STANDARD PLANS LIST

The standard plan sheets applicable to this Contract include those listed below. When applicable, revised standard plans (RSPs) listed below are included in the project plans.

	ABBREVIATIONS, LINES, SYMBOLS, AND LEGEND
A3A	**Abbreviations (Sheet 1 of 3)**
A3B	**Abbreviations (Sheet 2 of 3)**
A3C	**Abbreviations (Sheet 3 of 3)**
A10A	**Legend - Lines and Symbols (Sheet 1 of 5)**
A10B	**Legend - Lines and Symbols (Sheet 2 of 5)**
A10C	**Legend - Lines and Symbols (Sheet 3 of 5)**
A10D	**Legend - Lines and Symbols (Sheet 4 of 5)**
A10E	**Legend - Lines and Symbols (Sheet 5 of 5)**
	PAVEMENT MARKERS, TRAFFIC LINES, AND PAVEMENT MARKINGS
A20A	**Pavement Markers and Traffic Lines - Typical Details**
A20B	**Pavement Markers and Traffic Lines - Typical Details**
A20D	**Pavement Markers and Traffic Lines - Typical Details**
A24A	**Pavement Markings - Arrows**
A24C	**Pavement Markings - Symbols and Numerals**
A24D	**Pavement Markings - Words**
A24F	**Pavement Markings - Crosswalks**
A24G	**Pavement Markings - Yield Lines, Limit Lines, and Wrong Way Details**
	CURBS, DRIVEWAYS, DIKES, CURB RAMPS AND ACCESSIBLE PARKING
A88A	**Curb Ramp Details**
	TEMPORARY TRAFFIC CONTROL SYSTEMS
T9	**Traffic Control System Tables for Lane and Ramp Closures**
T10	**Traffic Control System for Lane Closure on Freeways and Expressways**
T11	**Traffic Control System for Lane Closure on Multilane Conventional Highways**
T11A	**Traffic Control System for Changeable Lane Closure on Multilane Conventional Highways and Expressways**
T12	**Traffic Control System for Half Road Closure on Multilane Conventional Highways and Expressways**
T13	**Traffic Control System with Reversible Control on Two Lane Conventional Highways**
T13A	**Traffic Control System Two Lane Conventional Highways**
T13B	**Traffic Control System Two Lane Conventional Highways**
	TEMPORARY PEDESTRIAN ACCESS ROUTES
T30	**Temporary Pedestrian Access Routes - Typical Sidewalk Closure and Pedestrian Detour**
T31	**Temporary Pedestrian Access Routes - Typical Sidewalk Diversion Within Roadbed**
T32	**Temporary Pedestrian Access Routes - Typical Sidewalk/Crosswalk Closure and Pedestrian Detour**
	TEMPORARY WATER POLLUTION CONTROL
T59	**Temporary Water Pollution Control Details (Temporary Concrete Washout Facility)**
T64	**Temporary Water Pollution Control Details (Temporary Drainage Inlet Protection)**

ROADSIDE SIGNS

RS1	**Roadside Signs - Typical Installation Details No. 1**
RS5	**Roadside Sign-PSST Post-Typical Installation Details No. 1**
RS6	**Roadside Sign-PSST Post-Typical Installation Details No. 2**

ELECTRICAL SYSTEMS - LEGEND AND ABBREVIATIONS

ES-1A	**Electrical Systems (Legend)**
ES-1B	**Electrical Systems (Legend)**
ES-1C	**Electrical Systems (Legend)**

ELECTRICAL SYSTEMS - SERVICE EQUIPMENT AND WIRING DIAGRAMS

ES-2D	**Electrical Systems (Service Equipment Enclosure and Typical Wiring Diagram, Type III - A Series)**

ELECTRICAL SYSTEMS - PULL BOX

ES-8A	**Electrical Systems (Non-Traffic Pull Box)**

ELECTRICAL SYSTEMS - SPLICE INSULATION METHODS, KINKING AND BANDING DETAILS

ES-13A	**Electrical Systems (Splice Insulation Methods Details)**

ORGANIZATION

Special provisions are under headings that correspond with the main-section headings of the *Standard Specifications*. A main-section heading is a heading shown in the table of contents of the *Standard Specifications*.

Each special provision begins with a revision clause that describes or introduces a revision to the *Standard Specifications*.

Any paragraph added or deleted by a revision clause does not change the paragraph numbering of the *Standard Specifications* for any other reference to a paragraph of the *Standard Specifications*.

^^

DIVISION I GENERAL PROVISIONS

1 GENERAL

Add to section 1-1.01:

Bid Items and Applicable Sections

Item code	Item description	Applicable section
153250A	Remove Bike Racks and CycleSafe Lockers	15
730071A	Directional Indicator	73
771000A	2" Water Service Installation	77
772000A	4" Sewer Lateral Installation	77
820010A	Monument Sign	82
840509A	6" Thermoplastic Traffic Stripe (Broken 9-3)	84
870901A	Real Time Sign Assembly	87
872149A	Redwood Avenue Park and Ride Electrical Work	87

Add to section 1-107A:

Wherever in these special provisions, State Standard Specifications, Revised Standard Specifications, Standard Plans or project plans, the following terms used, the intent of the meaning shall be interpreted as follows:

Director of Public Works: Authorized representative of the City of Napa.

Replace the 38th paragraph of section 1-107B with:

Department: Authorized representative of the Napa Valley Transportation Authority.

Replace the 45th paragraph of section 1-107B with:

Engineer: Authorized representative of the Napa Valley Transportation Authority.

^^

5 CONTROL OF WORK

Replace section 5-1.20E with:

5-1.20E Water Meter Charges

Section 5-1.20E applies if a bid item for water meter charges is shown on the Bid Item List.

The local water authority is the City of Napa.

The local water authority will install the water meters.

The charges are as shown in the following table:

Water Meter Charges

Meter size	Quantity	Charge per meter ($)
2”	1	5,900

The charges by the local water authority include:

1. Furnishing and installing each water meter
2. Connecting to the local water authority's main water line, including any required hot tap or tee
3. Furnishing and installing an extension pipe from the main water line to the water meter
4. Sterilizing the extension pipe
5. Locating the water meter along the property line

Make arrangements and pay the charges for installation of the water meters.

If the charge is changed at the time of installation, the Department adjusts the lump sum price based on the difference between the specified charges and the changed charges.

Add to end of section 5-1.32:

Overnight storage and staging of materials within the City of Napa right of way will not be allowed unless approved in writing by the Director of Public Works or his/her designated representative. Any staging areas used by the Contractor shall be subject to the provisions of “Water Pollution Control”, of the City of Napa Standard Specifications. Use of the Contractor’s staging areas shall be at the Contractor’s own risk and the Department or City of Napa shall not be held liable for any damage or loss of materials or equipment located within such areas.

Temporary storage of equipment and materials on the parcels adjacent to the City of Napa right of way will be subject to the approval of the Engineer on a parcel-by-parcel basis. The Contractor shall fence each of the parcels approved for construction use with 6’ high temporary chain link fencing completely covered with opaque black mesh screening. The Contractor shall maintain the fencing continuously. Use of the Contractor's work areas and other City of Napa-owned property shall be at the Contractor's own risk, and the City of Napa shall not be held liable for any damage to or loss of materials or equipment located within such areas.

^^

7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

Delete the 24th paragraph of section 7-1.04.

^^

DIVISION II GENERAL CONSTRUCTION

10 GENERAL

Replace Section 10-7 Reserved with:

10-7 TEMPORARY WATER SUPPLY (FIRE HYDRANT METERS)

Contractor shall install fire hydrants for the primary purposes of extinguishing fires and water utility maintenance activities. Only an authorized City of Napa representative(s) or permitted customer(s) shall withdraw water from fire hydrants.

Water withdrawn from any hydrant shall be taken through a hydrant meter. In all cases where the City of Napa grants a permit to take water from a fire hydrant, the permitted customer shall use the eddy valve on the hydrant meter assembly to regulate the delivery of the water.

Contractor can obtain a permit to withdraw water by submitting a Hydrant Meter Set Form (www.cityofnapa.org/newdelopment, under Construction Water/Hydrant Meters) to the City of Napa's Revenue Division. The City of Napa shall collect a deposit prior to issuance of any hydrant meter.

All hydrant meters and backflow devices shall be fully supported to ensure the weight of the meter and backflow device are not bearing on the steamer opening of the hydrant.

The water meter and backflow device shall be protected from damage at all times and be returned to the City of Napa in good working order. The City of Napa reserves the right to determine whether or not a meter and/or backflow device is in good working order; retention or release of the deposit will be based on the condition of the meter and/or backflow device and shall be at the sole discretion of the City of Napa.

^^

11 WELDING

Add to the end of section 11-2.01:

All structural welding shall be detailed and fabricated in an approved fabricator's shop by a licensed fabricator in accordance to *AISC Design, Fabrication and Erection of Structural Steel for Buildings* and *AWS Structural Welding Code D 1.1-77.*

Structural steel fabrication and welding not performed in an approved shop, including field welding, requires special inspection.

The special inspector need not be continuously present during welding of the following items, provided the materials, qualifications of welding procedures and welders are verified prior to the start of work, periodic inspections are made of work in progress, and a visual inspection of all welds is made prior to completion or prior to shipment of shop welding:

1. Single pass fillet welds not exceeding 5/16 inch.
2. Floor and roof deck welding.
3. Welded studs when used for structural diaphragm or composite systems.
4. Welded sheet steel for cold-formed steel framing members such as studs and joists.
5. Welding of stairs and railing systems.

All welding of reinforcing steel bars to structural members will require continuous inspection by a Deputy Inspector. Submit a welding procedure for approval to Engineer of Record prior to any welding of any reinforcing steel bars.

Welds designed as Demand Critical Welds (DCW) shall be made with filler materials meeting the requirements specified in AWS D1.8/D1.8M clause 6.3.

Testing of studs welded through metal deck per AWS 7.6 is required.

^^

12 TEMPORARY TRAFFIC CONTROL

Replace section 12-1.04:

The cost of furnishing flaggers, including transporting flaggers, is paid for per location as Traffic Control System.

Replace section 12-3.36 with:

12-3.36 PORTABLE TRANSVERSE RUMBLE STRIPS

12-3.36A General

12-3.36A(1) Summary

Section 12-3.36 includes specifications for providing portable transverse rumble strips.

12-3.36A(2) Definitions

Not Used

12-3.36A(3) Submittals

Submit a copy of the manufacturer's instructions as an informational submittal before using portable transverse rumble strips.

12-3.36A(4) Quality Assurance

Not Used

12-3.36B Materials

Portable transverse rumble strips must:

1. Be on the Authorized Material List for signing and delineation materials
2. Be rated for ambient temperatures from 0 to 150 degrees F
3. Have a minimum weight of 75 pounds and withstand vehicles up to 80,000 pounds with minimal movement
4. Not degrade due to weather or traffic conditions
5. Have a non-slip textured surface
6. Have a drainage design that efficiently removes liquid without displacing the unit
7. Be black or orange in color

12-3.36C Construction

Install portable transverse rumble strips under the manufacturer's installation instructions.

Before installation of portable transverse rumble strips, the roadway must be cleaned and free of dust, sand, and other materials that may cause slippage. Place each portable transverse rumble strip on a uniform paved surface free of defects, including potholes, excessive rutting, separated transverse joints, and utility structures.

Portable transverse rumble strips, whether comprised of one segment or interlocking segments, must extend to the full lane width, and be configured in accordance with the manufacturer’s recommendations. Use 2 arrays where each array consists of 3 rumble strips.

Portable transverse rumble strips must not be placed at any of the following locations:

1. On sharp horizontal curves
2. On vertical curves

3. Through pedestrian crossings

Portable transverse rumble strips are not required if:

1. Duration of work in a work zone is 4 hours or less
2. Posted speed limit is below 45 mph
3. Work is of emergency nature
4. Work zone is in snow or icy weather conditions

Portable transverse rumble strips must be installed without adhesive or bolts.

When a portable transverse rumble strip consists of multiple sections, connect sections under the manufacturer's instructions before placing them in the traffic lane.

If a portable transverse rumble strip is displaced out of alignment or skewed by more than 6 inches, as measured from one end to the other, immediately readjust position to original location.

Portable transverse rumble strips that no longer provide audible or vibratory alerts must be replaced immediately.

12-3.36D Payment

Not Used

Add to the end of section 12-4.02C(1):

Keep the full width of the traveled way open to traffic when no active construction activities are occurring in the traveled way or within 6 feet of the traveled way and on:

1. Friday after 3:00 p.m.
2. Saturday
3. Sunday
4. Designated holidays
5. Special days
6. Dates and times consistent with City of Napa approved traffic control plan conditions.

Replace section 12-4.02C(3)(d) with:

12-4.02C(3)(d) City Street Closure Requirements

No lane closures will be permitted without the permission of the Director of Public Works or his/her designated representative. A traffic control plan shall be submitted to the Director of Public Works or his/her designated representative for review and approval at least ten working days before the scheduled closure. Construction will not be allowed to start prior to the approval of the traffic control plan. If the Engineer approves a lane closure, signs shall be posted 48 hours in advance of the closure noticing motorists of date and time of the closure.

As part of the traffic control plan, Contractor will submit a phasing plan for the utility trenching in Solano Avenue to ensure minimal impacts to both transit and Vine Trail users and operations. At least two lanes of traffic on Solano Avenue shall remain open at all times. Trenching in the northbound lane and the bus lane shall not occur simultaneously. Trenching and traffic control plan must allow for continuous bus access to the northern half of the bus lane along northbound Solano Avenue and along the west side of the bus island at all times during construction.

Add between the 1st and 2nd paragraphs of section 12-4.04C:

A pedestrian facility closure is limited to no more than 1 block. When working on one side of the road, the pedestrian facility on opposite side of the road within the same block must be open.

Existing pedestrian facilities, including the Vine Trail, can only be closed in one direction at a time.

^^

13 WATER POLLUTION CONTROL

Replace the 2nd sentence of the 1st paragraph of section 13-6.03C with:

The drainage inlet protection must be Type 6A,, or Type 6B, as appropriate for the conditions around the drainage inlet.

Add to the end of the 3rd paragraph of section 13-7.02C:

At the end of each working day or as directed by the Engineer, the Contractor shall clean, and sweep roadways and on-site paved areas of all materials attributable to or involved in the work. The Contractor shall not use water to flush down streets in place of street sweeping.

^^

14 ENVIRONMENTAL STEWARDSHIP

Replace the 2nd paragraph of section 14-8.02 with:

Noise from job site activities must not exceed 86 dBA Lmax at 50 feet from the job site activity from 9:00 p.m. to 6 a.m. each day. This requirement shall not relieve the Contractor from responsibility for complying with local ordinances regulating noise level.

Replace 14-10.04 Reserved with:

14-10.04 City Construction and Demolition Requirement

All plans for non-residential and/or multi-family development with common prescribed collection areas shall comply with the solid waste and recycling enclosure standards prescribed by City Council resolution R2008-185 or as it may be updated by subsequent council action. Current enclosure standards can be found at www.cityofnapa.org/832/enclosure-standards-update.

During the construction and demolition period of the project, the contractor shall comply with all provisions of the City of Napa's Construction & Demolition Debris (C&DD) recycling ordinance contained in chapter 15.32 of Napa Municipal Code. The C&DD recycling ordinance requires site separation and recycling (or composting) for designated recyclable materials such as clean wood, concrete, metal, yard waste and other salvageable materials, and requires that all projects exceeding 5000 square feet or $100,000 in project valuation achieve a minimum level of 50% diversion from landfill disposal. All qualifying project applicants must submit a waste reduction and recycling plan (WRRP) and have the WRRP approved by the City before a City building or demolition permit is issued. Also, the City will determine compliance or non-compliance with approved WRRP and City's C&DD ordinance before a certificate of occupancy or temporary certificate of occupancy is issued by the City. A City determination of non-compliance for a given project may result in a fine as prescribed in the City's C&DD ordinance. Details on the City's C&DD ordinance, including a frequently asked questions (FAQ) summary, can be found at www.cityofnapa.org/709/construction-and-demolition-debris-recyc.

^^

15 EXISTING FACILITIES

Add to the end of section 15-1.03A:

Street restoration limits on existing street pavement whenever a street is cut for utility or other improvement plans, shall be per the City of Napa's Pavement Restoration Limits Table. The resurfacing shall extend a sufficient distance beyond any cut to ensure a smooth transition and shall consist of a full 2-inc-deep grind for the entire area and a 2-inch asphalt concrete overlay. The limits of the overlay may be extended beyond the project frontage of the parcel and/or 10 feet on either side of the trench to cover all the utility trench cuts at the discretion of the City after all underground infrastructure has been installed.

Delete the 7th paragraph of section 15-1.03B.

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DIVISION IV SUBBASES AND BASES

26 AGGREGATE BASES

Add after the 3rd paragraph in section 26-1.01D(3):

All Class II aggregate base shall be sampled and tested for sieve analysis, r-value, sand equivalent and maximum density within 10 days of submitting the submittal to the Engineer for approval. The Department shall receive the submittal a minimum of five working days prior to scheduled use.

Add to section 26-1.03B:

Proof-rolling of the finished subgrade shall be performed by the contractor using a fully loaded 3-axle water truck and reviewed and approved by the Engineer prior to placement of additional materials. Proof-rolling shall be observed by the contractor's licensed geotechnical engineer and the Engineer. The developer's/contractor's licensed geotechnical engineer shall provide in writing an appropriate method to stabilize the areas of deflection.

Add after the 2nd paragraph in section 26-1.03E:

Proof-rolling of the finished aggregate section shall be performed by the contractor using a fully loaded 3-axle water truck and reviewed and approved by the Engineer prior to placement of asphalt concrete. Proof-rolling shall be observed by the contractor's licensed geotechnical engineer and the Engineer. The developer's/contractor's licensed geotechnical engineer shall provide in writing an appropriate method to stabilize the areas of deflection. All aggregate base compaction shall be tested with a nuclear gage.

In addition, contractor shall obtain complete stabilization of aggregate base material with no rolling or deflection of the finish aggregate base grade. This proof-rolling is determined by passing a loaded 3 axle water truck, cement truck or similar vehicle over the completed subgrade without the material rolling, deflecting more than ¼" or cracking perpendicular to the path of travel.

If accepted aggregate base becomes saturated and/or disturbed or more than five working days pass between acceptance of the material and placement of the upper layer, the aggregate base must again be proof-rolled and retesting will be required. The cost of the retesting shall be borne by the Contractor.

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DIVISION V SURFACINGS AND PAVEMENTS

39 ASPHALT CONCRETE

Add to end of section 39-1.01:

Produce and place ½ inch Type A HMA, Grade PG 64-16 per Section 39-2.02C.

Add to end of section 39-2.01A(1):

The HMA must be ½ inch Type "A" HMA.

Add to end of section 39-2.01A(3)(b)(i):

Each delivery ticket must include information on the material type, binder type, oil content, and the mix design number. Material delivered to the project without such annotations shall be subject to rejection. Only original delivery tickets (no photocopies) shall be delivered to the Engineer on a daily basis.

Replace the 4th paragraph in Section 39-2.01A(4)(h)(i) with:

For any single quality characteristic except smoothness, if 2 consecutive quality control test results do not comply with the action limits or specifications:

1. Stop production.
2. Notify the Engineer.
3. Take corrective action.
4. Demonstrate compliance with the specifications before resuming production placement.

Replace the 2nd paragraph in Section 39-2.01A(4)(h)(v) with:

Within the first 500 tons produced on the 1st day of HMA production, in the Engineer's presence and from the same production run, take samples of:

1. Aggregates
2. Asphalt binder
3. RAP
4. HMA

Replace the 6th paragraph in Section 39-2.01A(4)(h)(v) with:

In-place density and relative compaction for the Standard Construction Process projects is determined by the nuclear density device per California Test 375. Test density within the first 500 tons on the 1st day of HMA production.

Add to end of Section 39-2.01A(4)(h)(viii):

In-place density and relative compaction for the Standard Construction Process projects is determined by the nuclear density device per California Test 375.

Replace Section 39-2.01B(3) with:

Asphalt binder must comply with section 92.

Asphalt binder to be mixed with aggregate shall be grade PG 64-16.

The Contractor must submit mix designs for all asphalt concrete to be used on the project.

Add to end of Section 39-2.01B(4)(a):

The Durability Index for all HMA aggregates must be a minimum of 35.

The aggregate must not be treated with lime, cement or other chemical material before the Durability Index test is performed.

Replace Section 39-2.01B(10) with:

Tack coat must be utilized and be emulsified asphalt Grade RS-1, RS-1h, SS-1, or SS-1h and must conform to Section 94 "Asphaltic Emulsions".

Add to Section 39-2.01C(2)(a):

The Contractor must have hand-compaction equipment immediately available for compacting all areas inaccessible to rollers. Hand-compaction must be performed concurrently with breakdown rolling. If for any reason hand-compaction falls behind breakdown rolling, further placement of HMA must be suspended until hand-compaction is caught up. Hand-compaction includes plate compactor, pneumatic tamper and hand tampers. Hand torches must be available for rework of areas which have cooled. After

compaction, the surface texture of all hand work areas must match the surface texture of the machine placed mat. Any course or segregated areas must be corrected immediately upon discovery. Failure to immediately address these areas will cause suspension of HMA placement until the areas are satisfactorily addressed, unless otherwise allowed by the Engineer.

Replace Section 39-2.01C(3)(a):

Before placing HMA, the surface must be prepared. Such work shall include removing loose paving particles, removing dirt, removing raised pavement markers, removing thermoplastic and painted traffic markings and legends, controlling nuisance water, sweeping, watering, and removing loose and broken asphalt concrete pavement and foreign material as specified in the Standard Specifications and as directed by the Engineer.

Replace Section 39-2.01C(10) Reserved with:

39-2.01C(10) Cold Joints

All cold joints, both longitudinal and transverse, must be heated with a torch immediately prior to paving. Cold joints include previously installed asphalt passes that are more than three hours old. All cold joints must be tack coated.

Replace Section 39-2.01C(11) Reserved with:

39-2.01C(11) Tolerances

The average pavement thickness must be equal to the specified thickness for the project. For total pavement thicknesses of less than four inches, the minimum allowable thickness will be ¼ inch less than that specified. For total pavement thicknesses of four inches or more, the minimum allowable thickness will be ½ inch less than that specified. You are responsible for verifying the anticipated tonnage for each street segment using the data from the JMFs for the mix to be used at least 10 days prior to paving. If the anticipated quantity varies more than +/-5% from that indicated in the bid schedule, you must notify the Engineer in writing of the discrepancy and provide computations regarding tonnage.

Replace Section 39-2.01C(12) Reserved with:

39-2.01C(12) Daily Paving Completion

The Contractor must schedule paving activities such that each layer of HMA is placed across the entire excavated area at the end of each work shift.

Replace Section 39-2.01C(13) Reserved with:

39-2.01C(13) Pavement Thickness and Temperatures

Pave HMA in maximum 0.25-foot thick compacted layers.

If the surface to be paved is both in sunlight and shade, pavement surface temperatures must be taken in the shade.

Spread HMA Type A and Type B at the atmospheric and surface temperatures shown in the following table:

Minimum Atmospheric and Surface Temperature

Compacted layer thickness, feet				
	Atmospheric, °F		Surface, °F	
	Unmodified asphalt binder	Modified asphalt binder	Unmodified asphalt binder	Modified asphalt binder

<0.15	55	50	60	55
0.15-0.25	45	45	50	50

If the asphalt binder for HMA Type A and Type B is unmodified asphalt binder, complete:

1. First coverage of breakdown compaction before the surface temperature drops below 250 degrees F
2. Breakdown and intermediate compaction before the surface temperature drops below 200 degrees F
3. Finish compaction before the surface temperature drops below 150 degrees F

If the asphalt binder for HMA Type A and Type B is modified asphalt binder, complete:

1. First coverage of breakdown compaction before the surface temperature drops below 240 degrees F
2. Breakdown and intermediate compaction before the surface temperature drops below 180 degrees F
3. Finish compaction before the surface temperature drops below 140 degrees F

Replace Section 39-2.01C(15)(c) Reserved with:

39-2.01C(15)(c) Hand Compaction

The Contractor must have hand-compaction equipment immediately available for compacting all areas inaccessible to rollers. Hand-compaction must be performed concurrently with breakdown rolling. If for any reason hand-compaction falls behind breakdown rolling, further placement of HMA must be suspended until hand-compaction is caught up. Hand-compaction includes plate compactor, pneumatic tamper and hand tampers. Hand torches must be available for rework of areas which have cooled.

After compaction, the surface texture of all hand work areas must match the surface texture of the machine placed mat. Any course or segregated areas must be corrected immediately upon discovery. Failure to immediately address these areas will cause suspension of HMA placement until the areas are satisfactorily addressed, unless otherwise allowed by the Engineer.

Replace section 39-2.02A(4)(e) with:

39-2.02A(4)(e) Department Acceptance

The Engineer will perform acceptance testing of the HMA based on the Acceptance Criteria as shown in the following Table 1.

Table 1 - HMA Acceptance - Standard Construction Process

Quality characteristic	Test method	HMA Type A	Frequency	Location of Sampling
Aggregate gradation[a] Sieve: 3/4" / 1/2" / 3/8" 1/2": X[b] / / 3/8": / X / No. 4: / / X No. 8: X / X / X No. 200: X / X / X	California Test 202	JMF ± tolerance	1 per day	At plant per CT 125
Sand equivalent (min)[d]	California Test 217	47	1 per day	At plant per CT 125
Asphalt binder content (%)	California Test 379 or 382	JMF ± 0.45	1 per 500 TONS	Loose mix behind paver per CT 125
HMA moisture content (%, max)	California Test 226 or 370	1.0	1 per 500 TONS	Loose mix behind paver per CT 125
Percent of maximum theoretical density (%) [e, f]	California Test 375	91-97	1 per day (max th. Density)	Loose mix behind the paver
In-Place Density and Relative Compaction (Nuclear)	Nuclear California Test 375 or ASTM D2950	91-97	1 per 500 TONS	Random locations per CT 375
Stabilometer value (min) [d, g] 1/2" and 3/4" gradings	California Test 366	37	1 per 500 TONS	Loose mix behind paver per CT 125
Air Void content (%) [d, h]	California Test 367	4 ± 2	1 per 500 TONS	Loose mix behind paver per CT 125
Asphalt binder	Various	Section 92	Sample 1 per day	At plant per CT 125
Percent of crushed particles Coarse aggregates (%, min) One fractured face Two fractured faces Fine aggregate (%, min) (Passing no. 4 sieve and retained on no. 8 sieve.) One fractured face	California Test 205	 90 75 70	1 per mix per plant (sample aggregates 1 per day and hold)	At Plant
Los Angeles Rattler (%, max) Loss at 100 rev. Loss at 500 rev.	California Test 211	 12 45		
Fine aggregate angularity	California Test 234	45		

(%, min)				
Flat and elongated particles (%, max by weight @ 5:1)	California Test 235	Report only		
Voids filled with asphalt (%)[i] No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367	 76.0-80.0 73.0-76.0 65.0-75.0 65.0-75.0		
Voids in mineral aggregate (% min)[i] No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367	 17.0 15.0 14.0 13.0		
Dust proportion[i] No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 367	 0.9-2.0 0.6-1.3		
Smoothness	Section 39-1.12	12-foot straight-edge, must grind, and PI	As necessary to confirm contract compliance	Final pavement surface

[a] The Engineer determines combined aggregate gradations containing RAP under California Test 367.
[b] "X" denotes the sieves the Engineer tests for the specified aggregation gradation.
[c] The tolerances must comply with the allowable tolerances in section 39-1.02E.
[d] The Engineer reports the average of 3 tests from a single split sample.
[e] The Engineer determines percent of maximum theoretical density if the specified paved thickness is at least 0.15 foot under California Test 375, except the Engineer uses:

1. California Test 308, Method A, to determine in-place density of each density core instead of using the nuclear gauge in Part 4, "Determining In-Place Density By The Nuclear Density Device"
2. California Test 309 to determine maximum theoretical density instead of calculating test maximum density in Part 5, "Determining Test Maximum Density."

[f] The Engineer determines maximum theoretical density (California Test 309) at the frequency specified for Test Maximum Density under California Test 375, Part 5.D.
[g] California Test 304, Part 2.13.
[h] The Engineer determines the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.
[i] Report only if the adjustment for the asphalt binder content TV is less than or equal to ±0.3 percent from the OBC value submitted on a Contractor Hot Mix Asphalt Design Data form.

If the Acceptance test results do not meet the Acceptance Criteria shown in Table 1 the HMA shall be rejected, removed and replaced as directed by the Engineer at Contractor's expense.

Field density acceptance testing will be accomplished using the nuclear gauge method. If the density acceptance tests indicate failing compaction results, the Engineer determines a deduction for each test result outside the Acceptance Criteria using the "Reduced Payment Factors for Percent of Maximum Theoretical Density," table in Section 39-2.01A(4)(i)(ii).

If the Contractor requests verification of the nuclear density results by coring, the Contractor must perform the coring at no cost to the City.

The Engineer will randomly identify core locations and test cores for density at no cost to the City.

The Contractor must backfill the core holes with HMA temperatures above 250°F. The HMA must be firmly tamped in place in lifts not to exceed three (3) inches. Tamping must consist of a minimum of 20 blows with a ten-pound minimum weight bar with an approximate two (2) inch diameter head or by a suitable head attached to a demolition hammer or pneumatic hammer. The finished surface must be flush with the adjacent pavement surface.

Replace the 1st paragraph in section 39-2.02B(2):

The mix design for Type A HMA must comply with the requirements shown in the following table. The aggregate must be ½".

Replace *Reserved* in section 39-2.02B(3) with:

The grade of asphalt binder for Type A HMA must be Grade PG 64-16.

Add to end of section 39-2.02B(4)(a):

The Durability Index for all HMA aggregates must be a minimum of 35.

The aggregate must not be treated with lime, cement or other chemical material before the Durability Index test is performed.

Replace the 1st paragraph in section 39-2.02B(4)(b):

The aggregate gradations for Type A HMA must comply with the requirements shown in the following table. The aggregate must be ½".

Replace section 39-2.02B(6) Reserved with:

39-2.02B(6). Tack Coat

Tack coat must be utilized and be emulsified asphalt Grade RS-1, RS-1h, SS-1, or SS-1h and must conform to Section 94 "Asphaltic Emulsions".

^^

40 CONCRETE PAVEMENT

Add to end of section 40-1.03J:

Any concrete placed that becomes tagged, defaced, cracked or damaged shall be replaced prior to project acceptance. Spot patching repairs of concrete is not allowed. Any permanent reference point marks made into concrete is not allowed. If done, entire section of concrete from joint to joint shall be removed and replaced.

^^

41 EXISTING CONCRETE PAVEMENT

Add to the end of the 4th paragraph of section 41-9.03D:

A "No Vibration Zone" will be enforced within 3-ft of the existing 36" water transmission line and within 5-ft of the existing 10" high pressure gas line.

Add to the end of section 41-9.03D:

Contractor shall provide trench plates at the completion of each working day until RSC reaches minimum design strength to accommodate a gross vehicle weight rating (GVWR) of 43,600 lbs.

^^

DIVISION VI STRUCTURES

45 GENERAL

Replace section 45-2 Reserved with:

45-2 PREFABRICATED RESTROOM

45-2.01 GENERAL

Pre-fabricated restroom shall be Exeloo Semi-Automated Jupiter Triple or approved equal. Final furnishings and accessories to be selected by NVTA.

45-2.02 MATERIALS

45-2.02A General

Reserved.

45-2.02B Concrete

For concrete requirements relating to the prefabricated restroom, refer to Sections 51-7.03, 52-1.03D, 55-1.02E(6)(a), 90-1.01C(6)(a), and 90-2.02A.

45-2.02C Reinforcing Steel

For reinforcing steel requirements relating to the prefabricated restroom, refer to Sections 52-1.02B, 52-1.02C, and 52-1.02D.

45-2.02D Structural Steel

For structural steel requirements relating to the prefabricated restroom, refer to Sections 55-1.02D(1), 55-1.02D(7), 55-1.02E(6)(a), and 55-1.02E(6)(b)(i).

45-2.03 CONSTRUCTION

45-2.03A General

Reserved.

45-2.03B Welding

For welding requirements relating to the prefabricated restroom, refer to Section 11-2.01.

45-2.03C Dry Pack / Non-Shrink Grout and Patching

For dry pack / non-shrink grout and patching requirements relating to the prefabricated restroom, refer to Section 51-7.02.

45-2.04 PAYMENT

Not Used.

51 CONCRETE STRUCTURES

Replace the 2nd paragraph of section 51-7.02:

Grout or non-shrink grout shall be as follows:

1. Embeco or approved equal – Below the slab-on-grade
2. Masterflow 713 Grout or approved equal – Above the slab-on-grade

Non-shrink grout and/or dry pack shall be as follows:

1. Custom “Pour-Stone”
2. Five Star “Special Grout 400”
3. Master Builders “Master Flow 713”
4. or approved equal

Mix with the least water required to place grout without voids.

Cement grout and drypack proportions by volume shall be:

1. 2 parts sand
2. 1 part cement
3. Minimum of water consistent with placing requirements

Add to the end of section 51-7.03:

Before concrete is poured, check with all trades for proper placement of sleeves, curbs, conduits, etc.

All reinforcing bars, anchor bolts, and other concrete inserts shall be well-secured in positions prior to placing concrete. Additionally, the concrete should be thoroughly vibrated during placement.

Concrete shall not fall more than 6 feet.

Waterproofing beneath slab and foundation with approval from the Engineer.

^^

52 REINFORCEMENT

Replace 1st paragraph in section 52-1.02B:

Reinforcing bars and bars to be welded must be deformed bars complying with ASTM A706/A706M, Grade 60, except you may use:

1. Deformed bars complying with ASTM A615/A615M, Grade 60, in:

    1.1. Junction structures
    1.2. Sign and signal foundations
    1.3. Minor structures
    1.4. Mechanically-stabilized-embankment concrete panels

2. Deformed or plain bars complying with ASTM A615/A615M, Grade 40 or 60, in:

    2.1. Slope and channel paving
    2.2. Concrete barrier Type 60

3. Plain bars for spiral or hoop reinforcement in structures and concrete piles

Add between 1st and 2nd paragraphs in section 52-1.03C:

All reinforcing bar bends shall be made cold.

Replace 7th paragraph in section 52-1.03D:

Clear concrete coverage for reinforcing bars shall be as follows, unless other noted:

1. Concrete cast against and exposed to earth: 3" minimum.
2. Concrete exposed to earth/weather cast in forms:

    a. No. 6 – No.18 Bars: 2"
    b. No. 5 Bars or Smaller: 1-1/2"

3. Concrete not exposed to weather above grade:

    a. Slabs/Walls/Joists:

        i. No. 14 – No. 18 Bars: 1-1/2"
        ii. No. 11 Bars or Smaller: 3/4"

    b. Beams/Columns: 1-1/2"

Add to end of section 52-1.03D:

Slab-on-grade shall be tied to footings and walls with dowels. Verify with soils report for locations where stricter requirements are needed. If slab is not connected to footings and walls, or is a "floating" slab, contact the Engineer. Dowels minimum size and spacing shall match slab reinforcement, unless otherwise noted.

Reinforcing steel dowels extending from footings into walls, columns, or pilasters shall match the vertical reinforcement in grade, size, spacing, and number, unless otherwise noted.

^^

55 STEEL STRUCTURES

Replace paragraph 2 of section 55-1.02D(1) with:

Fasteners

Material	Specification
Steel fastener components for general applications: Bolts and studs Anchor bolts HS bolts and studs HS threaded rods	ASTM A307, A325 ASTM F1554[a], Grade 55 (75ksi tensile), A325 ASTM A449, Type 1[a], A325 ASTM A449, Type 1 [a], A325 or ASTM F1554, Grade 105, Class 2A [a], A325 ASTM F1554, Grade 105, Class 2A [a], A325

HS anchor bolts Nuts Washers Hardened washers Machine Bolts and Threaded Rods	ASTM A563, including appendix X1 [b] ASTM F844 ASTM F436, Type 1, including S1 supplementary requirements ASTM A307, A325 or ASTM F1554 Gr. 36, A325
Components of HS steel fastener assemblies for use in structural steel joints: Bolts Tension control bolts Nuts Hardened washers Direct tension indicators	 ASTM F3125, Grade A325, Type 1 ASTM F3125, Grade F1852, Type 1, A325 ASTM A563, including appendix X1 [b] ASTM F436, Type 1, Circular, including S1 supplementary requirements ASTM F959, Type 325, zinc-coated

[a]Use hardened washers.
[b]Zinc-coated nuts tightened beyond snug or wrench tight must be furnished with a dry lubricant complying with supplementary requirement S2 in ASTM A563.

Add at end of section 55-1.02D(1):

Structural steel for prefabricated restroom shall conform to the following table:

Wide Flange Shapes	ASTM A-992 (F_y=50 ksi), unless otherwise noted
Pipe Columns	ASTM A-53, Grade B (F_y=35 ksi)
Hollow Steel Sections (HSS), Square & Rectangular	ASTM A500, Grade B (F_y=46 ksi)
Hollow Steel Sections (HSS), Round	ASTM A500, Grade B (F_y=42 ksi)
Steel Angles	ASTM A36 (F_y=36 ksi)
Steel Plates and Bars	ASTM A36 (F_y=36 ksi)
All other structural steel	ASTM A-572 Grade 50, unless otherwise noted

Add to end of section 55-1.02D(7):

"Dry-Pack"/Grout beneath column base plates or similar applications where called for shall be non-shrink type. Use "Rapid Set" by "CTS Cement Mfg. Co" or approved equal upon approval by the Engineer.

Add to end of section 55-1.02E(6)(a):

Concrete-embedded anchor bolts shall conform to ASTM 1554 Grade 55 (75ksi tensile), unless otherwise noted.

All bolts shall conform to ASTM A325, unless otherwise noted. Bolts designated MB (machine bolts) and threaded rods, where called for, shall conform to ASTM A307 or F1554 Gr. 36, unless otherwise noted.

Replace 2nd paragraph of section 55-1.02E(6)(b)(i):

Finished holes for bolts must:

1. Be round within ± 1/32 inch
2. Be perpendicular to the plane of the connection within 1 in 20
3. Be at most 1/16 inch larger than the nominal bolt diameter
4. Be clean cut without torn or ragged edges
5. Be without irregularities that prevent solid seating
6. Have a surface roughness not exceeding 1,000 microinches as defined in ASME B46.1

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DIVISION VIII MISCELLANEOUS CONSTRUCTION

73 CONCRETE CURBS AND SIDEWALKS

Replace the 1st and 2nd paragraph of section 73-1.02A with:

Concrete for curbs, sidewalks and their appurtenances must be minor concrete. All concrete shall be 6 sacks per cubic yard (4,000 psi).

Concrete aggregate shall be ¾" max unless otherwise approved by the Director of Public Works or his/her designated representative.

Add to the end of section 73-1.03A:

The Contractor shall be responsible for setting all of the utility boxes when installing sidewalk (except AT&T and PG&E) to the grade of the finished sidewalk and for cleaning and clearing concrete mortar from all utility boxes in the area so that they are fully accessible upon completion of the sidewalk installation. The Contractor shall be responsible for setting meter boxes to grade.

The Contractor shall be responsible for coordinating with AT&T and PG&E for the adjustment of AT&T and PG&E facilities prior to installing new curb, gutter, sidewalk, and driveway. The Contractor shall be responsible for guarding or otherwise protecting concrete work from vandalism or other damage. All such damage shall be repaired by the Contractor at the Contractor's own expense. The Contractor shall replace any asphalt paving that is removed as part of curb and gutter removal and as part of valley gutter removal; a 2-feet wide by 6-inches thick AC plug is required. The extent of removal and replacement of asphalt concrete on either side of valley gutters shall be a minimum of two feet. Attention is directed to the section 39 "Asphalt Concrete".

Constructing PCC curb, gutter, sidewalk and driveways shall include any necessary excavation and backfill, furnishing and installing aggregate base, reinforcement, expansion joint filler, and all other required materials, including water.

Utility identification symbols, typically "S" for sanitary sewer and/or "W" for water, may exist on some curb. Contractor shall reference these symbols prior to removal of the curb and gutter and stamp a new symbol at the location of the original symbol or the where the utility line has been identified. New symbol must be stamped where the underlying utilities are identified, 1/8" minimum depth, into the curing P.C.C., of a

plain font that is easily read with a letter height of approximately 3" placed on top and face of curb. If the Contractor elects to use the curing compound method for curing concrete, the curing compound shall be curing compound (6) non-pigmented with fugitive dye, Type 1-D, Class A, conforming to the provisions in Section 90-1.03B(3), "Curing Compound Method," of the Caltrans Standard Specifications.

The curing compound shall be applied in a manner that will provide a complete coating of all exposed faces of the concrete surface.

All new concrete shall be doweled to existing concrete; minimum 18-inches spacing on sidewalk and 24-inches spacing on curb and gutter; with #4 rebar embedded 6-inches deep. If concrete is placed in sections or phases, the new concrete shall be doweled together.

Any concrete placed that becomes tagged, defaced, cracked or damaged shall be replaced prior to project acceptance. Spot patching repairs of concrete is not allowed. Any permanent reference point marks made into concrete is not allowed. If done, entire section of concrete from joint to joint shall be removed and replaced.

Add to the beginning of section 73-3.03:

Before placing concrete, verify that forms and job site constraints allow the required dimensioning and slopes shown. Immediately notify the Engineer if you encounter job site conditions that will not accommodate the design details. Ordered modifications are change order work.

Replace section 73-5 Reserved with:

73-5 DIRECTIONAL INDICATOR SURFACE

73-5.01 GENERAL

Directional indicator surface must match yellow color no. 33538 of AMS-STD-595.

Directional indicator dimensions can vary but must meet the standard dimensions specified in ISO 23599:2012 as shown in the table below:

Top Width of Flat-Topped Elongated Bars (mm)	Spacing (mm)
17	57-78
20	60-80
25	65-83
30	70-85

^^

77 LOCAL INFRASTRUCTURE

Replace section 77-1 Reserved with:

77-1 WATER AND SEWER

77-1.01 WATER SERVICE

77-1.01A GENERAL WATER DESIGN

Contractor shall conduct all water system improvements in accordance with the following:

1. The City-adopted project special conditions of approval;
2. The approved improvement plans including any supplemental updates thereto;

3. The City-approved permit(s);
4. The Standard Specifications of the State of California Department of Transportation,
5. the latest edition, and the Standard Plans of the State of California Department of
6. Transportation, the latest edition;
7. The City of Napa Standard Plans, including any supplemental updates thereto;
8. These Water Distribution System Provisions;
9. The latest version of the applicable AWWA standards;
10. The regulation(s) and requirement(s) of appropriate agencies (e.g. State Department
11. of Transportation, Department of Fish and Wildlife, Pacific Gas & Electric, Napa
12. Sanitation District, AT&T, et al.).

Contractor shall submit any proposed revisions to the approved plans in writing which shall be reviewed and approved prior to any work taking place. The Water Division Engineer may allow modifications to the Water Distribution System Provisions or Standards for the convenience of the City on a case-by-case basis; all water system standard(s) modification(s) shall be subject to the review and approval of the Water Division Engineer.

If standards or other government regulations (including but not limited to minimum separation requirements) are in conflict, the stricter requirement shall prevail. Contractor shall submit all record drawings to the Water Division office in a timely fashion.

The terms Applicant, Developer, Customer, and Contractor are used throughout these Water Distribution System Provisions and are intended to mean the same and can be used interchangeably.

77-1.01B WATER SYSTEM DESIGN AND INSTALLATION

Water mains shall consist of either fusible C900 or C905, standard C900 or C905 with epoxy-coated fittings, metallic zinc-coated ductile iron pipe with epoxy-coated fittings, or standard ductile iron pipe and fittings with cathodic protection that shall be noted in the approved improvement plans.

When new water system connections are made to existing metallic water mains, cathodic protection shall be installed on the existing pipeline as directed by the Water Division.

Water services shall be sized appropriately for the intended use and comply with the current California Plumbing Code. The Water Division Engineer may request an engineered water analysis of the private water system (new or existing) to evaluate capacity and service size. Undersized water services shall not be permitted under any circumstances. A Water Fixture Count for determining the proposed water service size shall be performed per the latest edition of the California Plumbing Code as required by the Water Division and the Building Division.

Water service laterals shall not exceed the size of the public water main that is connected to the service. The allowance of size-on-size water service laterals shall be at the sole discretion of the Water Division Engineer. In the event proposed demands cannot be met by the City's distribution system, the Water Division Engineer shall conduct a hydraulic analysis (or direct the Applicant to conduct a hydraulic analysis at his or her own expense) to determine water system deficiencies that shall be addressed at the sole expense of the Applicant.

Changes in pipeline grade to clear existing or proposed underground facilities shall be achieved through vertical offsets with the use of fittings, if required. All fittings shall be made with fully restrained joints and shall adhere to the requirements of City Standard Plan W-15. Deflection of pipelines may be used to avoid existing or proposed underground facilities if approved by the Water Division Engineer; deflection at pipe joints shall not exceed 3 degrees (minimum radius = 345 feet).

Signs, fences, trees, foundations, streetlights, or other permanent structures shall not be installed within 10 feet of a City water main or water facility, or within a public water utility easement, unless otherwise noted.

Thrust blocks and restrained joints shall be installed as required and conform to the City of Napa Standard Plans W-14A, W-14B and W-14C.

Installation of a private pressure system may be required where sufficient pressure is not available from the existing or proposed water distribution facilities.

Only those personnel trained and equipped to meet the various standards and requirements contained herein shall conduct water system installations.

77-1.01C VALVES AND VALVE BOX INSTALLATION

Contractor shall install valve(s) as shown in the approved plans, and conform to City Standard W-9 and the latest applicable version of AWWA standards. The plans shall indicate the size, type, and location of the valve(s).

Resilient seated gate valves shall be used for pipe sizes smaller than 12 inches.

Valves shall be installed in a level position with the operating stem in a vertical position and be stabilized and supported separately from the pipeline.

Valve box caps shall be set flush with the finished pavement surface.

Valve box caps shall be marked “WATER”.

77-1.01D WATER SERVICES AND METERS

Contractor shall install water services as shown in the approved plans and conform to City standards and the latest version of the applicable AWWA standards. The plans shall indicate size, direction, and location of the water service and meter box. The Water Division Engineer will, insofar as practicable, work with the Applicant to locate the water meter along the property line at a point designated by the Customer.

The allowance of size-on-size water service laterals shall be at the sole discretion of the Water Division Engineer.

Water service laterals shall not exceed the size of the public water main that is connected to the service. In the event proposed demands cannot be met by the City’s distribution system, the Water Division Engineer shall conduct a hydraulic analysis (or direct the Applicant to conduct a hydraulic analysis at his or her own expense) to determine water system deficiencies that shall be addressed at the sole expense of the Applicant.

Water meter boxes and vaults shall be located outside all driveways and traveled ways, and be accessible at all times for inspections, reading, testing, and maintenance.

Water services within areas where the static pressure is in excess of 80 pounds per square inch (psi) shall be equipped with a pressure regulator that conforms to the most current California Plumbing Code. Conversely, installation of a private pressure system may be required where sufficient pressure is not available from the existing or proposed water distribution facilities.

All water service laterals shall be metered connections, with the exception of those designated by the Water Division Engineer.

Water meter installations may be scheduled upon receipt of payment, parcel address(es) and responsible party; meter installations shall only occur after successful completion and passing of the pressure, chlorinating, flushing, and bacteriologic tests and after all backflow devices have been certified and tested.

77-1.01E BACKFLOW DEVICES

Contractor shall install backflow device(s) as shown in the approved plans and conform to applicable City and latest version of AWWA standards. The plans shall indicate size, location, and reference the applicable City Standard. Backflow device(s) shall be installed in a manner that provides the clearances shown on the applicable City standard to facilitate inspection and maintenance.

Backflow devices installed on residential, commercial, industrial, or irrigation water services shall be installed as close to the meter or property line as practical, but in all cases before the first branch line. All commercial, industrial, or irrigation water service(s) shall be equipped with an approved reduced-pressure (RP) principle backflow prevention assembly.

All backflow prevention assemblies shall be a model and size approved by the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California and listed on the Foundation's current list of approved backflow prevention assemblies.

The approved backflow prevention assembly list can be obtained at http://fccchr.usc.edu/list.html

Meter shall be installed in the lock position before backflow devices can be tested. Use of jumpers, hose bibs, or other devices shall not be permitted. Water service will not be unlocked until passing results are received by the City of Napa.

77-1.01F MATERIALS

77-1.01F(1) General

Contractor shall furnish all materials required to complete the work.

A list of material sources shall include, but not be limited to, type, manufacturer, and model number of proposed materials. Specific manufacturers and part numbers may be indicated within these Provisions and City Standard Plans. The list of material sources shall be approved by the City prior to the installation.

Submitted materials shall conform to the requirements contained herein. All substitutions and "or approved equal" shall be reviewed by the Water Division Engineer prior to installation. Submittal of an approved equal will be reviewed on a case-by-case basis.

The list shall be furnished in sufficient time to permit proper inspection and testing of materials furnished from such listed sources in advance of their use. Such samples shall be furnished, without charge, as may be required. Inspection and tests, if deemed necessary, will be made by the Water Division or designated representative, but it shall be understood that such inspections and tests, if made at any point other than the point of incorporation in the work, in no way shall be considered as a guarantee of acceptance of such material, or of continued acceptance of material presumed to be similar to that upon which inspections and tests have been made.

Manufacturer's warranties, guarantees, instruction sheets, and parts lists, which are furnished with certain articles or materials incorporated in the work, shall be delivered to the Water Division before final acceptance. In certain instances, the Water Division Engineer may require electronic format of submittals.

Specific requirements for water facilities are described as follows.

77-1.01F(2) Fusible Polyvinyl Chloride Pipe (Fusible PVC)

Fusible PVC pipe shall be manufactured to conform to the latest version of AWWA C900. Fusible PVC shall be blue in color, pressure Class 305, and DR-14, or approved equal pipe.

The pipe shall be tested at the extrusion facility for properties required to meet all applicable parameters as outlined in the latest version of AWWA C900, applicable sections of ASTM D2241, ASTM D3034, or ASTM F679. Testing priority shall be in conformance with the latest version of AWWA C900, which shall be tested to those standards.

All piping shall be made from a PVC compound conforming to cell classification 12454 per ASTM D1784. Testing shall be in accordance with the latest version of AWWA standards for all pipe types. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe. Fusible polyvinylchloride pipe shall be manufactured in a standard 40-foot nominal length.

Each pipe shall be marked to conform to the latest version of AWWA C900, and shall include as a minimum:

1. Nominal pipe size
2. PVC
3. Dimension Ratio, Standard Dimension Ratio, or Schedule

4. AWWA pressure class
5. AWWA Standard designation number
6. Extrusion production-record code
7. Manufacturer's trademark or trade name
8. Cell Classification 12454 and/or PVC material code 1120 may also be included

77-1.01F(3) Restrained Joints (for PVC)

Restrained joints shall be installed as shown in the approved plans, conform to all applicable City and latest version of AWWA standards.

Pipe joints for fittings shall be ductile iron mechanical joint fittings with restrained locking glands rated for Class 305 PVC pipe shall be used. Joint restraint shall be EBAA Iron Series 2000PV Mechanical Joint Restraint or approved equal.

77-1.01F(4) Flanged Joints & Bolt-up Kits (for PVC)

All stainless-steel bolts and studs shall be the proper length to ensure proper bolt-up is achieved between two Class 125 Standard Cast Iron Flanges, flanged valve and cast-iron flange, and any other flanged configuration. All bolts, studs, nuts, and washers shall be Type 304 Stainless Steel with Teflon blue nuts and conform to the latest version of AWWA C111.

77-1.01F(5) Flanged Adapters

Flanged adapters shall be Rockwell International, Baker Series, or Columbus Standards, Inc. All bolts, studs, nuts, and washers shall be Type 304 Stainless Steel with Teflon blue nuts.

77-1.01F(6) Gate Valves

Gate valves shall be a resilient-seated type and manufactured to conform to the latest version of AWWA C-509 and be non-rising stem with square operating nut, open left, and have stainless steel nuts and bolts. Gate valves used for combination air and vacuum valves shall be Mueller H-10914 or approved equal.

All certified drawings and parts lists shall be submitted to the Water Division Engineer.

Gate valves shall be used for all pipe sizes smaller than 12 inches, unless otherwise approved by the Water Division Engineer.

77-1.01F(7) Copper Tubing and Fittings

Copper service tubing, fittings, saddles, et al., shall be manufactured to conform to ASTM Specifications B88-47 Type K soft copper and the latest version of AWWA C800.

The tubing shall be installed without splicing in lengths up to 50 feet, where possible.

77-1.01F(8) Miscellaneous Appurtenances

Miscellaneous appurtenances, including check valves, service materials, saddles, regulator valves, insulators, pumps, pressure tanks, valve boxes, and miscellaneous hardware shall be of the type shown on the plans and/or submittals, and be of a quality acceptable to the Water Division Engineer.

Upon request, Contractor shall deliver samples of any such miscellaneous appurtenances to the Water Division Engineer for examination and testing and, if rejected, remove all similar appurtenances from the job site, including that which may have already been installed.

77-1.01F(9) Tracer Wire

Tracer wire shall be taped to the top of the pipe at a minimum of 5-foot intervals, and at all crosses, tees, and elbows. When taping tracer wire to pipe, wrap the tape once around the tracer wire before wrapping the tape around the full diameter of the pipe.

Tracer wire material shall be installed as follows:

1. Open Cut: Tracer wire shall be at a minimum No. 10 AWG annealed bare copper UF solid type wire with cross-linked polyethylene insulation minimum 30 mil thickness or subject to the approval of the Water Division Engineer. The insulation shall be blue in color. Connectors shall have a dielectric gel and must be sealed.
2. Horizontal Directional Drilling & Non-Metallic Pipe: Tracer Wire No. 8 CCS Extra High Strength Hard Drawn 1150 lb. or approved equal. HDPE coating with minimum 45 mil thickness. The insulation shall be blue in color.

77-1.01F(10) Sand Backfill within City of Napa Right-of-Way

Section 77-1.01F(10) applies only to backfilling within City of Napa right-of-way.Sand Bedding shall conform to the following specifications:

CLEANED WASHED UTILITY SAND		
SIEVE SIZE		WATER DIVISION SPEC
37.5 mm	1-1/2”	
25 mm	1”	
19 mm	3/4”	
12.5 mm	1/2”	100
9.5 mm	3/8”	
4.75 mm	#4	75-100
2.36 mm	#8	
1.18 mm	#16	
600 µm	#30	
300 µm	#50	0-70
150 µm	#100	0-30
75 µm	#200	0-15
Sand Equivalent		>20
Minimum Resistivity		≥5.0 Ω-cm (x1,000)
Soil pH		4.5-9
Chloride		≤500 ppm
Sulfate		≤150 ppm
Plasticity Index		Non-Plastic
Organic Impurities		Not Present[a]

[a]This sand is a clean natural sand mined and processed in fresh water. It is free from clays, seashells, and other organic materials.

77-1.01F(11) Backfill within Caltrans Right-of-Way

Section 77-1.01F(11) applies only to backfilling within Caltrans right-of-way.

Backfill shall be per Caltrans Case 4 and shall be in accordance with Sections 19.

77-1.01F(12) Lubrication

Lubrication shall be NSF 61-approved water-soluble and non-toxic, be non-objectionable in taste and odor imparted to the fluid, be non-supporting of bacteria growth, and have no deteriorating effect on the PVC or rubber gaskets.

77-1.01F(13) Miscellaneous Iron and Steel

Miscellaneous iron and steel shall conform to the provisions in Section 55 of the Standard Specifications.

77-1.01F(14) Reinforcement

Reinforcement shall conform to the provisions in Section 52 of the Standard Specifications.

77-1.01F(15) Concrete

Concrete shall conform to the provisions in sections 51 and 90 of the Standard Specifications. Thrust blocks shall be constructed of Class C concrete, as a minimum.

77-1.01G CONSTRUCTION

77-1.01G(1) PRE-CONSTRUCTION MEETING

Contractor shall schedule a pre-construction meeting prior to installation of any water infrastructure intended for City ownership. Contact the City of Napa Water Division Inspector at 707-257-9521 or 707-257-9544 to schedule the pre-construction meeting. The Water Division Inspector shall be notified of the pre-construction meeting at least two business days in advance of the meeting.

77-1.01G(2) WATERMAIN AND WATER SERVICE INSTALLATION

Contractor shall install all water mains and services as shown in the approved plans and conform to applicable City and latest version of AWWA standards.

This section applies to installation of new water mains, new water services and work with existing water mains and services.

Contractor shall strictly adhere to all manufacturer requirements and storage procedures, including storage of all pipe lubricant, gaskets, and appurtenances.

For water service installation or reconnections, the Water Division Inspector or Engineer reserves the right to require a completely new water service installation based on field conditions.

Each section of pipe shall be carefully inspected for damage that may have occurred in transit. Any damaged or rejected pipe shall be marked appropriately and removed from project area immediately.

Each section of pipe and each fitting shall be thoroughly cleaned out before it is lowered into the trench. Cleaning of each pipe or fitting shall be accomplished by swabbing out, brushing out, blowing out with compressed air, washing out with water, or by any combination of these methods to achieve removal of all foreign matter.

If clean pipe sections and fittings cannot be placed in the trench without getting dirt into the open ends, the Water Division Engineer may require that a piece of tightly woven canvas be tied over the ends of the pipe or fitting until it has been lowered into position in the trench. After the pipe or fitting has been lowered into the trench, all foreign matter shall be completely brushed from the bell and spigot ends before assembly.

No pipe or fitting shall be lowered into any trench containing water. The trench bottom shall be free from pieces of rock or other material that could potentially damage the pipe. Water shall be pumped from wet trenches, and the trenches shall be kept dry until the joints have been completed and the open ends of the main have been closed with watertight plugs or bulkheads.

Whenever pipe-laying is discontinued on any job for short periods, or whenever work is stopped at the end of the day, the open ends of the main shall be closed with approved watertight plugs or bulkheads. The plug or bulkhead shall not be removed unless the trench is dry. Every effort shall be made to keep the trench dry at all times.

Each section of pipe shall be lowered into the trench by means of slings of a type approved by the Engineer, and the pipe main assembled piece by piece. Bells usually face the direction in which the work is progressing. Care shall be taken to provide for uniform support of the pipe in the bottom of the trench, as well as to prevent damage to the interior coating or lining. If damage occurs, repairs must be made before the damaged pipe will be acceptable. All pipe shall be cut squarely to length using manufacturer-approved methods.

77-1.01G(3) TRENCH PLATES

Trench plates for water trenches shall conform to Section 2.13.03 and the General Construction Notes. Trench plates installed on highly travelled streets (including all arterials) will be required to be set flush with the existing asphalt concrete. Plates shall be skid resistant, pinned and welded.

77-1.01G(4) TRACER WIRE

Contractor shall connect by tracer wire the full length of the new water main and new service laterals. Requirements for installation and testing shall be as follows:

1. Tracer wire shall be required on all non-ferrous water mains and services.

2. Tracer Wire Installation
   (a) Open Cut installations and for pipe diameters 14-inches and smaller: Tracer wire shall be at a minimum No. 10 AWG annealed bare copper UF solid type wire with cross-linked polyethylene insulation minimum 30 mil thickness or subject to the approval of the Water Division Engineer. The insulation shall be blue in color. Connectors shall have a dielectric gel and must be sealed.
   (b) Horizontal Directional Drilling & Non-Metallic Pipe applications: Tracer Wire No. 8 CCS Extra High Strength Hard Drawn 1150 lb. or approved equal. HDPE coating with minimum 45 mil thickness. The insulation shall be blue in color.
3. Tracer wires shall be interconnected at all pipe tees, pipe crosses, and pipe services. Splices shall be "KURNEY" (split-bolt) or "KUPLETAP". Installation tape shall be vinyl electrical with two coats of "Scotch Kote".
4. Tracer wire shall be placed outside of the valve riser pipe and shall be placed in the notch at the top of the valve riser pipe, as shown on the Plans and these Specifications.
5. Tracer wire shall be taped to the top of the pipe at a minimum of 5-foot intervals, and at all crosses, tees, and elbows. When taping tracer wire to pipe, wrap the tape once around the tracer wire before securing it to the pipe, then wrap the tape around the full diameter of the pipe.

After backfill and compaction, but prior to paving, continuity testing of the tracer wire and traceability of the tracer wire will be required. Contractor shall coordinate scheduling an independent tracing test and provide results to the Water Division Inspector. Any detected damages to the tracer wire shall be repaired at no cost to the City before paving will be allowed.

77-1.01G(5) PRESSURE TESTING

New water mains shall be subjected to a hydrostatic pressure/leakage test for a period of 4 hours at 150 psi. Pressure testing shall be performed after all compaction of trench backfill has been completed and/or subgrade on new streets is fully compacted and ready for paving. Pipelines shall be pressure tested prior to connection to the existing water system. The water mains shall be tested as a complete system including all fire hydrants. Testing of multiple portions of a continuous run of water main shall not be accepted.

The measured pressure shall not change by ±2 psi during the test.

The pressure/leakage test shall not be made until at least 36 hours after the last concrete thrust block has been poured when Type Ill cement is used, or at least 7 days after the last thrust block has been poured when Type II cement is used.

Prior to starting the test, the pipeline shall be filled with water for 24 hours. During the filling of the line and before applying the specified test pressure, all air shall be expelled from the pipe. If necessary, taps shall be made as directed at the points of highest elevation and plugged upon completion of the test. The pipeline shall be slowly filled with water, and the specified test pressure applied at the point of lowest elevation by means of a pump connected to the pipe by a corporation cock. During the test, all exposed pipe, fittings, valves, hydrants, and joints will be carefully examined.

The water lost due to leakage shall be none.

Contractor shall remove and replace any cracked or defective material to the satisfaction of the Engineer, and no additional payment will be made therefor. The test shall be repeated until no defects remain. If water leakage occurs in the pipeline being tested, Contractor shall locate and repair the defective joints or fittings, and no additional payment will be made therefore. Contractor shall retest the pipeline until leakage has been eliminated.

Contractor shall be required to conduct pressure/leakage testing on the isolated system, i.e., connections shall not be made to the City's system until all tests have passed. This will usually require that plugs and thrust blocks be used, which may not appear on the plans. Closing pieces will be laid after testing is complete. Testing against closed valves will not be allowed.

77-1.01G(6) FLUSHING AND CHLORINATING

The City shall be notified a minimum of 48 hours prior to commencement of flushing and chlorination operations. Contact the Water Division Inspector at the City's Corp Yard at 707-257-9544 to schedule flushing and chlorination of all newly installed pipeline(s).

Soil, debris, etc., shall be removed from the water lines prior to chlorination, and a flushing plan, if required, shall be submitted for approval prior to commencement of flushing operations.

The selected chlorination method (tablet, continuous feed, slug, spray) shall comply with AWWA C651 (Disinfecting Water Mains). The pipeline shall be slowly filled to allow proper circulation of chlorination solution and be allowed to stand in accordance with the prescribed method selected.

Upon completion of chlorination, all super-chlorinated water shall be thoroughly flushed from the pipeline(s), service(s), etc., until the replacement water is proved equal to that of the water quality discharged at the supply point within the City's water distribution system.

Super-chlorinated water shall be disposed in accordance with all City, County, and State pollutant discharge requirements. No super-chlorinated water shall be discharged into any storm drains or surface waters; discharge of super-chlorinated water into the sanitary sewer system may be granted but requires prior approval, which shall be at the sole discretion of the Napa Sanitation District (NSD).

Requests to discharge super-chlorinated water into the sanitary sewer system shall be made through the NSD Construction Inspector at (707) 258-6000 and shall be scheduled a minimum of two working days prior to any discharge into the sewer system.

Discharge(s) into the sewer system, if approved, may require additional equipment and reporting requirements, which shall be at the sole discretion of NSD.

If NSD does not grant approval to discharge into the sewer system, flushing and de-chlorination of super-chlorinated water shall be conducted in accordance with all City, County, and State pollutant discharge requirements; a flushing plan outlining the method of de-chlorination shall be provided to the City Water Division Inspector a minimum of two working days prior to commencement of flushing and de-chlorination operations.

77-1.01G(7) BACTERIOLOGICAL TESTS

Upon successful completion of pressure testing, chlorinating, and flushing of super-chlorinated water, the pipeline shall be allowed to stand for a minimum of 24 hours prior to the first bacteriological test, which shall be scheduled with the City of Napa Water Division Inspector at least two workings days prior to the first sampling event.

Temporary sampling points within the newly installed pipeline section(s) may, or may not, be shown in the approved plans, but may be taken at blow-off locations (temporary or permanent), newly installed sample station(s), service(s), or as directed by the City Water Division Inspector.

Water samples shall be taken on only Monday, Tuesday or Wednesday. Two sampling events will be required with the first being taken a minimum of 24 hours after completion of de-chlorination and flushing; the second sampling event shall be taken 24 hours later (i.e., 48 hours after the first sampling event).

All sample sets from both sampling events must pass bacteriological testing in order to be deemed ready for connection to the City's water system. Failure of any sample will require flushing, re-chlorination if necessary, and the initiation of a new bacteriological sampling and testing process, as prescribed above.

All portions of the City's form as described in Section 5.02.12 shall be submitted to the City Water Division Inspector prior to connection to the City's water system.

Final connection(s) to the City's water system shall be scheduled at least two working days in advance, and conducted under the direct supervision of the City Water Division Inspector.

77-1.01G(8) FINAL TIE-INS

Contractor shall contact the City to schedule tie-ins to City facilities by calling (707) 257-9521. All tie-ins shall be conducted under City inspection only after pressure testing, chlorination, and bacteriological testing is complete.

77-1.01G(9) CITY-OWNED FACILITIES

Any City-owned materials removed shall be delivered to the City Corporation Yard, 770 Jackson Street, as directed by the City Water Division Inspector.

77-1.01G(10) WATER CONSERVATION

All projects creating a net increase in demand on the City water system shall meet water demand mitigation (offset) requirements as specified by the Water Division per Napa Municipal Code Chapter 13.09. Current requirements may involve completion of offsite toilet retrofits, payment of an in-lieu fee, or an alternative method of equivalent water savings. Upon release of the building permit, specific offset requirements for a project are determined, and developers are notified by Water Conservation staff. In advance of building permit release, preliminary offset requirement estimates are available upon request.

Final requirements, in the form of toilet retrofit certificates, in-lieu fee payment, or authorized alternative method, must be met prior to final occupancy of the project.

77-1.01H PAYMENT

Payment for 2" water service installation shall include all work and materials required per City of Napa Standard Details S-12, W-2B, W-6A, W-12, W-13A, W-16A, W-20A, W-22A, and W-22B, and Section 77-1 Water. Water meter installation is not included in this payment and is paid separately.

Payment for 2" water meter installation shall include work and materials required per City of Napa Standard Detail W-2B and Section 77-1 Water.

The contractor shall provide all labor, materials, equipment, and incidentals necessary to complete the installation of a fully functional water service. No additional compensation will be allowed therefore.

77-1.02 SEWER LATERAL

77-1.02A SEWER PIPELINES

77-1.02A(1) SEWER CONSTRUCTION MATERIALS

All sewer construction materials proposed to be used shall be new materials approved by the Engineer, prior to start of construction.

Where material specification numbers are used herein, they shall refer to the latest revision thereof.

For the purpose of these specifications, all pipe materials are classified as either "rigid" or "flexible."

77-1.02A(2) PIPE MATERIALS

77-1.02A(2)(i) General

Sewer pipe for public and private laterals shall be Poly Vinyl Chloride (PVC) (Gravity) SDR26. Sewer pipe shall have minimum cover of 36" (minimum 12" for private laterals). 3" to 4" diameter piping permitted for private laterals.

All materials incidental to flexible pipe installations such as gaskets, joint lubricants, cements, etc. shall be supplied by the pipe manufacturer. All flexible pipe required in odd lengths shall be cut using a proper cutting tool and guide that insures true line cut on planes perpendicular to the pipe axis. No bevel cuts for pipeline alignment adjustments will be permitted. All flexible pipe for new construction shall be solid wall pipe.

All PVC solid wall pipe and fittings shall be in accordance with the requirements for SDR 26 sewer pipe as stated in ASTM Designation D-3034, PVC cell class 12454 ASTM D1784, minimum wall thickness of SDR 26, ASTM Designation F-789 Type PS-46. Pipe joints and fittings shall be factory assembled, integral wall bell and spigot configuration, compatible with the pipe. PVC solid wall pipe shall be used only for gravity sewer applications.

Gasketed PVC pipe shall have a solid cross section rubber ring gasket. The gasket shall be securely attached to the pipe to prevent displacement of the gasket when installed in the field. All rubber ring gaskets shall be in accordance with ASTM Designation F-477. Lubricant used for field assembly of gasketed PVC pipe shall have no detrimental effect on the gasket, joint, fitting, or pipe and shall be as recommended by the manufacturer.

Cement used for non-gasketed PVC pipe for private laterals only shall conform to ASTM Designation D-2564. Jointing of wet pipe is not allowed. Jointing of pipe shall be accomplished by applying a coating of

cement to the inside of the bell and the outside of the spigot. The cement shall be applied in sufficient quantity to produce a bead of cement around the entire circumference of the pipe joint. Excess cement shall then be removed.

77-1.02A(2)(ii) Storage

Pipe shall be stored if possible at the job site in unit packages provided by the manufacturer. Caution shall be exercised to avoid compression, damage, or deformation to bell ends of the pipe and barrel.

When unit packages of flexible pipe are stacked, ensure that weight or upper units do not cause deformation to pipe in lower units.

Flexible pipe unit packages shall be supported by racks or dunnage to prevent damage to the bottom during storage. Supports shall be spaced to prevent pipe bending.

When long-term storage with exposure to direct sunlight is unavoidable, flexible pipe shall be covered with an opaque material while permitting adequate air circulation above and around the pipe as necessary to prevent excessive heat accumulation.

Flexible pipe shall not be stored close to heat sources or hot objects such as heaters, boilers, steam lines, engine exhaust, etc.

Gaskets, if required, shall be protected from excessive exposure to heat.

77-1.02A(2)(iii) Deflection

The inside diameter of an installed section of flexible pipe shall not be allowed to deflect more than five percent (5%) of the base inside diameter (as defined in ASTM D3034) following 30 days after installation. Deflection testing conducted during daily installation and any time prior to 30 days after installation shall be based on an allowable deflection of 3-1/3 percent of the base inside diameter.

1. Flexible pipe deflection shall be checked by means of a 9-arm “go – no go” mandrel pipe deflection gauge. The mandrel shall have pulling rings at each end and shall be pulled by hand through the sewer without the aid of mechanical pulling devices. The pipe deflection shall be checked in the presence of the Engineer or Inspector after the placement and compaction of all trench backfills, but prior to installation of aggregate base and/or asphalt concrete.
2. The mandrel deflection gauge shall be fabricated to permit passage through installed sections of pipelines within the specified tolerances for flexible pipe. Any section or sections of flexible pipe that does not permit deflection gauge passage will not be accepted and said section or sections shall be properly repaired or replaced and rechecked as directed by the Engineer or Inspector.

77-1.02A(2)(iv) Other Pipe

Other pipe materials may be used for sewer installation with approval by the Engineer.

The pipe shall be joined with couplings as furnished with the pipe by the manufacturer, and installed as specified by the manufacturer.

77-1.02A(3) PIPE COUPLINGS

Fernco with shear bands or equal shall be used for PVC SDR 26 connections to: VCP, ACP, Concrete, Orangeburg, CIP, and PVC Schedule 40.

77-1.02A(4) MAIN CONNECTIONS

When connecting a lateral to an existing AC or VCP main, use a PVC SDR 26 wye and Fernco couplings with shear bands.

77-1.02A(5) EMBEDMENT

All pipe shall be embedded and backfilled as specified with extra care taken in compaction of said embedment and backfills as specified in 77-2.05.

77-1.02A(6) STAINLESS STEEL BANDS

Stainless steel bands shall be ASTM A-167, Type 316. Any fitting or coupling using stainless steel bands shall have the area of the band wrapped twice with 10-mil plastic tape.

77-1.02B PORTLAND CEMENT CONCRETE AND MORTAR

77-1.02B(1) CONCRETE

Concrete shall consist of a mixture of Type II Portland cement, sand, fine aggregate, coarse aggregate and water. The proportions of the water, sand and aggregate shall be regulated so as to produce a plastic, workable and cohesive mixture yielding the strength indicated.

77-1.02B(2) MORTAR AND GROUT

The dry materials used for mortar shall be thoroughly mixed with sufficient clean water to produce a uniform, plastic, workable and cohesive mixture.

Sand for mortar and grout shall be clean, dry, well-graded sand, free of organic or other deleterious matter, silt or other objectionable inorganic matter, and shall be of such size as determined by laboratory sieves, conforming to the following gradation:

Sieve Size	Percent Passing
3/8-inch	100
1/4-inch	95-100
No. 20	50-85
No. 100	0-15

Cement shall be Type II Portland cement. An industrial grade all-purpose non-shrinking cement such as “All Crete” or “Speed Crete” may be used.

No admixtures shall be used in the mortar or the grout unless otherwise specified or approved by the Engineer.

Mortar shall be composed of cement and sand proportioned and mixed as specified herein. Type "A" mortar shall be used unless Type "B" is specified by the Engineer.

1. Type "A" shall consist of one part by volume of cement and two parts by volume of sand.
2. Type "B" shall be a case basis, mixed and used in accordance with manufacturer's recommendations. Mixed mortar shall be used before initial set and in no case will retempering with additional water be permitted.

77-1.02C SEWER PIPE AND STRUCTURE INSTALLATION

77-1.02C(1) SEWER PIPE INSTALLATION

77-1.02C(1)(i) Construction Staging

All main sewers and laterals shall be staked in the field in accordance with the requirements of the Napa Sanitation District. The grades and alignment of the sewer staked shall be approved by the Engineer prior to start of sewer construction.

77-1.02C(1)(ii) Allowable Deviation of Alignment and Grade

The horizontal deviation of the sewer from the line shown on the plans shall be no more than three (3) inches. The sewer grade shall not deviate from the profile shown on the plans, and the grade shall be maintained during and after backfilling operations. Sewer grades with deviations exceeding 1/2 inch shall be removed and replaced at the Contractor's expense. If deviations less than 1/2 inch from the design grade occur, pipe joints may be deflected to bring the invert back to grade. Grade corrections shall be made gradually to prevent sags in the pipe invert at low spots. Pipe shall be installed to be free draining (no sags) between any two points. No reverse (adverse) grade will be allowed.

77-1.02C(1)(iii) Grade Line

When laying pipe for laterals, in lieu of a laser grade setting system, the Contractor may use a grade line. When laying the pipe, except where vertical curves are shown on the plans, or otherwise authorized by

the Engineer, the Contractor shall use a grade line with at least two (2) adjacent runs at all times in order to detect any variation from a straight grade.

The grade line must be established over the center of the trench in vertical trenches and over the center of the pipe in V-type trenches during the laying operations and grade line shall be maintained up until the pipe grade is checked by the Engineer.

The grade line shall be accurately and securely fastened at each staked station to securely erected batter boards and kept taut at all times.

The measuring pole shall be a solidly constructed straight pole with a metal foot at one end at right angles to the pole. The batter board construction, string line, and measuring pole construction shall be approved by the Engineer prior to start of sewer pipe laying.

In caving ground and in other circumstances when the above is not practicable, and when so authorized by the Engineer, the pipe must be checked by surveying instruments under the direction of a Registered Civil Engineer or Land Surveyor who shall accept the responsibility for the pipe being installed on the proper grade.

77-1.02C(1)(iv) Sewer Pipe Plugs

Sewer pipe stubs or other open ends, which are not to be immediately connected, shall be plugged or capped with a standard watertight plug or cap as approved by the Engineer for use in the particular installation. The plugs or caps may only be removed when so authorized by, and in the presence of, the Engineer.

77-1.02C(1)(v) Joint Deflections and Minimum Radius

When approved by the Engineer, curved sewers shall be in conformance with the following requirements.

For flexible pipe, horizontal curves shall be achieved only with approval of the District Engineer. Tracer wire shall be installed on curved sections of pipe. See tracer wire requirements. The minimum allowable bending radius is shown in the following table, which follows the equation:

Radius = 300 x Pipe Diameter (in feet).

Smaller radii may be approved by the Engineer.

Pipe Diameter (inches)	Minimum Radius (feet)
4	100
6	150
8	200
10	250
12	300
15	350
18	450

77-1.02C(1)(vi) Verification of Existing Sewer or Structure

Where connection is to be made to an existing sewer or structure, said existing sewer or structure shall be uncovered and checked for location and elevation prior to submitting cut sheets. Any discrepancy between the plans and field information shall be reported immediately to the Engineer.

77-1.02C(1)(vii) Commencement of New Sewer Pipe Line

Unless otherwise authorized by the Engineer, laying of the pipe in finished trenches shall be commenced at the lowest point of the project, with the spigot ends abutting and pointing in the direction of the flow. The joints shall be carefully centered so that when laid to proper grade and alignment as designated on the plans, they will form a sewer line with a uniform invert.

77-1.02C(1)(viii) Ground to be Filled / Fill Areas

In fill areas, fill shall be placed up to 3 feet above where the outside of the pipe would be and laterally to a width of the pipe outside diameter plus six (6) feet centered on where the pipe would be, and compacted prior to the construction of the sewer. The compaction requirements, as specified by the Agency governing the fill, shall be considered adequate except that not less than 90% relative compaction per ASTM D-1557 “Modified Proctor” shall be achieved. Evidence of these results in the areas concerned shall be furnished to the local agency (City/County) from an approved testing laboratory prior to construction of the affected sewer.

77-1.02C(1)(ix) Handling of Pipe

Pipe shall be protected during handling against impact shocks. Prior to making pipe joints, all surfaces of the portion of the pipe to be joined shall be cleaned, dried, primed or otherwise prepared as called for in these Standards. The interior of all pipe shall be kept free from all dirt and foreign matter as the work progresses. At the close of each day’s work, and at such other times when the pipe is not being laid, the ends of all open pipes shall be closed with a water tight plug or cap. Any modification of this requirement must be approved by the Engineer.

77-1.02C(1)(x) Field Cutting Pipe

Unless otherwise permitted by the Engineer, pipes that must be cut in the field shall be cut with mechanical cutters or as recommended by the pipe manufacturer.

77-1.02C(1)(xi) Bypass Pumping

The Contractor, when required, shall provide for the flow of sewage around the section or sections of pipe designated for repair. Plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system shall make the bypass. The pump(s) and bypass line(s) shall be of adequate capacity to accommodate the sewage flow. The District may require a detail of the bypass plan to be submitted that includes, at a minimum, 100% redundancy, 24-hour backup pumping equipment/generator, emergency contact numbers, qualified personnel to provide continuous supervision of bypass pumping system, traffic control, surface pipe restrictions, etc., complete to accomplish the bypass pumping operation.

77-1.02C(2) SPLICE

When a pipe is to be spliced into an existing sewer, the existing sewer shall be exposed and then mechanically cut at right angles to the pipe barrel, with sufficient length removed so that a pipe section with plain ends can be joined to the cut pipe with approved couplings to form an airtight joint. All work shall be done in the presence of the Engineer. Care must be taken to fill all voids under and around the pipe splice with import or approved native backfill material to properly support the new pipe and prevent any settlement of the spliced section.

77-1.02C(3) CLEANOUT TO GRADE (PRIVATE LATERAL FOR BUIILDING SEWER ONLY)

A wye-branch fitting, with branch the same diameter as the private sewer, shall be installed so that it opens in a direction opposite to the flow of the sewer, vertically above the pipe barrel. Necessary fittings and pipe, of the same diameter as the private lateral, shall be used to bring the "cleanout" vertically to ground surface and an approved box and cover installed, all as shown on the Standard Details.

Cleanouts shall be constructed as shown on the Standard Details and in locations shown on approved plans. A transition coupling and cleanout shall be provided and installed at the property line.

The vertical pipe shall be plugged below subgrade of surface in improved areas and sufficiently below the ground surface in unimproved areas so as to be protected during final site preparation. After surface work is complete, the riser pipe will be extended to finished grade, capped with an airtight threaded body and cap plug and protected with an approved cleanout box per Standard Details.

77-1.02C(4) TEST WYE (PRIVATE LATERAL)

A wye-branch fitting, with branch the same diameter as the private lateral, shall be installed so that it opens in a direction opposite to the flow of the sewer vertically above the pipe barrel. The test wye shall not be removed after testing, but shall be capped with an airtight threaded body and cap and left in place. Rubber caps shall not be used.

77-1.02D EXCAVATION

77-1.02D(1) DEFINITION

Excavation shall mean all of the below ground-surface work (including cutting of pavement; control of ground water, storm water and other extraneous water; removal, handling, stockpiling and/or proper disposal of removed material and water) necessary to prepare a firm, dry bed for the sewer line and structures.

The Contractor shall be solely and completely responsible for conditions of the jobsite, including safety of all persons and property during performance of the Work. This requirement shall apply continuously and not be limited to normal working hours. Safety provisions shall conform to U.S. Department of Labor (OSHA), the California Occupational Safety and Health Act (CalOSHA), and all other applicable Federal, State, County, and local laws, ordinances, codes, including but not limited to the requirements set forth below, and any regulations that may be detailed in other parts of these Standard Specifications. In the event of conflicting requirements, the most stringent requirement as it pertains to the Contractor's safety responsibility shall be followed by the Contractor.

The excavation shall be made to enable the sewer to be laid to the grade and alignment designed on the Plans.

77-1.02D(2) OPEN TRENCHING

77-1.02D(2)(i) General

Within City of Napa right-of-way, and except where tunneling is necessary, excavation for sewers shall be made by open trenching in accordance with Details SS-24 and SS-29. Within City of Napa right-of-way, and except where tunneling is necessary, excavation for sewers shall be made by open trenching in accordance with Caltrans Case 4. Existing pavement shall be saw cut and replaced in accordance with NapaSan and Caltrans standard specifications and details. The walls of the sewer trench shall be vertical in the region between the bottom of the trench and the top of the sewer pipe. In this region:

Pipe Diameter (inches)	Clear Distance between Pipe and Vertical Trench Wall (inches)
≤8	6
8 - 18	9
≥ 18	Per Engineer

A minimum 12-inch clearance shall be maintained between the outer wall of the pipe barrel and the embankment or shoring, unless otherwise approved by the Engineer.

The trench shall be excavated to a level section and to such elevation as will give a uniform bearing and true flow line elevation when the sewer pipe is laid. All loose dirt in the bottom of the trench must be removed.

77-1.02D(2)(ii) Mud or Other Soft or Spongy Material

Where mud or other soft or spongy material incapable of proper pipe support is encountered, it shall be excavated to a minimum depth of twelve (12) inches below sewer subgrade. Limits of the material to be removed shall be designated by the Engineer in the field. However, this does not relieve the Contractor of the requirements of these Specifications, including, but not limited to, allowable deviation of alignment and grade.

When so directed by the Engineer the trench shall be extended below the pipeline grades to permit the placement of ballast for the pipe foundation. All areas of over excavation, to remove unsuitable material, or for any other reason, shall be brought to grade with approved ballast material, and compacted.

77-1.02D(2)(iii) Rock

Where rock is encountered, the trench shall be excavated to a minimum depth of three (3) inches below the sewer subgrade and backfilled to sewer subgrade with approved import material, thoroughly compacted to grade before the sewer pipe is laid.

77-1.02D(2)(iv) Over-Excavated Areas

Over-excavated areas in the trench bottom where approved trench foundation material will be placed, shall be restored to sewer subgrade with Import, thoroughly compacted before the sewer pipe is laid.

77-1.02D(2)(v) Compaction

In all the above situations, the compaction shall be achieved by mechanical means. Water settling, flooding, jetting, and other water consolidation methods are expressly prohibited.

77-1.02D(2)(vi) Bracing and Shoring

The contractor shall at all times furnish, install, and maintain sufficient bracing and shoring in trenches to ensure safety of the workmen and to protect and facilitate the work. When practical, all such bracing and shoring shall be removed from the trench as the backfilling proceeds.

77-1.02D(2)(vii) Blasting

In the event that blasting is necessary in excavation, special permission, in writing, must be obtained from the Agency having jurisdiction over the issuance of blasting permits before any blasting will be permitted. Such permission shall in no way relieve the Contractor of the responsibility for obtaining any permits or licenses required by State Law or Local Ordinance.

77-1.02D(2)(viii) Sewer Subgrade

The sewer subgrade shall be kept dry at all times and precautions shall be taken that no storm water is allowed to enter the excavation prior to backfilling. The Contractor shall, at all times, have on the job, sufficient pumping machinery for immediate use. Water shall be disposed of in accordance with the requirements of the agency having local jurisdiction, and in such a manner as to cause no damage to public health or safety, or to public or private property.

77-1.02D(2)(ix) Excavation Material

Material excavated within streets and roadways may only be reused per approval of the City or County. Any such material shall be laid alongside the trench and kept trimmed up to minimize inconvenience to public travel.

1. Free access must be provided to all fire hydrants, water gates, meters and private drives, and means shall be provided so that water can flow in the gutters uninterruptedly.
2. All materials excavated in streets and roadways and not permitted for backfill, shall be immediately removed and properly disposed of at an approved facility by the Contractor. No surplus material shall be dumped on private property.

77-1.02D(2)(x) Open Trench Permitted

The Engineer will specify the amount of open trench permitted at any one time. In general, the length of trench open at any time shall be limited to the following:

Location	Maximum Open Trench Length
Business / Commercial Areas	100 feet
Residential Areas	250 feet or 1 block, whichever is less
Undeveloped Areas	1,000 feet

No trench shall be allowed to remain open outside of work hours and/or outside of immediate work area. At the end of a work day the trench shall be backfilled or secured with steel plates.

77-1.02D(2)(xi) Contractor's Responsibility

It shall be the responsibility of the Contractor to conform to all the requirements of all permits obtained from all Agencies and to make the construction site safe against injury to people and/or livestock by erection of adequate posted barricades and/or temporary fences.

77-1.02D(2)(xii) Groundwater

The Contractor shall keep excavations free from water during construction. Groundwater shall be controlled to prevent sloughing or erosion of trench walls, softening of the bottom of excavations, or formation of "quick" conditions where effective stress is reduced due to upward movement of flow of water. The static water level shall be drawn down to a sufficient depth below the bottom of excavations to maintain the undisturbed state of natural soils and allow the placement of any fill to the specified density. Dewatering systems shall not remove natural soils. The Contractor shall control surface runoff to prevent entry or collection of water in excavations.

1. Dewatering and shoring plans should be coordinated, with consultation from a licensed geotechnical engineer as necessary, to verify subsurface soil and groundwater conditions and adequate handling of field conditions to facilitate construction.
2. The Contractor shall obtain any and all permits required in conjunction with the installation and removal of the dewatering system and shall meet all permit requirements.
3. The Contractor shall contact the local drainage authority for discharge requirements. The Contractor shall dispose of water from dewatering operations so as not to cause injury or damage to adjacent property and shall at all times remain in compliance with the requirements of the local drainage authority.

77-1.02D(2)(xiii) Trench Dams

Trench dams are required when groundwater has the potential to erode trench backfill material.

77-1.02E TRENCH BACKFILLING

77-1.02E(1) TRENCH BACKFILLING

Trench backfilling shall consist of all materials placed in an excavation in the process of constructing a sewer line and/or appurtenances. No backfill shall be deposited over a sewer line and/or appurtenances until pipe laid has been inspected and approved by the District for backfilling operations.

77-1.02E(2) PIPE FOUNDATION (IF REQUIRED BY ENGINEER)

Pipe foundation shall be that portion of the trench which is twelve (12) inches below the sewer subgrade. This portion of the trench shall be backfilled with "Trench Foundation" thoroughly compacted to achieve a firm, dry bed for the sewer pipe or structure. Locations of the "Trench Foundation" will be designated by the Engineer in the field. However, this does not relieve the Contractor of the requirements of these Specifications, including, but not limited to, allowable deviation of alignment and grade. Trench Foundation shall be wrapped in non-woven geotextile fabric composed of polypropylene. The fabric shall be consistent with 77-2.05B below.

77-1.02E(3) GEOTEXTILE FILTER FABRIC WITHIN CITY OF NAPA RIGHT-OF-WAY

Section 77-1.02E(3) applies only to geotextile filter fabric within City of Napa right-of-way.

If required by the Engineer, geotextile filter fabric shall be used to wrap pipe foundation and pipe embedment as specified herein and as indicated on the Standard Details. The requirement for geotextile filter fabric may vary depending on groundwater and soil conditions.

Geotextile filter fabric shall be a non-woven material consisting of polyester, nylon, polypropylene filaments formed into a stable network. The fabric shall be permeable, not act as a wicking agent, be inert to commonly encountered chemicals, be rot-proof, and resistant to ultraviolet light.

The geotextile fabric shall also conform to the following physical properties:

Property	Test Value	Test Method
Weight	5.4 oz/yd^2 (min.)	ASTM D3776/D5261
Grab Tensile Strength	150 lb (min.)	ASTM D4632
Elongation at Break	50% (max.)	ASTM D4632
Puncture Strength	80 lb (min.)	ASTM D4833
Burst Strength	300 psi (min.)	ASTM D3786
Apparent Opening Size	#70 (max.)	ASTM D4751
Permittivity	1.0 sec-1 (min.)	ASTM D4491
UV Resistance	70% (min.)	ASTM D4355

The geotextile fabric shall be Mirafi 160N, or approved equal.

Wrap foundation material with geotextile fabric in a “burrito wrap” and overlap geotextile minimum twelve (12) inches. Secure edges of geotextile to prevent unraveling.

77-1.02E(4) GEOTEXTILE FILTER FABRIC WITHIN CALTRANS RIGHT-OF-WAY

Section 77-1.02E(4) applies only to geotextile filter fabric within Caltrans right-of-way.

Filter fabric shall be per Caltrans Case 4 and shall be in accordance with Sections 19 and 96.

77-1.02E(5) PIPE EMBEDMENT WITHIN CITY OF NAPA RIGHT-OF-WAY

77-1.02E(5)(i) General

Section 77-1.02E(5) applies only to pipe embedment within City of Napa right-of-way.Pipe embedment shall mean that portion of the material placed within the trench from the sewer subgrade to a point at least six (6) inches, but no more than twelve (12) inches above the outside top of the pipe. "Sewer Subgrade" is defined in 77-2.05A.

77-1.02E(5)(ii) Pipe Embedment Material

Import material shall be 3/4-inch x1/2-inch clean crushed rock. Alternate backfill bedding material may be used only if prior written approval is granted by the District Engineer. This approval is on a case-by-case basis.

Pipe bedding material shall be compacted by and tamping to a minimum ninety (90%) relative compaction from six inches (6”) below the bottom of pipe to a point twelve inches (12”) above top of pipe.

77-1.02E(5)(iii) Backfill

Import backfill is approved gravel, sand or rock material, free from deleterious substances, graded so that it will compact readily to a stable base with the following minimum requirements meeting the Caltrans Class 2 Aggregate Base standard for 3/4-inch maximum grading.

1. The material shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the following grading:

Sieve Size	Percent Passing (by Weight)
1-inch Sieve	100%
3/4-inch Sieve	90% - 100%
No. 4 Sieve	35% - 60%
No. 30 Sieve	10% - 30%
No. 200 Sieve	2% - 9%

2. The material shall also have a minimum sand equivalent (Test Method of Northern California 217) of 25, a minimum resistance (R) value (Test Method of Northern California 301) of 78, and a minimum durability index (Test Method of Northern California 229) of 35.

77-1.02E(5)(iv) Trench Excavation Material

Acceptable trench excavation material shall be that material which is free from vegetable matter and refuse and shall contain no concrete, stones or clods larger than 3/4-inch in diameter and shall contain sufficient fines so that all voids will be filled when compacted.

77-1.02E(5)(v) Pipe Embedment Installation

Pipe bedding material shall be import backfill material for main and laterals in public utility and District easements, public rights-of-way and paved private property.

77-1.02E(6) PIPE EMBEDMENT WITHIN CALTRANS RIGHT-OF-WAY

77-1.02E(6)(i) General

Section 77-1.02E(6) applies only to pipe embedment within Caltrans right-of-way.

Pipe embedment shall be per Caltrans Case 4 and shall be in accordance with Section 19.

77-1.02E(7) TRENCH BACKFILL MATERIAL

77-1.02E(7)(i) General Trench backfill material is considered to be all material placed in the trench between the pipe embedment and the road bed or ground surface.

77-1.02E(7)(ii) Backfill in Public Right-of-Way

Section 77-1.02E(7)(ii) applies only to pipe embedment within City of Napa right-of-way.

The material, placement and compaction shall be done in accordance with the requirements and inspection of the City or County.

77-1.02E(7)(iii) Backfill in Caltrans Right-of-Way

Section 77-1.02E(7)(iii) applies only to pipe embedment within Caltrans right-of-way.

Backfill shall be per Caltrans Case 4 and shall be in accordance with Section 19.

77-1.02E(7)(iv) Compaction

The method the Contractor uses to meet compaction requirements is not specified except for the following limitations.

1. Compaction shall be achieved by mechanical means. Water settling, jetting,
2. ponding, and other water compaction methods are prohibited. Compaction testing shall be done in accordance with the requirements of the City or other agency having jurisdiction.
3. For sloped trenches, or when heavy-impact compaction equipment is used, such as sheep-foot wheels and self-propelled compactors, the Contractor shall protect the pipe from being damaged during mechanical compaction. The remainder of the backfill shall be in accordance with the requirements of the City or County.

77-1.02F MISCELLANEOUS REQUIREMENTS

77-1.02F(1) INSPECTION

All work done under these specifications shall be subject to rigid inspection and shall be performed to the satisfaction of the Engineer.

The Contractor shall, at any time when requested by the Engineer, submit at his/her expense, properly authenticated documents of materials and performance tests as proof to the District of compliance with these Specifications.

The Engineer shall, at all times, have access to the work during construction, and the Contractor shall provide proper and safe facilities for such access and inspection.

77-1.02F(2) ALTERATIONS

The Engineer reserves the right to make such alterations or deviations, additions or omissions from the approved plans as may be determined during the progress of the work to be necessary and advisable for the proper completion thereof.

77-1.02F(3) DEFECTIVE WORK AND/OR MATERIALS

All work which has been rejected shall be remedied, or removed and replaced by the Contractor in a manner acceptable to the Engineer.

All materials not conforming to these Specifications shall be considered as defective and all such materials, whether in place or not, will be rejected. They shall be removed immediately from the site of the work.

77-1.02F(4) MANHOLE PROTECTION

Particular care must be taken to protect new and existing manholes from damage and to keep rock, dirt or debris from getting into the sewer. The contractor will be responsible to see that the manholes are kept clean and free from debris. Submit protection plan to District Engineer for review. Plan shall include protection materials, methods and devices.

On new manholes, or manholes that have had frame and cover removed, a steel cover of adequate strength, close fitted and well secured, shall be installed over the manhole opening until the frame and cover are permanently installed.

Ground or surface water must be kept out of existing sewers. Temporary plugs may be required by the Engineer to effect this protection.

77-1.02F(5) USE OF EXISTING LATERAL SEWERS

Existing private sewers disconnected from buildings that have been demolished, or moved, may be used for new buildings only when found by the Engineer to be in conformity with these Specifications. Full bore rodding and television inspection of the building sewer will be required as part of the review process.

77-1.02F(6) PUBLIC (STREET) LATERAL MARKING

Each public (street) lateral shall be marked at the location where it passes under the property curb in the following manner:

1. Where new curbs are constructed, a three (3) inch high letter "S" shall be impressed with an approved stamp into the fresh concrete on the curb so as to be clearly visible.
2. Where curbs already exist, a three (3) inch high letter "S" shall be neatly chiseled on the curb so as to be clearly visible.

77-1.02F(7) TRACER WIRE AND NON-DETECTABLE MARKING TAPE

77-1.02F(7)(i) General

Curved sections of sewer mains and laterals shall have tracer wire and green marker tape installed within the trench per the standard details.

77-1.02F(7)(ii) Tracer Wire

Tracer shall be AWG No. 10 THWN insulated copper tracer wire attached to top center of pipe, secured minimum of every 10 feet. Except for approved splice locations, tracer wire shall be continuous and without splices between sewer structures. Where a spliced location is approved, the following conditions must be met:

1. Crimping wires is not an acceptable method for splicing.
2. The spliced connection shall be securely bonded together with a watertight connector such as Nicotap Tracer Wire System KT1-102-D or approved equal to provide electrical continuity.
3. Tracer wire must be electrically continuous along the entire length of the pipe with wire terminations in valve boxes, vaults, or structures.
4. Tracer wire shall be tested with NapaSan present for inspection and all failed segments repaired by the contractor prior to paving.

77-1.02F(7)(iii) Non-Detectable Marking Tape

Non-detectable sewer marking tape shall be 5 mil., 3 inches wide, green in color, and shall read “Caution Buried Sewer Line Below”.

77-1.02F(8) REPAIR OF DAMAGED SEWERS AND OTHER UTILITIES

77-1.02F(8)(i) New Main and/or Public (Street Laterals)

Main and/or public (street) laterals not yet accepted by the District that are damaged during construction will be repaired by the Sewer Contractor in accordance with these Specifications and Standard Details. The work shall be done in the presence of and to the satisfaction of the Engineer. The portion of the pipe bedding from sewer subgrade to outside bottom of sewer pipe shall be satisfactorily installed before the pipe is laid.

77-1.02F(8)(ii) Existing Main Sewer or Appurtenances

Repairs or relocations of existing main sewers or appurtenances required by reason of damage, or conflict, will be performed by the District or by Contractors engaged with the District through a Contract or Permit. Upon completion of the work, the District will bill the party responsible for payment thereof.

77-1.02F(8)(iii) Existing Private Laterals

Except as noted below or otherwise agreed to by the District, all work involving repair or relocation of existing private laterals shall be done by private Contractors. Minimum inspection fees must be paid and a sewer construction permit issued prior to start of work. All work must be done per District Specifications and subject to District Inspection.

77-1.02F(8)(iv) Repair of Other Agency Facilities

Repair of other Agency utilities damaged during construction shall be made in accordance with the requirements of the Agency concerned.

77-1.02F(9) WINTERIZING SANITARY SEWER SYSTEM DURING CONSTRUCTION

If the sanitary sewer system is connected to the District's existing sanitary sewer system but construction of the site improvements are not complete, the contractor shall install measures to block stormwater from entering the sewer system. If winterizing is required by the District Engineer, the contractor shall coordinate with the District regarding specific requirements.

77-1.02G TESTING

77-1.02G(1) TESTING MAIN SEWERS

77-1.02G(1)(i) General

The Contractor shall, in the presence and under the direction of the Engineer, test the

air tightness of all main sewer lines. The test will be made between each adjacent structure and between the most upstream structure and dead-end. The air test will be made only after all other utilities and the curb and gutter have been installed and before any street base rock has been oiled. The Engineer shall be present during installation of plugs prior to air testing.

77-1.02G(1)(ii) When Tested

In areas to be paved, per Improvement Plans, when the outside top of the sewer is less than three (3) feet below the top of backfill, the air test shall be made after the "base rock" portion of the paving is satisfactorily compacted and before any street base rock has been oiled.

In areas to be paved, per Improvement Plans, when the outside top of the sewer main is three (3) feet or more below top of backfill, the air test shall be made after all other utilities and the curb and gutter have been installed and the "sub-base"material portion of the paving is satisfactorily compacted.

The air test as noted above is considered the "official test". However, preliminary air testing is strongly recommended and may be conducted by the Contractor at any time prior to the "official test".

As directed by the Engineer, the Contractor shall conduct a preliminary air test if the Engineer has reason to believe that the Contractor's means and methods have impacted the condition of the system. The preliminary test will not be considered the "official test".

77-1.02G(1)(iii) Equipment

The Contractor shall furnish all necessary equipment, including but not limited to: an air compressor, air hoses, blank plug, liquid-filled test gauge, test plug, stopwatch, and personnel for conducting the test.

77-1.02G(1)(iv) Air Test Procedure

Air testing sewer mains, particularly larger diameter mains, can be very dangerous due to the very large forces developed. The Contractor shall be fully responsible and take all precautions necessary to ensure the safety of their workers. All plugs shall be adequately braced and restrained to support the full load developed. No workers shall be allowed in the excavation or manhole while the line is under pressure. The Contractor shall make provisions for reading the pressure at the ground surface and for safely releasing the air pressure without entering the manhole or excavation.

The following procedure shall be used for air testing:

1. Prior to testing, clean pipe to be tested by propelling a snug fitting inflated rubber ball through the pipe with water and remove any debris.
2. Plug all pipe outlets with suitable test plugs. Brace each plug securely.
3. If the pipe to be tested is submerged in groundwater, insert a pipe probe by boring or jetting into the backfill material adjacent to the center of the pipe, and determine the pressure in the probe when air passes slowly through it. This is the backpressure due to groundwater submergence over the end of the probe. All gauge pressures in the test shall be increased by this amount.
4. Add air slowly to the portion of the pipe being tested until the internal pressure is raised to 4.0 PSIg.
5. Check exposed pipe and plugs for abnormal leakage by coating with a soap solution. If any leakage is observed, bleed off air and make necessary repairs.
6. After an internal pressure of 4.0 PSIg is obtained, allow at least two (2) minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.
7. After the two (2) minute period, disconnect the air supply.
8. When pressure decreases to 3.5 PSIg, start stopwatch. Determine the time in seconds that is required for the internal air pressure to reach 2.5 PSIg. The minimum allowable time in seconds shall be based on the diameters and lengths of pipe under test in accordance with the table below. At the Inspector's option, the test may be conducted for a pressure drop of 3.5 to 3.0 pounds per square inch and 1/2 of the time shown.

Minimum Specified Time Required For 1.0 PSIg Pressure Drop* For Size and Length of Pipe Indicated for Q=0.0015											
Pipe Dia.	Min. Time	Length for Min. Time	Time for Longer Length	Specification for Length (L) Shown (Min:Sec)							
(in)	(Min:Sec)	(ft)	(sec)	100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	0.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24

*Pressure air testing shall be done in accordance with the "Uni-Bell PVC Pipe Association" Bulletin No. Uni-8-6-90 using the table above.

If the pipe installation fails to meet these air test requirements, the Contractor shall determine the source or sources of leakage, and he shall repair or replace all defective materials or workmanship per approval of the Engineer. The completed pipe installation shall meet the requirements of this test.

77-1.02G(1)(v) Mandrel or Deflector Test

Mandrel test for flexible pipes shall also meet the requirements specified in 77-2.01B(1).

For flexible pipe less than 18" in diameter:

Upon completion of the air test, the Contractor shall pull a mandrel or deflectometer, approved by the Engineer, through the installed flexible pipe. This test shall be performed without mechanical pulling devices. Mandrel shall not be tampered with.

77-1.02G(2) TESTING PRIVATE AND PUBLIC SEWER LATERALS

77-1.02G(2)(i) General

The Contractor shall, in the presence and under the direction of the District Inspector, test the air-tightness of all private and public sewer laterals. The test will be made between the cleanout to grade at the property line, "test-wye" or manhole and the most upstream dead-end at a point not more than two (2) feet outside the building line (see 77-2.07B(1)-2 below for exception). Note that actual connection of the private sewer to the building plumbing will not be permitted until the main sewer to which it connects has been accepted for use by the District and the herein described testing has been satisfactorily completed. Entry into “live” District manholes requires District approval.

77-1.02G(2)(ii) When Tested

In all areas, the official air test shall be made after the backfill is satisfactorily compacted, base rock installed and all other underground utilities, private and public, installed.

Preliminary air testing is strongly recommended and may be conducted by the Contractor at any time prior to the "official test".

Exception to 1 above is for residential private laterals when a water test is authorized by indication on the Plans or as directed by the District Inspector in the field. In these cases, the following procedure will be used: After the private sewer has been laid, and the pipe bedding installed to the satisfaction of the District Inspector, the sewer shall be filled with water in the presence of the District Inspector. Any and all leaks shall be found and repaired by the Contractor in accordance with these Specifications, after which the sewer trench shall be immediately backfilled.

77-1.02G(2)(iii) Equipment

Same as main sewers Section 77-2.06A(2).

77-1.02G(2)(iv) Procedure

Same as main sewers Section 77-2.06A(3).

77-1.02G(2)(v) Mandrel or Deflectometer

Upon completion of the air test, the Contractor shall pull a mandrel or deflectometer approved by the Engineer between manholes on sewer lines six (6) inches in diameter and larger. This test shall be performed without mechanical pulling devices. Pull tag lines shall be attached to both sides of mandrel.

77-1.02G(3) ORDER OF WORK

The following order of work shall be performed by the Contractor following construction of the sewer mains and laterals, manholes, and sewer system appurtenances after placement and compaction of road base:

1. Preliminary Punch list
2. Preliminary Air Test
3. Mandrel Test
4. Installation of curb, gutter, sidewalk, and other surface features
5. Official Air Test
6. Clean Entire Sewer System
7. CCTV Inspection
8. Paving. Coordinate with District Engineer on timing for final pavement lift.
9. Final Punch list

77-1.02H CLOSED CIRCUIT TELEVISION (CCTV) INSPECTION

77-1.02H(1) CCTV INSPECTION

Prior to acceptance of any sanitary sewer line by the District, said line shall be inspected internally by the contractor by color CCTV as outlined below.

Defects such as high and low spots, joint separations, offset joints, chipped ends, cracked or damaged pipe, infiltration points and debris in lines shall be corrected by the Contractor. The camera equipment

shall include a gauge that is visible in the video footage to accurately determine the depth of any standing water. For joint separations, low spots and chipped ends, the following maximum acceptable limits shall apply:

Pipe Size / Type	Limits
4" Lateral	No standing water, indentation or chipped ends will be permitted.
6" – 10" Dia. Sewer Pipe	Joint separations - 1/2 inch Low spots - 1 inch maximum depth Chipped ends - 1/4 inch
10" or Greater Dia. Sewer Pipe	Specific maximum limits set by District for each project.

1. The complete job is ready for television inspection when the following work has been completed.
   a. All sewer pipelines are installed and backfilled.
   b. All structures are in place, all channeling is complete and pipelines are accessible from structures.
   c. All other underground facilities, utility piping and conduits are installed.
   d. Final street subgrade is complete.
   e. Pipelines to be inspected have been preliminarily balled, flushed and the vertical deflection test completed for flexible sewer lines.
   f. Final air test has been completed.
2. When the above work is complete, the Contractor shall arrange for the television inspection.
3. The Contractor of the project will notify the District in writing as to the scheduled date of the television inspection.
4. After conditions in Section 8.01.1 as outlined above are met, the entire job will be initially televised.
   a. A DVD or USB Drive will be made and defects requiring correction will be noted.
   b. Each mainline segment shall have a dedicated video file. The video file shall be named according to NapaSan's standard naming convention: "Manhole 'A##-###'– Manhole 'B##-###' – Street Name".
   c. Each lateral mpeg/mpg/mp4 file shall be named with the property address then the street name
   d. Electronic version (.jpg) of still photographs saved on DVDs or USB Drives
      i. Each jpg photograph will be named by street name then property address
   e. Video file shall include the following information within the footage:
      i. Project Name
      ii. Date of survey
      iii. Location (Road name & address for laterals)
      iv. Manhole number to manhole number (in order of inspection)
      v. Direction of survey (upstream or downstream)
      vi. Time of start of survey
      vii. Content (pre or post CCTV)
      viii. Video footage shall include footage information.
   f. Video file shall conform with the following requirements:
      i. Lighting and camera quality shall provide a clear, in-focus picture of the inside periphery of the sewers and laterals for all conditions except submergence.
      ii. Under ideal conditions the camera lighting shall allow a clear picture up to five pipe diameter lengths away for the entire periphery of the sewer.
      iii. The lighting shall provide uniform light free from shadows or hot spots.
      iv. The video recorder shall be paused if the camera progress is stopped for a period longer than 30 seconds due to breakdown of equipment, or any purpose other than analyzing conditions of the sewer.
      v. During inspection, the following information shall be electronically generated, automatically updated, and displayed on the CCTV monitors:
         1. Survey unit location in the sewer line in feet and tenths of feet adjusted zero
         2. Sewer diameter
         3. Abbreviated manhole reference numbers (upstream and downstream of manholes in order of survey direction)

g. A digital Microsoft Access database conforming to Version 7 of the NASSCO PACP database standard populated with all inspection and defect information shall be submitted to NapaSan
h. If no deficiencies are observed, the work will be considered satisfactory.

5. The Contractor will be notified in writing of any deficiencies revealed by the television inspection that will require repair. If corrective work is indicated and the Contractor wishes to view videotapes, he shall contact the District to set a time for the viewing with the Engineer.
6. Corrective work shall be done.
7. Those portions of the pipeline system that have been corrected must be re-televised.
8. The procedure outlined above will be repeated until all deficiencies observed by television inspection have been corrected to the complete satisfaction of the District.

77-1.02I CLEANING

77-1.02I(1) General

After the sewers have satisfactorily passed the tests required in 77-2.07 - Testing, and structures, backfilling and final paving are completed, the Contractor, in the presence of the District Inspector, shall clean each section of the sewer in the following manner:

77-1.02I(2) Sewer Mains

The District Inspector shall visually inspect the sewer and if in his/her opinion cleaning is necessary, the Contractor shall clean the sewer to the satisfaction of the District Inspector. District may clean the sewer at Contractor's request and at his/her expense.

Cleaning shall be performed by high pressure hydraulic cleaning or jetting.

77-1.02I(3) Four (4) Inch and Six (6) Inch Private and Public Sewer Laterals

When in the opinion of the Engineer, the sewer is not clean it shall be flushed or otherwise cleaned so as to properly serve its intended function.

1. High pressure hydraulic cleaning or jetting may be allowed with the prior approval of the District Engineer.
2. A screen or basket shall be used to remove debris removed from pipe during cleaning activities. The method shall be approved by the Engineer.

77-1.02J DESIGN AND POLICY STANDARDS FOR MAIN SEWERS AND PUBLIC LATERALS

77-1.02J(1) PIPE MATERIALS

Pipe materials are limited to Poly Vinyl Chloride Pipe (PVC, SDR 26, and C900 CL 165). Additional pipe materials may be used upon approval by the engineer.

77-1.02J(2) PIPE MATERIAL CHANGES

Size or pipe material changes and vertical deflections are not allowed between any two manholes.

77-1.02J(3) SIZE AND SLOPE FOR PUBLIC LATERALS

A minimum pipe size of 4-inch with a minimum slope of 2.0% will be allowed for public laterals only.

77-1.02J(4) ALIGNMENT

Sewer shall be laid in a straight alignment except that horizontal curved sewers may be used for flexible pipe only when located within a defined street area and concentric with center of street unless otherwise approved. Minimum curve radius shall be in accordance with 77-2.03A(5).

77-1.02J(5) GRADE

Sewer shall be designed and constructed on a straight grade.

77-1.02J(6) GRADE STAKES

Unless otherwise required by the Engineer, sewer construction stakes will be located at 50 feet maximum intervals except that on horizontal curves and on sewers with a slope flatter than 0.0034 feet per foot the maximum spacing will be 25 feet.

The stakes shall be offset from the center line of the sewer at a safe distance from the edge of the trench but in no case greater than 10 feet unless authorized by the Engineer. The stakes will be marked with off-set distance and station only. Cut sheets for the staking should be provided to the District.

77-1.02J(7) DESIGN DEPTH

To avoid interference between sewer laterals and other utilities, the sanitary sewer main should be designed, when possible, with no less than three (3) feet and no greater than eleven (11) feet of cover from finished grade.

77-1.02J(8) MINIMUM PIPE COVER

Minimum permitted cover over outside top of pipe bell to top of "backfill" or to existing ground at time of sewer installation, whichever is lower, shall be no less than three (3) feet. Cover requirements for other pipe materials and sizes will be based on their strength characteristics as approved by the Engineer.

Special Pipe Cover – Main and Trunk Sewers – Special pipe cover shall be used when total cover over main or trunk sewers is less than three (3) feet, and may be required when total cover will not be placed immediately after pipe installations, or when other special conditions exist.

1. Two (2) to three (3) feet of cover shall require the use of C-900, DR 18, or shall require concrete encasement of pipes of material other then C-900, DR 18.
2. Less than two (2) feet of cover requires special design subject to the approval of the Engineer.
3. Through cultivated or landscaped areas, special pipe cover requirements shall be modified by replacing the upper six (6) inches of excavation material with top soil.

77-1.02J(9) TRENCH INTERSECTIONS

Non-perpendicular crossings/intersections between the sanitary sewer and other underground utilities require approval of Engineer.

77-1.02J(10) HORIZONTAL AND VERTICAL CLEARANCE REQUIREMENTS

A minimum outside-to-outside horizontal clearance of five (5) feet shall be maintained between the sewer mains and structures and adjacent non-potable water and stormwater underground utility mains and structures. Provide eight (8) feet outside-to-outside separation from planter strips and six (6) feet separation from continuous sidewalk and concrete curbs, unless approved by the engineer.

A minimum vertical clearance between the sewer main and adjacent, non-potable water underground utility mains shall be six (6) inches. Greater clearance may be required by the District.

77-1.02J(11) CONNECTION BETWEEN PUBLIC AND PRIVATE LATERAL

A test wye shall be constructed at locations shown on Plans or as required by the Engineer to facilitate testing of the private sewers.

77-1.02J(12) PUBLIC LATERAL CONNECTIONS TO EXISTING MAIN

The public lateral will connect to an existing main as follows:

When the diameter of the connecting public lateral is less than the diameter of the existing or new main the contractor shall match the crowns at the connection.

77-1.02K DESIGN AND POLICY STANDARDS FOR PRIVATE LATERALS

77-1.02K(1) SIZE AND SLOPE

Minimum size of private sewer shall be four (4) inches in diameter but in no case smaller than the building drain (building plumbing) stub diameter. Plumbing fixture unit values, as established by the latest edition of the Uniform Plumbing Code, shall be used in designing the private sewer.

Pipe Dia. (in)	Min. Slope (%)
4	2.0
6	1.0

Slopes for larger pipes will require review and approval by the engineer.

77-1.02K(2) PIPE MATERIALS

Pipe materials shall be limited to Poly Vinyl Chloride Pipe (PVC, SDR 26 or C900 CL 150). Additional pipe materials may be used upon approval by the engineer.

77-1.02K(3) ALIGNMENT

Sewer alignment shall be as straight as possible. When angle points are approved, only one vertical 45-degree (maximum) change of direction is permissible without a cleanout. Any additional vertical changes of direction, thereafter, in excess of 22-1/2 degrees shall be served by a cleanout or manhole. A cleanout shall also be placed at all blind bends or other locations along the alignment where access is limited. Ninety degree bends or tees and horizontal changes of direction are not permitted.

77-1.02K(4) GRADE

Unless otherwise authorized by the Engineer, the sewer shall be designed and constructed on a straight grade between the main sewer and the property line and between the property line and the building drain (building plumbing). Changes in grade shall be served by a cleanout or manhole.

77-1.02K(5) GRADE STAKES

When cut sheets are required by the Engineer, sewer construction stakes shall be located at angle points, grade breaks, cleanouts, wyes, structures and at a 50-foot maximum spacing. An additional stake will also be required at property line and at connection point with building plumbing (building drain).

The stakes shall be offset from the center line of the sewer at a safe distance from the edge of the trench but in no case greater than ten (10) feet unless authorized by the Engineer. The stakes will be marked with off-set and station only.

When the sewer is to be constructed to property line only, the Engineer may require a stake to be set at the point prior to construction.

77-1.02K(6) CURB MARKING

At the time the curb stakes are set (prior to construction of curb and gutter) an additional stake must be set on the curb stake line opposite the point at which the private sewer crosses the property line. This will insure that the "S" can be stamped in the fresh concrete in the proper location as required under 77-2.06F.

77-1.02K(7) CONNECTION TO PUBLIC LATERAL

Unless otherwise permitted or required by the Engineer, the connection of the private lateral shall be made at the clean out stub from the public lateral at the property line see standard detail. The connection of the private lateral to the public lateral shall be airtight and at the option of the Engineer may require air testing.

77-1.02K(8) CONNECTION TO EXISTING PRIVATE SEWER

Private laterals, from a) a structure having a finished floor elevation at or lower than the top elevation of the nearest upstream manhole; or b) structures on a parcel with different finish floor elevations, shall have either:

1. An approved backwater overflow device or
2. An approved backwater check valve installed.

These backwater preventing devices shall be installed on the private lateral outside of and adjacent to the structure being protected. In the event any question exists whether such device is required, the final decision shall be made by the District.

The connection may be made by means of a private manhole, wye spliced into existing private sewer or stub installed by means of a tap made by "Tap Tite" or approved equal, all as shown on Standard Details and on District Approved Plans.

Actual connection of a new private sewer to an existing private sewer will not be permitted until the new sewer has been satisfactorily tested. If authorized by the Engineer, a test wye may be used with a plug in lieu of leaving a temporary gap in the sewer.

77-1.02K(9) CONNECTION TO BUILDING DRAIN (PLUMBING KICK-OUT)

After a permit authorizing said construction has been issued, private sewers may be constructed up to a point five (5) feet from the building wall. Actual connection of the private sewer to the building drain (building plumbing) will not be permitted until the main sewer or private sewer to which it connects has been accepted by the District and the subject private sewer has been satisfactorily tested in accordance with 77-2.07 - Testing.

Actual connection must be done by a sewer contractor with a valid sewer construction permit issued by the District. Work must be done in the presence of and to the satisfaction of the District Inspector.

77-1.02K(10) CLEARANCES

All clearances shall conform to the State of California, Department of Health Services, “Guidance Criteria for the Separation of Water Mains and Non Potable Pipelines”. See also 77-2.10J.

77-1.02K(11) SEWER UNDER OR NEAR STRUCTURES

Any sewer deeper than the footing of any building or structure and paralleling the same must be designed to be of sufficient distance from the footing so that no part of the trench will fall within a 45-degree line drawn downward from the bottom of the footing.

Any sewer than crosses under a structure or retaining wall shall be installed in a casing unless otherwise noted.

77-1.02K(12) MINIMUM PIPE COVER

Minimum cover for private lateral sewers shall be:

Cover Required	Location
3.0 – 5.0 feet	Property Line
1.0 foot min.	Building Cleanout / Connection

Cover requirements for other pipe materials and sizes will be based on their strength characteristics as approved by the Engineer.

77-1.02K(13) TRENCH INTERSECTIONS

Avoid non-perpendicular crossings/intersections between the sanitary sewer and other underground utilities.

77-1.02K(14) HORIZONTAL UTILITY CLEARANCE

A minimum horizontal clearance of five (5) feet should be maintained between the private sewer and adjacent underground utility lines and concrete curbs. A minimum horizontal clearance of ten (10) feet should be maintained between the private sewer and parallel water mains or services unless otherwise noted.

77-1.02K(15) STRUCTURE TYPE AND LOCATION

77-1.02K(15)(i) Cleanout to Grade “C.O.T.G.”

A cleanout shall be constructed on four (4) inch and six (6) inch sewer laterals at intervals not to exceed 100 feet as well as at blind bends greater than 45-degrees. See Section 77-2.11N(2) below for requirements at connection to building plumbing. No cleanout is required on runs less than 10 feet in length (See 77-2.03C).

77-1.02K(15)(ii) Other Structures

Other structures required will be located as shown on approved Plans and be constructed in accordance with District requirements.

77-1.02K(16) OVERFLOW DEVICES

Overflow protection devices shall be installed on private sewers when specifically required by the Engineer. The particular device to be used and its installation must be approved by the Engineer. This device will be required on all residential and commercial buildings where the floor elevation is six (6) inches or less above the closest upstream manhole rim elevation.

77-1.02L PAYMENT

Payment for 4" sewer lateral installation shall include all work and materials required per City of Napa Standard Detail S-12, NapaSan Standard Plans SS-1, SS-2, SS-3, SS-4, SS-7, SS-13, and SS-29, and Section 77-2 Sewer.

The contractor shall provide all labor, materials, equipment, and incidentals necessary to complete the installation of a fully functional sewer lateral. No additional compensation will be allowed therefore.

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DIVISION IX TRAFFIC CONTROL DEVICES

82 SIGNS AND MARKERS

Replace section 82-6 Reserved with:

82-6 MONUMENT SIGN

82-6.01 GENERAL

82-6.01A Summary

Section 82-6 includes specifications for the Redwood Park and Ride Monument Sign.

82-6.01B Definitions

Not Used

82-6.01C Submittals

Submit manufacturer's technical literature and all related diagrams for the Redwood Park and Ride Monument Sign.

Submit the following Manufacturer information:

1. Provide overview literature describing manufacturer's overall scope of products and manufacturing capabilities.
2. Provide URL for manufacturer's web site; web site must provide access to technical data, images and detailed product for all items that form the product's assembly. Otherwise, the detailed information shall be provided by the Contractor that has been generated by the manufacturer.
3. Provide manufacturer's toll-free telephone number for product support.
4. Provide complete list of materials proposed for use under this contract, including manufacturer's catalog number and description for each product in typewritten form. Obtain approval of materials from the Engineer before proceeding.

Submit shop drawings indicating specific mounting devices, materials, processes and mounting condition.

1. Shop drawings shall be submitted for review prior to fabrication. Shop drawings shall show design, materials (kind, thickness, and finish), dimensions, connections, mountings, colors and other details necessary to ensure that they accurately interpret the Design Plans and these Technical Specifications.
2. Shop drawings shall be presented in a clear and thorough manner, drawn to scale and not subsequently reduced to fit a drawing format. Title each drawing with the Contract name and sign number(s) and location(s).
3. Identify field dimensions; show relation to critical features, work, or adjacent products.
4. Shop drawings shall show typical message copy, graphics, symbols and finish for each different sign face.
5. Shop drawings that are submitted shall be complete drawings that have been fully engineered with all applicable and relevant details provided in each drawing for each sign type.
6. It is expressly understood that approval of the Contractor's shop drawings shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work in conformity with the requirements of the Design Plans and any specifications. Approval of the shop drawings shall not operate to waive any of the requirements of the plans and any specifications or relieve the Contractor of any obligation thereunder, and defective work, materials and equipment may be rejected notwithstanding the approval.
7. Contractor may request, in writing, permission from NVTA and Engineer to use equipment or material of a different type in place of the equipment or material specified.
8. The NVTA and Engineer, before considering or granting the request, may require the Contractor to furnish, at the Contractor's expense, evidence satisfactory to the NVTA and Engineer that the equipment or material proposed for use by the Contractor is capable of producing work equal to, or better than, that which can be produced by the equipment or material specified.
9. If permission is granted by the NVTA and Engineer, it shall be understood that the permission is granted for the purpose of testing the quality of work actually produced by the equipment or material and is subject to continuous attainment of results which, in the opinion of the NVTA and Engineer, are equal to, or better than, that which can be obtained with the equipment or material specified.
10. The NVTA and Engineer shall have the right to withdraw any permission at any time that the NVTA and Engineer determines that the alternative equipment or material is not producing work that is equal, in all respects, to that which can be produced by the equipment or material specified.
11. Upon withdrawal of permission by the NVTA and Engineer, the Contractor will be required to use the equipment or material originally specified and shall, in accordance with the directions of the NVTA and Engineer, remove and dispose of or otherwise remedy, at the Contractor's expense, any defective or unsatisfactory work produced with alternative equipment or material.
12. Neither NVTA nor the Contractor shall have any claim against the other for either the withholding or the granting of permission to use alternative equipment or material, or for the withdrawal of the permission.
13. Permission to use alternative equipment or material in place of equipment specified will only be granted where the equipment or material is new or improved and its use is deemed by the NVTA and Engineer to be in the furtherance of the purposes of these Technical Specifications.
14. Nothing in these Technical Specifications shall relieve Contactor of the responsibility for furnishing materials or producing finished work of the quality specified in these Technical Specifications or in the Design Plans.

82-6.01D Quality Assurance

Samples and Procedures:

1. Sample Requirements: All samples shall be submitted together. Samples shall be 10 inches x 10 inches in size of all sign materials with the required colors and finishes to show quality, type, range, texture and other specified characteristics.
2. Samples shall be submitted from the same source, which will supply the actual job. Samples of materials or products, which are normally furnished in containers or packages, which bear descriptive labels and/or application or installation instructions, shall be submitted with such labels and/or instructions.
3. All Samples shall be labeled, tagged, or otherwise clearly identified. Labels or tags shall set forth the name of the Project, Project Number, sign or signs, location or locations and other facilities for which the Sample is being submitted, Contractor, Subcontractor, and/or supplier, the name of the manufacturer, fabricator, or processor, the trade designation, grade and quality of the material of the

product, the date of submittal, and specific identification of each sample and a precise reference to the Specification Section and paragraph wherein the material, product, or element of the work is specified. Each label or tag shall have sufficient clear space to permit the application of the review stamps to the Contractor and the NVTA and Engineer.

Quality Assurance:

1. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of a specified quality.
2. Comply fully with manufacturer's instructions, including each step in sequence.
3. Should manufacturer's instructions conflict with the Contract Documents, Design Plans and these Technical Specifications (i.e., project plans and these Technical Specifications), the Contractor shall request clarification from the NVTA and Engineer before proceeding.
4. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
5. Work shall be performed by persons qualified to produce workmanship of specified quality.
6. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
7. To establish a standard of quality, design, and function desired, portions of these Technical Specifications and Design Plans have been based on products of manufacturers mentioned hereafter. When specific products of manufacturers are mentioned, it is to be noted that equal products of other manufacturers shall be reviewed by the NVTA and Engineer upon receipt of adequate supporting data and samples.
8. Produce high quality and accurate shop drawings clearly showing all of the necessary installation, mounting and construction details for each sign type.

Performance Standards:

1. Provide written calculations and stamped shop drawings by a professional engineer legally authorized to practice in the state of California. Signage must be engineered to meet International Building Codes (IBC) and the California Building Code (CBC) including any and all wind-loading and seismic criteria.

82-6.02 MATERIALS

82-6.02A General

Each required sign structure and panel type is specified in the Design Plans as well as the general fabrication and mounting details. The Contractor shall develop construction details and fabrication engineering on the shop drawings. Final responsibility for the development and execution of the fabrication and installation detail drawings rests with the Contractor.

Provide materials, which have been selected for their surface flatness, smoothness and freedom from surface blemishes wherever exposed to view in the finished unit. Exposed-to-view surfaces, which exhibit pitting, seam marks, roller mark, die marks, "oil-canning", stains, discoloration, or other imperfections on the finished units will not be acceptable.

Where metal surfaces or fasteners will be in contact with dissimilar materials, coat the surfaces with epoxy paint or provide other means of dielectric separation as recommended by manufacturer to prevent galvanic corrosion.

82-6.03 CONSTRUCTION

Not Used

82-6.04 PAYMENT

Not Used

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84 MARKINGS

Add to the beginning of section 84-2.03A:

Prior to the street opening after HMA is placed, there shall be temporary paint, tape, or reflective markers placed per Engineer's approval. Contractor to wait a minimum of 5 days and a maximum of 10 days after HMA is placed before permanent striping is placed. Bike lane legends shall be helmeted cyclist with arrow.

All striping and legends must be cat-tracked prior to placement of striping and markings. Contractor shall notify the Engineer after the cat-tracking is placed. Striping and markings must not be placed until the Engineer has authorized the cat-tracking alignment and placement details. Contractor must submit certificates of compliance from the materials suppliers indicating compliance of the materials with the requirements as specified in the Caltrans "Signing and Delineation Materials" Approved Materials List (AML).

Replace the 2nd paragraph of section 84-2.03B(2)(b) with:

Apply extruded thermoplastic for traffic stripes in a single pass at a rate of at least 0.473 lb/ft of 6-inch-wide solid stripe. The applied thermoplastic must be at least 0.090 inch thick.

Replace section 84-9.03B with:

84-9.03B Remove Traffic Stripes and Pavement Markings Containing Lead

Residue from the removal of painted or thermoplastic traffic stripes and pavement markings contains lead from the paint or thermoplastic. The average lead concentrations are less than 1,000 mg/kg total lead and 5 mg/L soluble lead. This residue:

1. Is a nonhazardous waste
2. Does not contain heavy metals in concentrations exceeding the thresholds established by the Health and Safety Code and 22 CA Code of Regs
3. Is not regulated under the Federal Resource Conservation and Recovery Act (RCRA), 42 USC § 6901 et seq.

Management of this material exposes workers to health hazards that must be addressed in your lead compliance plan.

^^

DIVISION X ELECTRICAL WORK

86 GENERAL

Replace the 4th paragraph of section 86-1.02F(1) with:

Conductors must be copper.

Replace the 1st paragraph of section 86-1.02U with:

Monument Sign up-light shall be BEGA Part Number B86418-K4-BLK or equivalent. Coordinate with Lighting Representative (Associated Lighting Representatives, Tim Haley, 925-997-5934) for exact placement. Follow the manufacturer's installation instructions.

Bus stop luminaires shall be GRDCO Part Number OPF-S-A04-740-T5W-AR1-UNV-FS1-OPF-RMB-BK with OPF-RMB retrofit hardware or equivalent.

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87 ELECTRICAL SYSTEMS

Replace section 87-9 Reserved with:

87-9 REAL-TIME DISPLAY ASSEMBLY

87-9.01 GENERAL

87-9.01A Summary

The Real-Time Display (RTD) shall provide hub and sign-location specific real-time information regarding transit departures. The RTD units shall be furnished and installed as a complete and fully integrated unit that is assembled, tested and delivered by a single manufacturer. As approved in writing by the NCTPA Project Manager or his/her designee, the individual elements that form each RTD assembly may be manufactured by different companies, but each RTD assembly shall be assembled and delivered as a single integrated unit, fully tested at the assembling manufacturer's facilities for compliance with these Technical Specifications. There will be no exceptions.

Contractor shall make himself familiar with the Contract Documents, Design Plans and these Technical Specifications and shall provide all real-time displays required as shown on the Contract Documents, Design Plans and these Technical Specifications. The Contractor shall thoroughly examine the Contract Documents, Design Plans and these Technical Specifications, carefully checking the dimensions before commencing work, and shall report any discrepancy that occurs, and shall request interpretation before proceeding with the work.

Should there be conflicts or contradictions between these Technical Specifications and the Design Plans, these Technical Specifications shall take precedence and prevail over the Design Plans. However, in the case where the Design Plans provide more explicit detail than these Technical Specifications, the Design Plans shall prevail. In all cases, should there be any differences in requirements between these Technical Specifications and the Design Plans, the more stringent requirements shall apply.

Section 87-9 includes specifications for installing and integrating real-time displays.

A complete and fully functioning Real-Time Display system includes:

a) LCD display unit assemblies installed on standalone structures and bus shelters

b) Equipment (e.g., 4G modems) installed in cabinets and junction boxes mounted on standalone structures and bus shelters

c) Cabling

d) Splicing

e) Licenses

f) Operating manuals/system documentation

g) Training

h) Testing and Integration

The Real-Time Display System shall enable communications between the field display units and remote servers operated by NVTA, which will include streaming of data feeds from remote servers to each field display unit over new 4G wireless connections.

87-9.01B References

A. Regional Transit Wayfinding Guidelines and Standards, Version 6.0 – August 1, 2019

B. The applicable date of reference standards shall be understood to be the date of the Invitation to Bid.

C. Regional Real Time Signs Physical Requirements and Specifications (Version 4.3).

D. U.S. Department of Justice, ADA Accessibility Guidelines for Buildings and Facilities.

E. American Society for Testing and Materials (ASTM):

1. ASTM B123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

2. ASTM B153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

F. National Fire Protection Association (NFPA):

1. NFPA 70 National Electrical Code (NEC).

G. Society For Protective Coatings (SSPC):

1. SSPC SP6/NACE No. 3 Commercial Blast Cleaning

87-9.01C Submittals

87-9.01C1 Shop Drawings

Contractor must provide shop drawings that show fabrication and installation details including mounting devices.

1. Show mounting heights, locations of supports, and accessories.

2. Wiring Diagrams: Power, control, and data (communications) wiring.

87-9.01C2 Manufacturer Information

The following information must be provided:

1. Overview literature describing manufacturer's overall scope of products and manufacturing capabilities.

2. URL for manufacturer's web site; website must provide access to technical data, images and general product information.

3. Manufacturer's toll-free telephone number for product support.

4. Complete list of materials proposed for use, including manufacturer's catalog number and description for each product in typewritten form. Obtain Engineer's approval of materials before proceeding with fabrication.

5. The RTD units shall be fully warrantied for a period of 5 years by the manufacturer who assembles, tests and delivers the units.

87-9.01C3 Calculations

Submit structural calculations including wind and vibration loadings prepared by a professional Engineer registered in California with a record of successful experience providing engineering services for installations similar in design and scope to the work of this Section. Include structural calculations for anchorage.

87-9.01C4 Quality Assurance

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Fabricator Qualifications

1. Minimum 5 years' experience in the fabrication of monitors of similar size and capabilities.

2. Upon Engineer's request, provide reference list and photos of at least 10 public or commercial projects currently using similar monitors made by the fabricator.

C. Powder-Coating Applicator Qualifications: A firm experienced in successfully applying powder coatings of type indicated and employing competent control personnel to conduct continuing, effective quality-control program to ensure compliance with requirements.

87-9.02 MATERIALS

87-9.02A General

The Contractor must furnish and install, where shown on the Plans, a fully functional and operational Real-Time Display System fully inter-operable with NVTA's existing real-time arrival system.

The Contractor is required to supply the necessary real-time display assemblies and units required for testing purposes to demonstrate that the system performs as specified.

The Contractor must conduct testing in the presence of the ENGINEER, or Engineer designated representative, as described below under "System Operation" during the signal test period. The Contractor shall give the ENGINEER a minimum of two working days' notice prior to performing the tests.

87-9.02B Products

The LCD display assembly shall consist of the following:

- Display Monitor and Controller
- Display Enclosure (environmentally rated)
- 4G Modem
- Equipment mounting assembly

Real-Time Information Display assemblies shall be able to receive and display location-specific real-time information regarding transit arrivals from NVTA using 4G wireless connections. Contractor shall coordinate with NVTA on the procurement of the 4G modems including setting up the accounts, configuration and testing.

Display Controller: The controller shall be a personal computer (PC) which shall include a standard web browser such as Internet Explorer. In lieu of a separate PC, the controller may be integrated with the monitor as a single unit subject to the approval of the Engineer.

For the real-time display that will be installed in a standalone configuration, the assembly includes the mounting structure consisting of poles, frames, base plates and equipment mounting for the real-time display unit.

The display enclosure shall be selected for the specific locations in accordance with these technical specifications and as noted on the Plans. The screen and controller shall be contained in a single stainless steel housing and anti-glare reflective protection for the screen. Where screen is recessed in wall panel, controller may be in a separate housing providing the same rating as the screen.

The housing enclosure shall meet the following minimum specifications:

1. Integrated 120V power source for both screen and sign controller. If power source is not within 5 feet of the display and sign controller, an in-line cut-off (disconnect) switch shall be furnished and installed.
2. Stainless steel shall conform to material requirements specified in Section 05 70 00, Decorative Metal.
3. The screen and sign controller enclosures shall be IP65-rated for exterior installations and IP 54-rated for interior installations except as otherwise approved by the Engineer.
4. If necessary, outdoor rated enclosures shall have Air Conditioning (AC) units to maintain the proper operating temperature recommended by the manufacturer of the real-time display sign and controller, except as otherwise approved by the Engineer.

Brackets, Anchors, and Inserts shall be fabricated from stainless steel to suit location and mounting conditions. Where exposed to view, stainless steel shall be Type 314 with brushed finish.

87-9.02C Electrical

1. Contractor must furnish and install conduit, wiring, pull boxes, and other electrical components as necessary to provide power and communications connections for complete and functioning real-time display system.
2. Contractor must field verify all existing electrical and communications conduits, junction boxes and circuits before beginning work and ordering new electrical materials.
3. Contactor must field verify operations of proposed communications links (wireless and hardwire) to existing routers and install additional equipment (e.g. external antennas, extenders) as necessary for a complete and functioning system.

87-9.03 FABRICATION

87-9.03A General

Provide assemblies of configurations indicated.

1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.
2. Mill joints to tight, hairline fit. Form joints exposed to exclude water penetration.
3. Form joints to eliminate light leaks. Provide gasketing and seals as required to ensure weather-tight assembly.
4. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.
5. Fabrication shall be clean and true and in accordance with applicable National codes and specifications.
6. All contact surfaces, whether bolted or welded, shall be checked for true plane faces and the absence of burrs or other obstructions to snug fits.

Shop assemble units and apply finishes and graphics in accordance with the Contract Plans, manufacturer's standards and approved shop drawings. Shop assemble units and apply finishes and graphics in accordance with the Contract Plans, manufacturer's standards and approved shop drawings. Contractor shall assume full liability, with regard to damages and losses as a result of incorrect and/or insufficient sign fabrication and installation.

87-9.03B Steel Finishes

Hot-dip galvanized products made from rolled, pressed, and forged steel shapes, castings, plates, bars, and strips indicated to be galvanized to comply with ASTM A123.

1. Hot-dip galvanized steel and iron hardware indicated to be galvanized to comply with ASTM A153.
2. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.

Prepare, treat, and coat non-galvanized ferrous metal to comply with resin manufacturer's written instructions and as follows:

1. Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils or resin manufacturer's recommended thickness, whichever is greater.

Prepare, treat, and coat galvanized metal to comply with resin manufacturer's written instructions and as follows:

1. Prepare galvanized metal by thoroughly removing grease, dirt, oil, flux, and other foreign matter.

2. Treat prepared metal with zinc-phosphate pretreatment, rinse, and seal surfaces.

3. Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils or resin manufacturer's recommended thickness, whichever is greater.

Select color to suit specific locations subject to the approval of the Engineer; typically, black. Sheen: satin.

87-9.03C Delivery, Storage, and Handling

Deliver, store, and handle materials in accordance with the manufacturer's instructions. Store in dry, secure location, protected against direct sunlight and excessive heat.

The Contractor will coordinate with the NVTA Project Manager and Designee, and will allow for an appropriate area for all deliveries to be assembled for inspection prior to installation. The Contractor will provide time in scheduling a job for sufficient time to allow for corrections and repairs to be completed at job site before installation if needed.

87-9.04 INSTALLATION, TESTING, AND INTEGRATION

87-9.04A General

The sign shown on the Plans is located schematically. The Contractor shall notify the NVTA Project Manager and Designee of any location or installation modification changes from those indicated on the Plans and gain approval before installation.

The Contractor shall lay out all the work and make all surveys necessary for the satisfactory completion of the work in accordance with the Design Plans and these Technical Specifications. The Contractor shall be responsible for all measurements required for the execution of the work.

Verify that substrates are stable and capable of supporting the weight of units.

Clean surfaces thoroughly prior to installation.

Protect surrounding finishes and fixtures from damage by work performed by Contractor.

Locate components in accordance with approved plans and complying with manufacturer's written instructions, as applicable.

Install monitors and enclosures level and plumb, with surfaces free of distortion and other defects in appearance.

Attach brackets and fittings securely with concealed fasteners and anchoring devices in accordance with the approved shop drawings.

Complete connections to internet. Demonstrate that each assembly including web browser is functioning and connected to the internet, and that all popups, screen savers and automated scripts have been disabled.

Verify that each assembly has been tested per the Real-Time Display Test Plan as outlined in the Regional Transit Wayfinding Guidelines and Standards.

Separate measurement and payment will not be made for work required under this Section. All costs in connection with the work specified herein will be considered to be included with the related item of work in the Bid Schedule of the Bid Form, or incidental to the Work.

In order to minimize time for field configuring and troubleshooting communications equipment after the Real-Time Display is installed, the Contractor should set up a testbed for each sign prior to the deployment of any real-time signs. All communications equipment and configurations should be set up and tested as if it were in the field (per the post installation test), including remote check-in. Contractor should run the testbed with test scripts and under different scenarios, including power failure, and communications failure, and recovery and troubling shooting procedures.

87-9.04B Cleaning and Protection

Clean exposed surfaces in accordance with manufacturer's instructions.

87-9.05 PAYMENT

Not used.

Add to the end of section 87-21.03C:

Modifying a Park and Ride Lot includes removing, adjusting, or adding:

1. Foundations
2. Pull boxes
3. Conduit
4. Conductors
5. Luminaires
6. Service equipment enclosure
7. Photoelectric control
8. Fuse splice connectors
9. Real-Time Sign

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DIVISION XI MATERIALS

90 CONCRETE

Add to the end of section 90-1.01C(6)(a):

Concrete mix design shall be designed by an approved testing laboratory or Licensed Engineer and submitted to the Structural Engineer for approval.

Replace section 90-2.02A Reserved with:

Section 90-2.02A only applies to concrete for the prefabricated restroom, including slab, footings, walls, topping, and apron. Concrete shall have a minimum ultimate compressive strength (f'_c) at 28 days as shown in the following table:

	f'_c	Hardrock Aggregate Size[b]	Max Slump[c]	Inspection Req'd
Footings, stem walls, slabs & retaining walls	3,000 psi	1"	4"	No
Concrete walls and grade beams[a]	3,000 psi	1"	4"	Yes
Topping for steel deck	3,500 psi	1"	4"	Yes
All other concrete	3,000 psi	1"	4"	Yes

[a]All slabs connecting to grade beam shall be 3,000 psi with special inspection, unless noted otherwise.
[b]Pea gravel shall not be used unless written approval is obtained from Structural Engineer
[c]Slump measured without plasticizer. If plasticizer is used, a higher final slump may be allowed upon Engineer's review.

Portland Cement shall conform to ASTM C-150, Type I or II. Aggregate for hardrock concrete shall conform to all requirements and tests of the latest ASTM C-33. Concrete mixing operations shall conform to ASTM C-4.

Max water-to-cement ratio of 0.57 shall be used at all locations, unless otherwise noted.

Water-reducing plasticizers may be used to achieve design slump at maximum water-to-cement ratio noted.

Fly ash, where used, shall be limited to 20% of total cementitious mix.

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