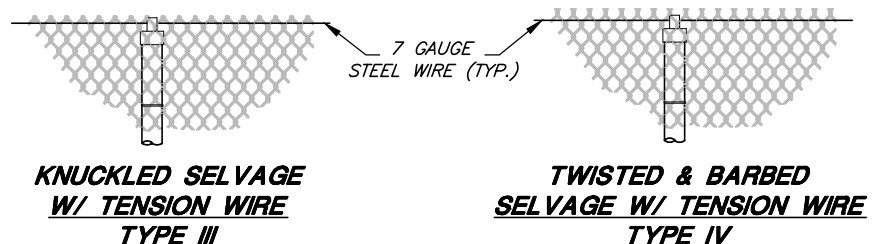
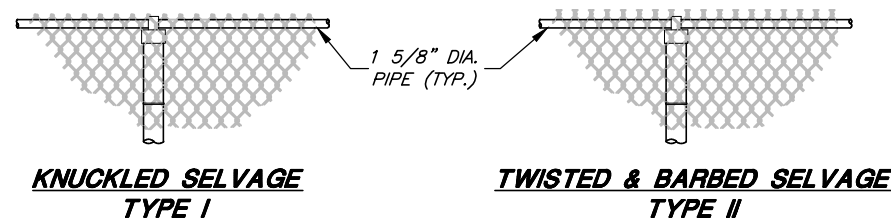
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FRUIT HEIGHTS CITY
PUBLIC WORKS STANDARDS
STORM DRAIN - SMALL DETENTION BASIN DETAILS

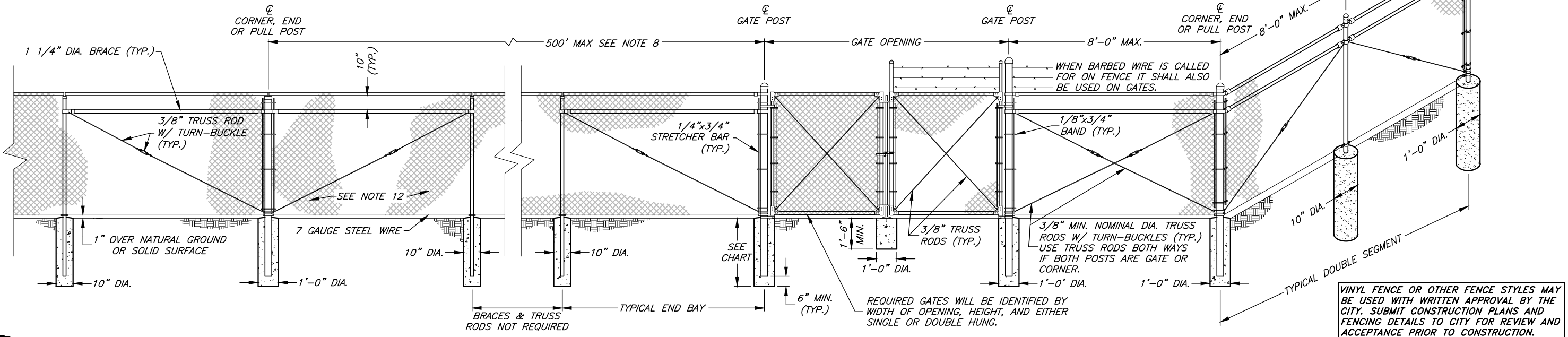
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OF 22 SHEETS
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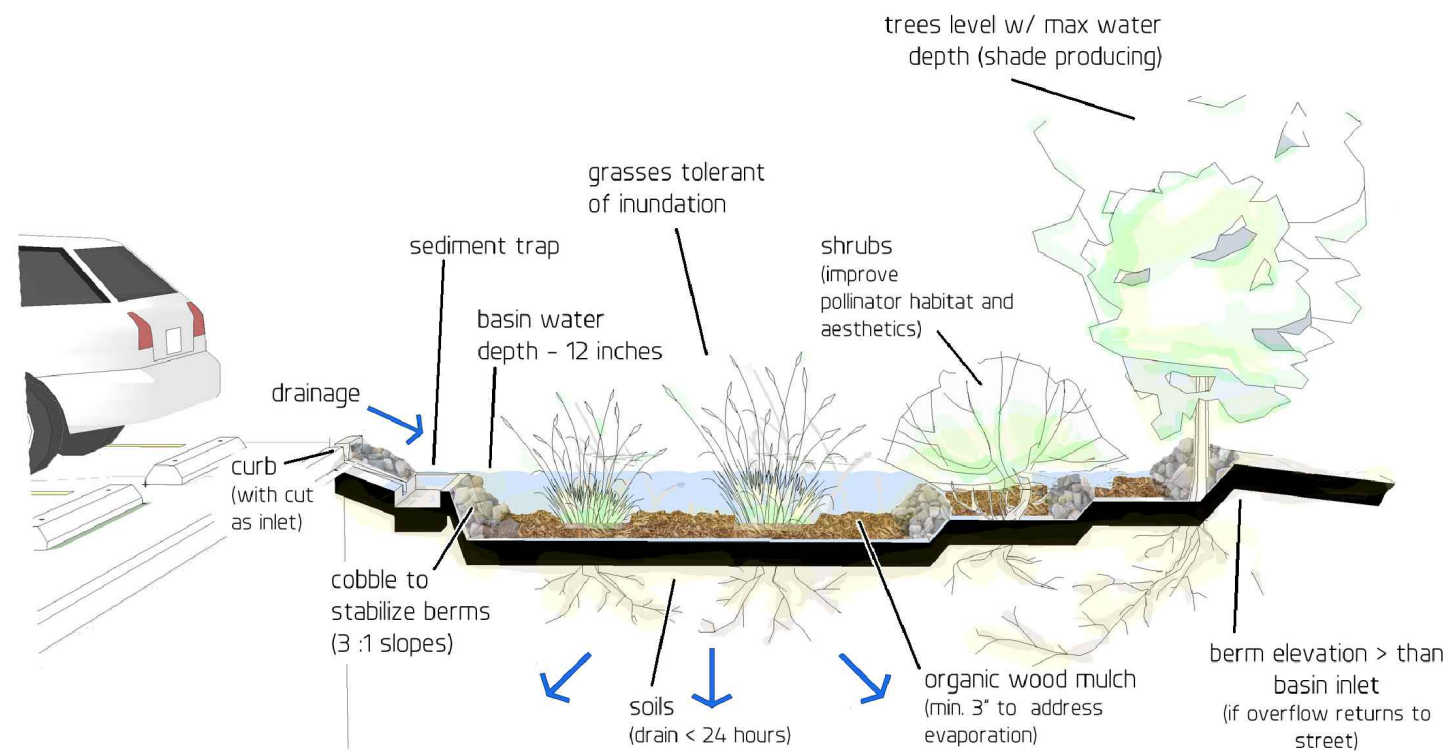


- GENERAL NOTES:**
1. MATERIALS, CONSTRUCTION, AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH PROJECT STANDARD SPECIFICATIONS.
 2. THE TYPE OF TOP SUPPORT IS SPECIFIED IN THE BIDDING SCHEDULE, TYPES I AND II TUBULAR RAIL, TYPES III AND IV TENSION WIRE.
 3. BARB WIRE SHALL BE USED ONLY WHEN DESIGNATED ON THE PLANS OR IN THE SPECIFICATIONS.
 4. TWISTED AND BARBED SELVAGE TOP AND BOTTOM SHALL BE USED ON FENCES 5- FEET HIGH OR GREATER.
 5. KNUCKLED SELVAGE ON TOP AND TWISTED AND BARBED ON BOTTOM SHALL BE USED ON FENCES LESS THAN 5- FEET.
 6. ALL STEEL PIPE MEMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION A 120 SCHEDULE 40 HOT DIPPED ZINC COATED HIGH TENSILE STEEL PIPE OR TRIPLE COATED PIPE MADE FROM STEEL CONFORMING TO ASTM 569.
 7. POSTS SHALL BE STEEL SCHEDULE 40 PIPE OR TRIPLE COATED HIGH TENSILE STEEL PIPE OF THE SIZE SHOWN IN THE CHART. WEIGHT IN POUNDS PER FOOT WITH A TOLERANCE OF 5%.
 8. LINE POSTS SHALL BE LOCATED AT EQUAL SPACING FOR EACH SEGMENT WITH A MAXIMUM SPACING AS FOLLOWS:
 - a. TANGENT SECTIONS TO 500-FOOT RADIUS NOT MORE THAN 8- FEET.
 - b. UNDER 500-FOOT RADIUS TO 200-FOOT RADIUS NOT MORE THAN 8- FEET.
 - c. UNDER 200-FOOT RADIUS TO 100-FOOT RADIUS NOT MORE THAN 6- FEET.
 - d. UNDER 100-FOOT RADIUS NOT MORE THAN 5- FEET.
 9. TRUSS RODS AND BRACES SHALL NOT BE REQUIRED FOR FABRIC HEIGHT LESS THAN 5- FEET.
 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 CHAINLINK 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 FENCING ORDINANCE.

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

HEIGHT OF FABRIC	DEPTH OF POSTS	LENGTH OF END, CORNER OR PULL POST	LENGTH OF LINE POST HOLES	SIZE OF POSTS							
				END, CORNER, & PULL POSTS				LINE POST MIN. SIZE			
				NOM. SIZE	OUTSIDE DIA.	PIPE WEIGHT ASTM A-120	PIPE WEIGHT TRIPLE COATED	NOM. SIZE	OUTSIDE DIA.	PIPE WEIGHT ASTM A-120	PIPE WEIGHT TRIPLE COATED
7'	3'	10'	9'-8"	2 1/2"	2.875"	5.79	4.64	2"	2.375"	3.65	3.11
6'	3'	9'	8'-8"	2 1/2"	2.875"	5.79	4.64	2"	2.375"	3.65	3.11
5'	3'	8'	7'-8"	2"	2.375"	3.65	3.11	1 1/2"	1.900"	2.72	2.23
4'	3'	6'	5'-8"	2"	2.375"	3.65	3.11	1 1/2"	1.900"	2.72	2.23
3'	3'	5'	4'-8"	2"	2.375"	3.65	3.11	1 1/2"	1.900"	2.72	2.23





Basic Basin Design Considerations

RAIN GARDEN

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

diagram by
Paul Navrot
for SUH

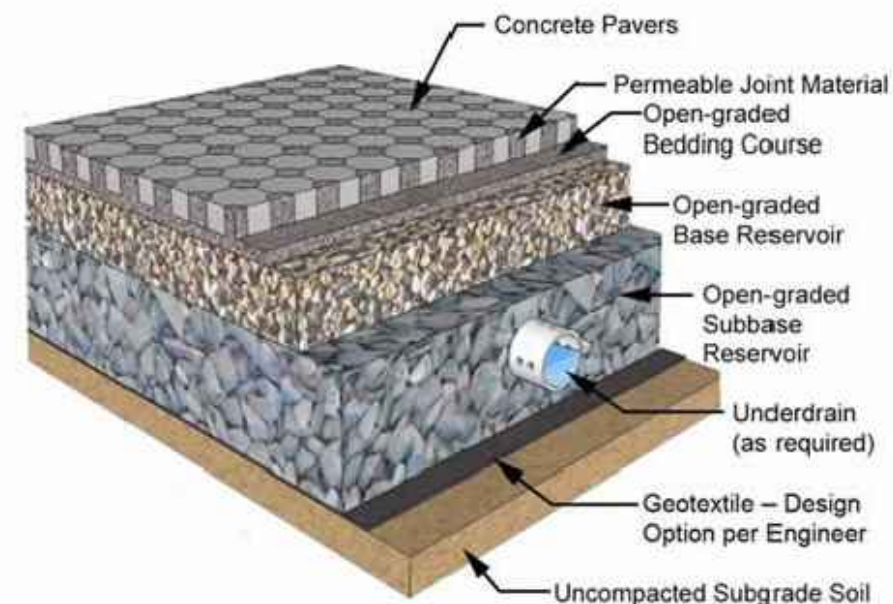


RAIN BARREL

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

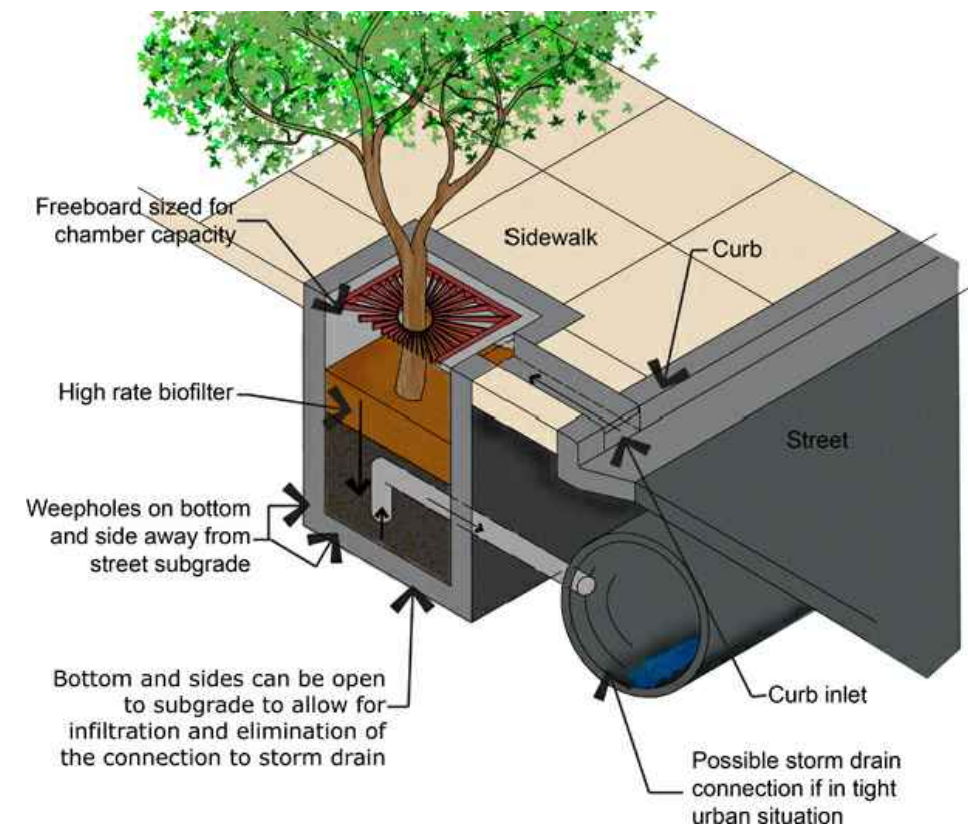
DISCLAIMER:
ALL LID EXAMPLES SHOWN ON THIS SHEET ARE FOR REFERENCE PURPOSES ONLY. ANY SPECIFIC WEBSITES, COMMERCIAL PRODUCTS, PROCESS OR SERVICE BY TRADE NAME, TRADEMARK, MANUFACTURER, OR OTHERWISE, DOES NOT CONSTITUTE OR IMPLY ITS ENDORSEMENT, RECOMMENDATION, OR FAVORING BY FRUIT HEIGHTS CITY. THE PURPOSE 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.



PERMEABLE PAVER

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



TREE BOX FILTER

From www.wbdg.org



BRANDON KENT JONES
No. 5148758
State of Utah
PROJECT ENGINEER
9-4-2018
DATE

REV.	DATE	APPR.

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FRUIT HEIGHTS CITY CORPORATION
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GENERAL - LID (LOW IMPACT DEVELOPMENT) EXAMPLES

SHEET:
CS-22
OF 22 SHEETS
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