



City of Tualatin

Self-Evaluation and Transition Plan:
Appendix A: ADA Task Force Meeting Agendas

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agenda

ADA Task Force – Meeting #1

Date 10/25/17

Time 6:30 PM - 8:00 PM

Participants ADA Task Force

6:30 pm – 6:35 pm

Introductions

6:35 pm – 6:50 pm

Project Overview

- Goals, Process and Schedule
- Role of the Task Force

6:50 pm – 7:10 pm

Strengths and Opportunities

- What's working well?
- Where are the greatest opportunities?

7:10 pm – 7:30 pm

Challenges and Issues

- What are the biggest challenges?
- What are the biggest needs?

7:30 pm – 7:50 pm

Planning Priorities

- Prioritization Criteria Development
- Federal Priorities for the right-of-way
- ADA Barrier Removal Priorities Tualatin

7:50 pm – 8:00 pm

Next Steps

In compliance with the Americans with Disabilities Act, if you need special assistance or accommodation to participate in this meeting, contact Kelsey Lewis at 503-691-3032 or klewis@tualatin.gov. Please notify the City at least thirty-six (36) hours prior to the meeting to enable the City to make reasonable arrangements to assure accessibility to this meeting.

agenda

ADA Task Force – Meeting #2

Date 12/13/17

Time 6:30 PM - 8:30 PM

Participants ADA Task Force

6:30 pm – 6:45 pm

Project Status Report

6:45 pm – 7:30 pm

Summary of Facility Analysis Results

- Buildings
- Parks
- Right-of-Way

7:30 pm – 8:25 pm

Transition Plan Phasing

- Priorities

8:25 pm – 8:30 pm

Next Steps

In compliance with the Americans with Disabilities Act, if you need special assistance or accommodation to participate in this meeting, contact Kelsey Lewis at 503-691-3032 or kewis@tualatin.gov. Please notify the City at least thirty-six (36) hours prior to the meeting to enable the City to make reasonable arrangements to assure accessibility to this meeting.

agenda

ADA Task Force – Meeting #3

Date **3/19/18**

Time **6:30 PM - 8:30 PM**

Participants
ADA Task Force

6:30 pm – 7:30 pm

Overview of Draft Plan

7:30 pm – 8:25 pm

Discussion and Comments

8:25 pm – 8:30 pm

Next Steps

In compliance with the Americans with Disabilities Act, if you need special assistance or accommodation to participate in this meeting, contact Kelsey Lewis at 503-691-3032 or kewis@tualatin.gov. Please notify the City at least thirty-six (36) hours prior to the meeting to enable the City to make reasonable arrangements to assure accessibility to this meeting.

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City of Tualatin

Self-Evaluation and Transition Plan:
Appendix B: Policies and Programs Reviewed

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- 1,000 Books Before Kindergarten (<https://www.tualatinoregon.gov/library/1000-books-kindergarten>)
- 2015 Annual Report: Tualatin Library Advisory Committee (https://www.tualatinoregon.gov/sites/default/files/fileattachments/library_advisory_committee_tlac/page/4821/2015-16_tlac_report_to_council.pdf)
- 2017 ArtSplash Art Show and Sale (<https://www.tualatinoregon.gov/recreation/2017-artsplash-art-show-and-sale>)
- About Us (<https://www.tualatinoregon.gov/recreation/about-us>)
- ADA Policy and Notice (<https://www.tualatinoregon.gov/administration/ada-accessibility>)
- Adult Drop-In Athletics & Tournaments (<https://www.tualatinoregon.gov/recreation/adult-drop-athletics-tournaments>)
- Adult Events & Enrichment Programs (<https://www.tualatinoregon.gov/recreation/adult-events-enrichment-programs>)
- Adult Fitness, Health & Wellness Programs (<https://www.tualatinoregon.gov/recreation/adult-fitness-health-wellness-programs-0>)
- Adult Programs and Services (<https://www.tualatinoregon.gov/recreation/adult-programs-and-services>)
- Adult Services & Support Groups (<https://www.tualatinoregon.gov/recreation/adult-services-support-groups>)
- Adult Trips & Travel (<https://www.tualatinoregon.gov/recreation/adult-trips-travel>)
- Adults (<https://www.tualatinoregon.gov/library/adults>)
- Advisory Committees and Boards (<https://www.tualatinoregon.gov/advisorycommittees>)
- Application Checklist - Fire Alarm and Suppression (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/3969/fire_alarm_suppression_checklist.pdf)
- Application for Medical Gas Permit (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/3964/medical_gas_permit.pdf)
- Appointment with a Tutor / Cita con un tutor (<https://www.tualatinoregon.gov/library/appointment-tutor-cita-con-un-tutor>)
- Arbor Week (<https://www.tualatinoregon.gov/recreation/arbor-week-0>)
- Arbor Week 2016 Flyer (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/4911/2016_arbor_week_ppt.pdf)
- Arbor Week Submission Form and Artist Release (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/4911/arbor_week_photo_contest_submission_form_artist_release.pdf)
- Architectural Review Checklist for Commercial, Industrial & Public (City of Tualatin Fact Sheet)
- ArtWalk Brochure (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/4698/06.15.16_artwalk_brochure-low_res.pdf)
- Atfalati Park (<https://www.tualatinoregon.gov/recreation/atfalati-park>)

- Banner Permit Application Instructions (https://www.tualatinoregon.gov/sites/default/files/fileattachments/planning/page/5096/sign_-_banner_rev_20150825.pdf)
- Borrowing Materials (<https://www.tualatinoregon.gov/library/borrowing-materials>)
- Brainfuse HelpNow™ Online Homework Help (<https://www.tualatinoregon.gov/library/brainfuse-helpnow%E2%84%A2-online-homework-help>)
- Bring in Your Tualatin Memories (<https://www.tualatinoregon.gov/library/bring-your-tualatin-memories>)
- Brown's Ferry Park (<https://www.tualatinoregon.gov/recreation/browns-ferry-park>)
- Building Permit Application (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/5007/application_-_building_permit_2015.pdf)
- Citizen's Statement of Interest for Board or Committee Appointment (<https://www.volgistics.com/ex/portal.dll/ap?AP=1954903020>)
- City of Tualatin Job Application (<https://agency.governmentjobs.com/tualatinor/default.cfm>)
- City of Tualatin Teen Volunteer Club Application (<https://www.volgistics.com/ex/portal.dll/ap?ap=1568002928>)
- City of Tualatin Volunteer Application (<https://www.volgistics.com/ex/portal.dll/ap?AP=1292724023>)
- Class Registration Information (<https://www.tualatinoregon.gov/recreation/class-registration-information>)
- Combustible Stock Storage Questionnaire (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/4262/13combustible_stock_storage_questionnaire.pdf)
- Commercial Kitchen Hood Performance Verification (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/4263/13commercial_kitchen_hood_verification_form.pdf)
- Commercial Phased Project Matrix (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/4264/13commercial_phased_project_matrix.pdf)
- Commercial Plan Review Submittal Checklist (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/4261/commercial_plan_review_checklist.pdf)
- Community Services Contact Information (<https://www.tualatinoregon.gov/communityservices/community-services-contact-information>)
- Complaint of ADA Noncompliance (<https://www.tualatinoregon.gov/administration/webforms/complaint-ada-noncompliance>)
- Concerts on the Commons (<https://www.tualatinoregon.gov/recreation/concerts-commons>)
- Cool Down at the Library / ¡Mantente fresca en la biblioteca! (<https://www.tualatinoregon.gov/library/cool-down-library-%C2%A1mantente-fresca-en-la-biblioteca>)

- Credit Card Authorization Form (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/4265/13credit_card_authorization_form.pdf)
- Cultural Pass to Adventure (<https://www.tualatinoregon.gov/library/cultural-pass-adventure>)
- Current Advisory Committee Openings (<https://www.tualatinoregon.gov/advisorycommittees/current-advisory-committee-openings>)
- Drop-In Activities (<https://www.tualatinoregon.gov/recreation/drop-activities>)
- Excavation & Grading Permit Application (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/5009/00excavation_grading_permit_2016.pdf)
- Explore Tualatin Activity Guide (<https://www.tualatinoregon.gov/recreation/activity-guide>)
- Facility Rental Brochures [two versions] (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/4080/facility_brochure.pdf); (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/18991/newfacbroch_2013_pohl.pdf)
- Facility Rentals (<https://www.tualatinoregon.gov/recreation/facility-rentals>)
- Facility Use Permit for Sports Fields (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/4051/fieldusepermit.pdf)
- Fall Storytimes (<https://www.tualatinoregon.gov/library/fall-storytimes>)
- Fire Alarm System Affidavit for Alterations or Tenant Improvements (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/19401/fafaaffidavit_10-2016.pdf)
- Fire Sprinkler Affidavit (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/3966/sprinkler_-_affidavit.pdf)
- Friends Used Book Sale (<https://www.tualatinoregon.gov/library/friends-used-book-sale-2>)
- Get Involved (<https://www.tualatinoregon.gov/recreation/get-involved>)
- Heritage Center (<https://www.tualatinoregon.gov/recreation/heritage-center>)
- Heritage Tree Nomination Form (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/4854/heritagetreenominationform_fillable.pdf)
- Heritage Trees (<https://www.tualatinoregon.gov/recreation/heritage-trees>)
- Ibach Park (<https://www.tualatinoregon.gov/recreation/ibach-park>)
- Ice Age Floods: How the Northwest was Shaped (https://www.tualatinoregon.gov/sites/default/files/fileattachments/community/page/4810/ice_age_floods.pdf)
- Ice Age Tonquin Trail Master Plan (<https://www.tualatinoregon.gov/recreation/ice-age-tonquin-trail-master-plan>)
- Ice Control Pre Treatment Map (https://www.tualatinoregon.gov/sites/default/files/fileattachments/public_works/page/5262/anti-icing_program.pdf)
- Interactive Maps Gallery (<http://gisapps.tualatinoregon.gov/Gallery/index.html>)

- Juanita Pohl Center Emergency Exit Map (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/18871/juanita_pohl_center_layout_emergency_exit_map.pdf)
- Jurgens Park (<https://www.tualatinoregon.gov/recreation/jurgens-park>)
- Kids (<https://www.tualatinoregon.gov/library/kids>)
- Lafky Park (<https://www.tualatinoregon.gov/recreation/lafky-park>)
- Library - Homebound: Books-by-Mail Service (<https://www.tualatinoregon.gov/library/homebound-books-mail-service>)
- Library Anniversary (<https://www.tualatinoregon.gov/library/library-anniversary>)
- Library Calendar (https://www.tualatinoregon.gov/calendar?field_microsite_tid=225)
- Library Card Application (<https://www.wccs.org/sites/default/files/uploads/Library-Card-Application.pdf>)
- Library Cards (<https://www.tualatinoregon.gov/library/library-cards>)
- Library Computers and Other Technologies (<https://www.tualatinoregon.gov/library/library-computers-and-other-technologies>)
- Library Meeting Rooms (<https://www.tualatinoregon.gov/library/library-meeting-rooms>)
- Library News and Events (<https://www.tualatinoregon.gov/library/news-and-events-your-library>)
- Library Policies (<https://www.tualatinoregon.gov/library/library-policies>)
- Library Policy: Child Safety Policy (https://www.tualatinoregon.gov/sites/default/files/fileattachments/library/page/5126/child_safety_policy.pdf)
- Library Policy: Children’s Room and Teen Room Use Policy (https://www.tualatinoregon.gov/sites/default/files/fileattachments/library/page/5126/child_teen_room_policy.pdf)
- Library Policy: Conference Room and Study Room Use (https://www.tualatinoregon.gov/sites/default/files/fileattachments/library/page/4740/meeting_rooms_policy.pdf)
- Library Policy: Confidentiality of Library Circulation Records (https://www.tualatinoregon.gov/sites/default/files/fileattachments/library/page/5126/confidentiality_of_circulation_records.pdf)
- Library Policy: Distribution of Free Materials Policy (https://www.tualatinoregon.gov/sites/default/files/fileattachments/library/page/5126/distribution_of_free_materials.pdf)
- Library Policy: Meeting Room Use (https://www.tualatinoregon.gov/sites/default/files/fileattachments/library/page/5126/meeting_rooms_policy.pdf)
- Library Volunteer Opportunities (<https://www.tualatinoregon.gov/volunteer-listings>)
- Little Woodrose Nature Park (<https://www.tualatinoregon.gov/recreation/little-woodrose-nature-park>)
- Living Room Gallery Art Program (<https://www.tualatinoregon.gov/communityservices/living-room-gallery-art-program>)
- Lobby Display Case (<https://www.tualatinoregon.gov/library/lobby-display-case>)
- Location and Hours (<https://www.tualatinoregon.gov/library/location-and-hours>)

- Makerspace (<https://www.tualatinoregon.gov/library/makerspace-0>)
- Manufactured Dwelling and Park Trailer Installation Permit Application (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/3968/mfg_dwlg_permit_application.pdf)
- Mechanical Permit Application (<https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/3963/mechanicalpermitapp.pdf>)
- Meetings (<https://www.tualatinoregon.gov/meetings/boardsandcommissions?starting%5Bvalue%5D%5Bdate%5D=09/02/2012&ending%5Bvalue%5D%5Bdate%5D=11/01/2012&committee=259&departments=All>)
- Movies on the Commons (<https://www.tualatinoregon.gov/recreation/movies-commons>)
- Noise/Hours of Work Variance (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/4928/noise_hour_variance_form.pdf)
- Nutrition Program (<https://www.tualatinoregon.gov/recreation/nutrition-program>)
- One- and Two-Family Dwelling Building Permit Application Checklist (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/4261/sfr_check_list.pdf)
- Overdue Fine Rate Changes (<https://www.tualatinoregon.gov/library/overdue-fine-rate-changes>)
- Park Rules (<https://www.tualatinoregon.gov/recreation/park-rules>)
- Parks & Recreation Master Plan Update (<https://www.tualatinoregon.gov/recreation/webforms/parks-recreation-master-plan-update>)
- Parks (map page) (<https://www.tualatinoregon.gov/parksites>)
- Parks and Recreation Program Registration (<https://www.tualatinoregon.gov/recreation/register>)
- Parks Maintenance Division (<https://www.tualatinoregon.gov/recreation/parks-maintenance-division>)
- Picnic Shelter Rentals FAQ (<https://www.tualatinoregon.gov/recreation/picnic-shelter-rentals-frequently-asked-questions>)
- Plumbing Permit Application (<https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/3965/plumbingpermitapp.pdf>)
- Policies and Procedures for Reserving the Brown's Ferry Park Community Center (http://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/5138/browns_ferry_community_center-rental_policies.pdf)
- Policies and Procedures for Reserving the Juanita Pohl Center (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/18871/juanita_pohl_center-rental_policies_layout.pdf)
- Policies and Procedures for Reserving the Tualatin Heritage Center (http://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/5140/heritage_center-rental_policies.pdf)

- Policies and Procedures for Reserving the Tualatin Public Library Community Room (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/3954/libcommrmfacilityusepermit.pdf)
- Position Open on the Tualatin Arts Advisory Committee (<https://www.tualatinoregon.gov/volunteer/position-open-tualatin-arts-advisory-committee>)
- Position Open on the Tualatin Parks Advisory Committee (<https://www.tualatinoregon.gov/volunteer/position-open-tualatin-parks-advisory-committee>)
- Position Open on Tualatin Library Advisory Committee (TLAC) (<https://www.tualatinoregon.gov/volunteer/position-open-tualatin-library-advisory-committee-tlac>)
- Pre-Final and Certificate of Occupancy Checklist (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/5193/pre-final_inspection_certificate_of_occupancy_checklist.pdf)
- Prime Times (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/5294/prime_time_october-november_2017-final.pdf)
- Procedures and Fee Schedule for Reservation of Picnic Shelters and Sports Fields (http://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/5038/picnic_shelters-sports_field-rental_policies.pdf)
- Properly Removing a Tree from Private Property (<https://www.tualatinoregon.gov/recreation/properly-removing-tree-private-property>)
- Public Libraries Welcome All / Todos son bienvenidos en las bibliotecas públicas (<https://www.tualatinoregon.gov/library/public-libraries-welcome-all-todos-son-bienvenidos-en-las-bibliotecas-p%C3%BAblicas>)
- Public Use of Exhibit Space (https://www.tualatinoregon.gov/sites/default/files/fileattachments/library/page/5126/public_use_of_exhibit_space.pdf)
- Quilt Barn Trail (<https://www.tualatinoregon.gov/communityservices/quilt-barn-trail>)
- Rent a Kayak or Canoe at Browns Ferry Park! (<https://www.tualatinoregon.gov/recreation/rent-kayak-or-canoe-browns-ferry-park>)
- Request for Reasonable Accommodation (<https://www.tualatinoregon.gov/administration/webforms/request-reasonable-accommodation>)
- Saarinen Wayside Park (<https://www.tualatinoregon.gov/recreation/saarinen-wayside-park>)
- Sewer Fixture County Worksheet (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/5245/new_fixture_count_worksheet_2017_-_no_calcs.pdf)
- Sidewalk and Street Tree Program (<https://www.tualatinoregon.gov/recreation/sidewalk-and-street-tree-program>)
- Sign Permit Application (https://www.tualatinoregon.gov/sites/default/files/fileattachments/planning/page/5096/sign_permit_application_revised_final_04062017.pdf)
- Snow and Ice Response Plan (<https://www.tualatinoregon.gov/publicworks/snow-and-ice-response-plan>)

- Special Event Permit Application (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/4919/17-18_se_application.pdf)
- Special Event Permit Application (<https://www.tualatinoregon.gov/recreation/special-event-permit-application>)
- Special Event Permit Supplemental Information (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/4919/se_supplemental_information.pdf)
- Special Events Page (<https://www.tualatinoregon.gov/recreation/special-events>)
- Special Inspection & Testing (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/5160/special_inspection.pdf)
- Sponsorship Opportunities // Concerts & Movies on the Commons (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/5046/2017_tualatin_sponsorship_web.pdf)
- Starry Nights and Holiday Lights (<https://www.tualatinoregon.gov/recreation/starry-nights-and-holiday-lights-1>)
- Stoneridge Park (<https://www.tualatinoregon.gov/recreation/stoneridge-park>)
- Student Visual Chronicle (<https://www.tualatinoregon.gov/communityservices/student-visual-chronicle>)
- Summer Camps 2017 (<https://www.tualatinoregon.gov/recreation/summer-camps-2017>)
- Sunday Music by the Hearth (<https://www.tualatinoregon.gov/library/sunday-music-hearth>)
- Street Sweeping Program (<https://www.tualatinoregon.gov/publicworks/street-sweeping-program>)
- Structural Demolition Permit Application (https://www.tualatinoregon.gov/sites/default/files/fileattachments/building/page/4413/00demolition_permit_packet.pdf)
- Sweek Pond Natural Area (<https://www.tualatinoregon.gov/recreation/sweek-pond-natural-area>)
- Teen Adventure Camp (<https://www.tualatinoregon.gov/recreation/teen-adventure-camp>)
- Teen Library Committee (<https://www.tualatinoregon.gov/library/teen-library-committee>)
- Teen Library Committee (TLC) Application for Membership (https://www.tualatinoregon.gov/sites/default/files/fileattachments/library/page/5006/17-18_tlc_application_form.pdf)
- Teen Library Committee (TLC) Recommendation Form (https://www.tualatinoregon.gov/sites/default/files/fileattachments/library/page/5006/tlc_recommendation_form.pdf)
- Teen Volunteer Club (<https://www.tualatinoregon.gov/library/teen-volunteer-club>)
- Teens (<https://www.tualatinoregon.gov/library/teens>)
- Tennis & Pickleball Courts (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/18641/pickleball_sign_rev_august.pdf)
- The Homes and Businesses of our Forefathers (<https://www.tualatinoregon.gov/library/homes-and-businesses-our-forefathers>)

- The Tualatin Mastodon (<https://www.tualatinoregon.gov/sites/default/files/fileattachments/community/page/4810/mastodon.pdf>)
- Tonquin Trail Master Plan (<https://www.tualatinoregon.gov/recreation/tonquin-trail-master-plan>)
- Trail User Counts (<https://www.tualatinoregon.gov/recreation/trail-user-counts>)
- Tualatin Arts Advisory Committee (<https://www.tualatinoregon.gov/taac>)
- Tualatin Arts Advisory Committee: Reproduction Rights, Visual Chronicle of Tualatin (https://www.tualatinoregon.gov/sites/default/files/fileattachments/community_services/page/4782/vc_reproduction_rights.pdf)
- Tualatin Commons Park (<https://www.tualatinoregon.gov/recreation/tualatin-commons-park>)
- Tualatin Community Park (<https://www.tualatinoregon.gov/recreation/tualatin-community-park>)
- Tualatin Community Park Picnic Shelters (<https://www.tualatinoregon.gov/recreation/tualatin-community-park-picnic-shelters>)
- Tualatin Development Code (incorporates the Comprehensive Plan / Tualatin Community Plan) (Section 1.020: Administration Provisions - Definitions; Section 38.050 (11): Sign Regulations - Exempt Signs)
- Tualatin Lake at the Commons (<https://www.tualatinoregon.gov/recreation/tualatin-lake-commons>)
- Tualatin Library Advisory Committee (TLAC) (<https://www.tualatinoregon.gov/tlac>)
- Tualatin Municipal Code (6-6-030 (10): Alarm Systems Regulations - Definitions; Chapter 05-01: Library Rules of Conduct; 5-3-040 (1)(m)(ii): Tualatin Commons Regulations - General Rules and Regulations 5-2-040 (7); 5-2-040 (8): Use of City Parks and Other Recreational Areas, Providing for Remedies for Violations - General Rules and Regulations; 6-4-045 (1): Nuisances - Dog Waste Removal; 6-1-210 (3): Proscribing General Offenses and Providing Penalties - Other Offenses as Civil Infractions)
- Tualatin Parks Advisory Committee (TPARK) (<https://www.tualatinoregon.gov/tpark>)
- Tualatin Parks Map (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/5139/parkssystemmap.pdf)
- Tualatin Public Library Internet Use Policy (https://www.tualatinoregon.gov/sites/default/files/fileattachments/library/page/5126/internet_use_policy.pdf)
- Tualatin River Greenway Video (<https://www.youtube.com/watch?v=q0CgbiVihYU&feature=youtu.be>)
- Tualatin River Water Trail (<https://www.tualatinoregon.gov/recreation/tualatin-river-water-trail>)
- Tualatin Today - City Newsletter (<https://www.tualatinoregon.gov/administration/tualatin-today-city-newsletter>)
- Tualatin Visual Chronicle (<https://www.tualatinoregon.gov/communityservices/tualatin-visual-chronicle>)
- Tualatin Youth Advisory Council (<https://www.tualatinoregon.gov/recreation/tualatin-youth-advisory-council>)

- Tualatin's Heritage Trees Listing and Map (https://www.tualatinoregon.gov/sites/default/files/fileattachments/parks_and_recreation/page/4854/1999brochure.pdf)
- Tualatin's Mastodon (<https://www.tualatinoregon.gov/community/tualatins-mastodon>)
- Urban Forestry (<https://www.tualatinoregon.gov/recreation/urban-forestry>)
- Use of Library by Tutors (https://www.tualatinoregon.gov/sites/default/files/fileattachments/library/page/5126/use_of_library_by_tutors_policy.pdf)
- Volunteer Assignment Description: Tualatin Arts Advisory Committee (https://www.tualatinoregon.gov/sites/default/files/fileattachments/volunteer/page/5251/taac_assignmentdescription.pdf)
- Volunteer Assignment Description: Tualatin Library Advisory Committee (https://www.tualatinoregon.gov/sites/default/files/fileattachments/volunteer/page/5305/tlac_assignmentdescription.pdf)
- Volunteer Assignment Description: Tualatin Parks Advisory Committee (https://www.tualatinoregon.gov/sites/default/files/fileattachments/advisory_committees/page/5072/tpark_assignmentdescription.pdf)
- West Coast Giant Pumpkin Regatta (<https://www.tualatinoregon.gov/pumpkinregatta>)
- Youth Advisory Council (YAC) Application (<https://www.volgistics.com/ex/portal.dll/ap?ap=2027353080>)
- Youth Sports Leagues (<https://www.tualatinoregon.gov/recreation/youth-sports-leagues>)

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City of Tualatin

Self-Evaluation and Transition Plan:
Appendix C: Standard Plan and Specification
Review and Recommendations

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PUBLIC WORKS CONSTRUCTION CODE

CITY OF TUALATIN

ENGINEERING DIVISION

18880 S.W. MARTINAZZI AVENUE
TUALATIN, OR 97062-7092

NOVEMBER 2001

LATEST REVISION: APRIL 24, 2017

The selection and use of the enclosed specifications and standards, while in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a registered professional engineer.

REVISIONS SUMMARY

April 24, 2017 Revisions (Adopted under Resolution No. 5314-17)

Revised Specification Sections:

- Section 102.3.3 “Erosion Control Fees”
- Section 102.3.4 “Water Quality Fees”
- Section 203.2.01 “Design Speed”
- Section 312.5.00 “Sidewalk Repair”

Revised Standard Drawings:

- Commercial Driveway Approach – Curbside Planter Strip (Drawing No 440)
- Commercial Driveway Approach – Curbside Sidewalk (Drawing No 441)
- Residential Driveway Approach – Curbside Planter Strip (Drawing No 442)
- Residential Driveway Approach – Curbside Sidewalk (Drawing No 443)
- Curb and Gutter (Drawing No 470)
- Curb (Drawing No 471)

New Standard Drawings:

- Example Single Family Erosion & Sediment Control Site Plan (Drawing No 001)

Deleted Standard Drawings:

- Approach Private Driveway (Drawing No 444)

December 12, 2016 Revisions (Adopted under Resolution No. 5302-16)

Revised Specification Sections:

- Section 202.1.00 “Scope”
- Section 202.2.00 “Plan View”
- Section 203.2.02 “Sight Distance”
- Section 203.2.04 “Superelevation”
- Section 203.2.08 “Intersections”
- Section 203.2.11C “Accessways”
- Section 203.2.14 “Sidewalks”
- Section 203.2.15 “Curb Ramps”
- Section 203.2.24A “Design and Installation Requirements”
- Section 203.2.25 “Traffic Signs”
- Section 203.2.27 “Traffic Marking”
- Section 311.3.05 “Control Joints”
- Section 312.3.05 “Control Joints”
- Section 312.3.07 “Finish”

Revised Standard Drawings:

- ADA Ramp – General Notes (Drawing No 460)
- ADA Ramp – Perpendicular (Drawing No 461)
- ADA Ramp – Parallel (Drawing No 462)
- ADA Ramp – Midblock (Drawing No 463)
- Concrete Sidewalk (Drawing No 475)
- Street Sign Post (Drawing No 516)

New Standard Drawings:

- ADA Ramp – Details (Drawing No 464)
- Street Name Sign (Drawing No 517)

Standard Drawings Table of Contents

NUMBER	EFF. DATE	TITLE
001	Apr-17	EXAMPLE SINGLE FAMILY EROSION & SEDIMENT CONTROL SITE PLAN
010	Oct-01	48-INCH MANHOLE ECCENTRIC CONE TOP
011	Oct-01	48-INCH MANHOLE FLAT TOP
012	Oct-01	60-INCH MANHOLE ECCENTRIC CONE TOP
013	Oct-01	60-INCH MANHOLE FLAT TOP
014	Oct-01	72-INCH MANHOLE ECCENTRIC CONE TOP
015	Oct-01	72-INCH MANHOLE FLAT TOP
016	Oct-01	84-INCH MANHOLE ECCENTRIC CONE TOP
017	Oct-01	84-INCH MANHOLE FLAT TOP
018	Oct-01	96-INCH MANHOLE ECCENTRIC CONE TOP
019	Oct-01	96-INCH MANHOLE FLAT TOP
020	Feb-00	MANHOLE OUTSIDE DROP ASSEMBLY
021	Mar-04	MANHOLE INSIDE DROP ASSEMBLY
030	Jul-96	MANHOLE COVER AND FRAME
031	Jun-97	MANHOLE COVER AND FRAME WATERTIGHT
032	Feb-98	MANHOLE STEPS
040	Dec-01	CATCH BASIN GUTTER GRATE INLET 36-INCH
041	Dec-01	CATCH BASIN CURB INLET 30-INCH
042	Dec-01	CATCH BASIN CURB INLET 48-INCH
043	Dec-01	DITCH INLET 24-INCH
044	xxx	DITCH INLET 27-INCH
050	Feb-02	FRAME AND GRATE CATCH BASIN
051	xxx	FRAME AND GRATE DITCH INLET
060	Mar-03	MANHOLE WATER QUALITY CONTROL
100	Feb-98	SEWER CLEANOUT
240	Oct-01	PIPE TRENCH BACKFILL
270	Mar-03	CONCRETE PIPE SLOPE ANCHORS
290	Mar-04	UNDERCROSSING
300	Mar-03	SEWER BUILDING LATERAL (SERVICE)

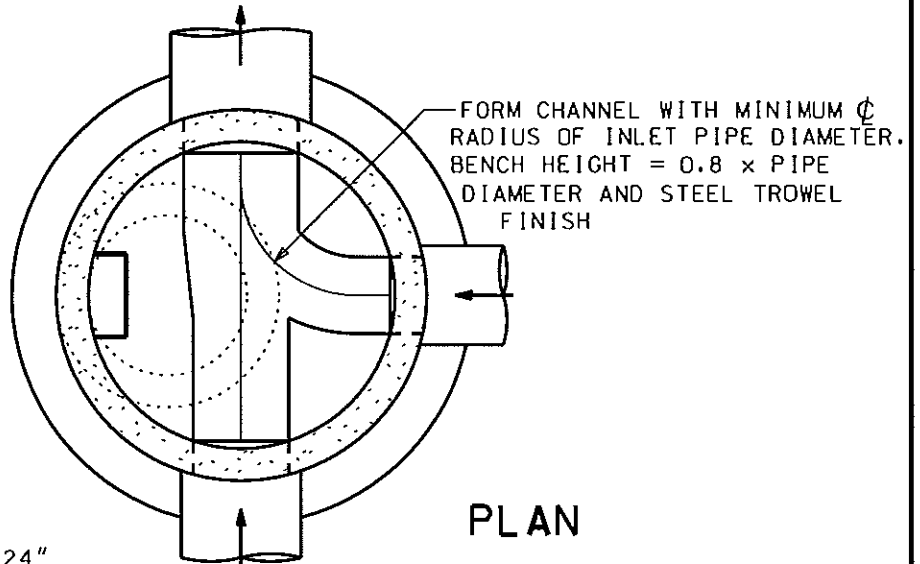
Standard Drawings Table of Contents

NUMBER	EFF. DATE	TITLE
310	Jan-02	SUBGRADE DRAIN
330	Mar-03	PIPELINE STREAM CROSSING
425	Jul-92	UTILITY LOCATIONS
435	xxx	BICYCLE/PEDESTRIAN ASPHALT CONCRETE PATH
436	xxx	BICYCLE PATH CONCRETE
437	xxx	PEDESTRIAN ACCESS CONCRETE PATH
438	xxx	PEDESTRIAN PATH CRUSHED ROCK
ADD 440-443 - DRIVEWAY APPROACHES.		
450	Oct-02	PARABOLIC SPEED HUMP CONSTRUCTION
451	Oct-02	PARABOLIC SPEED HUMP PAVEMENT MARKINGS & STREET SIGNS
452	Oct-02	SPEED TABLE HUMP CONSTRUCTION
453	Oct-02	SPEED TABLE HUMP PAVEMENT MARKINGS AND STREET SIGNS
460	Dec-16	ADA RAMP – GENERAL NOTES
461	Dec-16	ADA RAMP – PERPENDICULAR
462	Dec-16	ADA RAMP – PARALLEL
463	Dec-16	ADA RAMP – MIDBLOCK
464	Dec-16	ADA RAMP – DETAILS
470	Apr-17	CURB AND GUTTER
471	Apr-17	CURB
475	Dec-16	CONCRETE SIDEWALK
500	Oct-01	MAILBOX POST INSTALLATION
510	Feb-02	STREET BARRICADE
511	Feb-02	STREET BARRICADE SIGN
512	Mar-04	STORMWATER FACILITY SIGN
514	Feb-13	TREE WELL AND GRATE
515	xxx	TYPICAL SIGN AND STREET TREE LOCATION
516	Dec-16	STREET SIGN POST
517	Dec-16	STREET NAME SIGN
520	Apr-10	CENTERLINE SURVEY MONUMENT

Standard Drawings Table of Contents

NUMBER	EFF. DATE	TITLE
600	Apr-10	GATE VALVE AND BOX
601	Apr-10	BUTTERFLY VALVE AND BOX
602	Mar-08	1-INCH AIR RELEASE VALVE
603	Mar-08	2-INCH AIR RELEASE VALVE
604	Mar-08	SAMPLE STATION
605	Mar-08	VALVE ASSEMBLY PERMANENT BLOW-OFF
606	Mar-08	VALVE ASSEMBLY TEMPORARY BLOW-OFF
607	Mar-08	OUTSIDE RPBA 2" AND SMALLER
608	Mar-08	INSIDE RPBA 2" AND SMALLER
609	Mar-08	INSIDE RPBA 3/4"- 1"
610	Mar-03	FIRE HYDRANT ASSEMBLY
611	Mar-08	INSIDE RPBA 1 1/2"- 2 1/2"
612	Mar-08	INSIDE RPBA 2 1/2"- 10"
613	Mar-08	BACKFLOW ASSEMBLY DOUBLE CHECK 3" THRU 10"
614	Mar-08	BACKFLOW ASSEMBLY FIRE PROTECTION WITHOUT FDC
615	Mar-08	BACKFLOW ASSEMBLY FIRE PROTECTION WITH FDC
616	Mar-08	BACKFLOW ASSEMBLY REDUCED PRESSURE 3/4" THRU 2"
617	Mar-08	BACKFLOW ASSEMBLY REDUCED PRESSURE 2 1/2" THRU 10"
618	xxx	PRESSURE REDUCING/SUSTAINING ASSEMBLY
619	xxx	PRESSURE REDUCING ASSEMBLY
620	Feb-02	JOINT RESTRAINT BEARING THRUST BLOCKS
621	Oct-01	JOINT RESTRAINT GRAVITY THRUST BLOCKS
622	Oct-01	JOINT RESTRAINT STRADDLE THRUST BLOCK
630	Apr-10	WATER SERVICE 5/8" x 3/4" METER
631	Mar-08	WATER SERVICE 1" METER
632	Mar-08	WATER SERVICE 1 1/2" METER
633	Mar-08	WATER SERVICE 2" METER
634	Mar-08	WATER SERVICE 3" AND LARGER METER COMPOUND TYPE
635	Mar-08	WATER SERVICE 4" AND LARGER METER FIRE SERVICE TYPE

~~xxx~~ — Denotes drawing in progress and not included in this document



PLAN

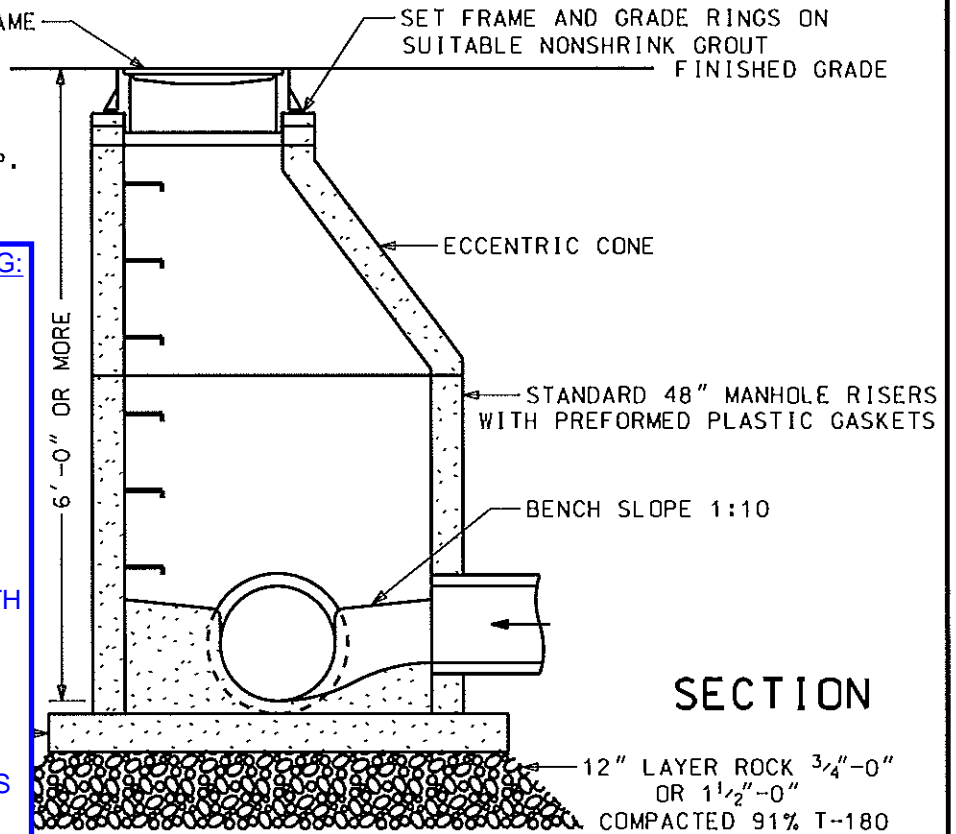
NOTES:

1. MAXIMUM PIPE DIAMETER 24"
2. MANHOLE TO CONFORM WITH ASTM C-478
3. FALL THROUGH MANHOLE = 0.20 FT
4. PLACE CONCRETE PIPE JOINT A MAXIMUM OF ONE PIPE DIAMETER FROM WALL OF MANHOLE
5. LOCATE MANHOLE COVER/FRAME AND STEPS OVER BENCH LEDGE WITH MAXIMUM DEPTH OF GRADE RINGS OF 12"
6. IN PAVEMENT, PLACE MINIMUM 12" OF 3/4"-0" OR 1 1/2"-0" COMPACTED ROCK OUTSIDE RISERS

MANHOLE COVER AND FRAME
STD. DWG O30 OR O31

SET FRAME AND GRADE RINGS ON
SUITABLE NONSHRINK GROUT
FINISHED GRADE

MAXIMUM 27" FROM TOP OF
MANHOLE COVER TO TOP STEP.
STEPS AT 12" c-c



SECTION

ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

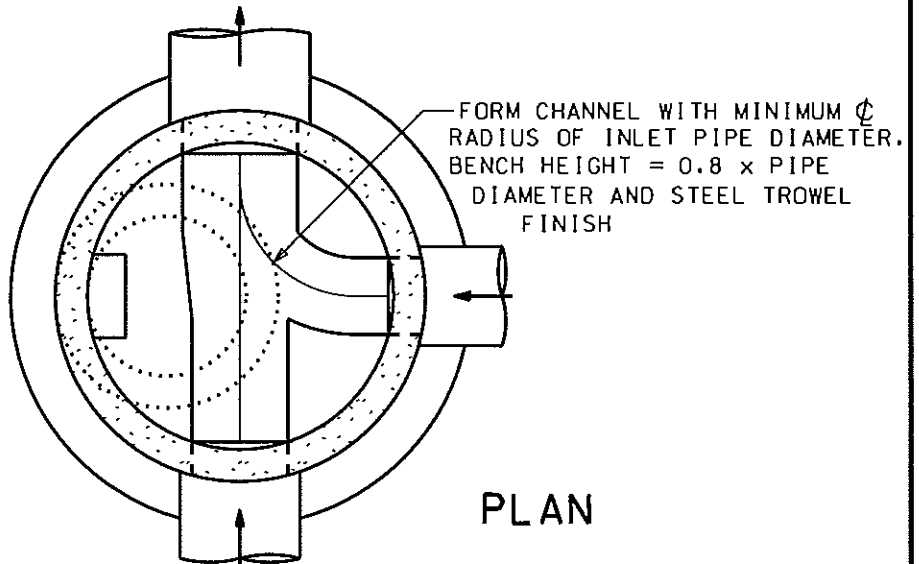
**MANHOLE
48-INCH
ECCENTRIC CONE TOP**

REVISIONS
REVISED: 12/2001
VAL ID: 3/2003

SCALE: 1:30

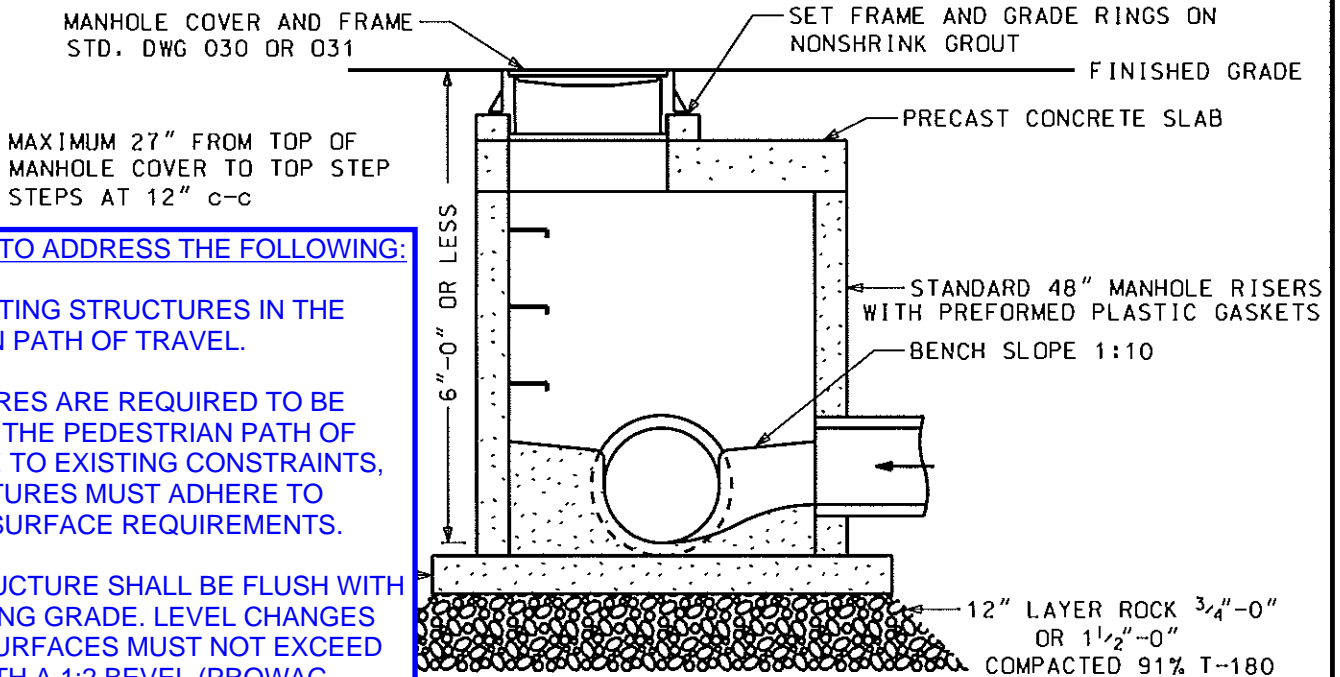
DRAWN: D.L.
APPROVED: K.L.H.

DWG NO. 010



NOTES:

1. MAXIMUM PIPE DIAMETER 24"
2. MANHOLE TO CONFORM WITH ASTM C-478
3. FALL THROUGH MANHOLE = 0.20 FT
4. PLACE CONCRETE PIPE JOINT A MAXIMUM OF ONE PIPE DIAMETER FROM WALL OF MANHOLE
5. LOCATE MANHOLE COVER/FRAME AND STEPS OVER BENCH LEDGE WITH MAXIMUM DEPTH OF GRADE RINGS OF 10"
6. IN PAVEMENT, PLACE MINIMUM 12" OF 3/4"-0" OR 1 1/2"-0" COMPACTED ROCK OUTSIDE RISERS



MAXIMUM 27" FROM TOP OF MANHOLE COVER TO TOP STEP STEPS AT 12" c-c

ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

SECTION

IN, OR

**MANHOLE
48-INCH
FLAT TOP**

REVISED: 12/2001
VALID: 3/2003

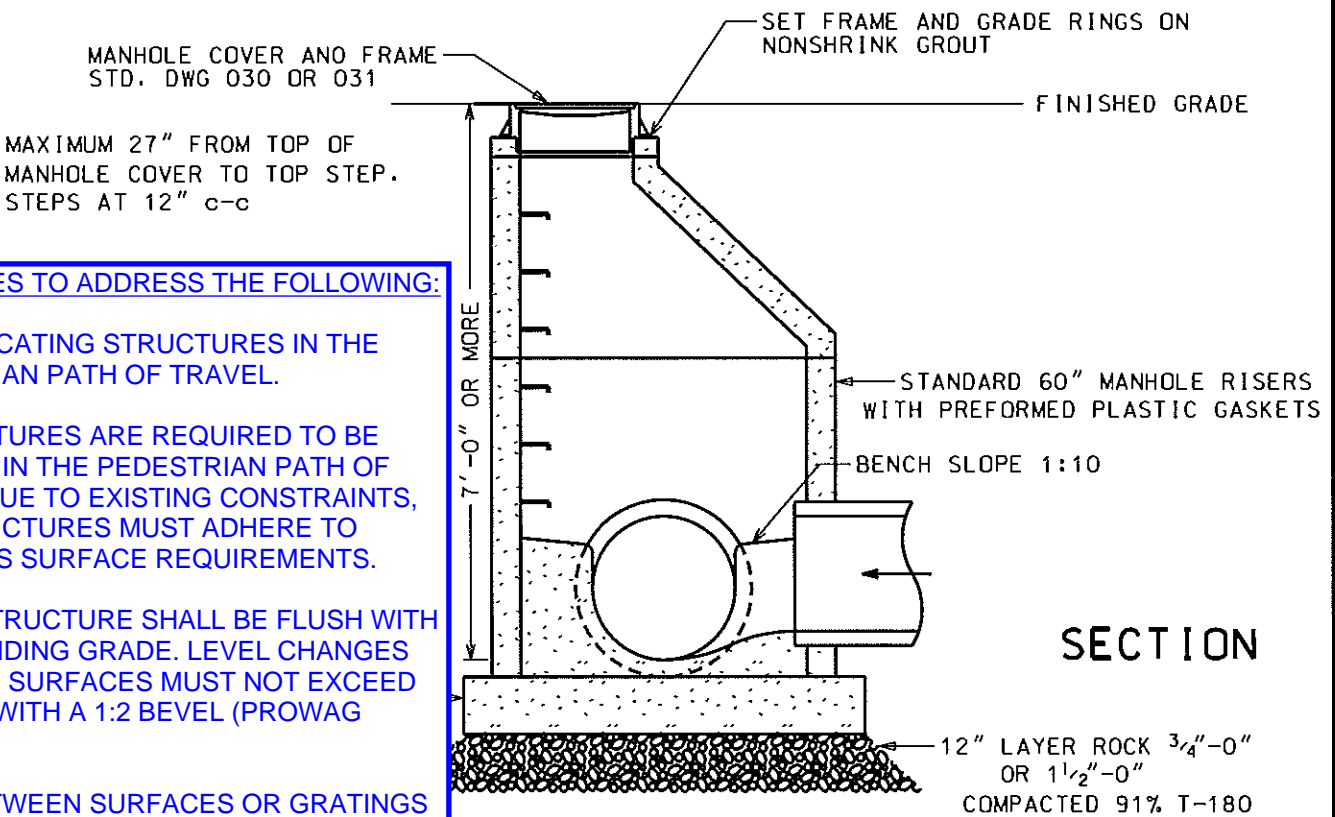
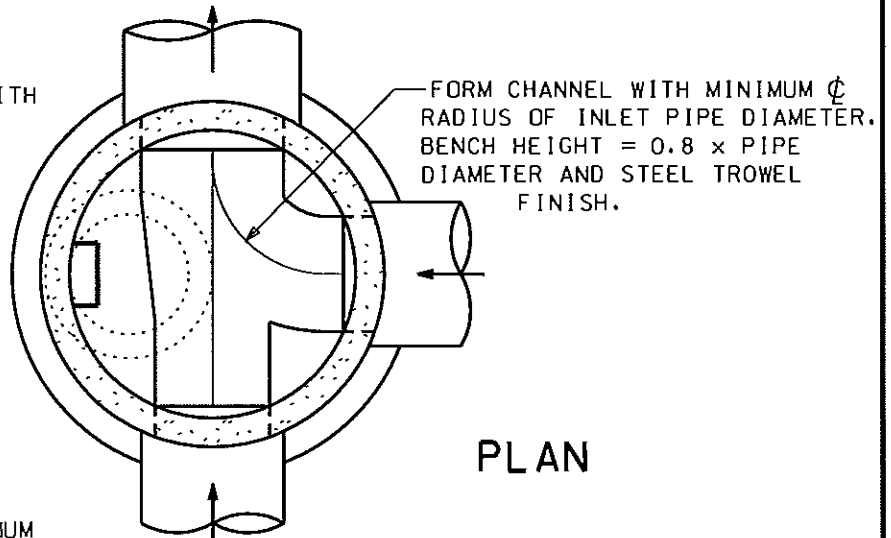
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DRAWN: D.L.
APPROVED: K.L.H.

DWG NO. 011

NOTES:

1. MANHOLE TO CONFORM WITH ASTM C-478
2. MAXIMUM PIPE DIAMETER WITH HORIZONTAL PIPE ANGLE CHANGE = 30". STRAIGHT THRU = 36"
3. FALL THROUGH MANHOLE = 0.20 FT
4. PLACE CONCRETE PIPE JOINT A MAXIMUM OF ONE PIPE DIAMETER FROM WALL OF MANHOLE
5. LOCATE MANHOLE COVER/FRAME AND STEPS OVER BENCH LEDGE WITH MAXIMUM DEPTH OF GRADE RINGS OF 15"
6. IN PAVEMENT, PLACE MINIMUM 12" OF 3/4"-0" OR 1 1/2"-0" COMPACTED ROCK OUTSIDE RISERS



ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)



TUALATIN, OR

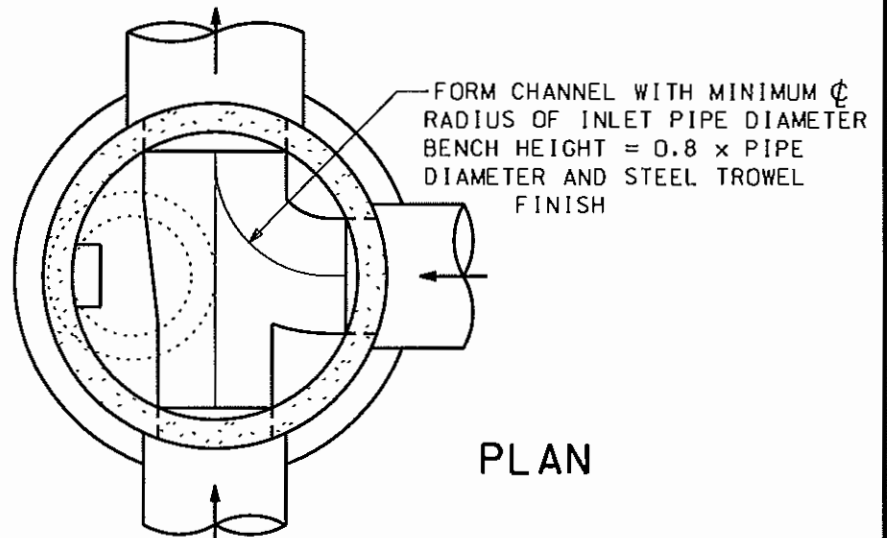
**MANHOLE
60-INCH
ECCENTRIC CONE TOP**

REVISED: 12/2001
VAL ID: 3/2003

SCALE: 1:40

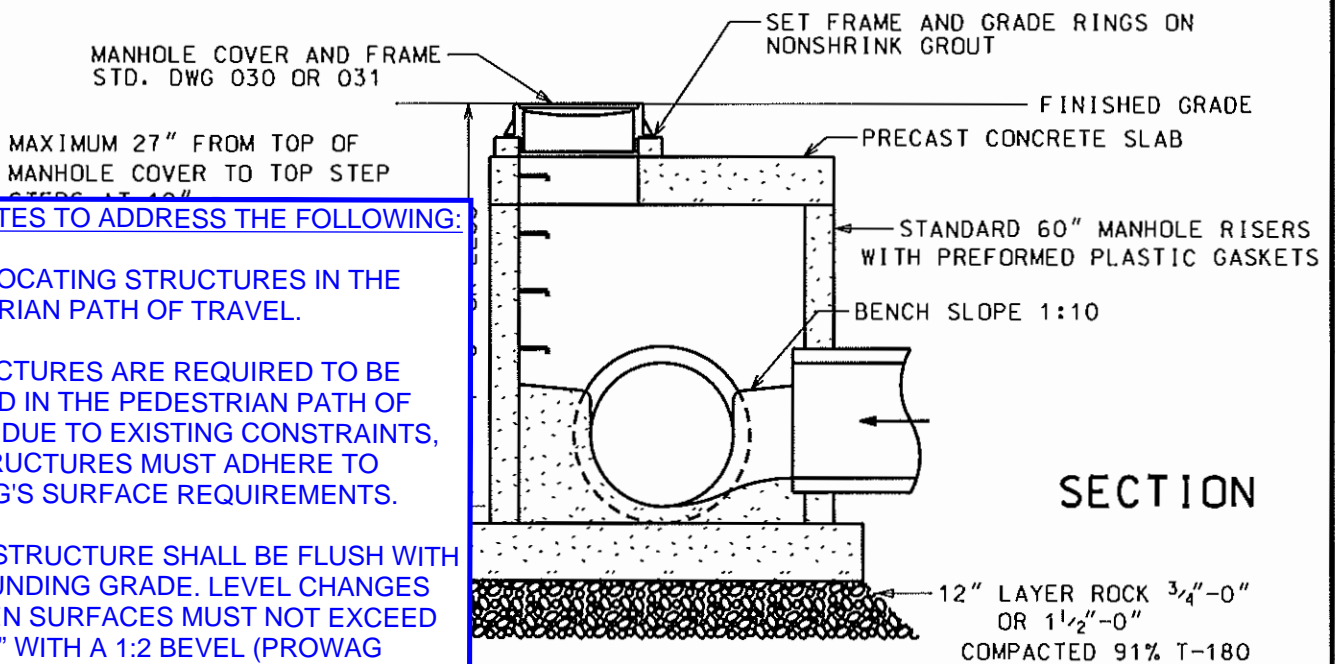
DRAWN: D.L.
APPROVED: K.L.H.

DWG NO. 012



NOTES:

1. MANHOLE TO CONFORM WITH ASTM C-478
2. MAXIMUM PIPE DIAMETER WITH HORIZONTAL PIPE ANGLE CHANGE = 30", STRAIGHT THRU = 36"
3. FALL THROUGH MANHOLE = 0.20 FT
4. PLACE CONCRETE PIPE JOINT A MAXIMUM OF ONE PIPE DIAMETER FROM WALL OF MANHOLE
5. LOCATE MANHOLE COVER/FRAME AND STEPS OVER BENCH LEDGE WITH MAXIMUM DEPTH OF GRADE RINGS OF 15"
6. IN PAVEMENT, PLACE MINIMUM 12" OF 3/4"-0" OR 1 1/2"-0" COMPACTED ROCK OUTSIDE RISERS



ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

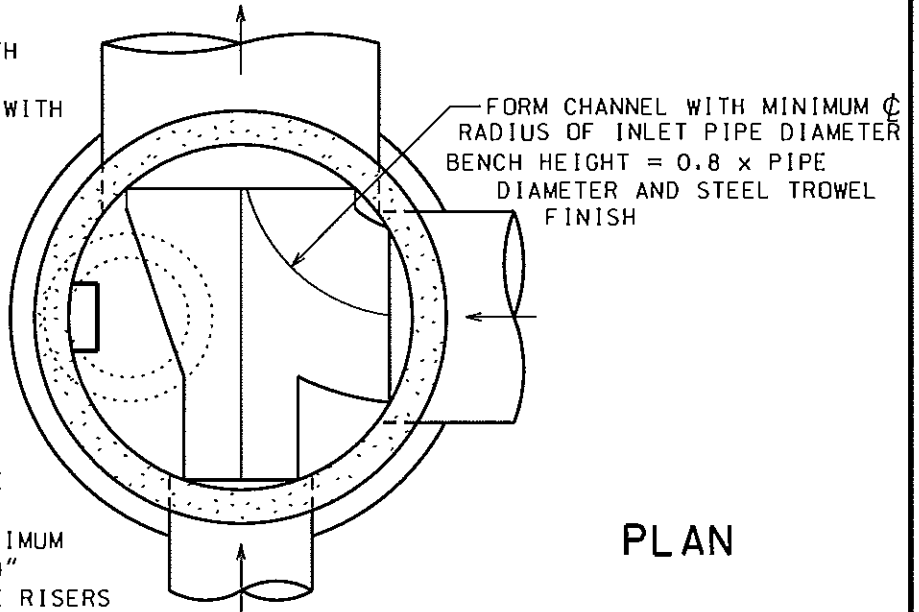
SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

**MANHOLE
60-INCH
FLAT TOP**

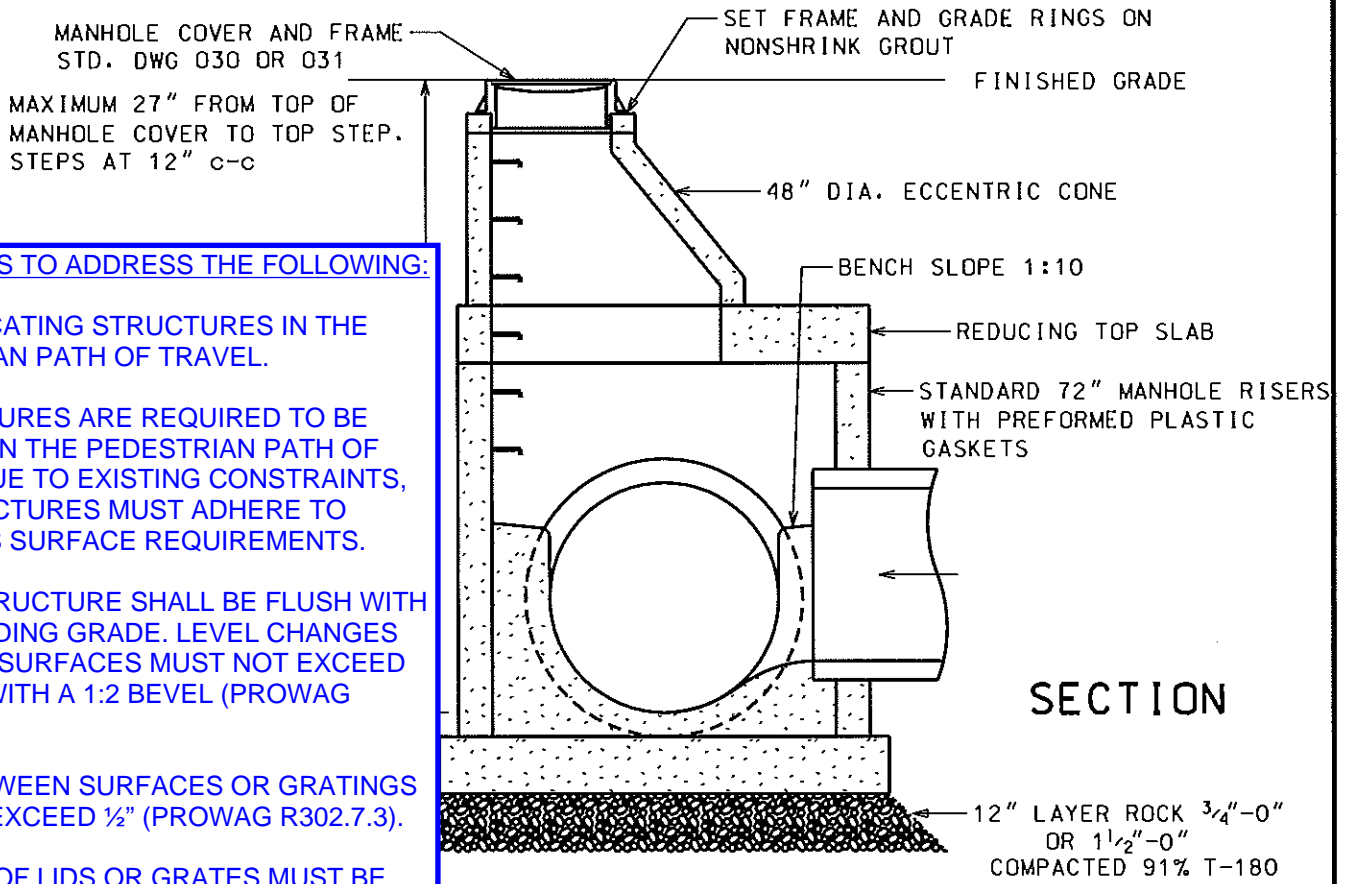
REVISED: 12/2001	SCALE: 1:40	DRAWN: D.L.	DWG NO. 013
VALID: 3/2003		APPROVED: K.L.H.	

NOTES:

1. MANHOLE TO CONFORM WITH ASTM C-478
2. MAXIMUM PIPE DIAMETER WITH HORIZONTAL PIPE ANGLE CHANGE = 36", STRAIGHT THRU = 48"
3. FALL THROUGH MANHOLE = 0.20 FT
4. PLACE CONCRETE PIPE JOINT A MAXIMUM OF ONE PIPE DIAMETER FROM WALL OF MANHOLE
5. LOCATE MANHOLE COVER/FRAME AND STEPS OVER BENCH LEDGE WITH MAXIMUM DEPTH OF GRADE RINGS OF 15"
6. IN PAVEMENT, PLACE MINIMUM 12" OF 3/4"-0" OR 1 1/2"-0" COMPACTED ROCK OUTSIDE RISERS



PLAN



SECTION

ADD NOTES TO ADDRESS THE FOLLOWING:

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IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATES MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)



TUALATIN, OR

**MANHOLE
72-INCH
ECCENTRIC CONE TOP**

REVISED: 12/2001
VALID: 3/2003

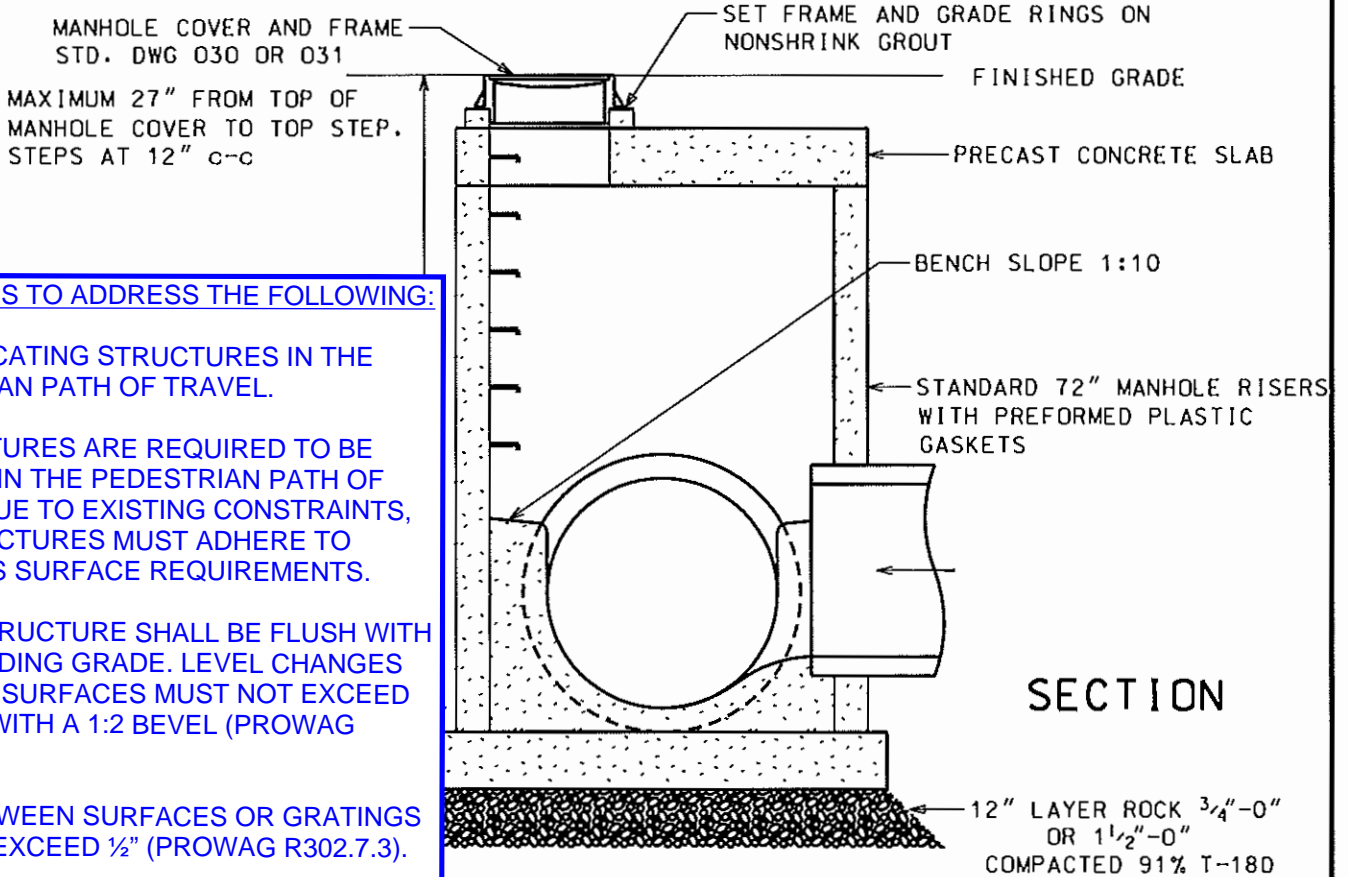
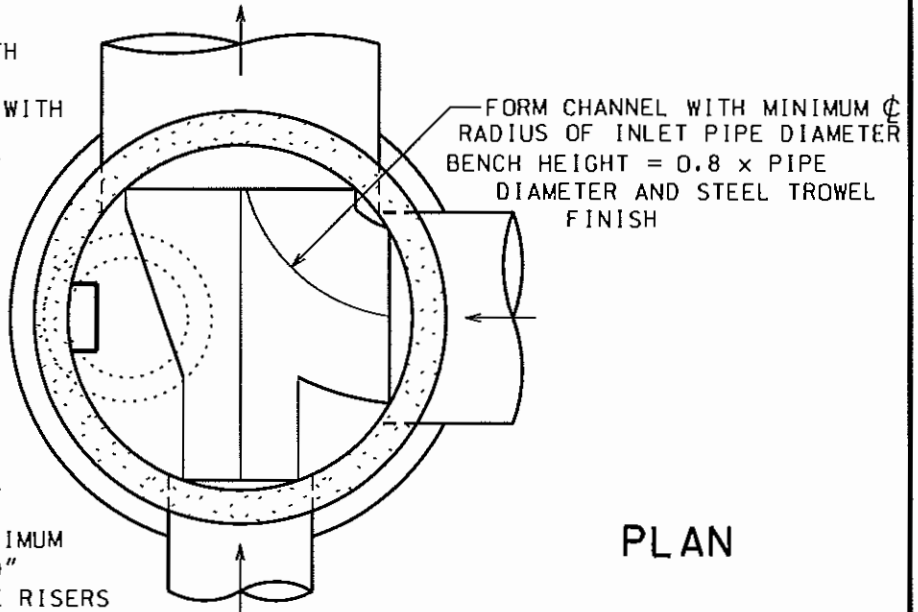
SCALE: 1:40

DRAWN: D.L.
APPROVED: K.L.H.

DWG NO. 014

NOTES:

1. MANHOLE TO CONFORM WITH ASTM C-478
2. MAXIMUM PIPE DIAMETER WITH HORIZONTAL PIPE ANGLE CHANGE = 36", STRAIGHT THRU = 48"
3. FALL THROUGH MANHOLE = 0.20 FT
4. PLACE CONCRETE PIPE JOINT A MAXIMUM OF ONE PIPE DIAMETER FROM WALL OF MANHOLE
5. LOCATE MANHOLE COVER/FRAME AND STEPS OVER BENCH LEDGE WITH MAXIMUM DEPTH OF GRADE RINGS OF 15"
6. IN PAVEMENT, PLACE MINIMUM 12" OF 3/4"-0" OR 1 1/2"-0" COMPACTED ROCK OUTSIDE RISERS



ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

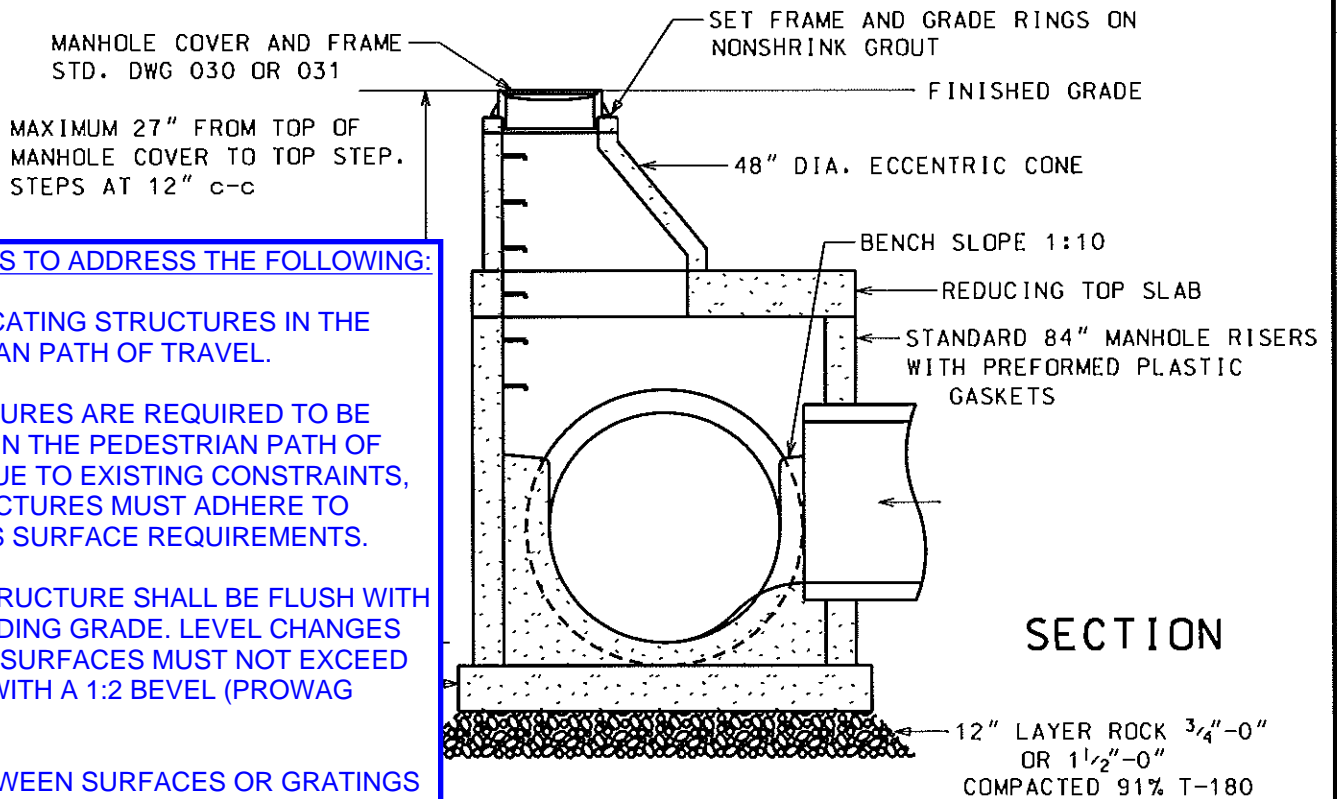
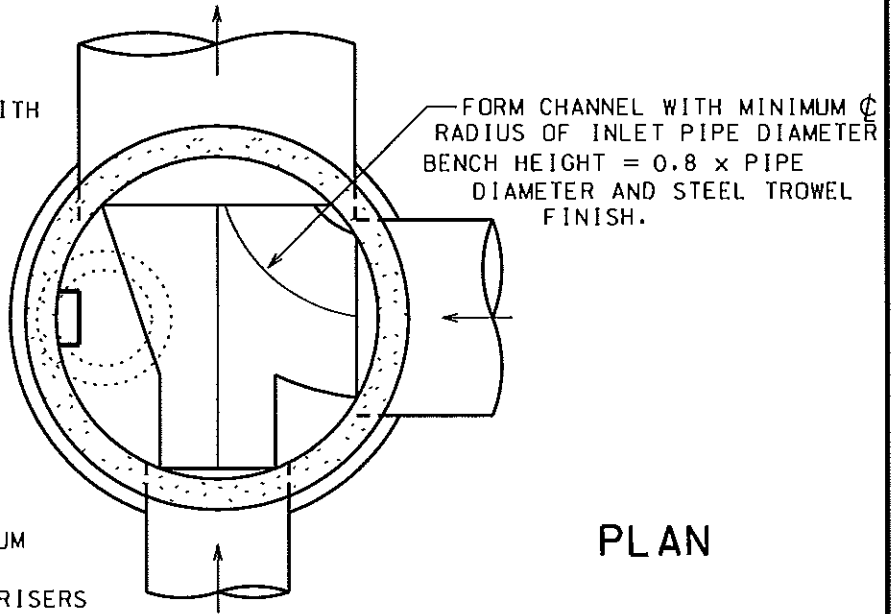
SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

SECTION

MANHOLE 72-INCH FLAT TOP	
REVISED: 12/2001	SCALE: 1:40
VALID: 3/2003	DRAWN: D.L. APPROVED: K.L.H.
DWG NO. 015	

NOTES:

1. MANHOLE TO CONFORM WITH ASTM C-478
2. MAXIMUM PIPE DIAMETER WITH HORIZONTAL PIPE ANGLE CHANGE = 42", STRAIGHT THRU = 60"
3. FALL THROUGH MANHOLE = 0.20 FT
4. PLACE CONCRETE PIPE JOINT A MAXIMUM OF ONE PIPE DIAMETER FROM WALL OF MANHOLE
5. LOCATE MANHOLE COVER/FRAME AND STEPS OVER BENCH LEDGE WITH MAXIMUM DEPTH OF GRADE RINGS OF 15"
6. IN PAVEMENT PLACE MINIMUM 12" OF 3/4"-0" OR 1 1/2"-0" COMPACTED ROCK OUTSIDE RISERS



ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

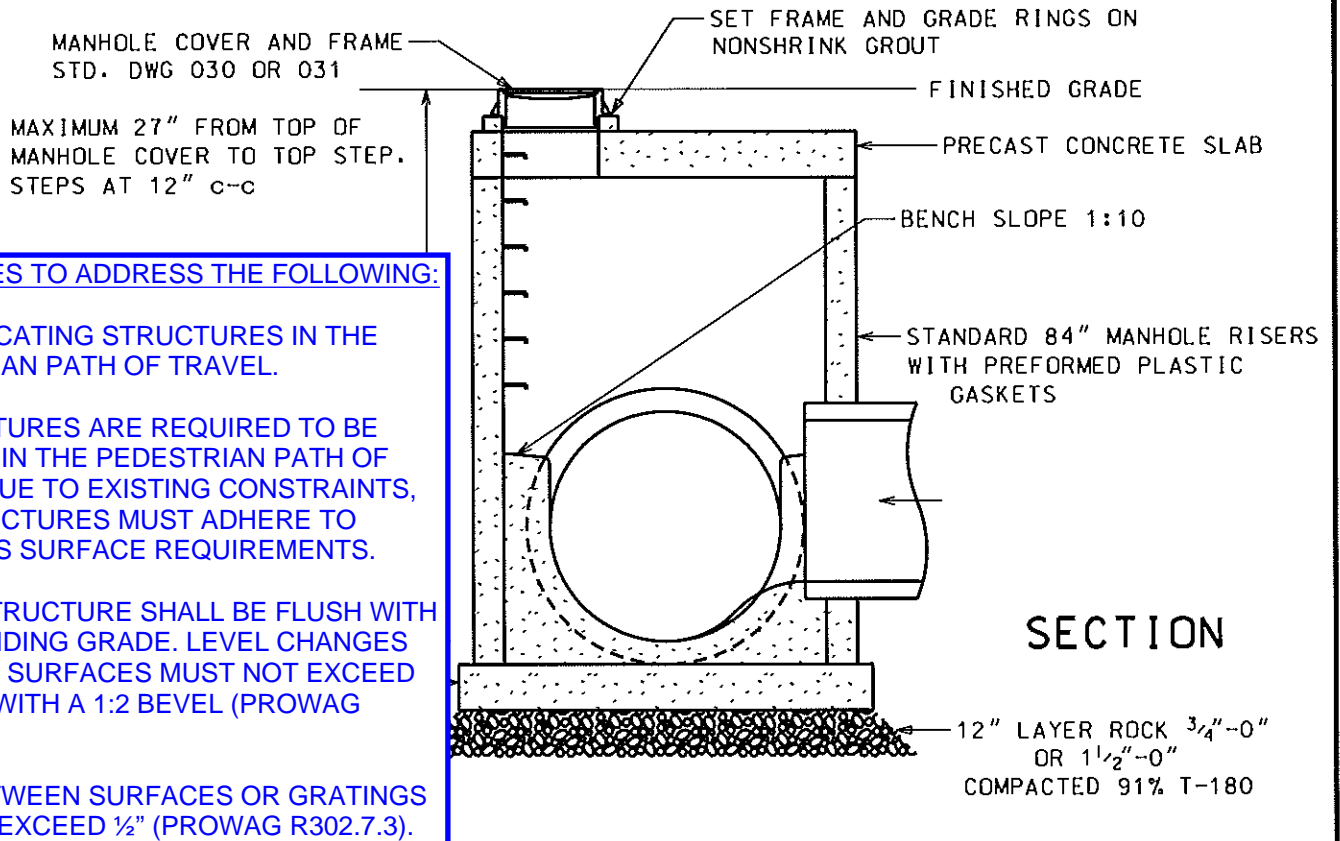
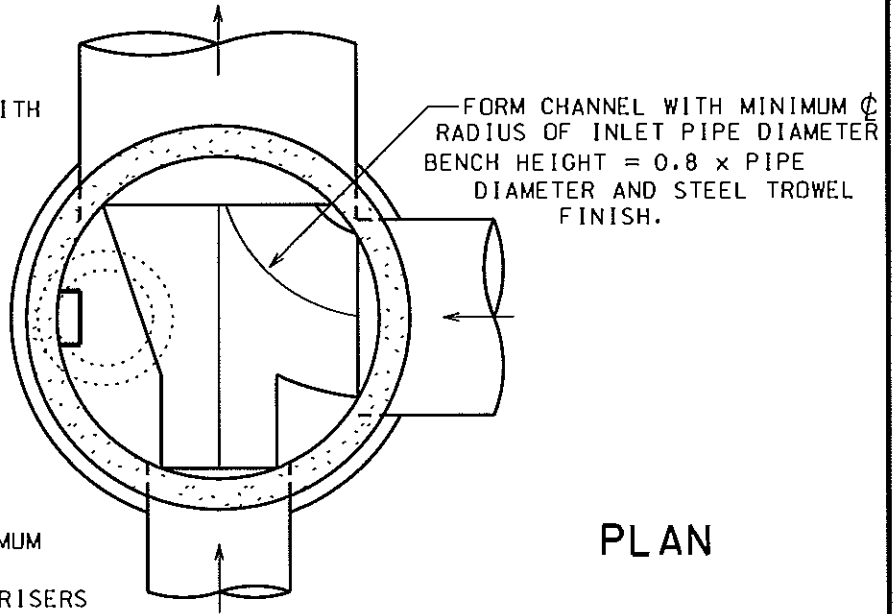
GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

<p>MANHOLE 84-INCH ECCENTRIC CONE TOP</p>	
<p>REVISOR: [Name]</p>	<p>REVISION: [Description]</p>
<p>REVISED: 12/2001</p>	<p>SCALE: 1:50</p>
<p>VALID: 3/2003</p>	<p>DRAWN: D.L.</p>
<p>APPROVED: K.L.H.</p>	<p>DWG NO. 016</p>

NOTES:

1. MANHOLE TO CONFORM WITH ASTM C-478
2. MAXIMUM PIPE DIAMETER WITH HORIZONTAL PIPE ANGLE CHANGE = 42", STRAIGHT THRU = 60"
3. FALL THROUGH MANHOLE = 0.20 FT
4. PLACE CONCRETE PIPE JOINT A MAXIMUM OF ONE PIPE DIAMETER FROM WALL OF MANHOLE
5. LOCATE MANHOLE COVER/FRAME AND STEPS OVER BENCH LEDGE WITH MAXIMUM DEPTH OF GRADE RINGS OF 15"
6. IN PAVEMENT, PLACE MINIMUM 12" OF 3/4"-0" OR 1 1/2"-0" COMPACTED ROCK OUTSIDE RISERS



ADD NOTES TO ADDRESS THE FOLLOWING:

- AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.
- IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.
- RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).
- GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).
- SURFACE OF LIDS OR GRATES MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

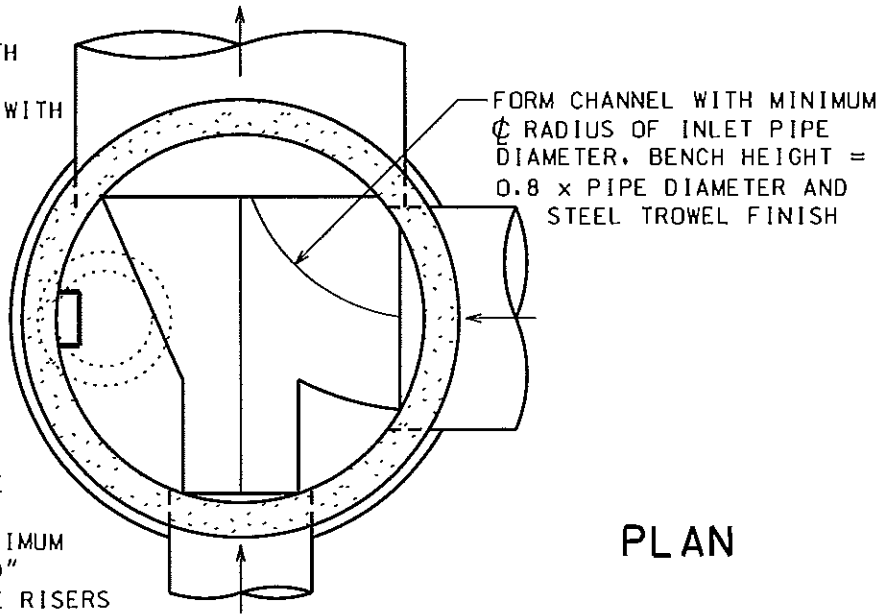
N, OR

**MANHOLE
84-INCH
FLAT TOP**

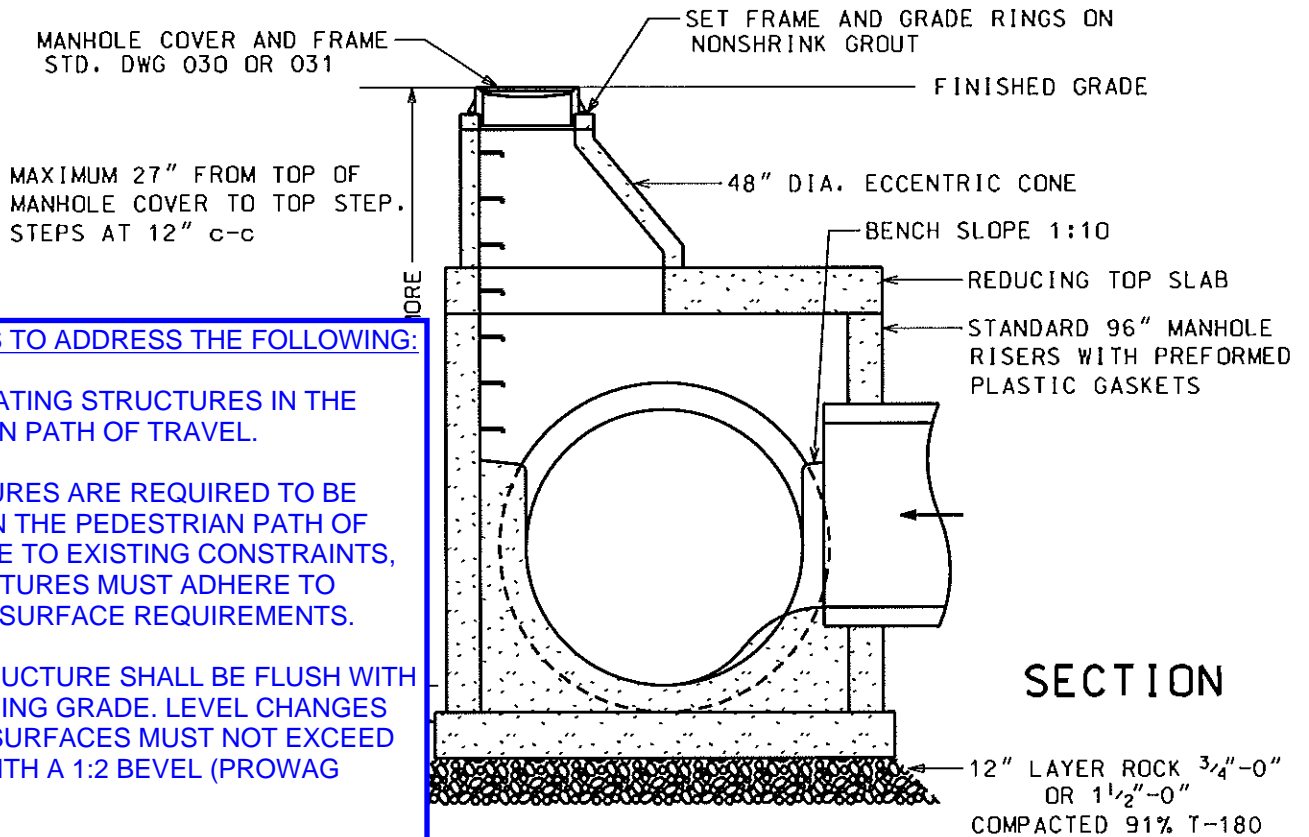
REVISED: 12/2001	SCALE: 1:50	DRAWN: D.L.	DWG NO. 017
VAL ID: 3/2003		APPROVED: K.L.H.	

NOTES:

1. MANHOLE TO CONFORM WITH ASTM C-478
2. MAXIMUM PIPE DIAMETER WITH HORIZONTAL PIPE ANGLE CHANGE = 48", STRAIGHT THRU = 72"
3. FALL THROUGH MANHOLE = 0.20 FT
4. PLACE CONCRETE PIPE JOINT A MAXIMUM OF ONE PIPE DIAMETER FROM WALL OF MANHOLE
5. LOCATE MANHOLE COVER/FRAME AND STEPS OVER BENCH LEDGE WITH MAXIMUM DEPTH OF GRADE RINGS OF 15"
6. IN PAVEMENT, PLACE MINIMUM 12" OF 3/4"-0" OR 1 1/2"-0" COMPACTED ROCK OUTSIDE RISERS



PLAN



SECTION

ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

IN, OR

**MANHOLE
96-INCH
ECCENTRIC CONE TOP**

REVISED: 12/2001
VALID: 3/2003

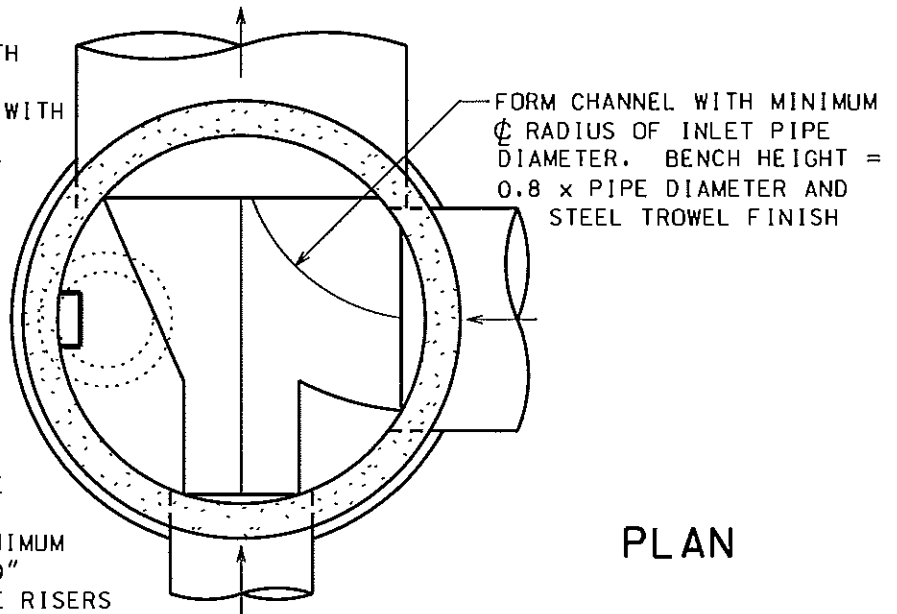
SCALE: 1:50

DRAWN: D.L.
APPROVED: K.L.H.

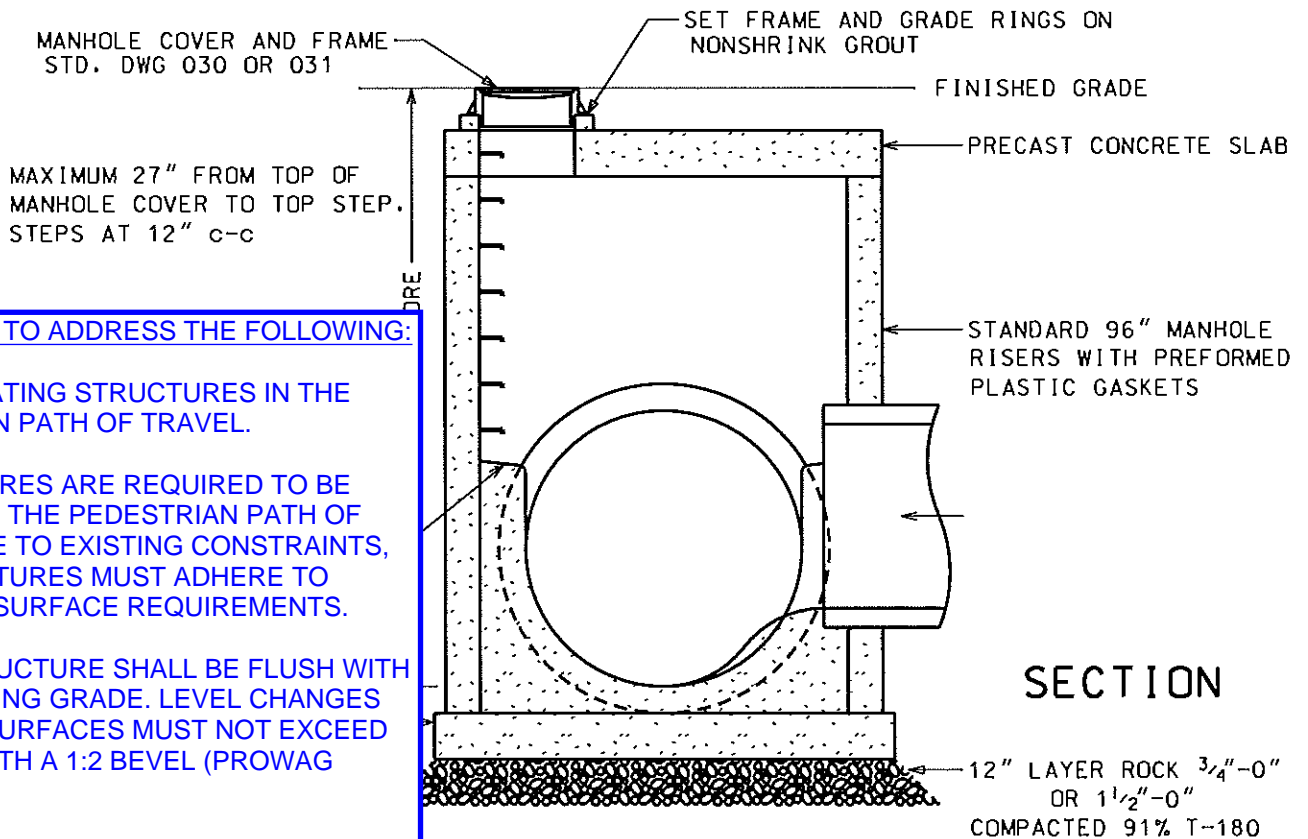
DWG NO. 018

NOTES:

1. MANHOLE TO CONFORM WITH ASTM C-478
2. MAXIMUM PIPE DIAMETER WITH HORIZONTAL PIPE ANGLE CHANGE = 48", STRAIGHT THRU = 72"
3. FALL THROUGH MANHOLE = 0.20 FT
4. PLACE CONCRETE PIPE JOINT A MAXIMUM OF ONE PIPE DIAMETER FROM WALL OF MANHOLE
5. LOCATE MANHOLE COVER/FRAME AND STEPS OVER BENCH LEDGE WITH MAXIMUM DEPTH OF GRADE RINGS OF 15"
6. IN PAVEMENT, PLACE MINIMUM 12" OF 3/4"-0" OR 1 1/2"-0" COMPACTED ROCK OUTSIDE RISERS



PLAN



SECTION

ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

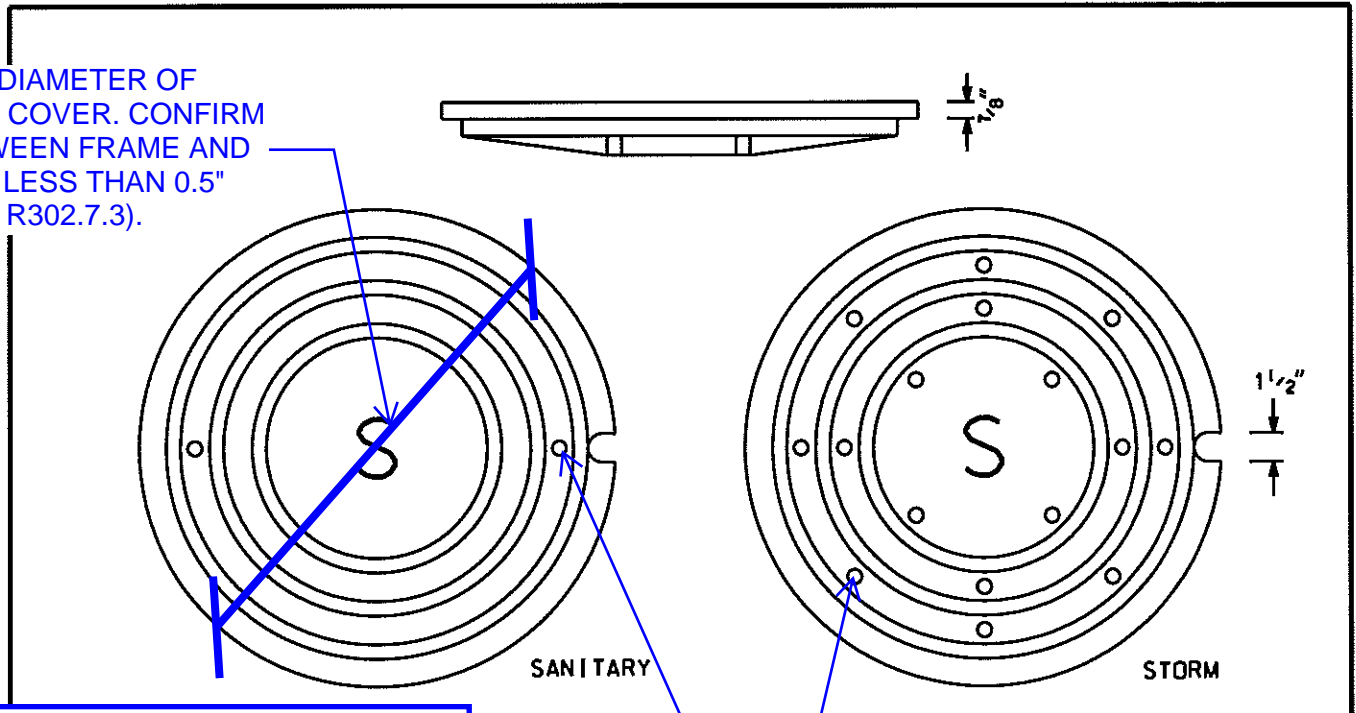
GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

IN, OR	MANHOLE 96-INCH FLAT TOP
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REVISED: 12/2001 VALID: 3/2003	SCALE: 1:50	DRAWN: D.L. APPROVED: K.L.H.	DWG NO. 019
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IDENTIFY DIAMETER OF MANHOLE COVER. CONFIRM GAP BETWEEN FRAME AND COVER IS LESS THAN 0.5" (PROWAG R302.7.3).



ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

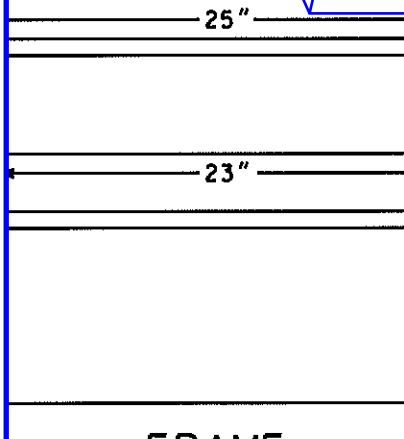
IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

IDENTIFY DIAMETER OF HOLES. CONSTRUCTION CODE SECTION 324.2.04 INDICATE THE DIAMETER OF THESE HOLES ARE 3/4". 3/4" DIAMETER HOLES ARE GREATER THAN THE 1/2" MAXIMUM OPENING ALLOWED IN THE PEDESTRIAN PATH OF TRAVEL PER PROWAG R302.7.3. LOCATE MANHOLE COVERS WITH 3/4" HOLES OUTSIDE ALL PEDESTRIAN PATHS OF TRAVEL.



STANDARD TYPE

NOTES:

1. ALL ASSEMBLIES ARE TO BE RATED FOR H-20 TRAFFIC LOADING
2. COVER & FRAME SHALL BE GRAY CAST IRON ASTM A-48 CLASS 30, WITH MATCHING SURFACES MACHINED TO A TRUE BEARING
3. NOTCH LID FOR LIFTING HOOK
4. REFER TO STD DWG 031 FOR WATERTIGHT ASSEMBLY MODIFICATIONS



CITY OF TUALATIN, OR

MANHOLE COVER AND FRAME STANDARD

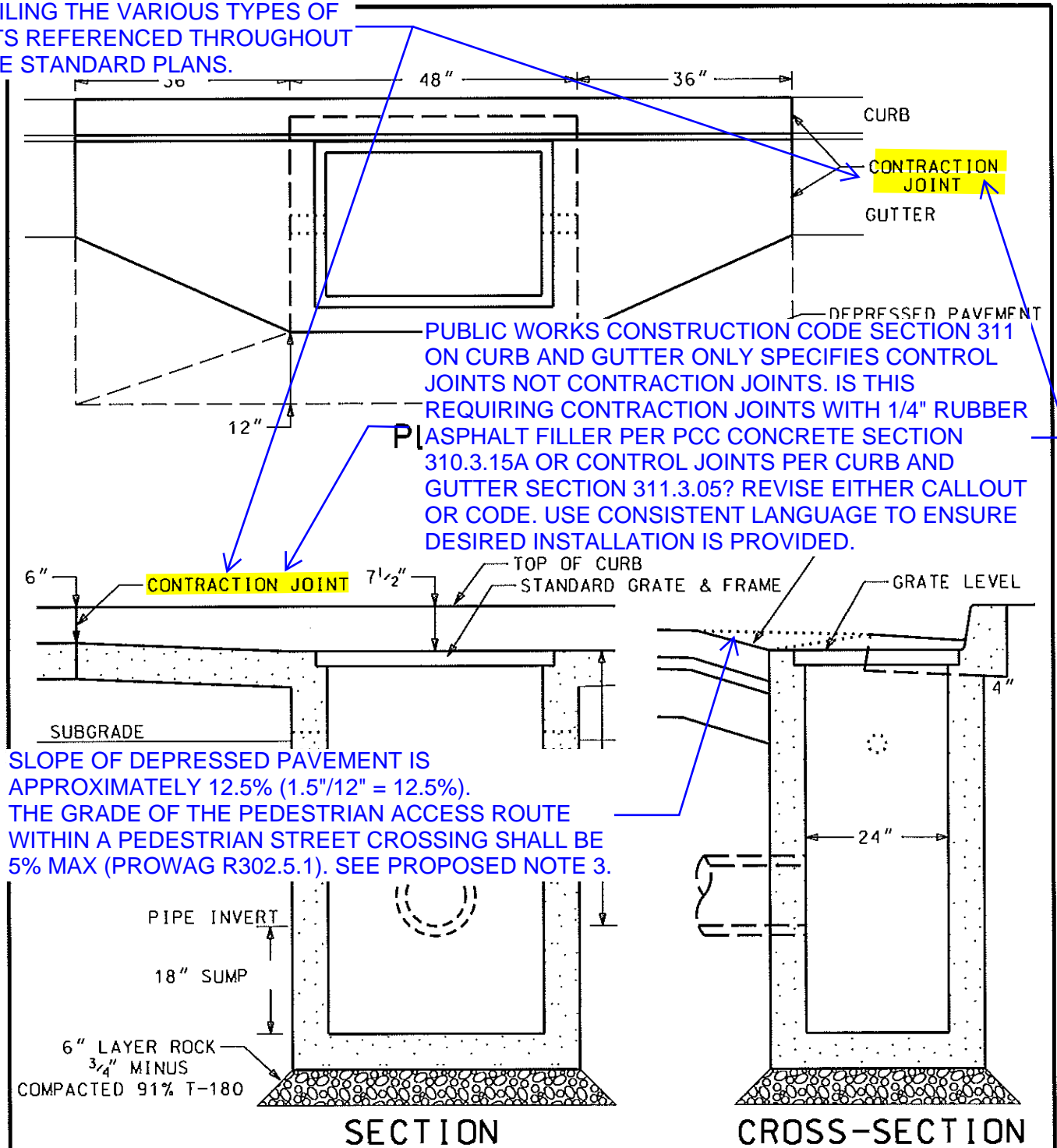
REVISED: 7/1996
VALID ID: 3/2003

SCALE: 1:10

DRAWN: D.L.
APPROVED: K.L.H.

DWG NO. 030

PROVIDE A STANDARD DRAWING
 DETAILING THE VARIOUS TYPES OF
 JOINTS REFERENCED THROUGHOUT
 THESE STANDARD PLANS.



SLOPE OF DEPRESSED PAVEMENT IS APPROXIMATELY 12.5% ($1.5"/12" = 12.5\%$). THE GRADE OF THE PEDESTRIAN ACCESS ROUTE WITHIN A PEDESTRIAN STREET CROSSING SHALL BE 5% MAX (PROWAG R302.5.1). SEE PROPOSED NOTE 3.

NOTES:

1. SEE STD DWG 050 FOR STANDARD GRATE AND FRAME
2. SHALL BE CAST-IN-PLACE, CONCRETE COMPRESSIVE STRENGTH 3300 PSI AT 28 DAYS, ENTRAINED AIR 4% - 7%.
3. DO NOT PLACE CATCH BASIN INCLUDING ASSOCIATED TAPERED GUTTER AND DEPRESSED PAVEMENT IN SIDEWALKS, CROSS-WALKS (MARKED OR UNMARKED) OR OTHER PEDESTRIAN PATH OF TRAVEL.



**36-INCH
 GUTTER GRATE INLET**

REVISED: 11/2004
 VALID: 3/2003

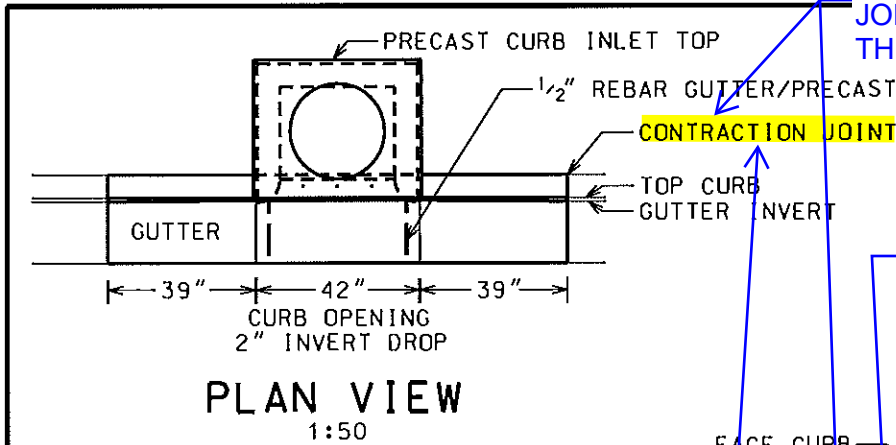
SCALE: 1:25

DRAWN: D.L.
 APPROVED: K.L.H.

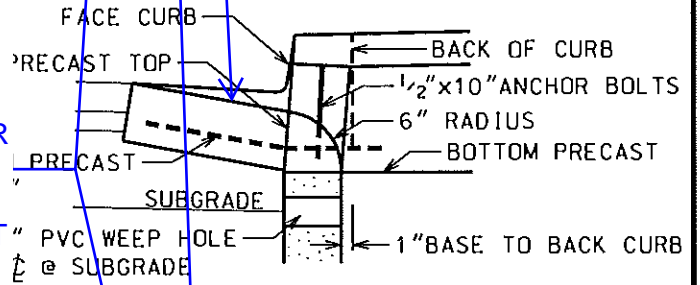
DWG NO. 040

PROVIDE A STANDARD DRAWING
 DETAILING THE VARIOUS TYPES OF
 JOINTS REFERENCED THROUGHOUT
 THESE STANDARD PLANS.

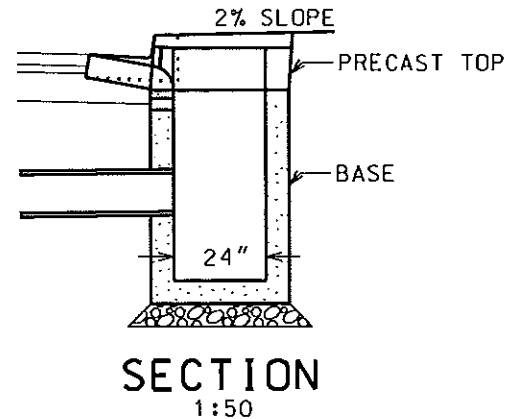
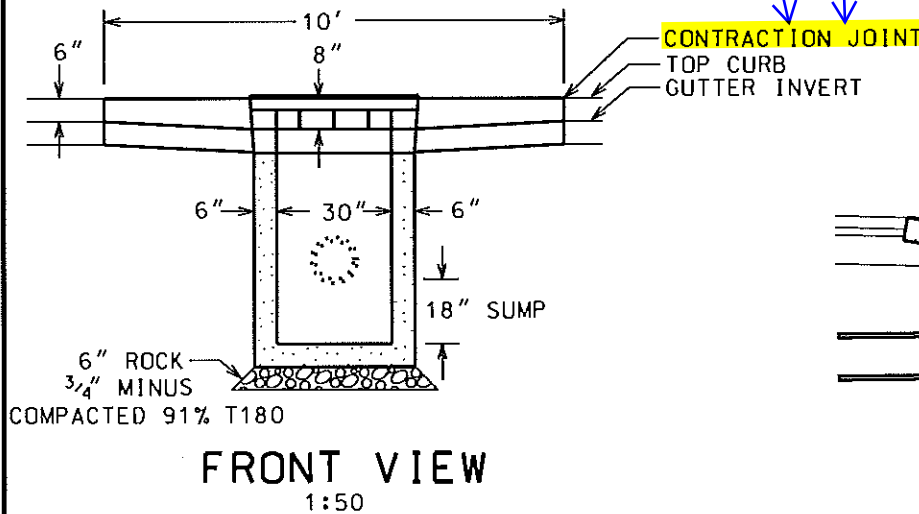
SLOPE OF GUTTER IS
 APPROXIMATELY 12.5%
 (2"/16" = 12.5%).
 THE GRADE OF THE
 PEDESTRIAN ACCESS
 ROUTE WITHIN A
 PEDESTRIAN STREET
 CROSSING SHALL BE 5%
 MAX (PROWAG R302.5.1).
 SEE PROPOSED NOTE 5.



PUBLIC WORKS CONSTRUCTION CODE SECTION 311
 ON CURB AND GUTTER ONLY SPECIFIES CONTROL
 JOINTS NOT CONTRACTION JOINTS. IS THIS
 REQUIRING CONTRACTION JOINTS WITH 1/4" RUBBER
 ASPHALT FILLER PER PCC CONCRETE SECTION
 310.3.15A OR CONTROL JOINTS PER CURB AND
 GUTTER SECTION 311.3.05? REVISE EITHER CALLOUT
 OR CODE. USE CONSISTENT LANGUAGE TO ENSURE
 DESIRED INSTALLATION IS PROVIDED.



TOP LEFT CNR OF SECTION
 1:20



NOTES:

1. ALL FABRICATED METAL PARTS SHALL BE HOT-DIPPEO GALVANIZED AFTER FABRICATION.
2. BASE SHALL BE CAST-IN-PLACE WITH CONCRETE COMPRESSIVE STRENGTH 3300 P.S.I. AT 28 DAYS, ENTRAINED AIR 4-7%
3. PRECAST CURB INLET 30" TOP SECTION MANUFACTURED BY UTILITY VAULT MODEL No. CI-30-23FC WITH CAST IRON MANHOLE COVER
4. FOR GRADES GREATER THAN 4% USE CATCH BASIN CURB INLET 48-INCH, DWG NO. 042
5. DO NOT PLACE CATCH BASIN INCLUDING ADJACENT GUTTER SECTIONS IN CROSS-WALKS (MARKED OR UNMARKED) OR OTHER PEDESTRIAN PATH OF TRAVEL.



TUALATIN, OR

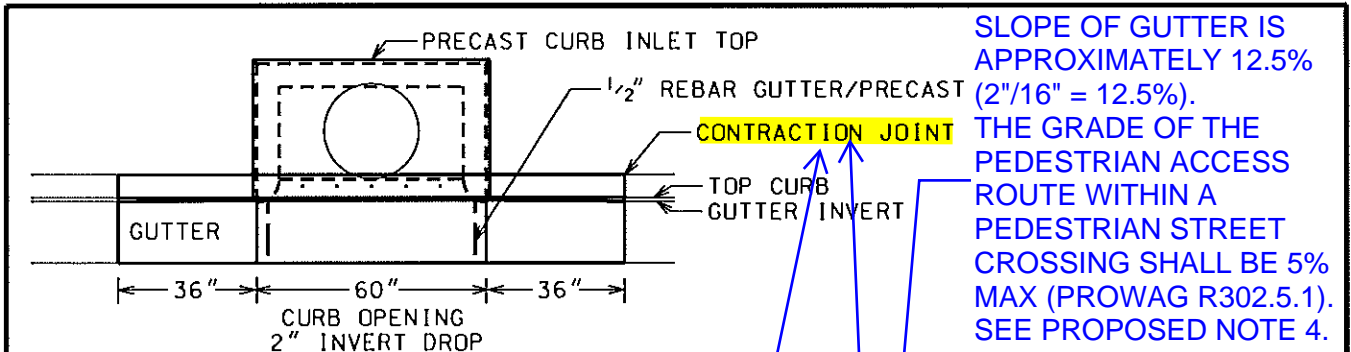
CURB INLET 30-INCH

REVISED: 11/2004
 VALID: 3/2003

SCALE: AS SHOWN

DRAWN: D.L.
 APPROVED: K.L.H.

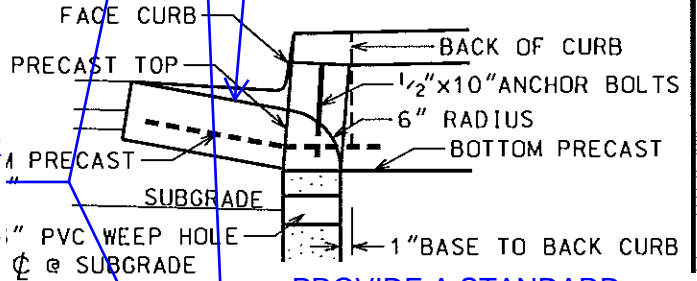
DWG NO. 041



SLOPE OF GUTTER IS APPROXIMATELY 12.5% ($2''/16'' = 12.5\%$).
 THE GRADE OF THE PEDESTRIAN ACCESS ROUTE WITHIN A PEDESTRIAN STREET CROSSING SHALL BE 5% MAX (PROWAG R302.5.1).
 SEE PROPOSED NOTE 4.

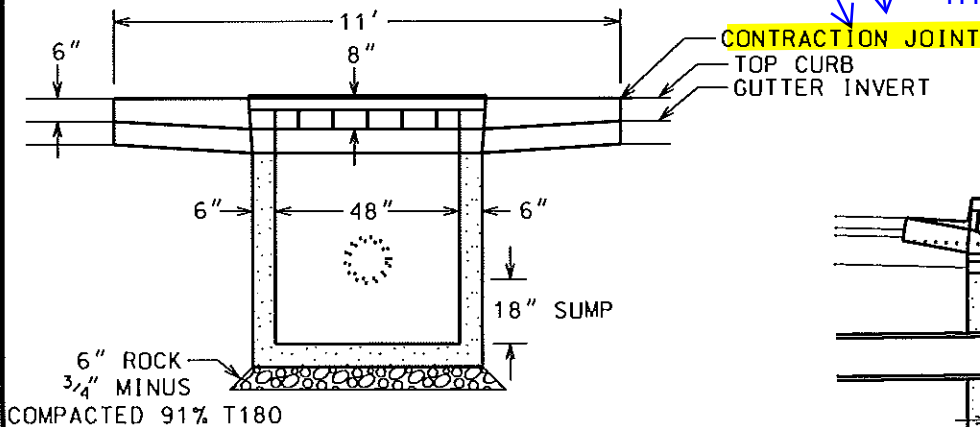
PLAN VIEW
1:50

PUBLIC WORKS CONSTRUCTION CODE SECTION 311 ON CURB AND GUTTER ONLY SPECIFIES CONTROL JOINTS NOT CONTRACTION JOINTS. IS THIS REQUIRING CONTRACTION JOINTS WITH 1/4" RUBBER ASPHALT FILLER PER PCC CONCRETE SECTION 310.3.15A OR CONTROL JOINTS PER CURB AND GUTTER SECTION 311.3.05? REVISE EITHER CALLOUT OR CODE. USE CONSISTENT LANGUAGE TO ENSURE DESIRED INSTALLATION IS PROVIDED.

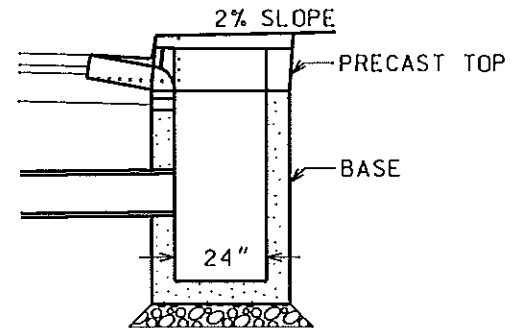


PROVIDE A STANDARD DRAWING DETAILING THE VARIOUS TYPES OF JOINTS REFERENCED THROUGHOUT THESE STANDARD PLANS.

TOP LEFT CORNER



FRONT VIEW
1:50



SECTION
1:50

NOTES:

1. ALL FABRICATED METAL PARTS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION.
2. BASE SHALL BE CAST-IN-PLACE WITH CONCRETE COMPRESSIVE STRENGTH 3300 P.S.I. AT 28 DAYS, ENTRAINED AIR 4%-7%
3. PRECAST CURB INLET 48" TOP SECTION MANUFACTURED BY UTILITY VAULT, MODEL No. CI-48-23FC WITH CAST IRON MANHOLE COVER
4. DO NOT PLACE CATCH BASIN INCLUDING ADJACENT GUTTER SECTIONS IN CROSS-WALKS (MARKED OR UNMARKED) OR OTHER PEDESTRIAN PATH OF TRAVEL.



CITY OF TUALATIN, OR

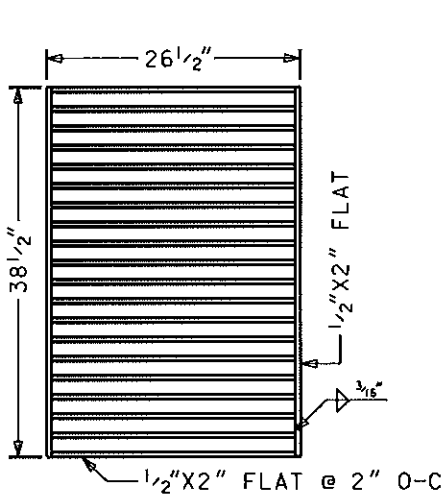
CATCH BASIN CURB INLET 48-INCH

REVISED: 11/2004
 VALID: 3/2003

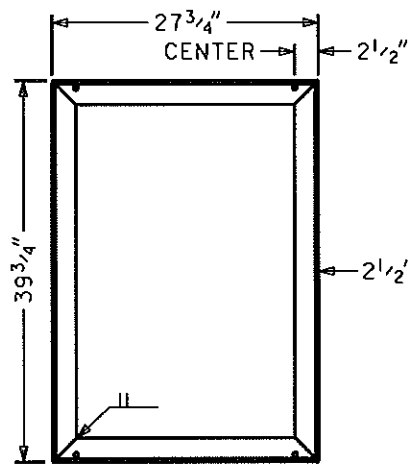
SCALE: AS SHOWN

DRAWN: D.L.
 APPROVED: K.L.H.

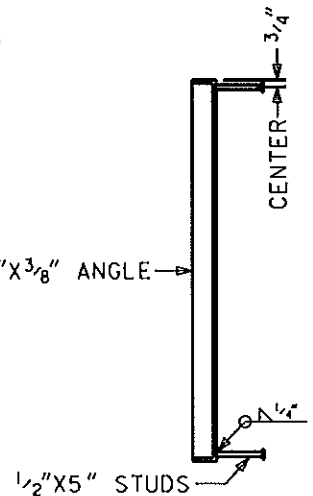
DWG NO. 042



GRATE



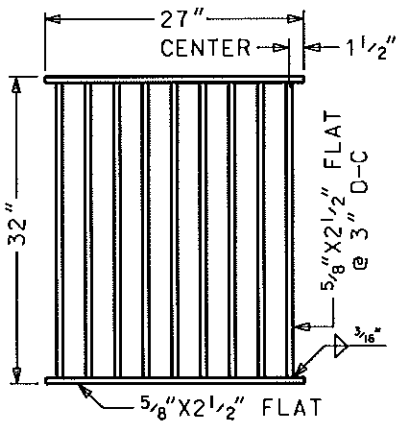
PLAN



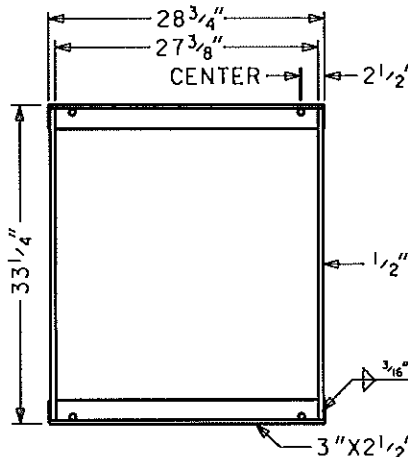
SECTION

STANDARD

FRAME



GRATE



PLAN

SECTION

TYPE 1

FRAME

NOTE:

1. ALL FLAT BARS SHALL HAVE SQUARE EDGES

ADD A NOTE TO ADDRESS THE FOLLOWING:

DO NOT INSTALL STRUCTURES WITH THESE GRATES IN ANY PEDESTRIAN PATH OF TRAVEL BECAUSE THE GAPS BETWEEN GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3) AND THE SURFACE OF GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7).



CITY OF TUALATIN, OR

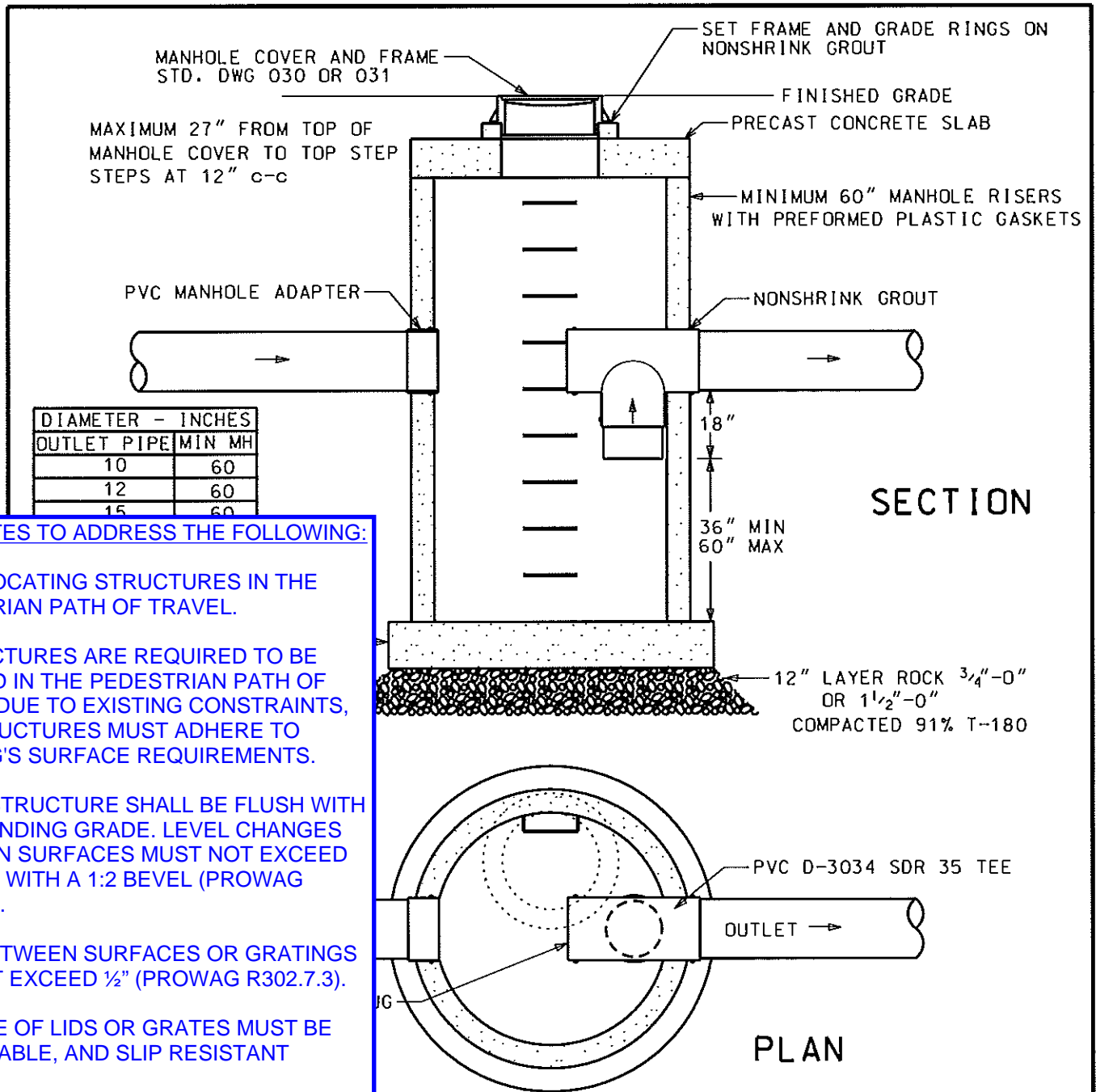
GRATE AND FRAME CATCH BASIN

REVISED: 2/2002
VALID: 3/2003

SCALE: 1:20

DRAWN: D.L.
APPROVED: K.L.H.

DWG NO. 050



DIAMETER - INCHES	
OUTLET PIPE	MIN MH
10	60
12	60
15	60

ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.


RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

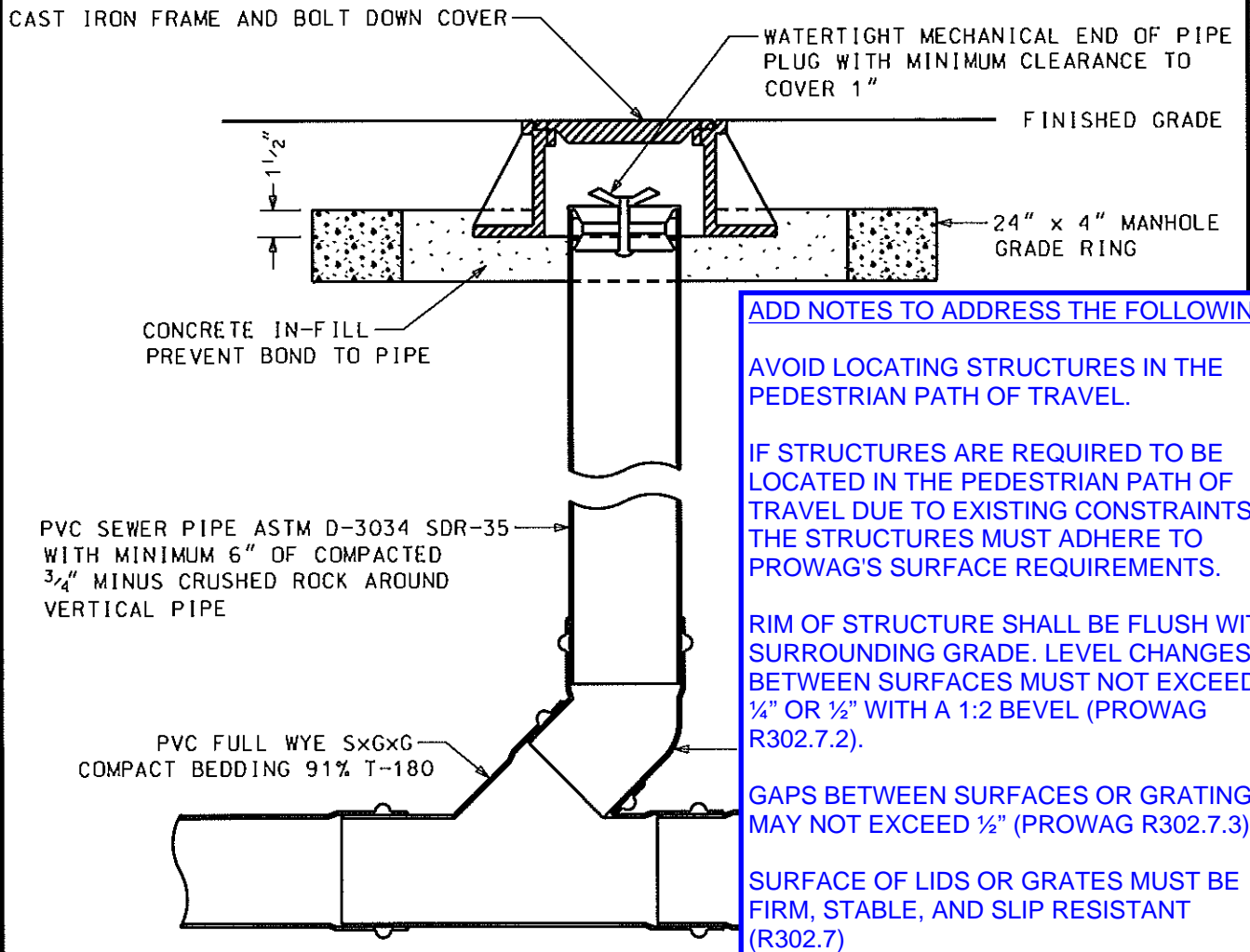
GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

NOTES:

1. MANHOLE TO CONFORM WITH ASTM C-478
2. MANHOLE DIAMETER VARIES WITH OUTLET PIPE DIAMETER, SEE TABLE ABOVE. MAINTAIN PIPE TEE/PLUG TO OPPOSITE WALL CLEARANCE OF 36"
3. IN PAVEMENT, PLACE MINIMUM 12" OF 3/4"-0" OR 1 1/2"-0" COMPACTED ROCK OUTSIDE RISERS
4. HYDRAULIC FALL THROUGH MANHOLE = 0.02 FT
5. PVC D-3034 SDR 35 TEE (SOLVENT SOFTEN EXTERIOR AND SAND), GROUT THROUGH WALL AND FASTEN TO WALL WITH S.S. BAND AND 1/2" S.S. ANCHOR BOLTS
6. MINIMUM SUMP VOLUME 20 CUBIC FEET PER 1.0 CFS FLOW, WITH 25 YEAR EVENT, IF THIS IS EXCEEDED CONSTRUCT UPSTREAM FLOW SPLITTER OR INCREASE MANHOLE DIAMETER TO SUIT

 CITY OF TUALATIN, OR	MANHOLE WATER QUALITY	
	REVISED: 3/2004 VALID: 10/2005	SCALE: 1:40
		DWG NO. 060



ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.


RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

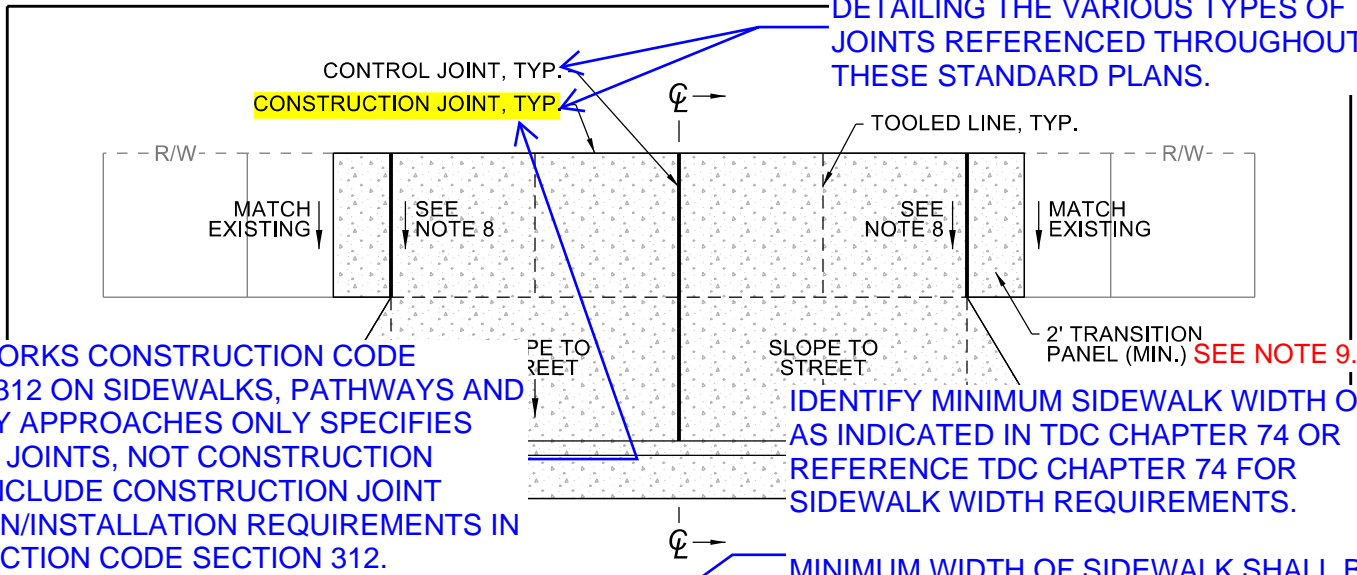
SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

⌀ SECTION

- NOTE:**
1. CAST IRON CLEANOUT FRAME AND BOLT DOWN COVER (TWO RECESSED STAINLESS STEEL BOLTS)
 6" PIPE - 9" ID x 6 1/2" HIGH TYPICAL OLYMPIC M1018 D/T
 8" PIPE - 11 1/2" ID x 7 5/8" HIGH TYPICAL OLYMPIC M1035 D/T

 CITY OF TUALATIN, OR		SEWER CLEANOUT	
REVISED: 3/2004 VALID ID: 10/2005	SCALE: 1:10	DRAWN: D.L. APPROVED: K.L.H.	DWG NO. 100

PROVIDE A STANDARD DRAWING DETAILING THE VARIOUS TYPES OF JOINTS REFERENCED THROUGHOUT THESE STANDARD PLANS.

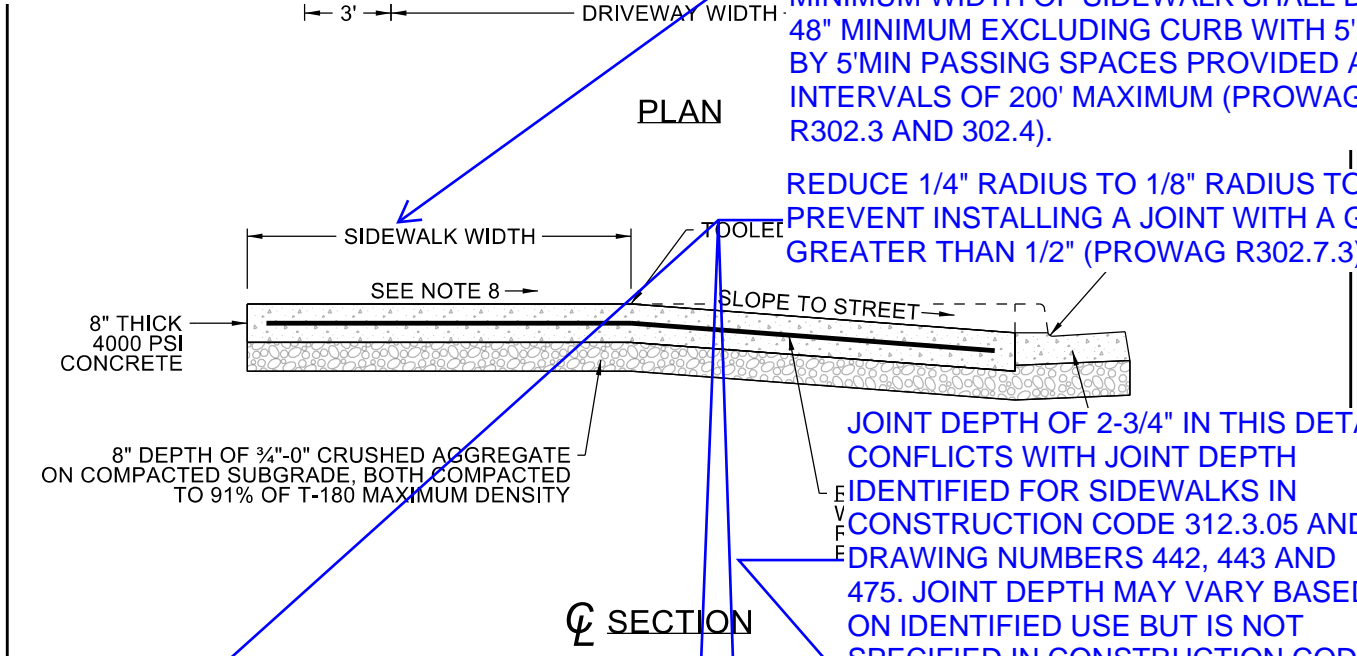


PUBLIC WORKS CONSTRUCTION CODE SECTION 312 ON SIDEWALKS, PATHWAYS AND DRIVEWAY APPROACHES ONLY SPECIFIES CONTROL JOINTS, NOT CONSTRUCTION JOINTS. INCLUDE CONSTRUCTION JOINT DEFINITION/INSTALLATION REQUIREMENTS IN CONSTRUCTION CODE SECTION 312.

IDENTIFY MINIMUM SIDEWALK WIDTH OF 5' AS INDICATED IN TDC CHAPTER 74 OR REFERENCE TDC CHAPTER 74 FOR SIDEWALK WIDTH REQUIREMENTS.

MINIMUM WIDTH OF SIDEWALK SHALL BE 48" MINIMUM EXCLUDING CURB WITH 5' MIN BY 5' MIN PASSING SPACES PROVIDED AT INTERVALS OF 200' MAXIMUM (PROWAG R302.3 AND 302.4).

REDUCE 1/4" RADIUS TO 1/8" RADIUS TO PREVENT INSTALLING A JOINT WITH A GAP GREATER THAN 1/2" (PROWAG R302.7.3)



JOINT DEPTH OF 2-3/4" IN THIS DETAIL CONFLICTS WITH JOINT DEPTH IDENTIFIED FOR SIDEWALKS IN CONSTRUCTION CODE 312.3.05 AND DRAWING NUMBERS 442, 443 AND 475. JOINT DEPTH MAY VARY BASED ON IDENTIFIED USE BUT IS NOT SPECIFIED IN CONSTRUCTION CODE FOR COMMERCIAL DRIVEWAYS.

NOTES:

- CONTROL JOINTS SHALL BE WEAKENED PLANE TYPE FORMED TO A DEPTH 2-3/4" WITH TOOLED EDGES (1/4" R EDGE, 3" FLAT) EXCEPT IN CURB AND GUTTER (1/4" R EDGE ONLY). NO MESH ACROSS CONTROL JOINTS.
- TOOLED LINES ARE FOR COMESTIC PURPOSES ONLY. (1/4" R EDGE, 3" FLAT).
- FOR LOCATION AND WIDTH OF DRIVEWAYS, MEET THE REQUIREMENTS OF THE TUALATIN DEVELOPMENT CODE.
- FINISH CONCRETE APPROACH RAMP WITH BRUSH FINISH TRANSVERSE TO CENTERLINE.
- POUR APPROACH SLAB AND WINGS (BOTH 8" THICK) MONOLITHIC WITH CURB AND GUTTER IF SO DIRECTED BY ENGINEER.
- BEFORE OPENING TO TRAFFIC, ATTAIN 4,000 PSI COMPRESSIVE STRENGTH.
- REMOVE THE CURB AND GUTTER IN ITS ENTIRETY AND POUR BACK AS A MONOLITHIC POUR IF AN EXISTING CURB AND GUTTER IS MODIFIED AS PART OF A DRIVEWAY APPROACH.
- SIDEWALK CROSS SLOPE TO BE MAX 1.5% DESIGN SLOPE (2.0% MAX FINISHED SURFACE SLOPE).

9. CONSTRUCT TRANSITIONAL SEGMENTS BETWEEN NEW CONSTRUCTION AND EXISTING SIDEWALK TO THE NEAREST EXISTING SIDEWALK CONTROL JOINT (MINIMUM 2' DISTANCE). TRANSITIONAL SEGMENTS ARE INTENDED TO SMOOTHLY TRANSITION BETWEEN THE NEW SIDEWALK CROSS SLOPE AND THE EXISTING CROSS SLOPE.

CLARIFY IF NOTE 7 IS REQUIRING THE APPROACH SLAB AND WINGS TO BE MONOLITHIC WITH THE CURB AND GUTTER OR IF JUST THE CURB AND GUTTER IS MONOLITHIC.

CURBSIDE PLANTER STRIP

M. PALMER
J. FUCHS

DRAWING NO:

440

PROVIDE A STANDARD DRAWING
 DETAILING THE VARIOUS TYPES OF
 JOINTS REFERENCED THROUGHOUT
 THESE STANDARD PLANS.

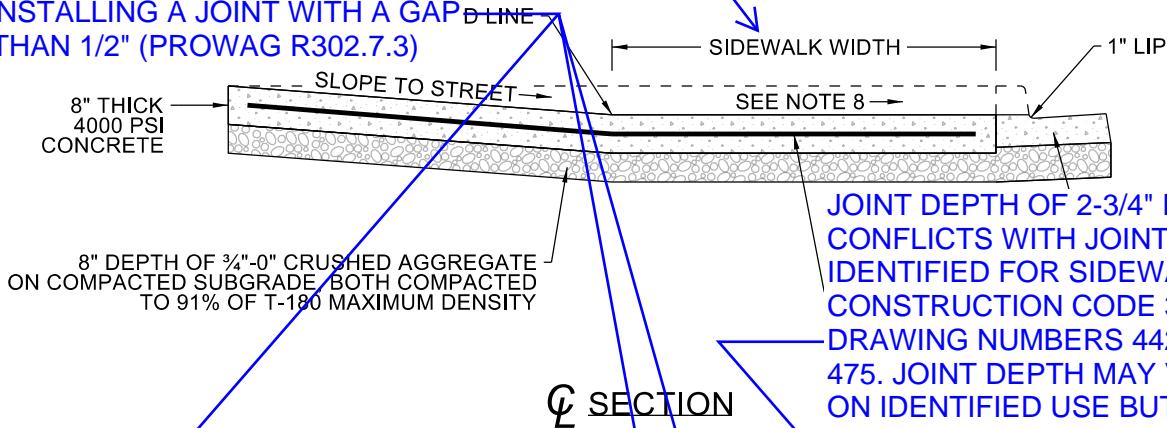
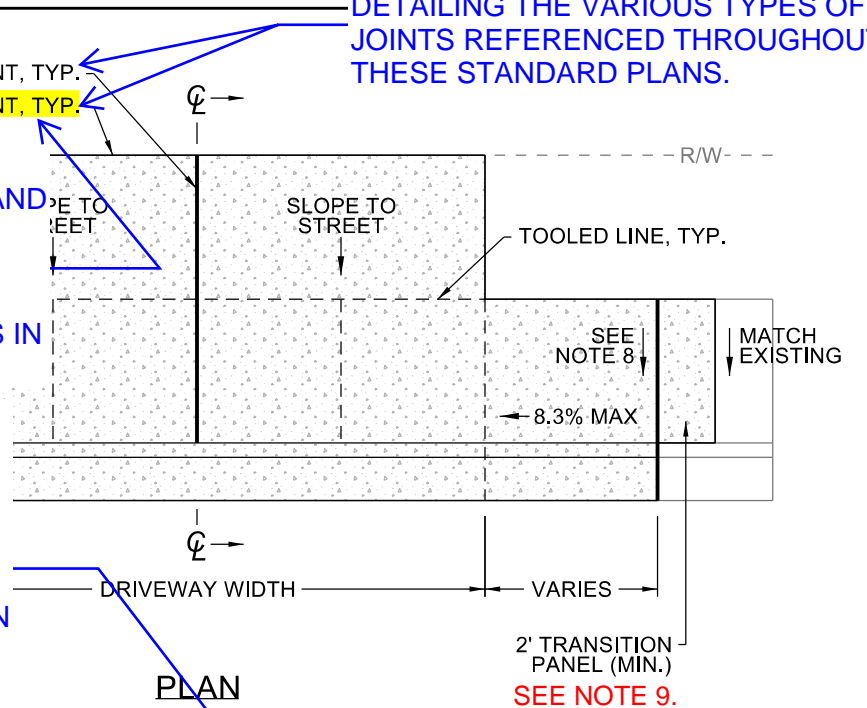
CONTROL JOINT, TYP.
 CONSTRUCTION JOINT, TYP.

PUBLIC WORKS CONSTRUCTION CODE
 SECTION 312 ON SIDEWALKS, PATHWAYS AND
 DRIVEWAY APPROACHES ONLY SPECIFIES
 CONTROL JOINTS, NOT CONSTRUCTION
 JOINTS. INCLUDE CONSTRUCTION JOINT
 DEFINITION/INSTALLATION REQUIREMENTS IN
 CONSTRUCTION CODE SECTION 312.

IDENTIFY MINIMUM SIDEWALK WIDTH OF 5'
 AS INDICATED IN TDC CHAPTER 74 OR
 REFERENCE TDC CHAPTER 74 FOR
 SIDEWALK WIDTH REQUIREMENTS.

MINIMUM WIDTH OF SIDEWALK SHALL BE
 48" MINIMUM EXCLUDING CURB WITH 5' MIN
 BY 5' MIN PASSING SPACES PROVIDED AT
 INTERVALS OF 200' MAXIMUM (PROWAG
 R302.3 AND 302.4).

REDUCE 1/4" RADIUS TO 1/8" RADIUS TO
 PREVENT INSTALLING A JOINT WITH A GAP
 GREATER THAN 1/2" (PROWAG R302.7.3)



JOINT DEPTH OF 2-3/4" IN THIS DETAIL
 CONFLICTS WITH JOINT DEPTH
 IDENTIFIED FOR SIDEWALKS IN
 CONSTRUCTION CODE 312.3.05 AND
 DRAWING NUMBERS 442, 443 AND
 475. JOINT DEPTH MAY VARY BASED
 ON IDENTIFIED USE BUT IS NOT
 SPECIFIED IN CONSTRUCTION CODE
 FOR COMMERCIAL DRIVEWAYS.

NOTES:

1. CONTROL JOINTS SHALL BE WEAKENED PLANE TYPE FORMED TO A DEPTH OF 2-3/4" WITH TOOLED EDGES (1/4" R EDGE, 3" FLAT) EXCEPT IN CURB AND GUTTER (1/4" R EDGE ONLY). NO MESH ACROSS CONTROL JOINTS.
2. TOOLED LINES ARE FOR COMESTIC PURPOSES ONLY (1/4" R EDGE, 3" FLAT).
3. FOR LOCATION AND WIDTH OF DRIVEWAYS, MEET THE REQUIREMENTS OF THE TUALATIN DEVELOPMENT CODE.
4. FINISH CONCRETE APPROACH RAMP WITH BRUSH FINISH TRANSVERSE TO CENTERLINE.
5. POUR APPROACH SLAB AND RAMPS (BOTH 8" THICK) MONOLITHIC WITH CURB AND GUTTER IF SO DIRECTED BY ENGINEER.
6. BEFORE OPENING TO TRAFFIC, ATTAIN 4,000 PSI COMPRESSIVE STRENGTH.
7. REMOVE THE CURB AND GUTTER IN ITS ENTIRETY AND POUR BACK AS A MONOLITHIC POUR IF AN EXISTING CURB AND GUTTER IS MODIFIED AS PART OF A DRIVEWAY APPROACH.
8. SIDEWALK CROSS SLOPE TO BE MAX 1.5% DESIGN SLOPE (2.0% MAX FINISHED SURFACE SLOPE).

9. CONSTRUCT TRANSITIONAL SEGMENTS BETWEEN NEW CONSTRUCTION AND EXISTING SIDEWALK TO THE NEAREST EXISTING SIDEWALK CONTROL JOINT (MINIMUM 2' DISTANCE). TRANSITIONAL SEGMENTS ARE INTENDED TO SMOOTHLY TRANSITION BETWEEN THE NEW SIDEWALK CROSS SLOPE AND THE EXISTING CROSS SLOPE.

CLARIFY IF NOTE 7 IS REQUIRING THE APPROACH SLAB AND WINGS TO BE MONOLITHIC WITH THE CURB AND GUTTER OR IF JUST THE CURB AND GUTTER IS MONOLITHIC.

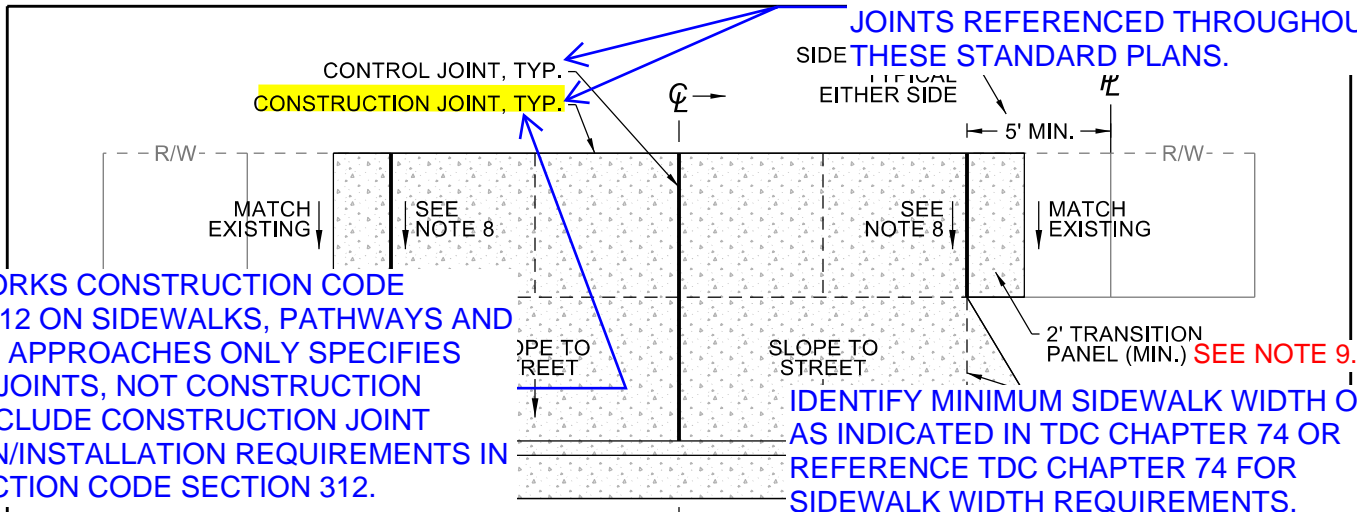
CURBSIDE SIDEWALK

M. PALMER
 J. FUCHS

DRAWING NO.:

441

PROVIDE A STANDARD DRAWING
 DETAILING THE VARIOUS TYPES OF
 JOINTS REFERENCED THROUGHOUT
 THESE STANDARD PLANS.

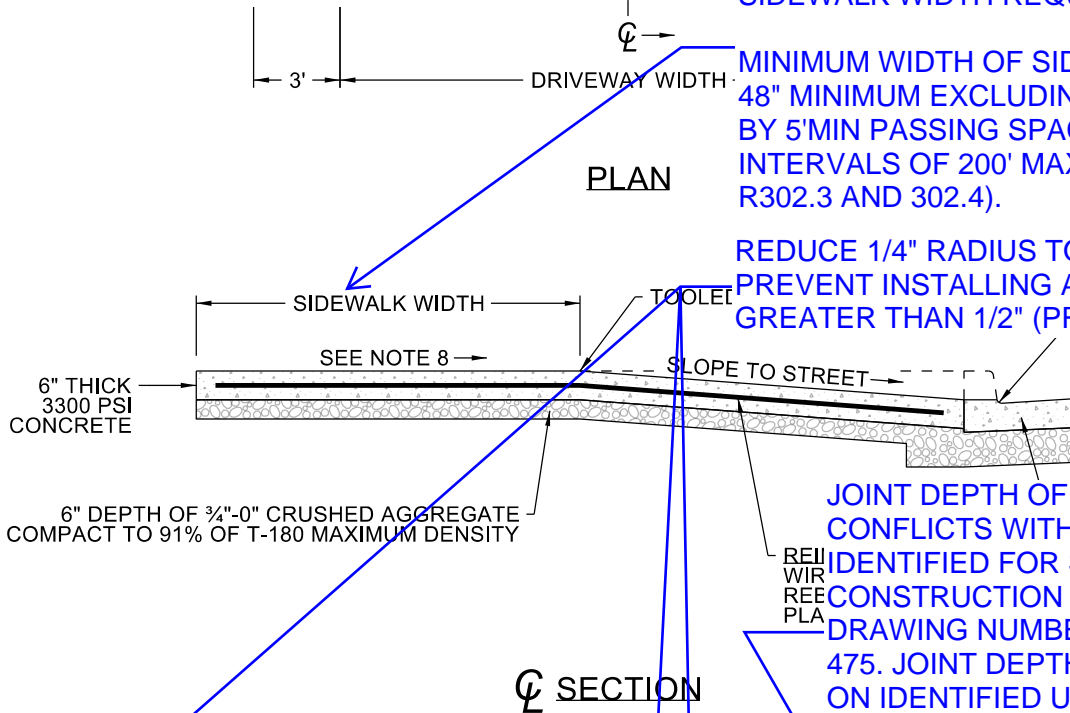


PUBLIC WORKS CONSTRUCTION CODE
 SECTION 312 ON SIDEWALKS, PATHWAYS AND
 DRIVEWAY APPROACHES ONLY SPECIFIES
 CONTROL JOINTS, NOT CONSTRUCTION
 JOINTS. INCLUDE CONSTRUCTION JOINT
 DEFINITION/INSTALLATION REQUIREMENTS IN
 CONSTRUCTION CODE SECTION 312.

IDENTIFY MINIMUM SIDEWALK WIDTH OF 5'
 AS INDICATED IN TDC CHAPTER 74 OR
 REFERENCE TDC CHAPTER 74 FOR
 SIDEWALK WIDTH REQUIREMENTS.

MINIMUM WIDTH OF SIDEWALK SHALL BE
 48" MINIMUM EXCLUDING CURB WITH 5' MIN
 BY 5' MIN PASSING SPACES PROVIDED AT
 INTERVALS OF 200' MAXIMUM (PROWAG
 R302.3 AND 302.4).

REDUCE 1/4" RADIUS TO 1/8" RADIUS TO
 PREVENT INSTALLING A JOINT WITH A GAP
 GREATER THAN 1/2" (PROWAG R302.7.3)



JOINT DEPTH OF 2" IN THIS DETAIL
 CONFLICTS WITH JOINT DEPTH
 IDENTIFIED FOR SIDEWALKS IN
 CONSTRUCTION CODE 312.3.05 AND
 DRAWING NUMBERS 440, 441 AND
 475. JOINT DEPTH MAY VARY BASED
 ON IDENTIFIED USE BUT IS NOT
 SPECIFIED IN CONSTRUCTION CODE
 FOR RESIDENTIAL DRIVEWAYS.

NOTES:

- CONTROL JOINTS SHALL BE WEAKENED PLANE TYPE FORMED TO A DEPTH 2" WITH TOOLED EDGES (1/4" R EDGE, 3" FLAT) EXCEPT IN CURB AND GUTTER (1/4" R EDGE ONLY). NO MESH ACROSS CONTROL JOINTS.
- TOOLED LINES ARE FOR COMESTIC PURPOSES ONLY. (1/4" R EDGE, 3" FLAT).
- FOR LOCATION AND WIDTH OF DRIVEWAYS, MEET THE REQUIREMENTS OF THE TUALATIN DEVELOPMENT CODE.
- FINISH CONCRETE APPROACH RAMP WITH BRUSH FINISH TRANSVERSE TO CENTERLINE.
- POUR APPROACH SLAB AND WINGS (BOTH 6" THICK) MONOLITHIC WITH CURB AND GUTTER IF SO DIRECTED BY ENGINEER.
- BEFORE OPENING TO TRAFFIC, ATTAIN 3,300 PSI COMPRESSIVE STRENGTH.
- REMOVE THE CURB AND GUTTER IN ITS ENTIRETY AND POUR BACK AS A MONOLITHIC POUR IF AN EXISTING CURB AND GUTTER IS MODIFIED AS PART OF A DRIVEWAY APPROACH.
- SIDEWALK CROSS SLOPE TO BE MAX 1.5% DESIGN SLOPE (2.0% MAX FINISHED SURFACE SLOPE).

9. CONSTRUCT TRANSITIONAL SEGMENTS BETWEEN NEW CONSTRUCTION AND EXISTING SIDEWALK TO THE NEAREST EXISTING SIDEWALK CONTROL JOINT (MINIMUM 2' DISTANCE). TRANSITIONAL SEGMENTS ARE INTENDED TO SMOOTHLY TRANSITION BETWEEN THE NEW SIDEWALK CROSS SLOPE AND THE EXISTING CROSS SLOPE.

CLARIFY IF NOTE 7 IS REQUIRING THE APPROACH SLAB AND WINGS TO BE MONOLITHIC WITH THE CURB AND GUTTER OR IF JUST THE CURB AND GUTTER IS MONOLITHIC.

CURBSIDE PLANTER STRIP

M. PALMER
 J. FUCHS

DRAWING NO.:

442

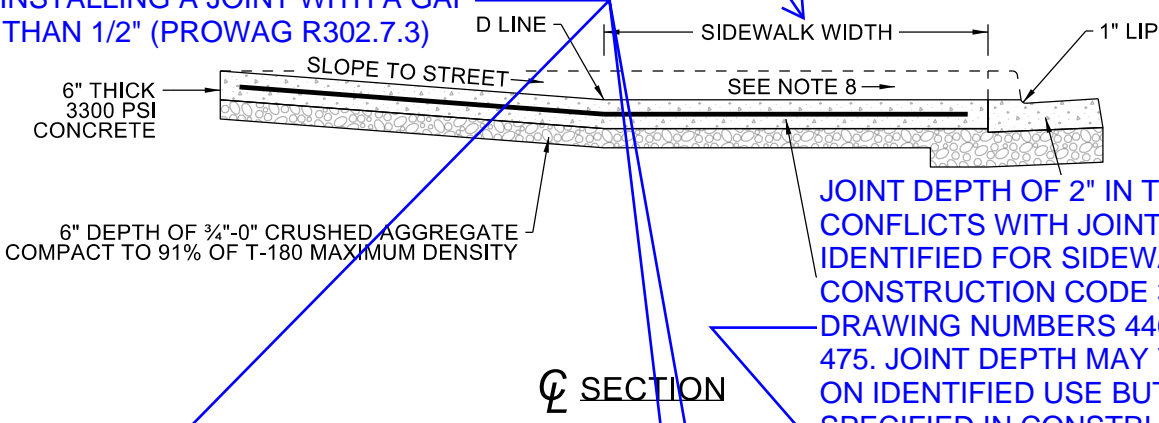
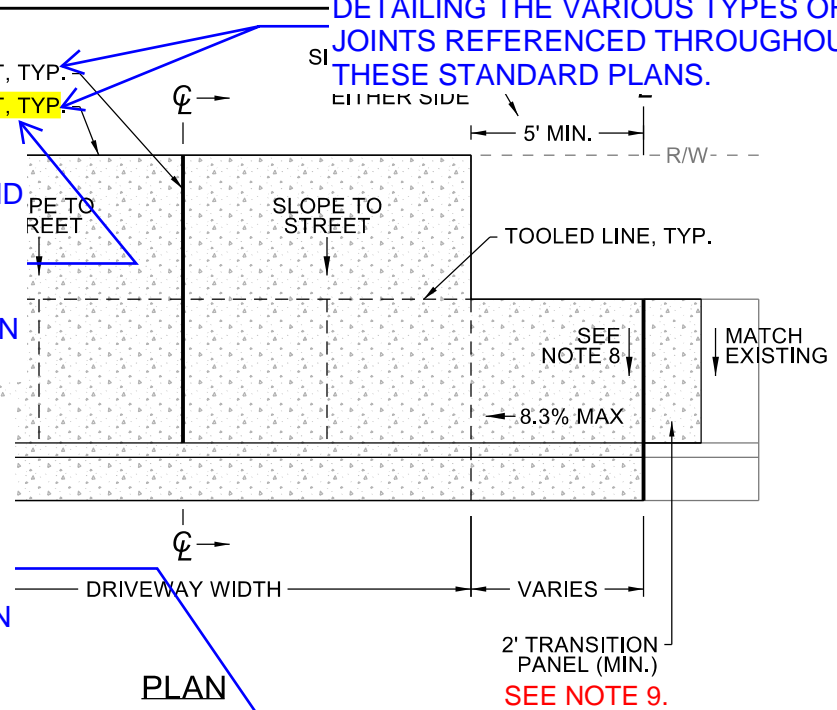
PROVIDE A STANDARD DRAWING
DETAILING THE VARIOUS TYPES OF
JOINTS REFERENCED THROUGHOUT
THESE STANDARD PLANS.

PUBLIC WORKS CONSTRUCTION CODE
SECTION 312 ON SIDEWALKS, PATHWAYS AND
DRIVEWAY APPROACHES ONLY SPECIFIES
CONTROL JOINTS, NOT CONSTRUCTION
JOINTS. INCLUDE CONSTRUCTION JOINT
DEFINITION/INSTALLATION REQUIREMENTS IN
CONSTRUCTION CODE SECTION 312.

IDENTIFY MINIMUM SIDEWALK WIDTH OF 5'
AS INDICATED IN TDC CHAPTER 74 OR
REFERENCE TDC CHAPTER 74 FOR
SIDEWALK WIDTH REQUIREMENTS.

MINIMUM WIDTH OF SIDEWALK SHALL BE
48" MINIMUM EXCLUDING CURB WITH 5' MIN
BY 5' MIN PASSING SPACES PROVIDED AT
INTERVALS OF 200' MAXIMUM (PROWAG
R302.3 AND 302.4).

REDUCE 1/4" RADIUS TO 1/8" RADIUS TO
PREVENT INSTALLING A JOINT WITH A GAP
GREATER THAN 1/2" (PROWAG R302.7.3)



NOTES:

- CONTROL JOINTS SHALL BE WEAKENED PLANE TYPE FORMED TO A DEPTH (2") WITH TOOLED EDGES (1/4" R EDGE, 3" FLAT) EXCEPT IN CURB AND GUTTER (1/4" R EDGE ONLY). NO MESH ACROSS CONTROL JOINTS.
- TOOLED LINES ARE FOR COMESTIC PURPOSES ONLY (1/4" R EDGE, 3" FLAT).
- FOR LOCATION AND WIDTH OF DRIVEWAYS, MEET THE REQUIREMENTS OF THE TUALATIN DEVELOPMENT CODE.
- FINISH CONCRETE APPROACH RAMP WITH BRUSH FINISH TRANSVERSE TO CENTERLINE.
- POUR APPROACH SLAB AND RAMPS (BOTH 6" THICK) MONOLITHIC WITH CURB AND GUTTER IF SO DIRECTED BY ENGINEER.
- BEFORE OPENING TO TRAFFIC, ATTAIN 3,300 PSI COMPRESSIVE STRENGTH.
- REMOVE THE CURB AND GUTTER IN ITS ENTIRETY AND POUR BACK AS A MONOLITHIC POUR IF AN EXISTING CURB AND GUTTER IS MODIFIED AS PART OF A DRIVEWAY APPROACH.
- SIDEWALK CROSS SLOPE TO BE MAX 1.5% DESIGN SLOPE (2.0% MAX FINISHED SURFACE SLOPE).

9. CONSTRUCT TRANSITIONAL SEGMENTS BETWEEN NEW CONSTRUCTION AND EXISTING SIDEWALK TO THE NEAREST EXISTING SIDEWALK CONTROL JOINT (MINIMUM 2' DISTANCE). TRANSITIONAL SEGMENTS ARE INTENDED TO SMOOTHLY TRANSITION BETWEEN THE NEW SIDEWALK CROSS SLOPE AND THE EXISTING CROSS SLOPE.

CLARIFY IF NOTE 7 IS REQUIRING THE APPROACH SLAB AND WINGS TO BE MONOLITHIC WITH THE CURB AND GUTTER OR IF JUST THE CURB AND GUTTER IS MONOLITHIC.

CURBSIDE SIDEWALK

M. PALMER
J. FUCHS

DRAWING NO:

443

PLOT TIME: 9:14:30 AM

PLOT DATE: 11/22/2016

FILENAME: GE

GENERAL NOTES FOR ALL CURB RAMP DETAILS:

1. ALTERNATIVE ENGINEERED CURB RAMP DESIGNS THAT MEET ALL REQUIREMENTS OF THE UNITED STATES ACCESS BOARD ~~PROPOSED PUBLIC RIGHTS OF WAY ACCESSIBILITY GUIDELINES~~ (PROWAG) MAY BE USED IF APPROVED BY THE CITY ENGINEER. ← PROPOSED ACCESSIBILITY GUIDELINES FOR PEDESTRIAN FACILITIES IN THE PUBLIC RIGHT-OF-WAY
 2. MEET THE REQUIREMENTS OF PROWAG. GENERAL NOTES AND DETAILS ARE PROVIDED TO CONVEY MINIMUM REQUIREMENTS TO MEET PROWAG FOR DESIGN AND CONSTRUCTION OF ADA RAMPS. EACH PROJECT REQUIRES A DESIGN BY A STATE OF OREGON LICENSED ENGINEER. ↑ CURB
 3. SEE DWG. NO. 470 & 471 FOR CURB DETAILS. SEE DWG. NO. 475 FOR SIDEWALK DETAILS.
 4. CONSTRUCT TURNING SPACE/LANDING WITH 1.5% MAX. SLOPE IN THE DIRECTION OF TRAVEL AND PERPENDICULAR TO THE DIRECTION OF TRAVEL. SLOPE TURNING/LANDING SPACE TO DRAIN TOWARDS STREET UNLESS OTHERWISE NOTED.
 5. PROVIDE **EDGED JOINTS** AT ALL SIDEWALK RAMP SLOPE BREAK LINES.
 6. FOR THE PURPOSE OF THESE DRAWINGS, A CURB RAMP IS CONSIDERED "PERPENDICULAR" IF THE ANGLE BETWEEN THE LONGITUDINAL AXIS OF THE RAMP AND A LINE TANGENT TO THE CURB AT THE RAMP CENTER IS 75 DEGREES OR GREATER.
 7. SIDEWALK CURB RAMP SLOPES SHOWN ARE RELATIVE TO THE TRUE LEVEL HORIZON (ZERO BUBBLE). VERIFY ALL SLOPES USING A CALIBRATED SMART LEVEL.
 8. PLACE TRUNCATED DOME DETECTABLE WARNING SURFACE IN THE LOWER 2' ADJACENT TO TRAFFIC OF THE THROAT OF THE RAMP ONLY. SEE DWG. NO. 464 FOR TRUNCATED DOME PATTERN AND AND DETAIL. AT CURB RAMPS PER DWG. NO. 461, 462 & 463.
 9. LOCATE THE RAMP WIDTH EXCLUDING FLARED SIDES COMPLETELY WITHIN THE LEGAL CROSSWALK LIMITS. SEE DWG. NO. 464 IF A SINGLE SHARED DIAGONAL PERPENDICULAR RAMP IS INSTALLED, THE RAMP SHALL HAVE A SEGMENT OF CURB 24" LONG MINIMUM ON EACH SIDE OF THE CURB RAMP INCLUDING FLARED SIDES WITHIN A MARKED CROSSING.
 10. CONSTRUCT RAMP FLARED SIDES 9.0% MAX SLOPE (10.0% MAX. FINISHED SURFACE SLOPE) MEASURED PARALLEL TO THE CURBLINE, WHEN IN THE PEDESTRIAN CIRCULATION PATH.
 11. COUNTER SLOPE FOR STREETS, GUTTERS, AND TRANSITIONS, AT THE FOOT OF THE CURB RAMP IS ~~5.0% MAX.~~ 4.0% MAX. REDUCE MAX SLOPE TO ALLOW FOR CONSTRUCTION TOLERANCE.
 12. CONSTRUCT TRANSITIONAL SEGMENTS BETWEEN NEW CONSTRUCTION AND EXISTING SIDEWALK TO THE NEAREST SIDEWALK CONTROL JOINT (MINIMUM 2' DISTANCE). TRANSITIONAL SEGMENTS ARE INTENDED TO SMOOTHLY TRANSITION BETWEEN THE NEW RAMP AND SIDEWALK CROSS SLOPE AND THE EXISTING CROSS SLOPE. SECTIONS R209, R306.2, R306.3.2, R306.5, R403 AND R404 WITH OREGON SUPPLEMENTS
 13. REFER TO PROWAG ~~SECTION R409~~ OPERABLE PARTS AND MUTCD (CHAPTER 4) FOR PEDESTRIAN SIGNAL REQUIREMENTS.
 14. CONSTRUCT RAMPS WITH A RUNNING SLOPE BETWEEN 5.0% ↓ MIN TO 7.5% MAXIMUM (8.3% ↓ MAX FINISHED SURFACE). MEET RUNNING SLOPE REQUIREMENTS FOR UP TO 15.0'. RUNNING SLOPE FOR THAT PORTION OF RAMP LONGER THAN 15.0' MAY EXCEED 7.5% MAX. (8.3% MAX FINISHED SURFACE) TO MATCH SIDEWALK GRADE AS APPROVED BY THE CITY ENGINEER. ← ADD WORDING IF PERPENDICULAR RAMP, TURNING SPACE AT TOP OF 15' RAMP IS STILL REQUIRED.
- ADD THE FOLLOWING NOTES AFTER GENERAL NOTE 2 AND RENUMBER ACCORDINGLY:
3. TWO CURB RAMPS SHALL BE INSTALLED AT EACH CORNER UNLESS OTHERWISE DIRECTED BY ENGINEER. SHARED DIAGONAL PERPENDICULAR RAMPS SHALL NOT BE INSTALLED UNLESS ALL OTHER DESIGN OPTIONS ARE UNABLE TO BE CONSTRUCTED DUE TO EXISTING SITE CONSTRAINTS.
 4. CURB RAMP SHALL BE CONSTRUCTED WITH COMPANION RAMP ON OPPOSITE SIDE OF THE ROADWAY WHERE NO RAMP IS PROVIDED UNLESS OTHERWISE DIRECTED BY ENGINEER.

PUBLIC WORKS CONSTRUCTION CODE SECTION 312 ON SIDEWALKS, PATHWAYS AND DRIVEWAY APPROACHES ONLY SPECIFIES CONTROL JOINTS, NOT EDGE JOINTS. INCLUDE EDGE JOINT DEFINITION/INSTALLATION REQUIREMENTS IN CONSTRUCTION CODE SECTION 312. PROVIDE A STANDARD DRAWING DETAILING THE VARIOUS TYPES OF JOINTS REFERENCED THROUGHOUT THESE STANDARD PLANS.

ADD THE FOLLOWING INFORMATION TO NOTE 10:
THE INSTALLATION OF CURBED EDGES ARE NOT REQUIRED BUT MAY BE USED IN LIEU OF FLARED SIDES AT THE SIDES OF CURB RAMPS WHERE THE ADJACENT SURFACE IS LANDSCAPED OR OTHERWISE NOT USABLE BY PEDESTRIANS.

MOVE REFERENCE TO CURB DETAILS FROM NOTE 3 TO NOTE 11 AND ADD THE FOLLOWING INFORMATION TO NOTE 11:
GUTTER PAN SLOPE IN FRONT OF DETECTABLE WARNING SURFACE SHALL NOT EXCEED 1/2" OF DEPTH FOR EACH 16" OF WIDTH. TRANSITION GUTTER PAN SLOPE FROM 1/2" OF DEPTH FOR EACH 16" OF WIDTH TO MATCH TYPICAL GUTTER PAN SLOPE PER DRAWING NO 470 FOR X' ON EITHER SIDE OF DETECTABLE WARNING. SHOW GUTTER SLOPE TRANSITION ON DRAWINGS 461, 462 AND 463.



ADA CURB RAMP ~~ADA RAMP~~ GENERAL NOTES

REVISED:	11/22/2016	DRAFTED BY:	S. ATWOOD
EFFECTIVE:	12/31/2016	APPROVED BY:	D. HIPPENSTIEL

DRAWING NO: 460

NOTE: SEE DWG. NO. 460 FOR GENERAL NOTES.

IS THIS MIN 3' IDENTIFYING A MINIMUM CURB LENGTH OR HEIGHT? DOES THIS DETAIL ALLOW THE CURB TO COME TO AN EDGE SO THAT THE FACE OF CURB IS TRIANGULAR IN SHAPE INSTEAD OF TRAPEZOIDAL? RECOMMEND 1' MINIMUM CURB LENGTH BETWEEN WINGS, OTHERWISE, CONCRETE MAY BREAK, CRACK OR UNRAVEL?

SHOW CLEAR SPACES AND ADD A CALLOUT IDENTIFYING CLEAR SPACE REQUIREMENTS PER DWG. NO. 464.

DTH (NEW 5' MIN., ALTERATIONS 4' MIN.).

BREAKS ONLY AT TOP AND BOTTOM OF RAMP AND PERPENDICULAR TO THE DIRECTION OF TRAVEL.

FLARED SIDE (TYP.) MAX. SLOPES 9.0% (10.0% FINISHED SURFACE SLOPE)(SEE GENERAL NOTE 10)

MATCH EXISTING

MIN. 3" CURB EXPOSURE

UCT TRUNCATED DOME DETECTABLE SURFACE (TYP.) THE FULL WIDTH RAMP (EXCLUDING FLARED SIDES). (SEE G. 464 FOR DETAILS.)

FULL CURB EXPOSURE (TYP.)

MATCH EXISTING

SIDEWALK (TYP.)

1:1 TAPER NOM.

20" MIN. (TYP.)

REVISE MINIMUM SIZE OF TURNING SPACE TO BE AT LEAST AS WIDE AS THE CURB RAMP BY 4' MIN.

CONSTRUCT TURNING SPACE 4' X 4' MIN. MAX. SLOPES 1.5% (2.0% FINISHED SURFACE). IF CONSTRAINED AT THE BACK OF SIDEWALK INCREASE TO 5' IN THE DIRECTION OF THE RAMP RUN (SEE TURNING SPACE DETAIL AND GENERAL NOTE 4).

SIDEWALK WIDENING (WHEN REQD.)

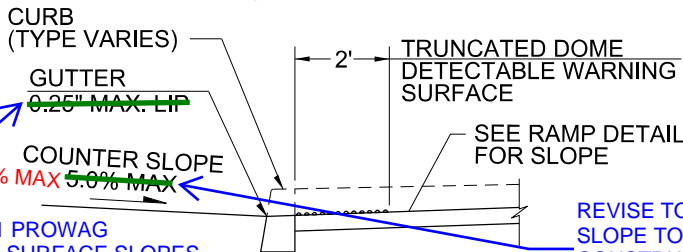
DIRECTION OF TRAVEL (TYP.)

THE BACK (OR TOP) OF THE CURB RAMP MUST MEET THE MINIMUM CLEAR WIDTH REQUIREMENTS NOT JUST THE FRONT (OR BOTTOM). THE EDGES OF CURB RAMP SHOULD APPEAR TO BE DRAWN RADIALLY AND NOT PARALLEL TO EACH OTHER AS REQUIRED PER ADA SECTION 406.6. HOWEVER, PROWAG SECTION R304.2.2 INDICATES THAT THE RUNNING SLOPE OF THE CURB RAMP SHALL MEET THE GUTTER GRADE BREAK AT RIGHT ANGLES WHERE THE CURB IS CURVED. AFTER REVIEWING THE CURB RAMP FIGURES IN PROWAG SECTION 304 AND ADA SECTION 406.6, WE RECOMMEND THAT THE CENTERLINE OF THE CURB RAMP BE DRAWN PERPENDICULAR TO THE CURB RETURN WITH THE SIDES OF THE 5' MIN WIDE CURB RAMP PARALLEL TO CURB RAMP CENTERLINE.

RETURN TO PROTECT CROSS

MIN

PERPENDICULAR RAMPS (FOR NARROW SIDEWALKS)



SECTION A-A

PER 2011 PROWAG R304.5.2, SURFACE SLOPES THAT MEET AT GRADE BREAKS SHALL BE FLUSH.

REVISE TO 4.0% MAX SLOPE TO ALLOW FOR CONSTRUCTION TOLERANCE.

TURNING SPACE 4' X 4' MIN. (SEE TURNING SPACE DETAIL AND GENERAL NOTE 4)

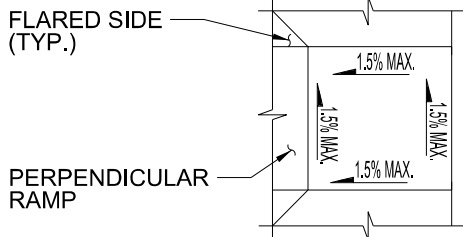
TRANSITIONAL SEGMENT (TYP.) MIN. 2' CONST. (SEE GENERAL NOTE 12)

LANDSCAPED AREA

MATCH EXISTING

PERPENDICULAR RAMPS (FOR WIDE SIDEWALKS/PLANTERS)

REVISE MINIMUM SIZE OF TURNING SPACE TO BE AT LEAST AS WIDE AS THE CURB RAMP BY 4' MIN. ADD WORDING FROM TURNING SPACE CALLOUT ABOVE REQUIRING THE LENGTH OF THE TURNING SPACE TO INCREASE TO 5' IN THE DIRECTION OF THE RAMP RUN IF CONSTRAINED AT THE BACK OF WALK.



TURNING SPACE



CITY OF TUALATIN, OR

~~ADA CURB RAMP~~ ~~ADA RAMP~~
PERPENDICULAR

REVISED: 11/22/2016
EFFECTIVE: 12/31/2016

DRAFTED BY: S. ATWOOD
APPROVED BY: D. HIPPENSTIEL

DRAWING NO: 461

PLOT DATE: 11/22/2016

FILENAME: PERPENDICULAR CURB.dgn

NOTE: SEE DWG. NO. 460 FOR GENERAL NOTES.

REVISE MINIMUM SIZE OF TURNING SPACE TO BE AT LEAST AS WIDE AS THE CURB RAMP BY 4' MIN.

CONSTRUCT TURNING SPACE/LANDING 4'X4' MIN. IF CONSTRAINED ON 2 OR MORE SIDES, INCREASE TO 5' IN THE DIRECTION OF THE RAMP RUN. SEE TURNING SPACE/LANDING DETAIL FOR SLOPES.

CONSTRUCT TRUNCATED DOME DETECTABLE WARNING SURFACE (TYP.) THE FULL WIDTH OF THE TURNING SPACE/LANDING. (SEE DWG. 464 FOR DETAILS.)

IS THIS MIN 3" IDENTIFYING A MINIMUM CURB LENGTH OR HEIGHT? DOES THIS DETAIL ALLOW THE CURB TO COME TO AN EDGE SO THAT THE FACE OF CURB IS TRIANGULAR IN SHAPE INSTEAD OF TRAPEZOIDAL? RECOMMEND 1' MINIMUM CURB LENGTH BETWEEN RAMPS, OTHERWISE, CONCRETE MAY BREAK, CRACK OR UNRAVEL?

3" MIN. CURB EXPOSURE

SHOW CLEAR SPACES AND ADD A CALLOUT IDENTIFYING CLEAR SPACE REQUIREMENTS PER DWG. NO. 464.

TRANSITIONAL SEGMENT (TYP.) MIN 2'. (SEE GENERAL NOTE 12).

CONSTRUCT CURB AT BACK OF RAMP UNLESS OTHERWISE DIRECTED (SEE DWG. NO. 471)

THE BACK OF THE TURNING SPACE MUST MEET THE MINIMUM CLEAR WIDTH REQUIREMENTS NOT JUST THE FRONT. REVISE MINIMUM LANDING WIDTH TO BE 5' FOR NEW CONSTRUCTION AND 4' MIN FOR ALTERATIONS TO MATCH STANDARD DRAWINGS #461.

RAMP LENGTH NOT TO EXCEED 15.0' (TYP.). (SEE GENERAL NOTE 14).

PARALLEL RAMP DETAIL

PER 2011 PROWAG R304.5.2, SURFACE SLOPES THAT MEET AT GRADE BREAKS SHALL BE FLUSH.

THIS IS IDENTIFIED AS A TURNING SPACE RATHER THAN A LANDING PER PROWAG R304.3.1. THE USE OF THE WORD LANDING MAY TRIGGER STRICTER SLOPE REQUIREMENTS SUCH AS 2% MAX IN ANY DIRECTION.

TURNING SPACE/LANDING DETAIL

REVISE TO 4.0% MAX SLOPE TO ALLOW FOR CONSTRUCTION TOLERANCE.

GRADE BREAK AT BOTTOM OF DETECTABLE WARNING SURFACE ONLY.

REVISE MINIMUM SIZE OF TURNING SPACE TO BE 4' MIN AND AT LEAST AS WIDE AS THE CURB RAMP.

TURNING SPACE/LANDING 4' MIN.

CURB (TYPE VARIES)

GUTTER 0.25" MAX. LIP

COUNTER SLOPE 4.0% MAX 5.0% MAX

2' TRUNCATED DOME DETECTABLE WARNING SURFACE

SEE TURNING SPACE/LANDING DETAIL FOR SLOPE

SECTION A-A

TIME: 9:17:56 AM

PLOT D. 201

FILENAME: PARALLEL CURB



CITY OF TUALATIN, OR

ADA CURB RAMP ~~ADA RAMP~~ PARALLEL

REVISED: 11/22/2016
EFFECTIVE: 12/31/2016

DRAFTED BY: S. ATWOOD
APPROVED BY: D. HIPPENSTIEL

DRAWING NO: 462

PLOT TIME: 9:19:03 AM

DATE: 11/22/2016

FILENAME: MIBBLOCK

CONST. CURB AT BACK OF RAMP UNLESS OTHERWISE DIRECTED. CURB EXPOSURE VARIES. (SEE DWG. 471 FOR DETAILS).

MATCH EXISTING
FLARED SIDE (TYP.) MAX. SLOPES 9.0% (10.0% FINISHED SURFACE SLOPE)(SEE GENERAL NOTE 10)

CURB EXPOSURE

GRADE BREAKS ONLY AT TOP AND BOTTOM OF RAMP AND PERPENDICULAR TO THE DIRECTION OF TRAVEL.

RAMP WIDTH (NEW CONST. 5' MIN., ALTERATIONS 4' MIN.).

TUNING SPACE (TYP.) 4'X4' MIN. (SEE GENERAL NOTE 10 FOR DETAILS).
TURNING SPACE (TYP.) 4' MIN.
2' MIN

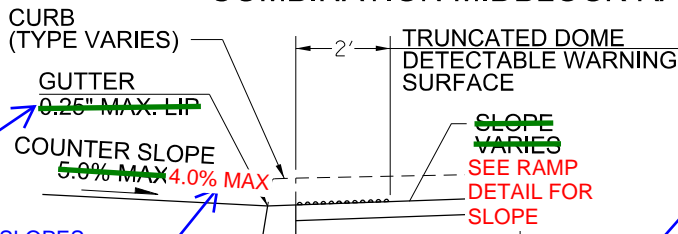
REVISE MINIMUM SIZE OF TURNING SPACE TO BE AT LEAST AS WIDE AS THE CURB RAMP BY 4' MIN. ADD WORDING FROM TURNING SPACE FALLOUT BELOW REQUIRING THE LENGTH OF THE TURNING SPACE TO INCREASE TO 5' IN THE DIRECTION OF THE RAMP RUN IF CONSTRAINED ON TWO OR MORE SIDES.

TRANSITIONAL SEGMENT (TYP.) MIN 2'. (SEE GENERAL NOTE 12)

CONSTRUCT TRUNCATED DOME DETECTABLE WARNING SURFACE (TYP.) THE FULL WIDTH OF THE RAMP (EXCLUDING FLARED SIDES). (SEE DWG. 464 FOR DETAILS.)

SHOW CLEAR SPACES AND ADD A CALLOUT IDENTIFYING CLEAR SPACE REQUIREMENTS PER DWG. NO. 464.

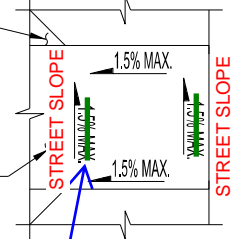
COMBINATION MIBBLOCK RAMP DETAIL



SECTION A-A

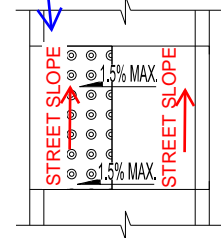
FLARED SIDE (TYP.)

PERPENDICULAR RAMP



TURNING SPACE

PER PROWAG R304.5.3, THE CROSS-SLOPE OF CURB RAMPS AND TURNING SPACES AT MIBBLOCK CROSSINGS SHALL BE PERMITTED TO EQUAL THE STREET OR HIGHWAY GRADE.



TURNING SPACE/ LANDING DETAIL

THIS IS IDENTIFIED AS A TURNING SPACE RATHER THAN A LANDING PER PROWAG SECTION R304.3.1. THE USE OF THE WORD LANDING MAY TRIGGER STRICTER SLOPE REQUIREMENTS SUCH AS 2% MAX IN ANY DIRECTION.

PER 2011 PROWAG R304.5.2, SURFACE SLOPES THAT MEET AT GRADE BREAKS SHALL BE FLUSH.

REVISE TO 4.0% MAX SLOPE TO ALLOW FOR CONSTRUCTION TOLERANCE.

TUNING SPACE (TYP.) 4'X4' MIN. (SEE TURNING SPACE/ LANDING DETAIL)

MATCH EXISTING

CONST. CURB AT BACK OF RAMP UNLESS OTHERWISE DIRECTED (SEE DWG. NO. 471)

TRANSITION SEGMENT (TYP) MIN 2'.

MATCH EXISTING

CURB EXPOSURE

MATCH EXISTING SIDEWALK WIDTH

TRUNCATED DOME DETECTABLE WARNING SURFACE (TYP.). (SEE DWG. 464 FOR DETAILS.)

CONSTRUCT TURNING SPACE/ LANDING 4'X4' MIN. IF CONSTRAINED ON 2 OR MORE SIDES, INCREASE TO 5' IN THE DIRECTION OF THE RAMP RUN. SEE TURNING SPACE/ LANDING DETAIL FOR SLOPES.

PARALLEL MIBBLOCK RAMP DETAIL

NOTE: SEE DWG. NO. 460 FOR GENERAL NOTES.



CITY OF TUALATIN, OR

ADA CURB RAMP - ADA RAMP - MIBBLOCK

REVISED: 11/22/2016
EFFECTIVE: 12/31/2016

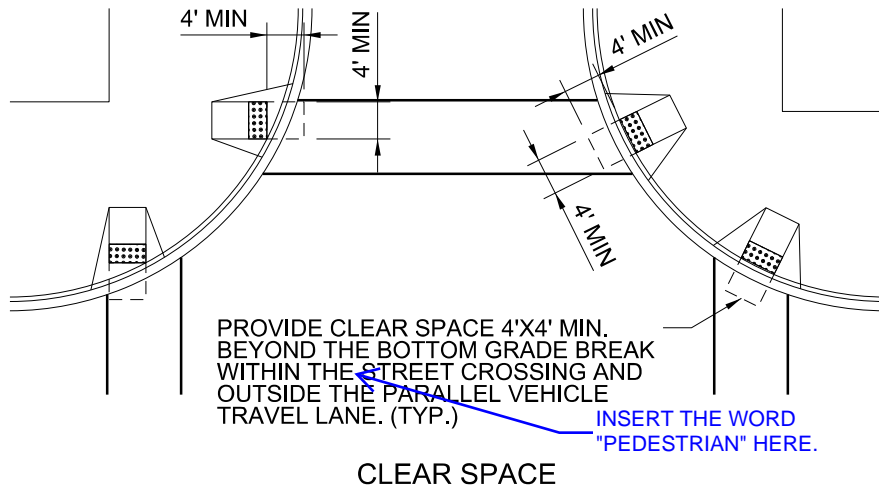
DRAFTED BY: S. ATWOOD
APPROVED BY: D. HIPPENSTIEL

DRAWING NO: 463

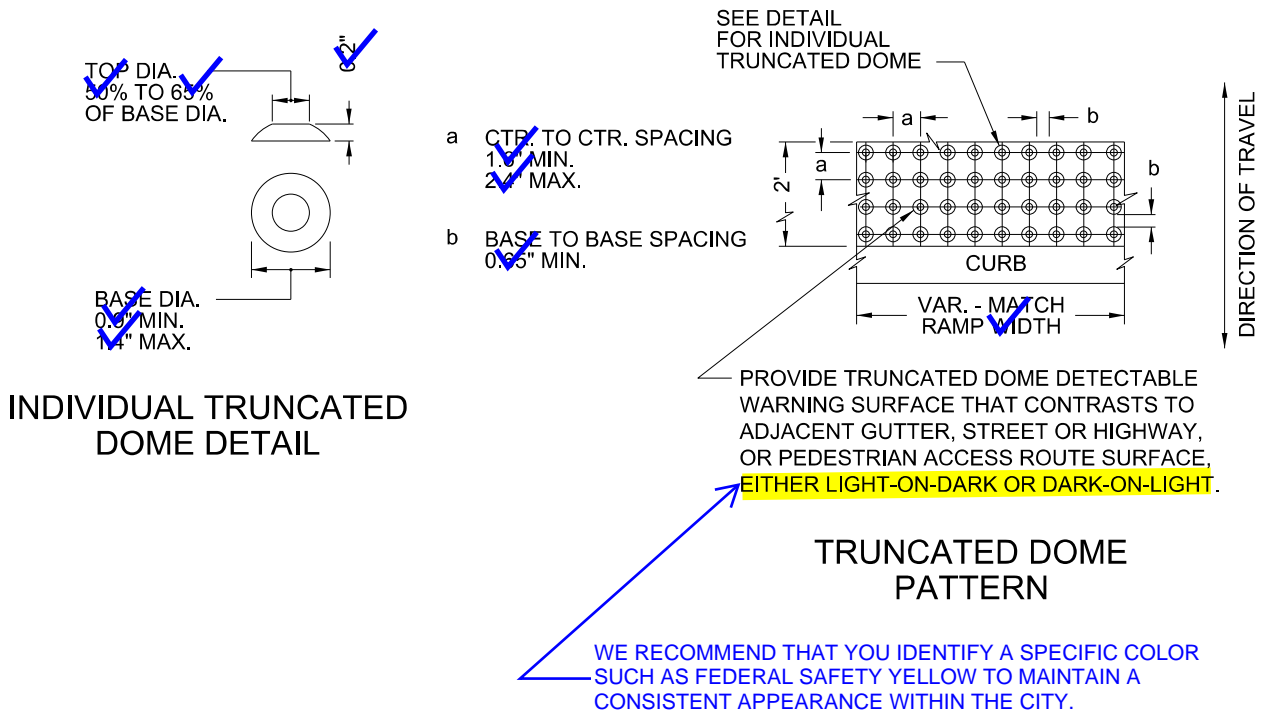
NOTE: SEE DWG. NO. 460 FOR GENERAL NOTES.

PLOT TIME: 9:20:19 AM

PLOT DATE: 11/22/2016



TRUNCATED DOME DETECTABLE WARNING SURFACE



FILENAME: DUAL CURB.dgn



CITY OF TUALATIN, OR

ADA CURB RAMP - ~~ADA RAMP~~ - DETAILS

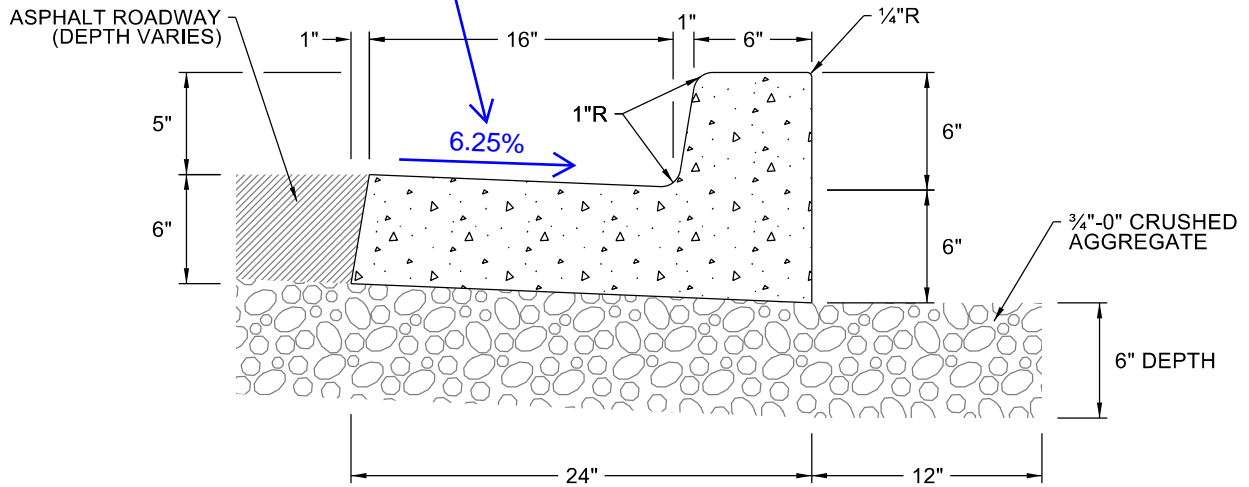
REVISED: 11/22/2016
EFFECTIVE: 12/31/2016

DRAFTED BY: S. ATWOOD
APPROVED BY: D. HIPPENSTIEL

DRAWING NO:

464

SLOPE = 1"/16" = 6.25%
 ADD A NOTE TO REDUCE SLOPE OF
 GUTTER TO LESS THAN 5% MAX
 ACROSS THE PEDESTRIAN ROUTE AT
 CURB RAMP LOCATIONS.



ADD TO NOTES 2 AND 3 TO AVOID PLACING JOINTS WITHIN
 THE PEDESTRIAN ROUTE AT CURB RAMP LOCATIONS.

NOTES:

1. CONCRETE, 4%-7% AIR, SHALL ATTAIN 3300 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
2. CONTROL JOINTS OF THE WEAKENED PLANE TYPE, DOWN THROUGH THE CURB TO HALF THE DEPTH OF THE GUTTER, SHALL BE SPACED AT 15' INTERVALS AND AT POINTS OF TANGENCY. FINISH THE EXPOSED EDGE WITH 1/4" RADIUS EDGER. DO NOT USE EXPANSION JOINTS.
3. CONSTRUCTION JOINTS SHALL BE FORMED WITH A SMOOTH FACE SQUARE TO THE CURB AND DOWN THROUGH HALF THE DEPTH OF THE GUTTER. FINISH FUTURE EXPOSED EDGE WITH 1/4" RADIUS EDGER. THE LOWER HALF OF THE GUTTER CROSS SECTION SHALL BE LEFT WITH A ROUGH EXPOSED AGGREGATE SURFACE TO INTERLOCK WITH A FUTURE EXTENSION OF THE CURB AND GUTTER.
4. BASE ROCK UNDER THE CURB AND ALSO PLACED 12" BEYOND THE BACK OF THE CURB SHALL BE COMPACTED TO 91% OF T-180 MAXIMUM DENSITY.
5. DRAINAGE WEEP HOLES OF 3" DIAMETER PVC SCHEDULE 40 PIPE SHALL BE PLACED THROUGH THE CURB 1/2" ABOVE THE GUTTER INVERT AND EXTEND 3" BEYOND THE BACK OF THE CURB AT POSITIONS SHOWN ON THE PLANS, LOW POINTS IN THE CURB, OR WHERE DETERMINED BY THE ENGINEER.
6. THE BACK OF THE CURB SHALL BE BACKFILLED NOT EARLIER THAN 7 DAYS AFTER CONCRETE PLACEMENT AND PRIOR TO THE COMPACTION OF BASE AND TOP COURSE ROCK AND PAVEMENT.
7. THE EXPOSED SURFACES SHALL BE BROOM FINISHED IN THE DIRECTION OF GUTTER FLOW.

ADD TO NOTE 5, IF SIDEWALK IS ADJACENT TO CURB, EXTEND PIPE UNDER THE SIDEWALK
 TO THE R/W LINE PER NOTE 1 IN DETAIL 475.



**CITY OF
 TUALATIN, OR**

CURB AND GUTTER

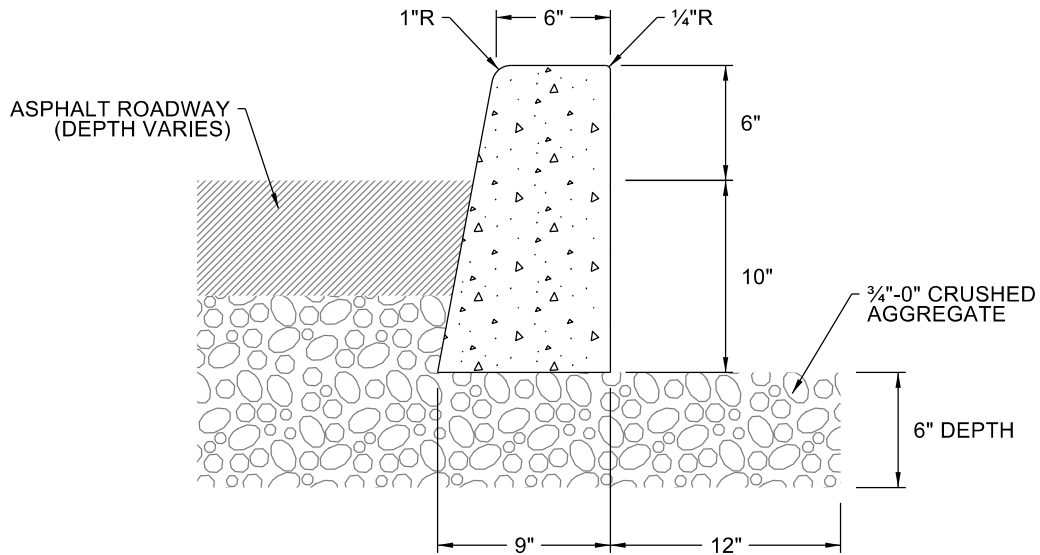
REVISED: 04/07/2017
 EFFECTIVE: 04/24/2017

SCALE:

DRAFTED BY: M. PALMER
 APPROVED BY: J. FUCHS

DRAWING NO:

470



NOTES:

1. CONCRETE, 4%-7% AIR, SHALL ATTAIN 3300 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
2. CONTROL JOINTS OF THE WEAKENED PLANE TYPE, DOWN THROUGH THE CURB TO HALF THE DEPTH OF THE CURB, SHALL BE SPACED AT 15' INTERVALS AND AT POINTS OF TANGENCY. FINISH THE EXPOSED EDGE WITH 1/4" RADIUS EDGER. DO NOT USE EXPANSION JOINTS.
3. CONSTRUCTION JOINTS SHALL BE FORMED WITH A SMOOTH FACE SQUARE TO THE CURB AND DOWN THROUGH HALF THE DEPTH OF THE CURB. FINISH FUTURE EXPOSED EDGE WITH 1/4" RADIUS EDGER. THE LOWER HALF OF THE CURB CROSS SECTION SHALL BE LEFT WITH A ROUGH EXPOSED AGGREGATE SURFACE TO INTERLOCK WITH A FUTURE EXTENSION OF THE CURB.
4. BASE ROCK UNDER THE CURB AND ALSO PLACED 12" BEYOND THE BACK OF THE CURB SHALL BE COMPACTED TO 91% OF T-180 MAXIMUM DENSITY.
5. DRAINAGE WEEP HOLES OF 3" DIAMETER PVC SCHEDULE 40 PIPE SHALL BE PLACED THROUGH THE CURB WITH INVERT 5 1/2" BELOW THE CURB TOP AND EXTEND 3" BEYOND THE BACK OF THE CURB AT POSITIONS SHOWN ON THE PLANS, LOW POINTS IN THE CURB, OR WHERE DETERMINED BY THE ENGINEER.
6. THE BACK OF THE CURB SHALL BE BACKFILLED NOT EARLIER THAN 7 DAYS AFTER CONCRETE PLACEMENT AND PRIOR TO THE COMPACTION OF BASE AND TOP COURSE ROCK AND PAVEMENT.
7. THE EXPOSED SURFACES SHALL BE BROOM FINISHED LONGITUDINALLY.

ADD TO NOTE 5, IF SIDEWALK IS ADJACENT TO CURB, EXTEND PIPE UNDER THE SIDEWALK TO THE R/W LINE PER NOTE 1 IN DETAIL 475.



**CITY OF
TUALATIN, OR**

CURB

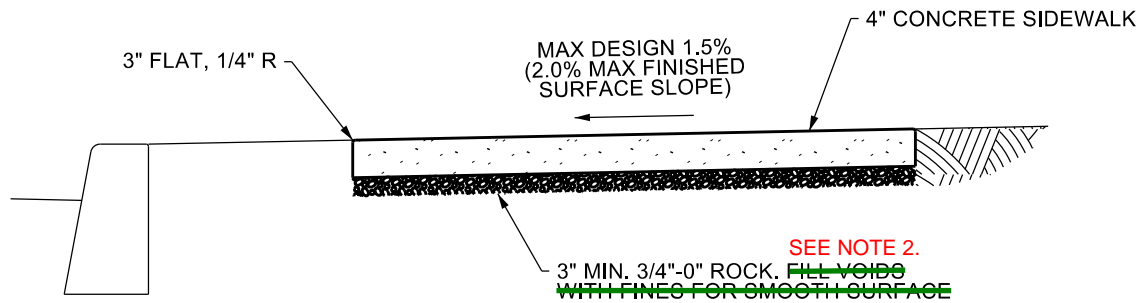
REVISED: 04/07/2017
EFFECTIVE: 04/24/2017

SCALE:

DRAFTED BY: M. PALMER
APPROVED BY: J. FUCHS

DRAWING NO:

471



CROSS SECTION

NOTES:

CONFIRM IF REQUIREMENT IN NOTE 1 IS FOR CURB SIDE SIDEWALKS ONLY OR IF THIS IS ALSO REQUIRED FOR SIDEWALKS SETBACK FROM THE CURB.

1. EXTEND DRAINAGE WEEP HOLE PIPE WHERE PROVIDED IN THE CURB UNDER THE SIDEWALK TO THE R/W LINE WITH 3" SCHEDULE 40 PVC.
2. COMPACT THE SIDEWALK SUBGRADE AND 3/4"-0" BASE ROCK ^{PER THE CONSTRUCTION CODE AND} TO THE SATISFACTION OF THE ENGINEER. DO NOT COMPACT EARLIER THAN 7 DAYS AFTER CONSTRUCTING CURB OR BEFORE COMPLETING THE PLACEMENT OF PAVEMENT BASE ROCK. ~~FILL VOIDS WITH FINES WHERE NECESSARY TO PROVIDE SMOOTH SURFACE.~~
3. CONCRETE, ~~4%~~ ^{PER THE CONSTRUCTION CODE} - 7% AIR, COMPRESSIVE STRENGTH OF NOT LESS THAN 3,300 PSI AT 28 DAYS.
4. TRANSVERSE CONTROL JOINTS SHALL BE OF THE WEAKENED PLANE TYPE, 1-1/2" CONCRETE DEPTH, AND WILL BE SPACED AT 5' INTERVALS AND AT POINTS OF TANGENCY.
5. CONTROL JOINTS SHALL BE FORMED WITH A SMOOTH FACE SQUARE TO THE SIDEWALK.
6. WHERE A STRUCTURE IS SURROUNDED BY OR IS ADJACENT TO THE SIDEWALK (EXCLUDING CURB), PROVIDE SEPARATION WITH 1/2" PREMOLDED ASPHALT IMPREGNATED, NONEXTRUDING EXPANSION JOINT MATERIAL.
7. THE SURFACE SHALL BE BROOM FINISHED TRANSVERSE TO THE LINE OF TRAFFIC.
8. FINISH ALL EDGES WITH 1/4" RADIUS EDGER WITH 3" FLAT.
9. WHERE PRACTICAL, ALIGN SIDEWALK CONTROL JOINTS WITH CURB JOINTS.

FOR NOTE 4, PER CONSTRUCTION CODE SECTION 312.3.05, CONTROL JOINT MUST BE 1/4" DEPTH.

REVISED TO 1/8" MAX RADIUS TO ALLOW FOR CONSTRUCTION OF A 1/2" MAXIMUM HORIZONTAL OPENING IN SIDEWALK PER PROWAG R302.7.3.

REVISED TO 1/4" JOINT FILLER TO ALLOW FOR CONSTRUCTION OF A 1/2" MAXIMUM HORIZONTAL OPENING IN SIDEWALK PER PROWAG R302.7.3.



**CITY OF
TUALATIN, OR**

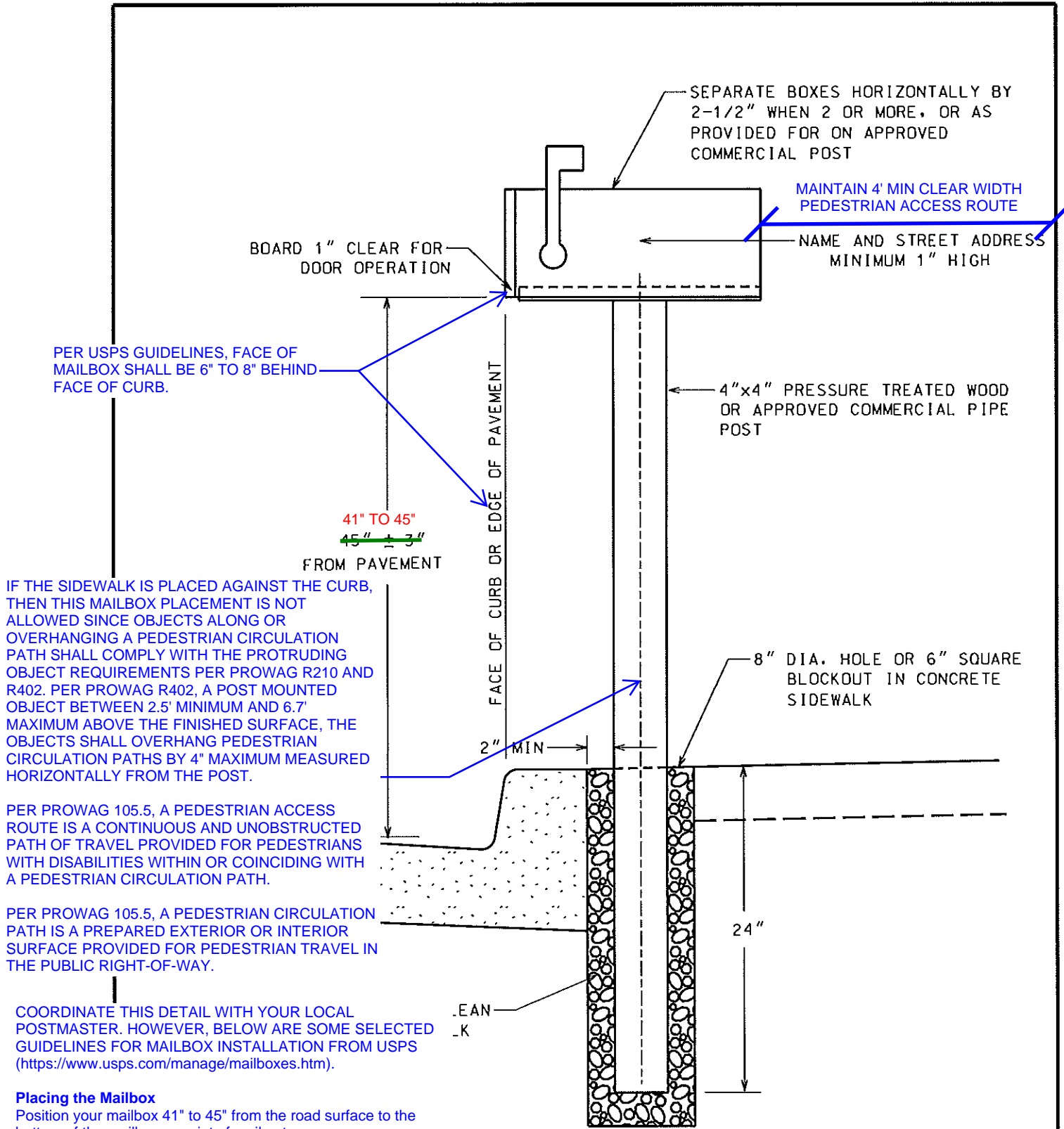
CONCRETE SIDEWALK

REVISED: 11/22/2016
EFFECTIVE: 12/31/2016

DRAFTED BY: M. PALMER
APPROVED BY: J. FUCHS

DRAWING NO:

475



IF THE SIDEWALK IS PLACED AGAINST THE CURB, THEN THIS MAILBOX PLACEMENT IS NOT ALLOWED SINCE OBJECTS ALONG OR OVERHANGING A PEDESTRIAN CIRCULATION PATH SHALL COMPLY WITH THE PROTRUDING OBJECT REQUIREMENTS PER PROWAG R210 AND R402. PER PROWAG R402, A POST MOUNTED OBJECT BETWEEN 2.5' MINIMUM AND 6.7' MAXIMUM ABOVE THE FINISHED SURFACE, THE OBJECTS SHALL OVERHANG PEDESTRIAN CIRCULATION PATHS BY 4" MAXIMUM MEASURED HORIZONTALLY FROM THE POST.

PER PROWAG 105.5, A PEDESTRIAN ACCESS ROUTE IS A CONTINUOUS AND UNOBSTRUCTED PATH OF TRAVEL PROVIDED FOR PEDESTRIANS WITH DISABILITIES WITHIN OR COINCIDING WITH A PEDESTRIAN CIRCULATION PATH.

PER PROWAG 105.5, A PEDESTRIAN CIRCULATION PATH IS A PREPARED EXTERIOR OR INTERIOR SURFACE PROVIDED FOR PEDESTRIAN TRAVEL IN THE PUBLIC RIGHT-OF-WAY.

COORDINATE THIS DETAIL WITH YOUR LOCAL POSTMASTER. HOWEVER, BELOW ARE SOME SELECTED GUIDELINES FOR MAILBOX INSTALLATION FROM USPS (<https://www.usps.com/manage/mailboxes.htm>).

Placing the Mailbox

Position your mailbox 41" to 45" from the road surface to the bottom of the mailbox or point of mail entry.

Place your mailbox 6" to 8" back from the curb. If you do not have a raised curb, contact your local postmaster for guidance.

Installing the Post

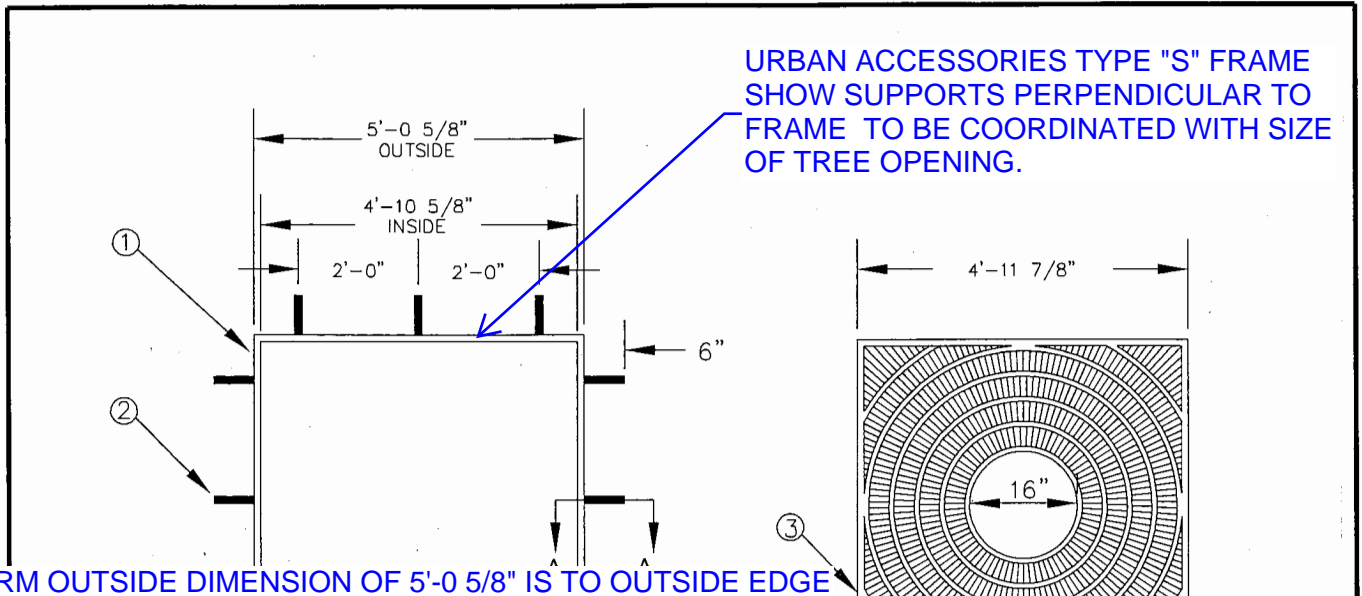
The best mailbox supports are stable but bend or fall away if a car hits them. The Federal Highway Administration recommends:

A 4" x 4" wooden support or a 2"-diameter standard steel or aluminum pipe.

Bury your post no more than 24" deep.

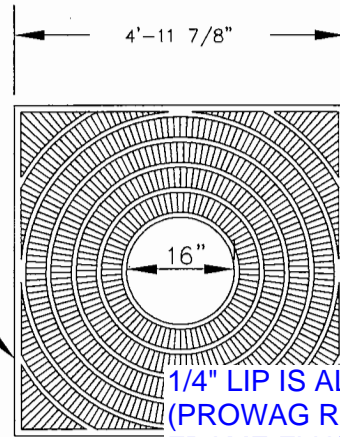
 N, OR	MAILBOX POST INSTALLATION	
	1:10	DRAWN: D.L. APPROVED: K.L.H.
		DWG NO. 500

URBAN ACCESSORIES TYPE "S" FRAME SHOW SUPPORTS PERPENDICULAR TO FRAME TO BE COORDINATED WITH SIZE OF TREE OPENING.

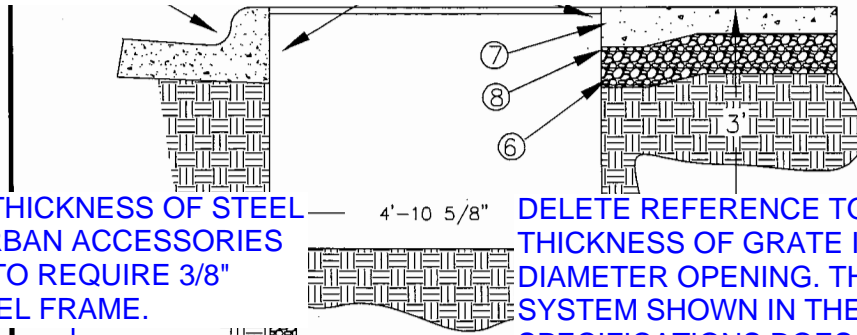


CONFIRM OUTSIDE DIMENSION OF 5'-0 5/8" IS TO OUTSIDE EDGE OF STEEL FRAME.

$5'-0 \frac{5}{8}'' - 4'-11 \frac{7}{8}'' - (2 \times \frac{1}{4}'') = \frac{1}{4}''$ TO ALLOW FOR A 1/8" GAP BETWEEN FRAME AND GRATE WHICH MEETS THE 1/2" MAXIMUM ALLOWED OPENING (PROWAG R302.7.3). HOWEVER, DIMENSIONS OF URBAN ACCESSORIES FRAME AND GRATE VARY SLIGHTLY FROM WHAT IS SHOWN IN THIS DETAIL BUT STILL INDICATES A 1/8" MAX GAP.

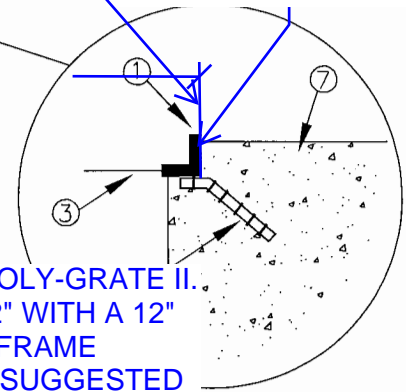


1/4" LIP IS ALLOWED (PROWAG R302.7.2) BUT FRAME FLUSH WITH ADJACENT PAVEMENT IS PREFERRED.



CONFIRM THICKNESS OF STEEL FRAME. URBAN ACCESSORIES APPEARS TO REQUIRE 3/8" THICK STEEL FRAME.

DELETE REFERENCE TO POLY-GRATE II. THICKNESS OF GRATE IS 2" WITH A 12" DIAMETER OPENING. THE FRAME SYSTEM SHOWN IN THEIR SUGGESTED SPECIFICATIONS DOES NOT INDICATE AN L SHAPED STEEL FRAME. GRATE WOULD BE STICKING ABOVE FRAME REQUIRED IN THIS DETAIL.



Notes:

1. 1" X 1" X 1/4" L SHAPE STEEL FRAME.
2. #3 REBAR, WELD TO FRAME
3. 3/4" THICK TREE GRATE CAST IN 2 PIECES, NO OPENINGS GREATER THAN 3/8", 16" DIA CENTER OPENING
4. CURB AND GUTTER, REFER TO COT DRAWING NO. 470 OR NO. 471 AS APPLICABLE.
5. COMPACTED SUBGRADE.
6. MINIMUM 2" LAYER OF COMPACTED 3/4" MINUS CLEAN CRUSHED AGGREGATE.
7. 4" CONCRETE SIDEWALK, REFER TO COT DRAWING NO. 475.
8. THICKENED EDGE (6" X 6")
9. 4" DIAMETER X 3' DEEP AUGERED HOLE WITH 4" RIGID PVC PERFORATED PIPE. FILL PIPE WITH DRAIN ROCK AND COVER WITH FILTER SOCK.
10. TREE GRATE SHALL BE SQUARE 5' FAN DESIGN (W/ ~~FLAT~~ **MATTE** BLACK POWDER COAT), URBAN ACCESSORIES, ~~POLY-GRATE II~~, OR APPROVED EQUAL.
11. TREE GRATE SHALL BE CAST IRON PER ASTM A-48 CLASS **36** ~~RECYCLED PLASTIC~~, OR APPROVED EQUAL.
12. TREE GRATE FRAME SHALL BE TYPE "S" FRAME, URBAN ACCESSORIES OR APPROVED EQUAL.
13. A ROOT CONTROL SYSTEM, BIOBARRIER, DEEPROOT, OR APPROVED EQUAL, SHALL BE INSTALLED ON ALL SIDES ADJACENT TO HARDSCAPE. IT SHALL BE INSTALLED VERTICALLY A MINIMUM OF 12" IN DEPTH FROM FINISH GRADE & PER MANUFACTURERS RECOMMENDATIONS.

CONFIRM CLASS OF CAST IRON.

MATERIAL SHOULD BE FIRM AND STABLE (PROWAG R302.7). GRATE SHOULD NOT FLEX IF STEPPED ON.

CONFIRM MINIMUM DEPTH OF TREE ROOT BARRIER. BIOBARRIER RECOMMENDS 19.5" DEPTH ADJACENT TO SIDEWALK AND CURB WHILE DEEPROOT RECOMMENDS 24" DEPTH ADJACENT TO CURB AND GUTTER (COORDINATE WITH CITY'S ARBORIST).

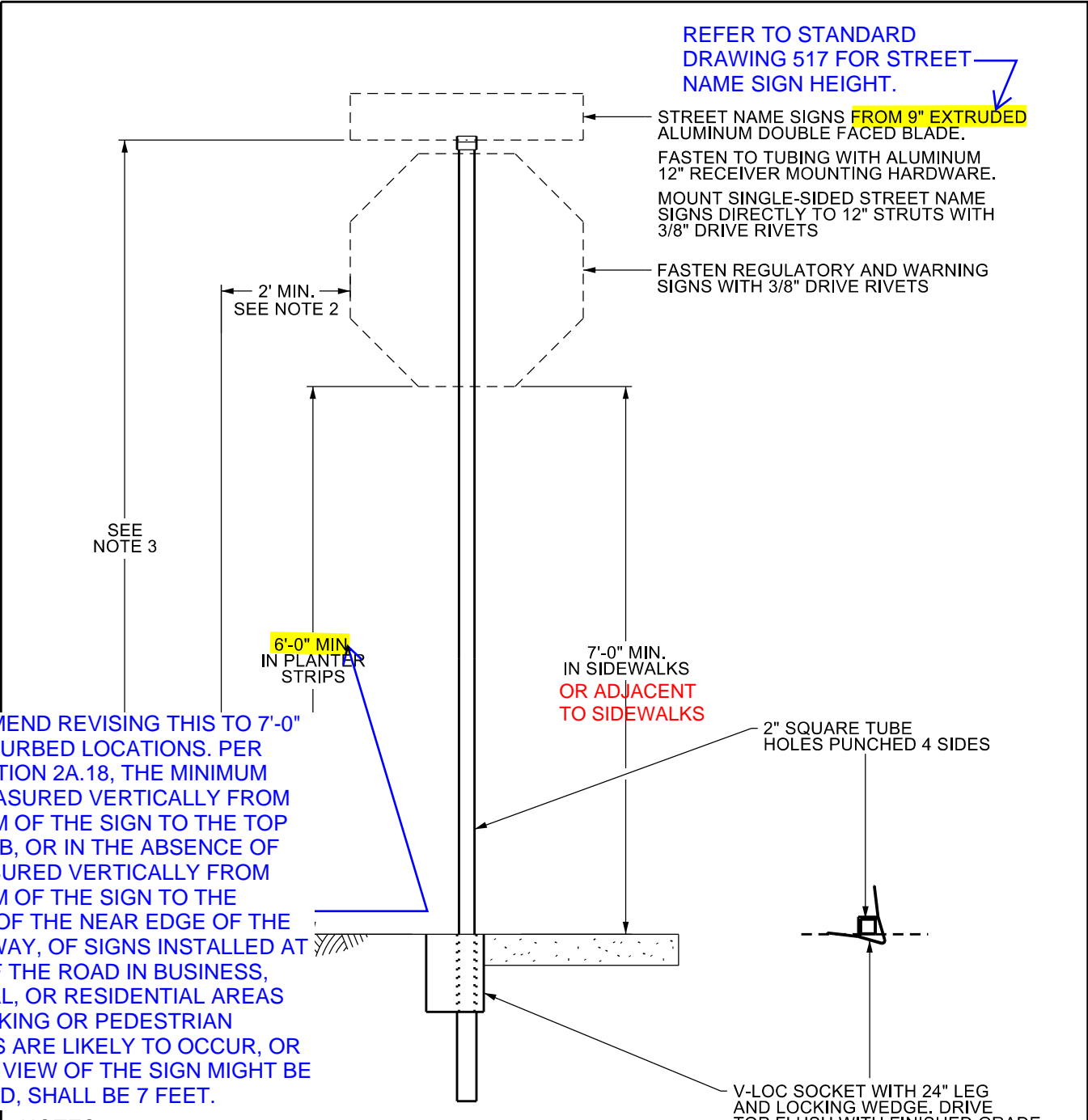
TREE WELL AND GRATE

UPDATE NOTE 3. URBAN ACCESSORIES FAN DESIGN TREE GRATE IS CAST INTO 4 PIECES WITH OPENINGS NO GREATER THAN 1/2" WIDE.

RAWN: JLS

DWG NO. 514

REFER TO STANDARD DRAWING 517 FOR STREET NAME SIGN HEIGHT.



STREET NAME SIGNS FROM 9" EXTRUDED ALUMINUM DOUBLE FACED BLADE. FASTEN TO TUBING WITH ALUMINUM 12" RECEIVER MOUNTING HARDWARE. MOUNT SINGLE-SIDED STREET NAME SIGNS DIRECTLY TO 12" STRUTS WITH 3/8" DRIVE RIVETS

FASTEN REGULATORY AND WARNING SIGNS WITH 3/8" DRIVE RIVETS

SEE NOTE 3

2' MIN. SEE NOTE 2

6'-0" MIN. IN PLANTER STRIPS

7'-0" MIN. IN SIDEWALKS OR ADJACENT TO SIDEWALKS


2" SQUARE TUBE HOLES PUNCHED 4 SIDES

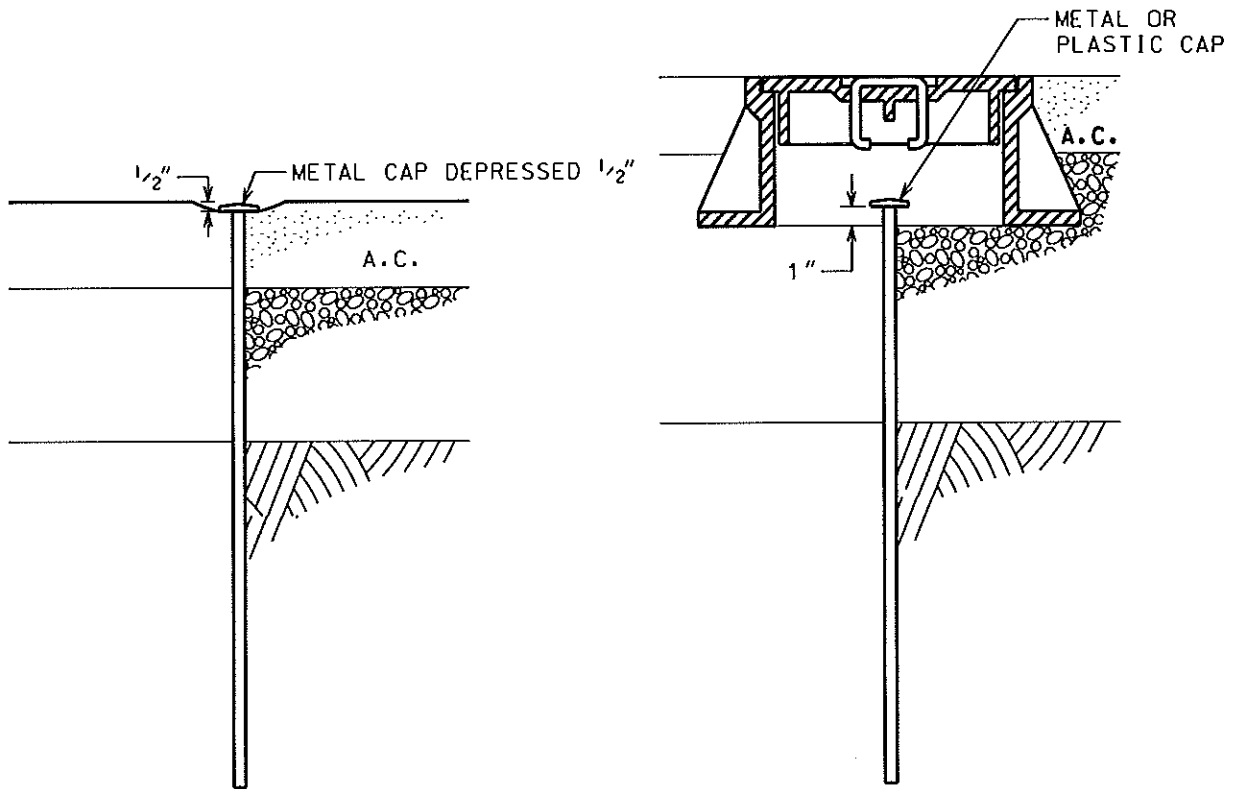
V-LOC SOCKET WITH 24" LEG AND LOCKING WEDGE. DRIVE TOP FLUSH WITH FINISHED GRADE.

WE RECOMMEND REVISING THIS TO 7'-0" MIN IN ALL CURBED LOCATIONS. PER MUTCD SECTION 2A.18, THE MINIMUM HEIGHT, MEASURED VERTICALLY FROM THE BOTTOM OF THE SIGN TO THE TOP OF THE CURB, OR IN THE ABSENCE OF CURB, MEASURED VERTICALLY FROM THE BOTTOM OF THE SIGN TO THE ELEVATION OF THE NEAR EDGE OF THE TRAVELED WAY, OF SIGNS INSTALLED AT THE SIDE OF THE ROAD IN BUSINESS, COMMERCIAL, OR RESIDENTIAL AREAS WHERE PARKING OR PEDESTRIAN MOVEMENTS ARE LIKELY TO OCCUR, OR WHERE THE VIEW OF THE SIGN MIGHT BE OBSTRUCTED, SHALL BE 7 FEET.

NOTES:

1. MEET REQUIREMENTS OF THE MOST CURRENT VERSION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND THE OREGON SUPPLEMENTS.
2. LATERAL OFFSET OF THE SIGN FROM THE FACE OF CURB CAN BE REDUCED TO 1 FOOT WHERE SIDEWALK WIDTH IS LIMITED OR WHERE EXISTING POLES ARE CLOSE TO THE CURB, AS DETERMINED BY THE CITY ENGINEER.
3. IF STREET NAME SIGN IS MOUNTED ALONE, MOUNT SIGN 9'-0" MIN. ABOVE FINISHED SURFACE.

 CITY OF TUALATIN, OR	STREET SIGN POST	
	REVISED: 11/22/2016 EFFECTIVE: 12/31/2016	DRAFTED BY: M. PALMER APPROVED BY: J. FUCHS



STANDARD

INTERSECTIONS

ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATES MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

NOTES:

1. MONUMENTS SHALL BE IN ACCORDANCE WITH ORS 209.250(4), AND THE REQUIREMENTS OF THE COUNTY SURVEYOR
2. ALL MONUMENTS SHALL COMPRISE EITHER:
5/8" O.D. x 30" IRON ROD OR 3/4" I.D. x 30" IRON PIPE
3. USE EAST JORDAN IRON WORKS OR OLYMPIC FOUNDRY. RISER RINGS MAY BE USED WHEN AN ASPHALT OVERLAY.
4. 8" BOXES ALLOWED FOR LOCAL STREETS.
5. 12" BOXES REQUIRED FOR COLLECTOR AND ARTERIAL STREETS.



**CITY OF
TUALATIN, OR**

**CENTERLINE SURVEY
MONUMENT**

REVISED: 3/2010
VALID: 4/2010

SCALE: 1:10

DRAWN: L.V.
APPROVED: K.L.H.

DWG NO. 520

ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

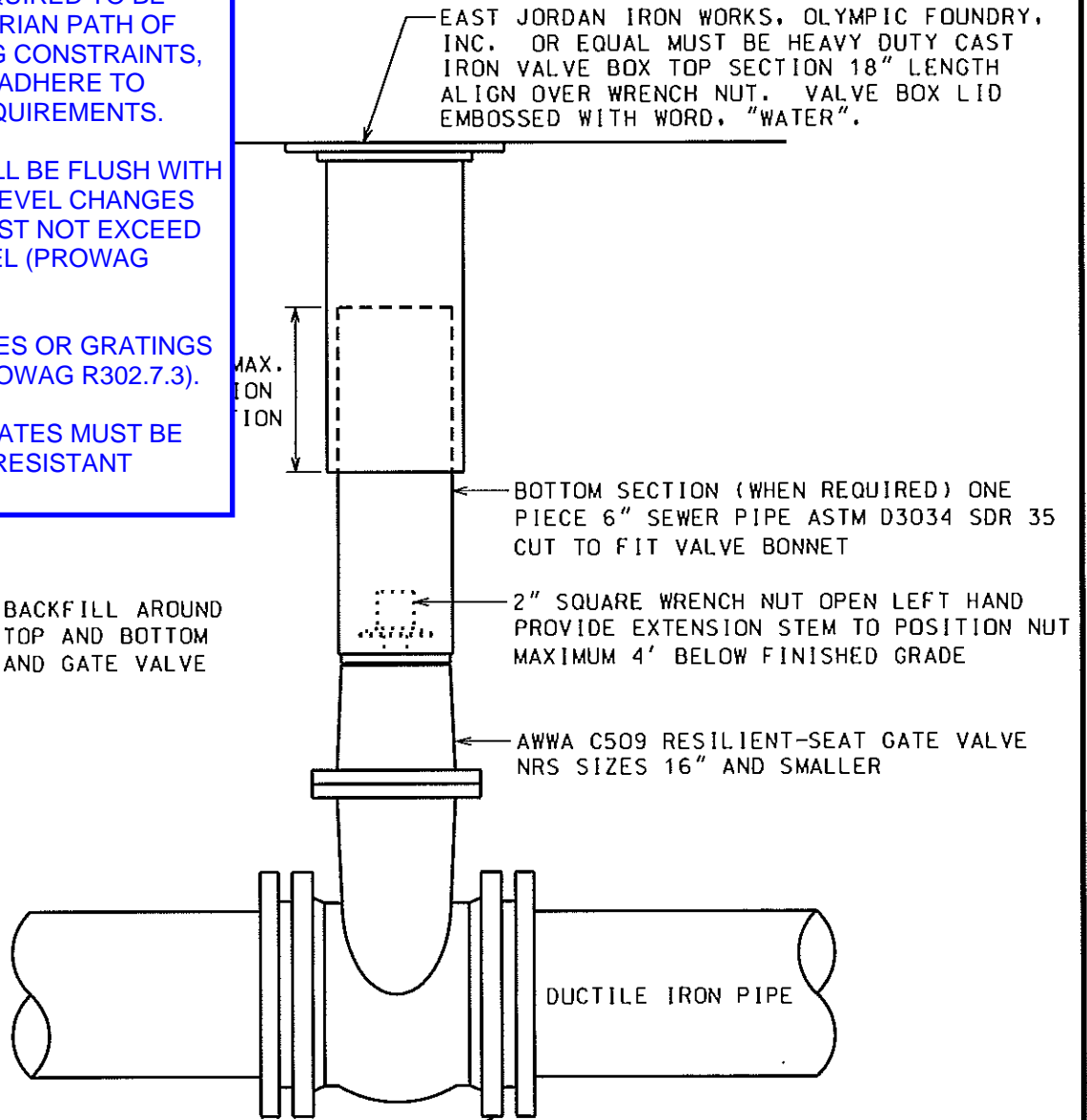
IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

HAND TAMP BACKFILL AROUND VALVE BOX TOP AND BOTTOM SECTIONS, AND GATE VALVE



NRS GATE VALVE WITH MECHANICAL JOINT OR FLANGED ENDS. USE MECHANICAL JOINT WHEN CONNECTING TO PIPE AND FLANGE WHEN ADJACENT TO FITTING. SET VALVE STEM VERTICAL TRANSVERSE TO LINE. DO NOT INSTALL VALVE ON ITS SIDE EVEN WHEN NON-FUNCTIONAL



CITY OF TUALATIN, OR

VALVE GATE

REVISED: 3/2010
VAL ID: 4/2010

SCALE: 1:10

DRAWN: L.V.
APPROVED: K.L.H.

DWG NO. 600

ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

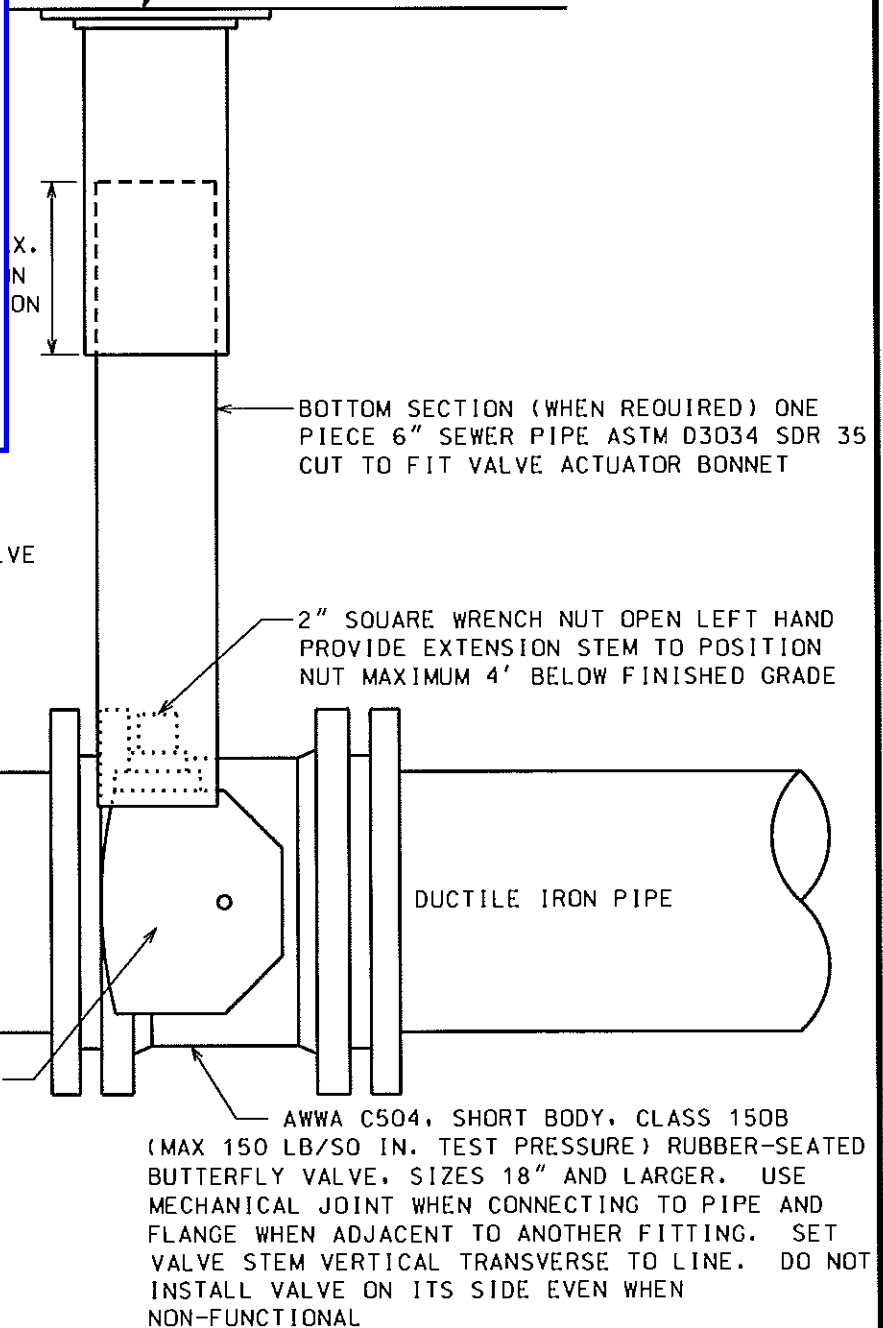
RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED ¼" OR ½" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED ½" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATES MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

HAND TAMP BACKFILL AROUND VALVE BOX TOP AND BOTTOM SECTIONS, AND BUTTERFLY VALVE

EAST JORDAN IRON WORKS, OLYMPIC FOUNDRY, INC. OR EQUAL MUST BE HEAVY DUTY CAST IRON VALVE BOX TOP SECTION 18" LENGTH ALIGN OVER WRENCH NUT. VALVE BOX LID EMBOSSED WITH WORD, "WATER".



**CITY OF
TUALATIN, OR**

**VALVE
BUTTERFLY**

REVISED: 3/2010
VALID: 4/2010

SCALE: 1:10

DRAWN: L.V.
APPROVED: K.L.H.

DWG NO. 601

REVISED: 3/2008
VALID: 3/2008

SCALE: 1:10

DRAWN: S.N.
APPROVED: K.L.H.

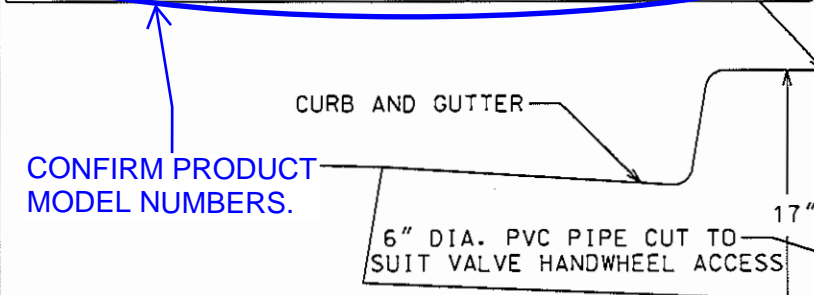
DWG NO. 602



CITY OF
TUALATIN, OR

1-INCH AIR RELEASE
VALVE

METER BOX No.	SIDEWALK	DRIVEWAY
NEWBASIS #66 17"X30"	#66	#66 D. I.
CHRISTY FL36	FL36D	



TYPE "K" SOFT COPPER 1" DIA. TUBE WITH BRASS COMPRESSION PACK JOINT FITTINGS
SLOPE UP TO AIR RELEASE VALVE AND LOCATE BELOW SUBGRADE

ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

ING ELL
P FORD

AINLESS STEEL BAND AWWA APPROVED

LINE AFTER CONNECTION TO CORPORATION STOP BEFORE CONNECTION TO AIR RELEASE VALVE S AND FITTINGS FROM FORD OR MUELLER MEET THE REQUIREMENTS OF AWWA C-800

REVISED: 3/2008
VALID: 3/2008

SCALE: 1:10

DRAWN: S.N.
APPROVED: K.L.H.

DWG NO. 603



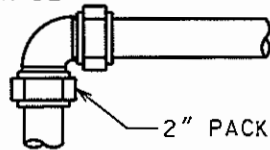
CITY OF
TUALATIN, OR

VALVE
2-INCH AIR RELEASE

METER BOX No.	SIDEWALK	DRIVEWAY
NEWBASIS #66 17"X30"	#66	#66 D.I.
CHRISTY FL36	FL36D	

CONFIRM PRODUCT MODEL NUMBERS.

TYPE "K" RIGID COPPER 2" DIA. TUBE WITH BRASS COMPRESSION PACK JOINT FITTINGS SLOPE UP TO AIR RELEASE VALVE AND LOCATE BELOW SUBGRADE



2" PACK JOINT COUPLING ELL

ADD NOTES TO ADDRESS THE FOLLOWING:

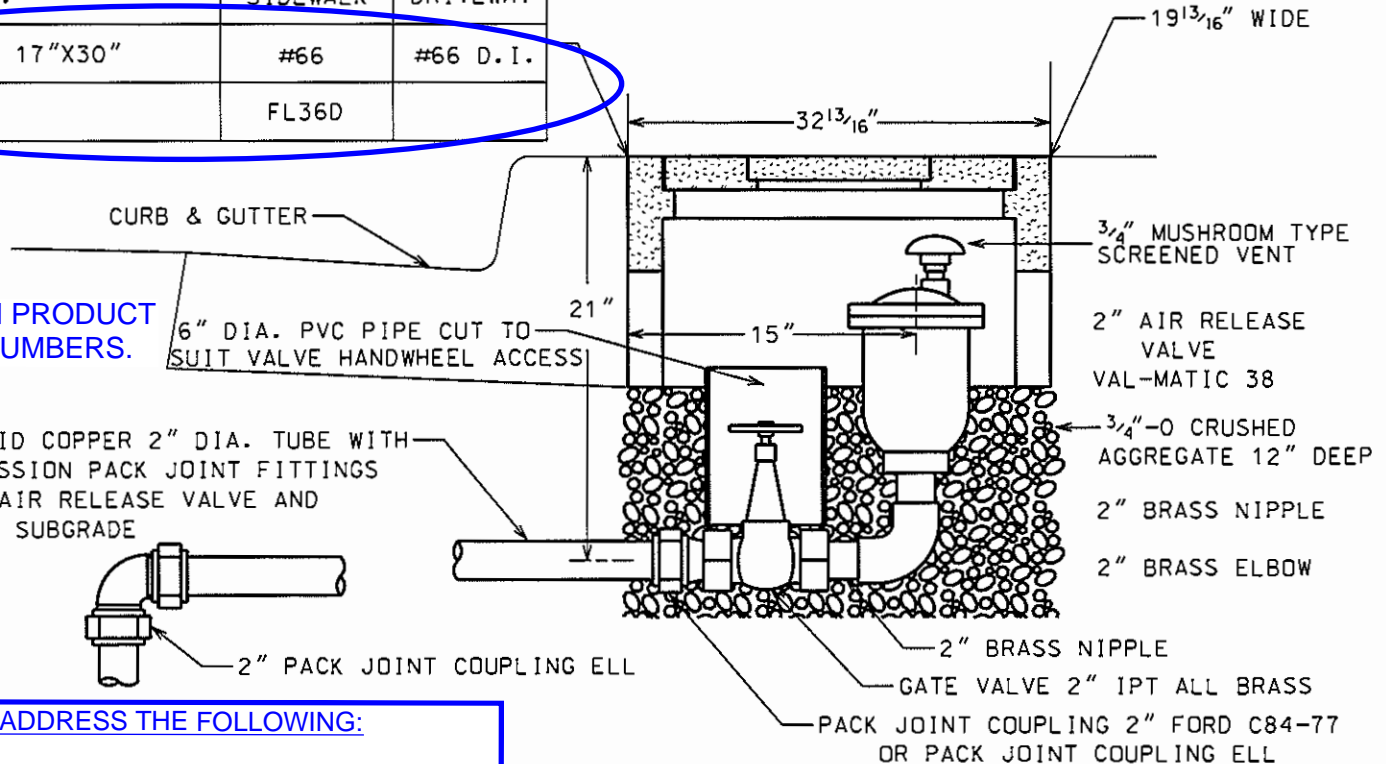
AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)



CORPORATION STOP

STAINLESS STEEL BAND AWWA APPROVED

PIPE LINE AFTER CONNECTION TO CORPORATION STOP AND BEFORE CONNECTION TO AIR RELEASE VALVE

VALVES & FITTINGS FROM FORD OR MUELLER

MUST MEET THE REQUIREMENTS OF AWWA C-800

AND BE USED ONLY ON 18" DIAMETER PIPE OR LARGER.

REVISED: 3/2008
VALID: 3/2008

SCALE: 1:10

DRAWN: S.N.
APPROVED: K.L.H.

DWG NO. 604



CITY OF
TUALATIN, OR

SAMPLE STATION

METER BOX No.	SIDEWALK	DRIVEWAY
NEWBASIS #37 12"X30"	#37	#37 D.I.
CHRISTY FL12	FL12D	

CONFIRM PRODUCT
MODEL NUMBERS.

ANGLE INVERTED KEY 3/4" METER VALVE

ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

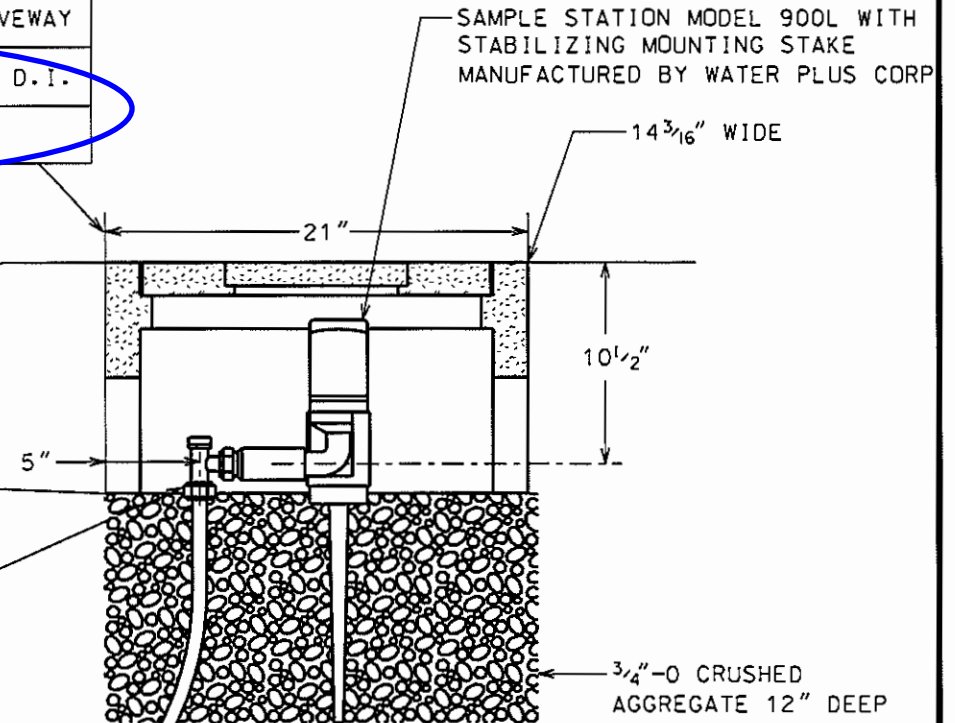
IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

CURB AND GUTTER



AINLESS STEEL BAND AWWA APPROVED FORD F202

LINE AFTER CONNECTION TO CORPORATION STOP AND BEFORE
CTION TO SAMPLE STATION
S & FITTINGS FROM FORD OR MUELLER.
MEET THE REQUIREMENTS OF AWWA C-800

ADD NOTES TO ADDRESS THE FOLLOWING:

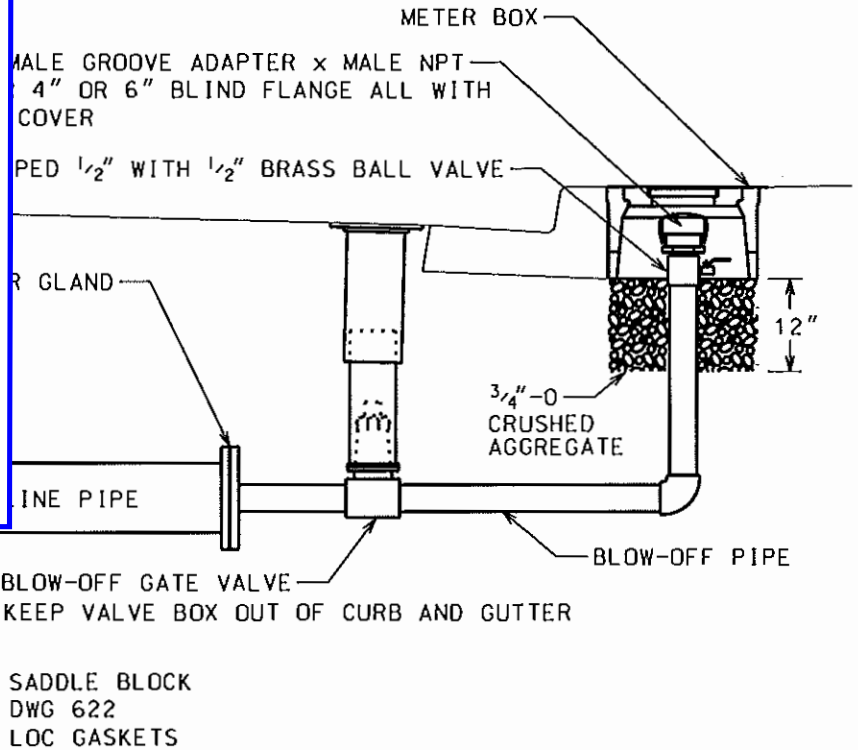
AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)



MAINLINE	BLOW-OFF			METER BOX EQUIPMENT
	SIZE	PIPE MATERIAL	FITTING TYPE	
4" TO 6"	2"	BRASS	NPT	67-S OR 67-T
8" TO 12"	3"	BRASS	NPT	69-S OR 69-T
14" TO 24"	4"	D. I.	FLANGED	PERMANENT INSTALLATION
LARGER THAN 24"	6"	D. I.	FLANGED	PERMANENT INSTALLATION

NOTES:

1. BRASS CAM AND GROOVE ADAPTERS SHALL MEET MIL-C-27487F SPECIFICATIONS
2. A PERMANENT INSTALLATION, WHERE THE WATERLINE WILL NOT BE EXTENDED LATER, SHALL CONSIST OF REQUIRED LENGTH OF BURIED RESTRAINED PIPE, AND THE ABOVE ASSEMBLY, ALL RESTRAINED WITH APPROVED RETAINER GLANDS, FIELD-LOCK GASKETS AND NPT THREADS. 4" AND 6" BLOW-OFFS SHALL BE INDIVIDUALLY DESIGNED WITH THE OUTLET ARRANGED TO DISSIPATE ENERGY WITHOUT DAMAGING PROPERTY.
3. BLOW-OFF TO BE IN-LINE HORIZONTALLY WITH MAINLINE PIPE WHERE POSSIBLE
4. MAINLINE WATER VELOCITY SHALL NOT BE LESS THAN 4 FT/SEC



CITY OF TUALATIN, OR

MAINLINE VALVE ASSEMBLY PERMANENT BLOW-OFF

REVISED: 3/2008
VAL ID: 3/2008

SCALE: 1:25

DRAWN: S.N.
APPROVED: K.L.H.

DWG NO. 605

ADD NOTES TO ADDRESS THE FOLLOWING:

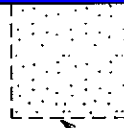
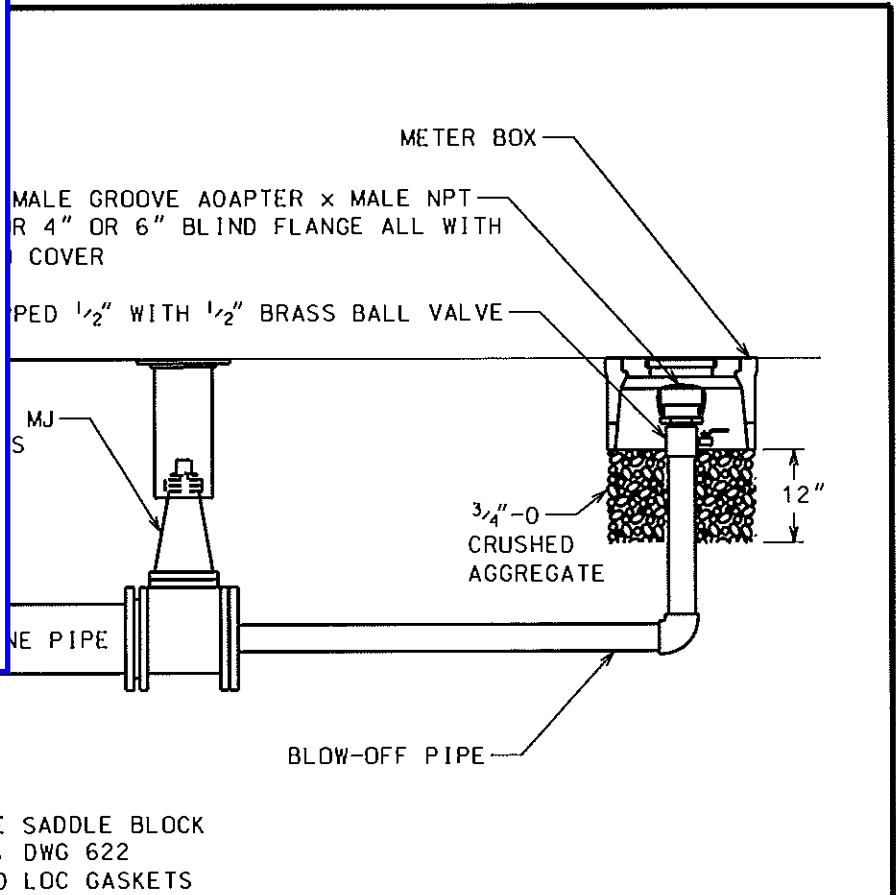
AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)



CONCRETE SADDLE BLOCK
SEE STD. DWG 622
OR FIELD LOC GASKETS

MAINLINE	BLOW-OFF			METER BOX EQUIPMENT
	SIZE	PIPE MATERIAL	FITTING TYPE	
4" TO 6"	2"	BRASS	NPT	67-S OR 67-T
8" TO 12"	3"	BRASS	NPT	69-S OR 69-T
14" TO 24"	4"	D.I.	FLANGED	
LARGER THAN 24"	6"	D.I.	FLANGED	

NOTES:

1. BRASS CAM AND GROOVE ADAPTERS SHALL MEET MII-C-27487F SPECIFICATIONS
2. A TEMPORARY INSTALLATION, WHERE THE WATERLINE IS TO BE EXTENDED LATER, SHALL CONSIST OF A MJxMJ MAINLINE VALVE RESTRAINED BY THE REQUIRED LENGTH OF BURIED RESTRAINING PIPE AND THE ABOVE ASSEMBLY. ALL RESTRAINED WITH APPROVED MJ RETAINER GLANDS, FIELD-LOK GASKETS AND NPT THREADS. 4" AND 6" BLOW-OFFS SHALL BE INDIVIDUALLY DESIGNED WITH AN OUTLET ARRANGED TO DISSIPATE ENERGY WITHOUT DAMAGING PROPERTY.
3. BLOW-OFF TO BE IN-LINE HORIZONTALLY WITH MAINLINE PIPE
4. MAINLINE WATER VELOCITY SHALL NOT BE LESS THAN 4 FT/SEC
5. MINIMUM DISTANCE MAINLINE VALVE TO BARRICADE 3'-0"



**CITY OF
TUALATIN, OR**

**MAINLINE
VALVE ASSEMBLY
TEMPORARY BLOW-OFF**

REVISED: 3/2008
VALID: 3/2008

SCALE: 1:25

DRAWN: S.N.
APPROVED: K.L.H.

DWG NO. 606

ADD NOTES TO ADDRESS THE FOLLOWING:

CONFIRM IF THIS IS ALLOWED TO BE INSTALLED IN THE RIGHT OF WAY.

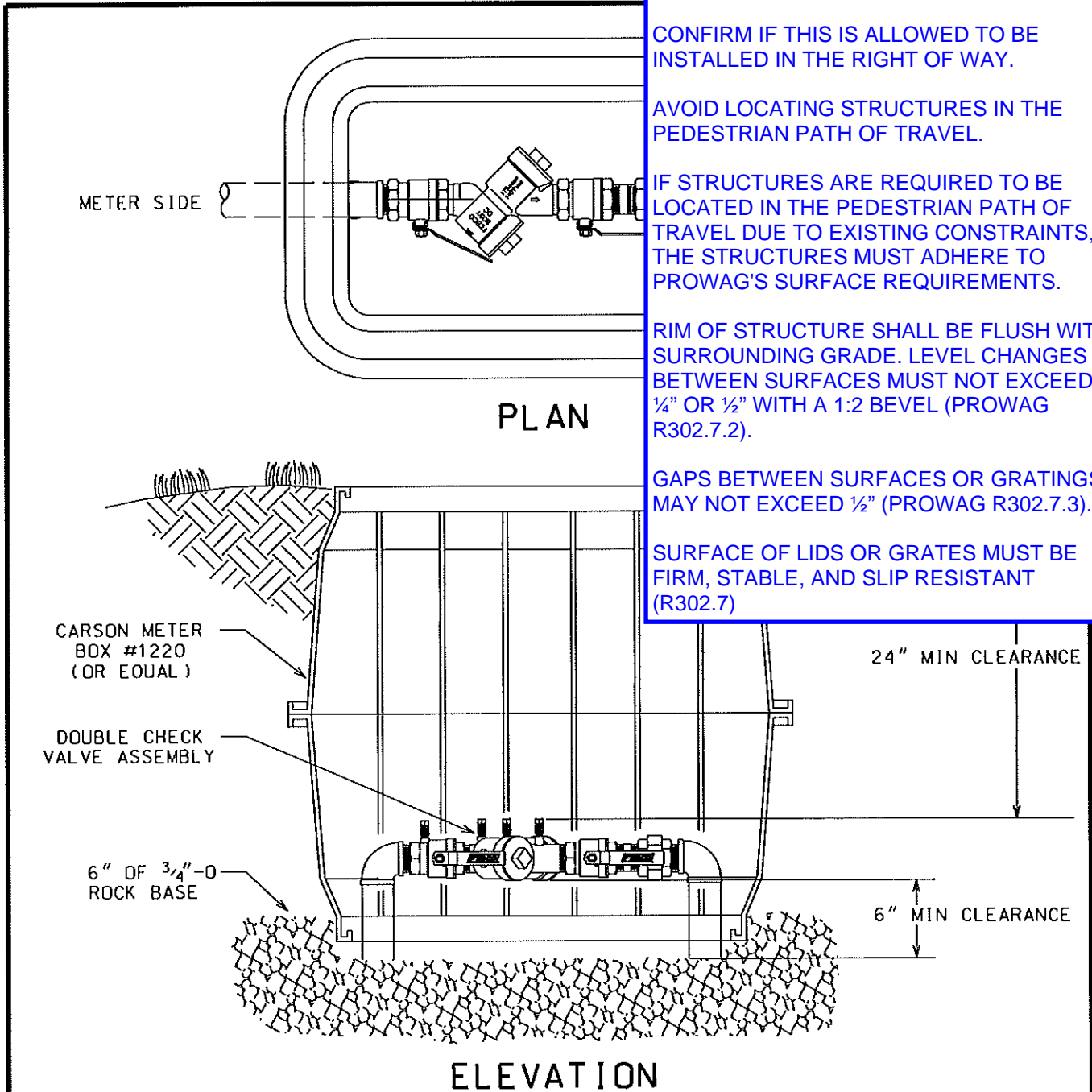
AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)



NOTE:

1. BACKFLOW ASSEMBLY TO BE APPROVED BY THE OREGON STATE HEALTH DIVISION WITH TWO INTEGRAL BALL VALVES AND INSTALLED WITH UNIONS AT BOTH ENDS AND PLUGS IN TEST COCKS
2. INSTALL BELOW GROUND IN A CARSON BROOKS, AMETEK OR SIMILAR ENCLOSURE. MAY ALSO BE MOUNTED ABOVE GROUND IN A HEATED INSULATED PROTECTIVE ENCLOSURE OR BUILDING
3. PROVIDE DEVICE CLEARANCES AS FOLLOWS: TOP 24", ENDS 3", BOTTOM AND SIDES 6"
4. SHALL BE TESTED AND APPROVED BY A CERTIFIED TESTER AND A COPY OF THE REPORT PROVIDED TO THE BACKFLOW INSPECTOR, TUALATIN CITY OPERATIONS DEPARTMENT
5. FLUSH LINE FROM METER BEFORE INSTALLATION OF BACKFLOW ASSEMBLY.

	<p>CITY OF TUALATIN, OR</p>	<p>DOUBLE CHECK BACKFLOW ASSEMBLY 3/4" THRU 1"</p>
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REVISED: 3/2008	SCALE: 1:10	DRAWN: S.N.	DWG NO. 609
VALID: 3/2008		APPROVED: K.L.H.	

REVISED: 8/2004
VALID ID: 10/2005

SCALE: 1:25

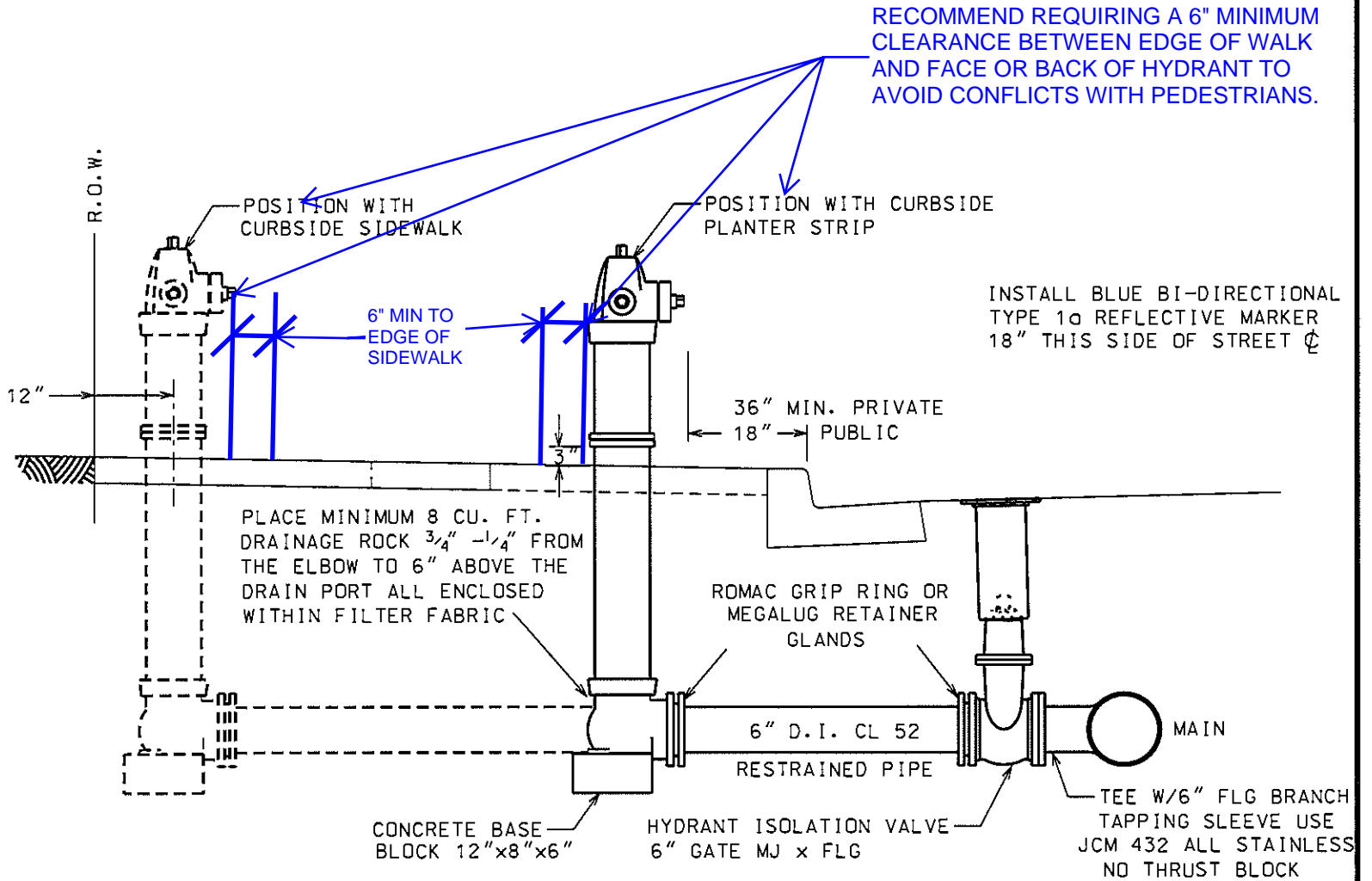
DRAWN: D.L.
APPROVED: K.L.H.

DWG NO. 610



CITY OF
TUALATIN, OR

FIRE HYDRANT
ASSEMBLY



NOTE:

1. APPLY MAINS TEST PRESSURE AGAINST CLOSED MAIN VALVE IN THE HYDRANT AND NOT THROUGH THE HYDRANT
2. FIRE HYDRANT SHALL BE WATEROUS PACER WB-67 (WITH 16" UPPER STANDPIPE), CLOW MEDALLION OR F-2500, MUELLER SUPER CENTURION 250 OR M & H VALVE 929 RELIANT, WITH ONE 4 $\frac{1}{2}$ " AND TWO 2 $\frac{1}{2}$ " NOZZLES, SHOE 6" MJ, 5 $\frac{1}{4}$ " VALVE WITH 1 $\frac{1}{2}$ " PENTAGON OPERATING NUT, PAINTED OVERALL WITH MILLER PAINT, BRIGHT RED # 2530, HIGH GLOSS SPAR ENAMEL, PRIVATE HYDRANTS ARE PAINTED YELLOW OVERALL. REMOVE NOZZLE CAP CHAINS.
3. HYDRANT SHALL CONFORM TO AWWA C502 AND BE INSTALLED GENERALLY IN ACCORDANCE WITH AWWA MANUAL M17

ADD NOTES TO ADDRESS THE FOLLOWING:

CONFIRM IF THIS IS ALLOWED TO BE INSTALLED IN THE RIGHT OF WAY.

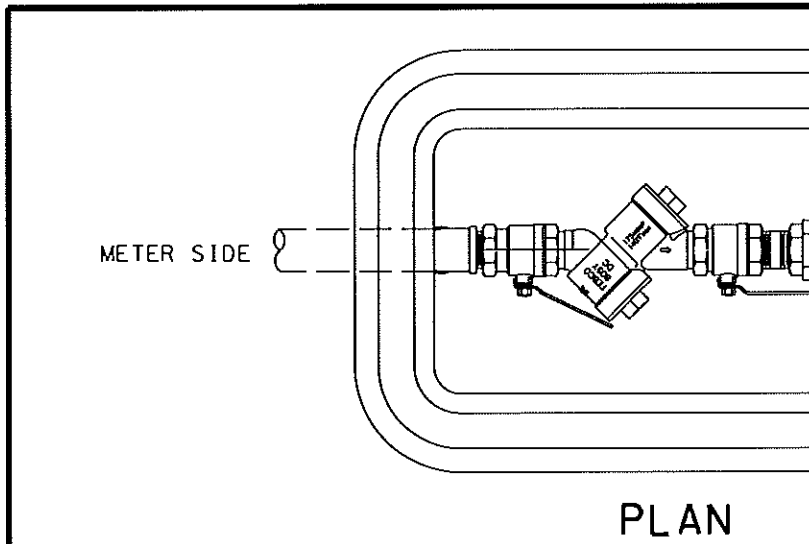
AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

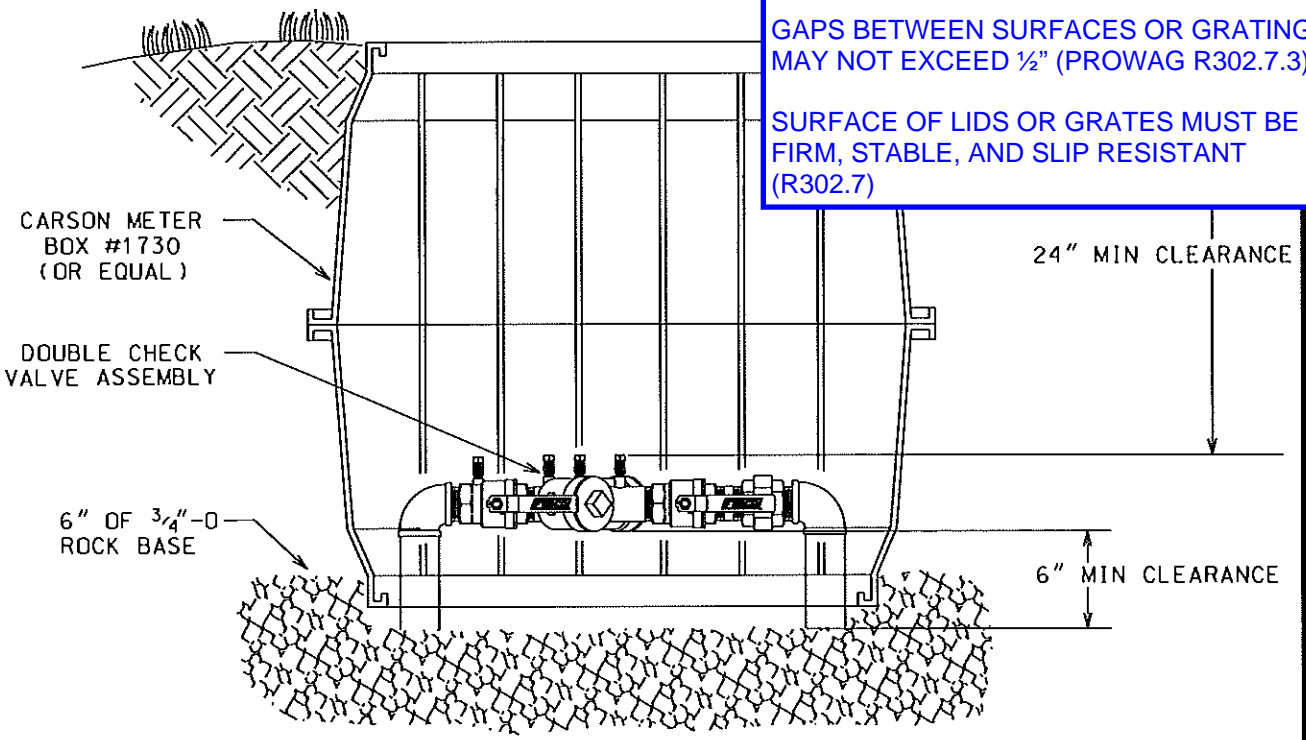
RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)



PLAN



ELEVATION

NOTE:

1. BACKFLOW ASSEMBLY TO BE APPROVED BY THE OREGON STATE HEALTH DIVISION WITH TWO INTEGRAL BALL VALVES AND INSTALLED WITH UNIONS AT BOTH ENDS AND PLUGS IN TEST COCKS
2. INSTALL BELOW GROUND IN A CARSON BROOKS, AMETEK OR SIMILAR ENCLOSURE. MAY ALSO BE MOUNTED ABOVE GROUND IN A HEATED INSULATED PROTECTIVE ENCLOSURE OR BUILDING
3. PROVIDE DEVICE CLEARANCES AS FOLLOWS: TOP 24", ENDS 3", BOTTOM AND SIDES 6"
4. SHALL BE TESTED AND APPROVED BY A CERTIFIED TESTER AND A COPY OF THE REPORT PROVIDED TO THE BACKFLOW INSPECTOR, TUALATIN CITY OPERATIONS DEPARTMENT
5. FLUSH LINE FROM METER BEFORE INSTALLATION OF BACKFLOW ASSEMBLY.

	<p>CITY OF TUALATIN, OR</p>	<p>DOUBLE CHECK BACKFLOW ASSEMBLY 1 1/2" THRU 2 1/2"</p>
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REVISED: 3/2008 VALID: 3/2008	SCALE: 1:10	DRAWN: S.N. APPROVED: K.L.H.	DWG NO. 611
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ADD NOTES TO ADDRESS THE FOLLOWING:

CONFIRM IF THIS IS ALLOWED TO BE INSTALLED IN THE RIGHT OF WAY.

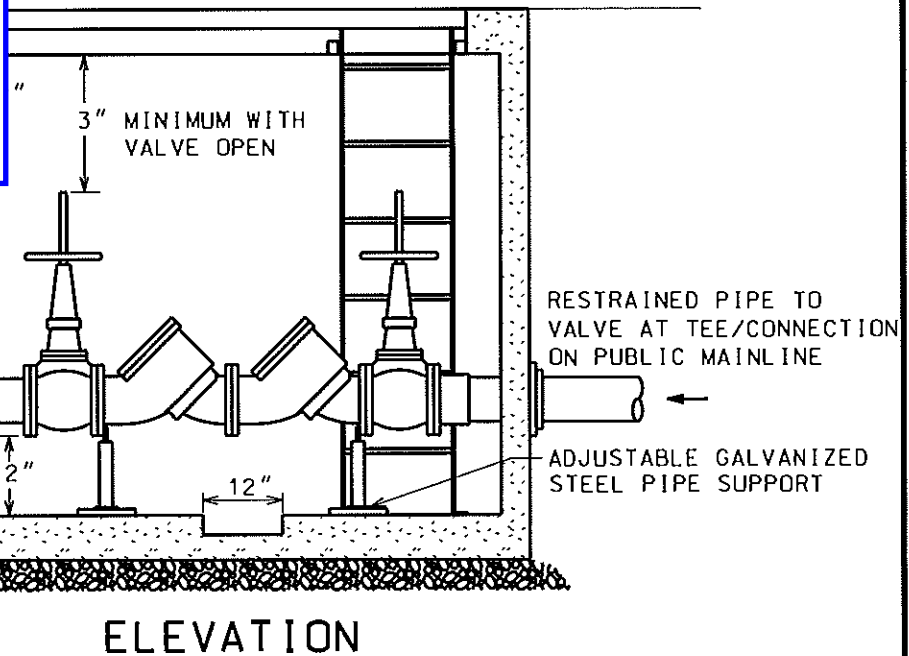
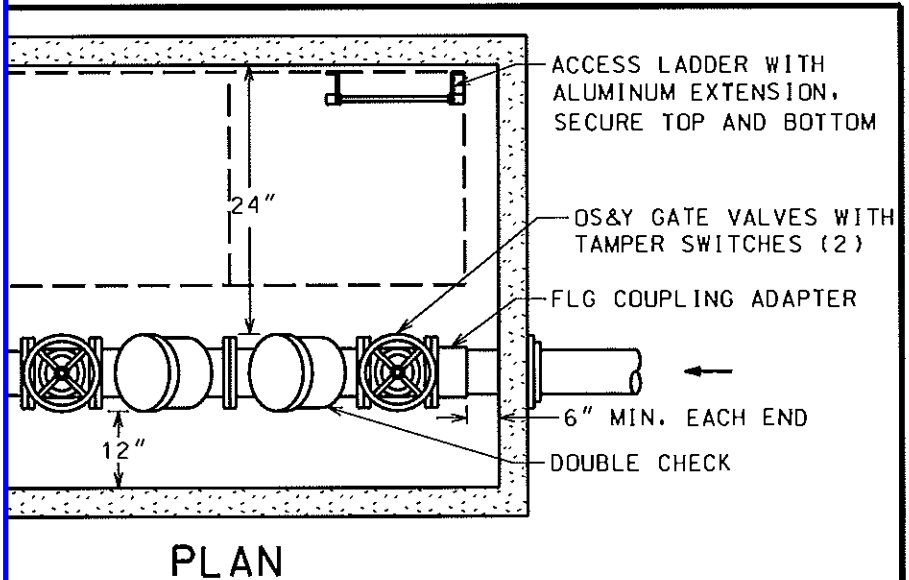
AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)



NOTES:

1. USE DUCTILE IRON PIPE THROUGH VAULT
2. PLUGS SHALL BE INSTALLED IN TEST COCKS.
3. ASSEMBLY MAY ALSO BE MOUNTED ABOVE GROUND IN AN INSULATED PROTECTIVE ENCLOSURE OR BUILDING.
4. CHECK VAULT FLOTATION AND CORRECT IF NECESSARY.
5. INSTALLATION AND BACKFLOW ASSEMBLY SHALL COMPLY WITH AWWA C510 AND OAR 333-61-070.
6. PROVIDE SUMP PUMP WITH DIAPHRAGM OR VERTICAL FLOAT SWITCH AND 1" PVC CHECK VALVE AND PIPE DISCHARGE TO DAYLIGHT. SUPPLY POWER THRU GFCI INTERNAL WALL MOUNT 12" BELOW CEILING.
7. IF BACKFLOW DEVICE IS INSTALLED INSIDE BUILDING, AN ISOLATION VALVE SHALL BE INSTALLED AT THE PROPERTY LINE.

PIPE SIZE	UTILITY VAULT	COVER OFFSET
3"	577-WA	2-332P
4"	577-WA	2-332P
6"	577-WA	2-332P
8"	687-WA	2-332P
10"	5106-WA	3-332P



CITY OF TUALATIN, OR

DOUBLE CHECK BACKFLOW ASSEMBLY 3" THRU 10"

REVISED: 3/2008
VALID ID: 3/2008

SCALE: 1:30

DRAWN: S.N.
APPROVED: K.L.H.

DWG NO. 613

ADD NOTES TO ADDRESS THE FOLLOWING:

CONFIRM IF THIS IS ALLOWED TO BE INSTALLED IN THE RIGHT OF WAY.

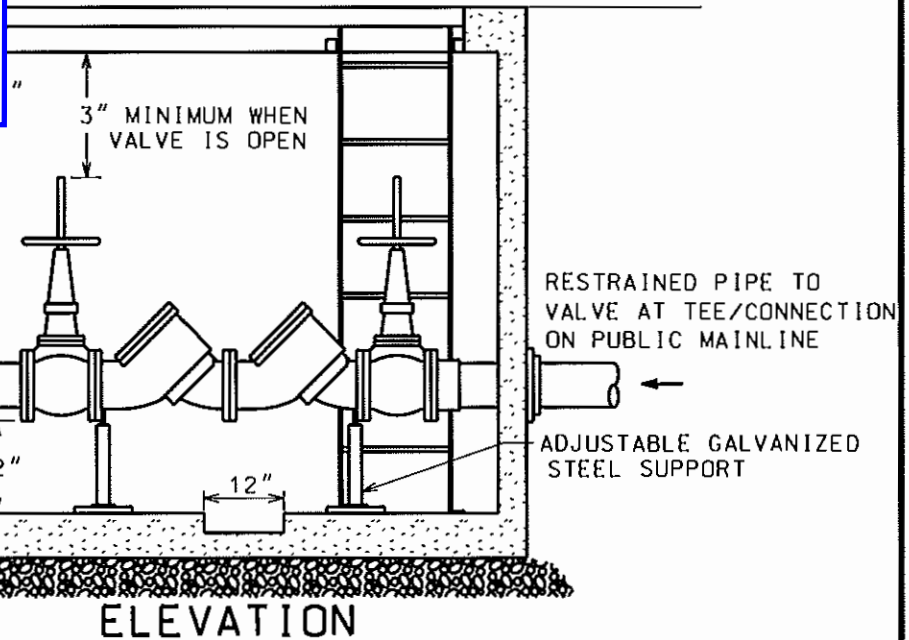
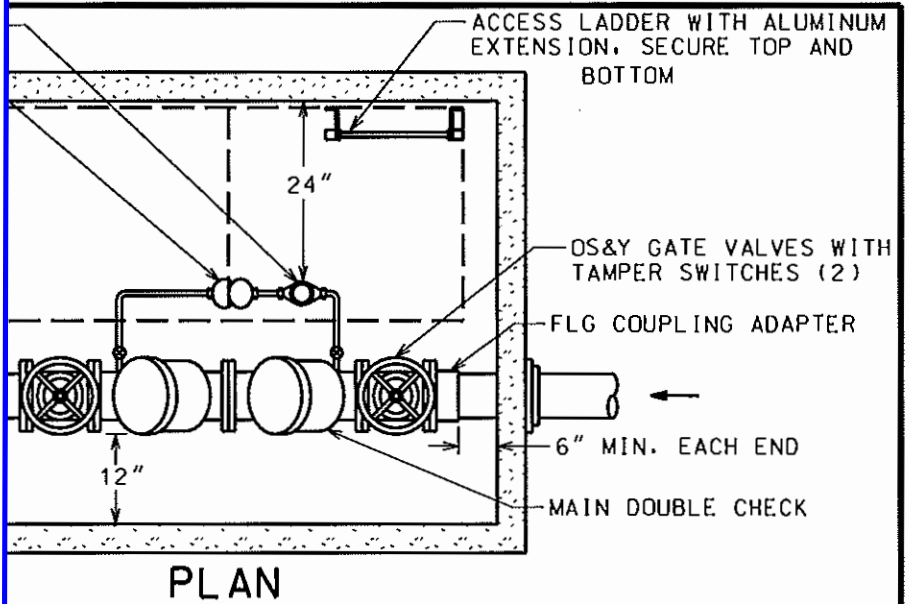
AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)



NOTES:

1. USE DUCTILE IRON PIPE THROUGH VAULT
2. PLUGS SHALL BE INSTALLED IN TEST COCKS.
3. ASSEMBLY MAY ALSO BE MOUNTED ABOVE GROUND IN AN INSULATED PROTECTIVE ENCLOSURE OR BUILDING.
4. CHECK VAULT FLOTATION AND CORRECT IF NECESSARY.
5. INSTALLATION AND BACKFLOW ASSEMBLY SHALL COMPLY WITH AWWA C510 AND OAR 333-61-070.
6. PROVIDE SUMP PUMP WITH DIAPHRAGM OR VERTICAL FLOAT SWITCH AND 1" PVC CHECK VALVE AND PIPE DISCHARGE TO DAYLIGHT. SUPPLY POWER THRU GFCI INTERNAL WALL MOUNT 12" BELOW CEILING.
7. IF BACKFLOW DEVICE IS INSTALLED INSIDE BUILDING, AN ISOLATION VALVE SHALL BE INSTALLED AT THE PROPERTY LINE.

PIPE SIZE	UTILITY VAULT	COVER OFFSET
4"	676-WA	2-332P
6"	676-WA	2-332P
8"	687-WA	2-332P
10"	5106-WA	3-332P



**DOUBLE CHECK DETECTOR
FIRE PROTECTION
WITHOUT FDC**

REVISED: 3/2008	SCALE: 1:30	DRAWN: S.N.	DWG NO. 614
VAL ID: 3/2008		APPROVED: K.L.H.	

ADD NOTES TO ADDRESS THE FOLLOWING:

CONFIRM IF THIS IS ALLOWED TO BE INSTALLED IN THE RIGHT OF WAY.

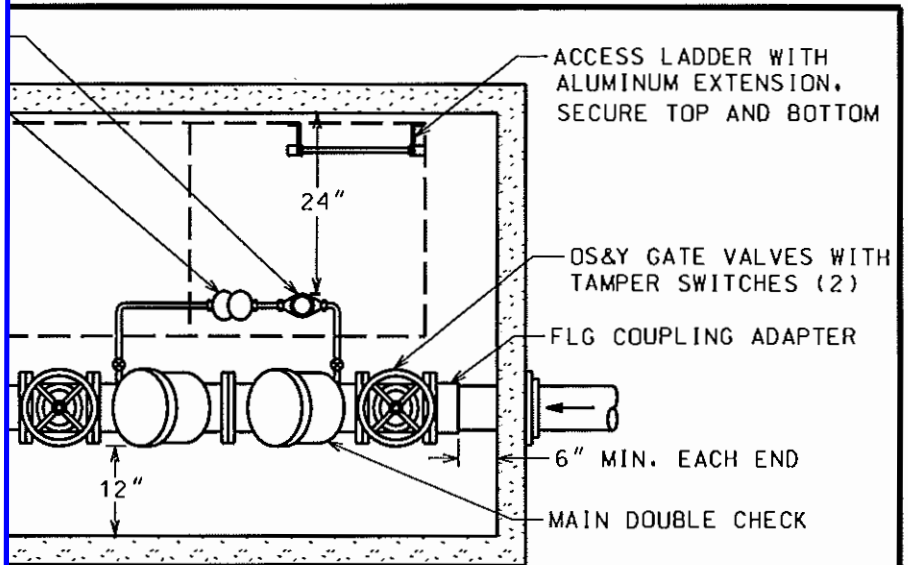
AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

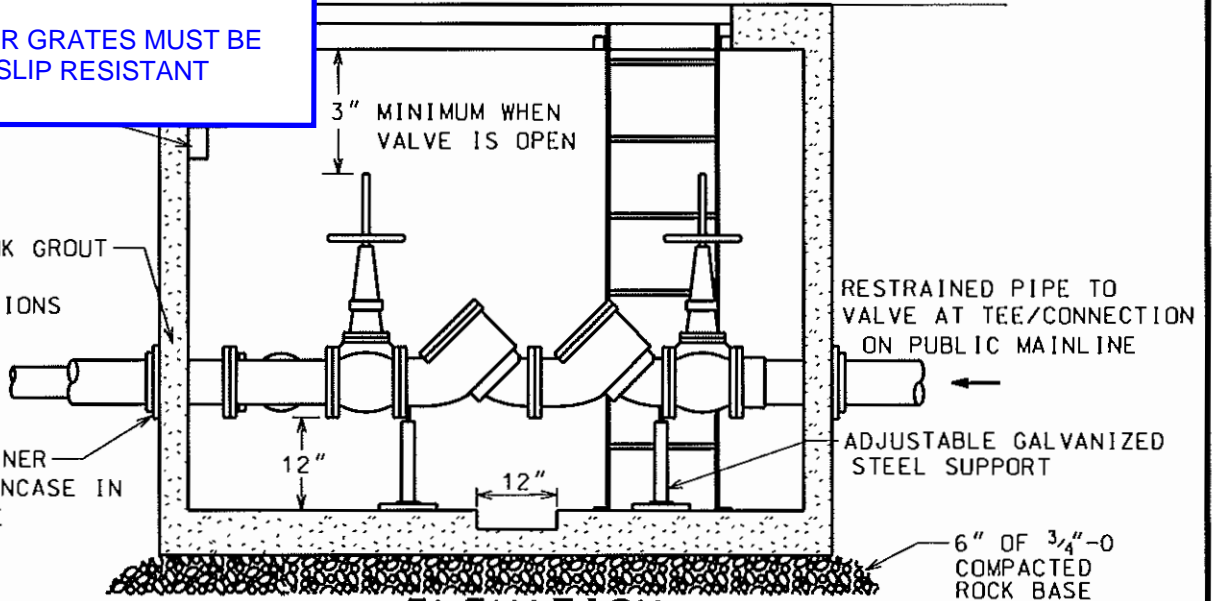
RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)



PLAN



ELEVATION

NOTES:

1. USE DUCTILE IRON PIPE THROUGH VAULT
2. PLUGS SHALL BE INSTALLED IN TEST COCKS.
3. ASSEMBLY MAY ALSO BE MOUNTED ABOVE GROUND IN AN INSULATED PROTECTIVE ENCLOSURE OR BUILDING.
4. CHECK VAULT FLOTATION AND CORRECT IF NECESSARY.
5. INSTALLATION AND BACKFLOW ASSEMBLY SHALL COMPLY WITH AWWA C510 AND DAR 333-61-070.
6. PROVIDE SUMP PUMP WITH DIAPHRAGM OR VERTICAL FLOAT SWITCH AND 1" PVC CHECK VALVE AND PIPE DISCHARGE TO DAYLIGHT. SUPPLY POWER THRU GFCI INTERNAL WALL MOUNT 12" BELOW CEILING.
7. IF BACKFLOW DEVICE IS INSTALLED INSIDE BUILDING, AN ISOLATION VALVE SHALL BE INSTALLED AT THE PROPERTY LINE.

PIPE SIZE	UTILITY VAULT	COVER OFFSET
4"	676-WA	2-332P
6"	687-WA	2-332P
8"	5106-WA	2-332P
10"	5106-WA	3-332P



CITY OF TUALATIN, OR

**DOUBLE CHECK DETECTOR
FIRE PROTECTION
WITH FDC CONNECTION**

REVISED: 3/2008
VAL ID: 3/2008

SCALE: 1:30

DRAWN: S.N.
APPROVED: K.L.H.

DWG NO. 615

REVISED: 3/2010
VALID: 4/2010

SCALE: 1:8

DRAWN: L.V.
APPROVED: K.L.H.

DWG NO. 630



CITY OF
TUALATIN, OR

WATER SERVICE
5/8" X 3/4" METER

METER BOX No.	SIDEWALK	DRIVEWAY
NEWBASIS #37 12"X20"	#37	#37 D.I.
CHRISTY FL12	(APPROVED FOR PLANTER AREAS ONLY)	

CONFIRM PRODUCT MODEL NUMBERS.

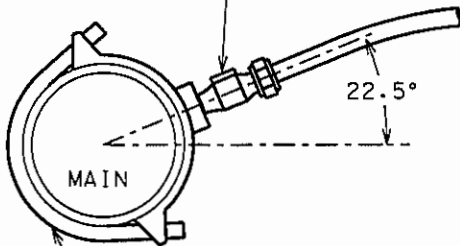
CITY SHALL SUPPLY & INSTALL
5/8" X 3/4" METER AND GA13
VALVE 3/4" METER X 3/4" I.P.

CURB & GUTTER

ANGLE INVERTED KEY METER VALVE
FOR 1" DIA. COPPER, FORD KV43-444W,
WITH MUELLER METER BUSHING H-10889

TYPE "K" SOFT COPPER 1" DIA. TUBE WITH
BRASS COMPRESSION PACK OR GRIP JOINT
FITTINGS. USE ELBOWS WHERE THERE IS A
POSSIBILITY OF BUCKLING THE COPPER TUBE

1" CORPORATION STOP DIRECT
TAP OR SERVICE SADDLE



SERVICE SADDLE STAINLESS STEEL BAND AWWA APPROVED

FLUSH LINE AFTER CONNECTION TO CORPORATION STOP
AND BEFORE CONNECTION TO METER

NOTE:

1. MAXIMUM CONTINUOUS FLOW RATE PER METER SHALL NOT EXCEED 10 GPM
2. VALVES & FITTINGS FROM FORD OR MUELLER SHALL MEET THE REQUIREMENTS OF AWWA C-800

ADD NOTES TO ADDRESS THE FOLLOWING:

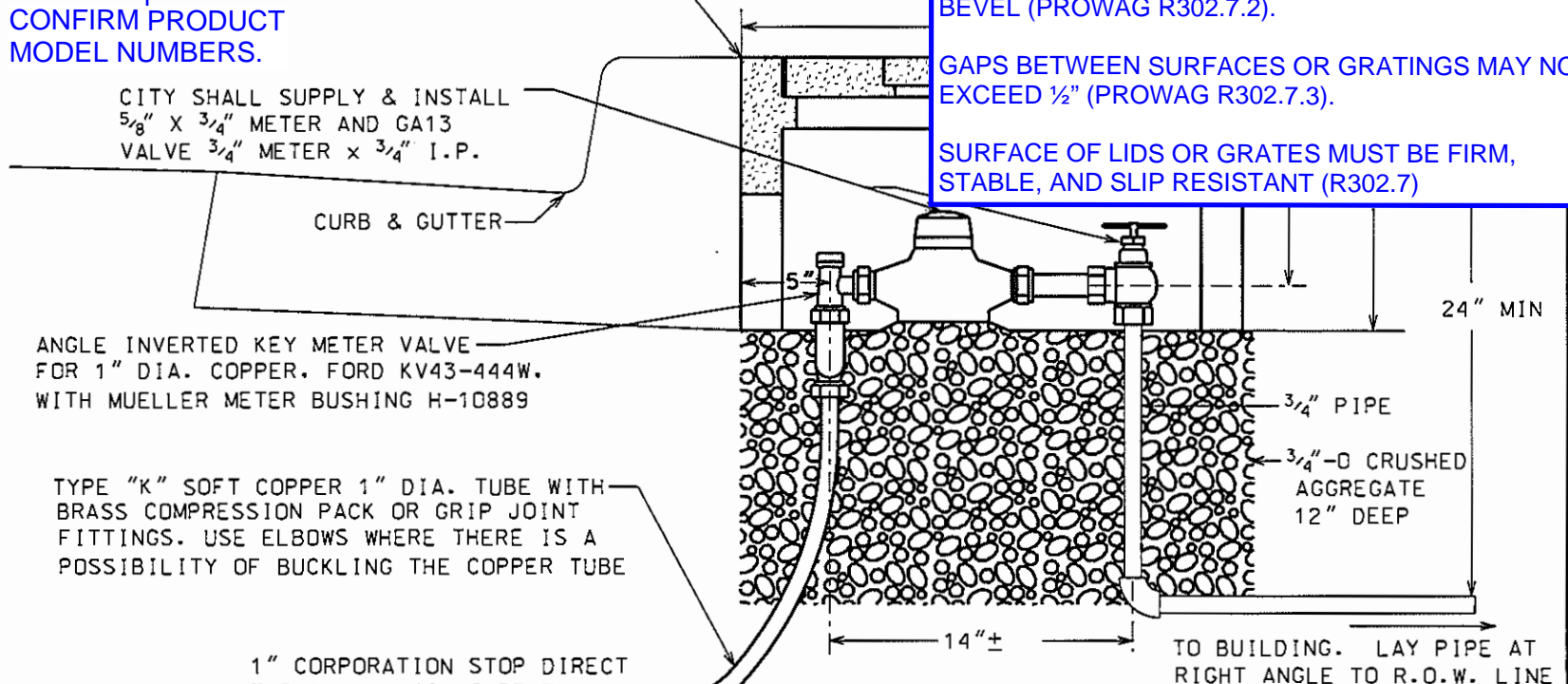
AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)



REVISED: 3/2008
VALID: 3/2008



DR

DRAWN: S.N.
APPROVED: K.L.H.

DWG NO. 631

WATER SERVICE
1" METER

METER BOX No.	SIDEWALK	DRIVEWAY
NEWBASIS #37 12"X20"	#37	#37 D.I.
CHRISTY FL12	FL12D	

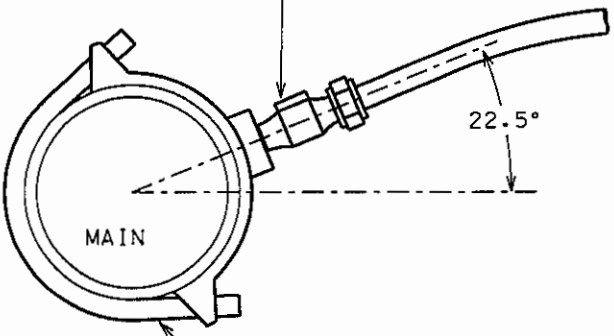
CITY SHALL SUPPLY & INSTALL 1" METER AND GA13 VALVE 1" METER x 1" I.P. FORD B13-444W WITH HANDLE HB-345

CURB & GUTTER

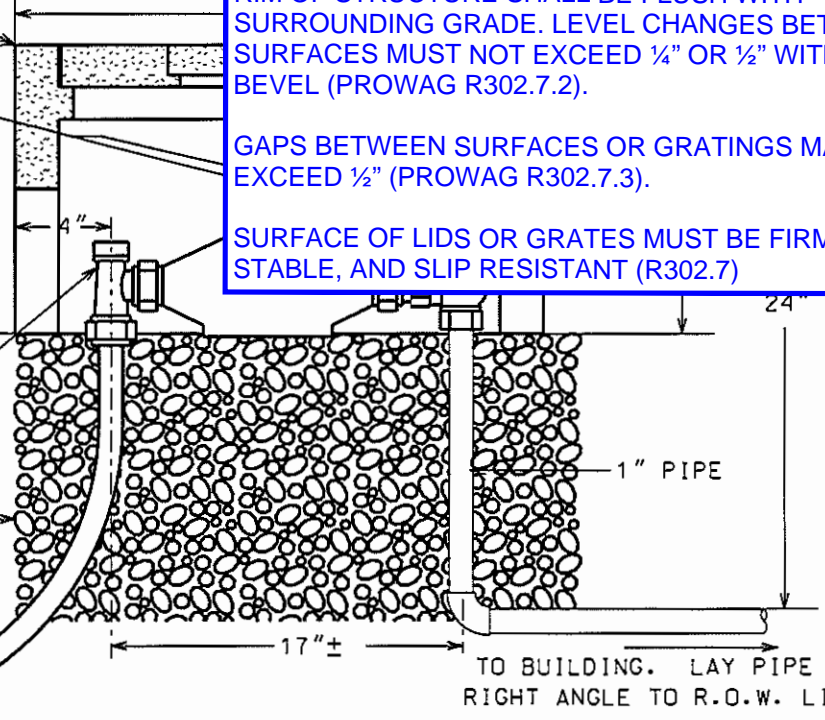
ANGLE INVERTED KEY 1" METER VALVE FORD KV43-444W

3/4"-0 CRUSHED AGGREGATE 12" DEEP

1" CORPORATION STOP FORD F1000-4 FOR DIRECT TAP OR F1100-4 FOR SERVICE SADDLE



SERVICE SADDLE STAINLESS STEEL BAND AWWA APPROVED



ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

CONFIRM PRODUCT MODEL NUMBERS. CONFIRM WHY CHRISTY FL12 IS SUITABLE FOR INSTALLATION IN SIDEWALK IN THIS DETAIL BUT IS APPROVED FOR USE IN PLANTER AREAS ONLY IN DWG NO 630.

NOTE:

1. FLUSH LINE AFTER CONNECTION TO CORPORATION STOP AND BEFORE CONNECTION TO METER
2. MAXIMUM CONTINUOUS FLOW RATE SHALL NOT EXCEED 25 GPM
3. APPROVED EQUAL VALVE & FITTINGS FROM FORD OR MUELLER SHALL MEET THE REQUIREMENTS OF AWWA C-800

REVISED: 3/2008
 VALID: 3/2008

SCALE: 1:8

DRAWN: S.N.
 APPROVED: K.L.H.

DWG NO. 632

CITY OF
 TUALATIN, OR

WATER SERVICE
 1 1/2" METER

METER BOX No.	SIDEWALK	DRIVEWAY
NEWBASIS #66 17"X30"	#66	#66 D.I.
CHRISTY FL36	FL36D	

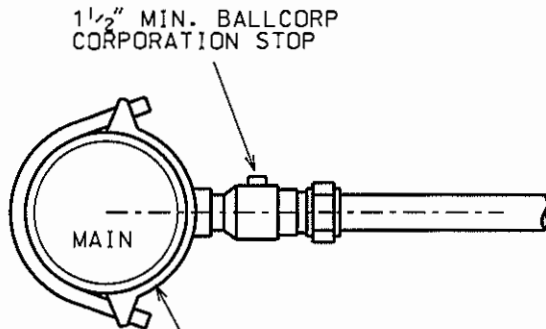
CITY SHALL SUPPLY & INSTALL
 1 1/2" METER AND STRAIGHT BALL
 VALVE 1 1/2" METER X 1 1/2" I.P.

CONFIRM PRODUCT
 MODEL NUMBERS.

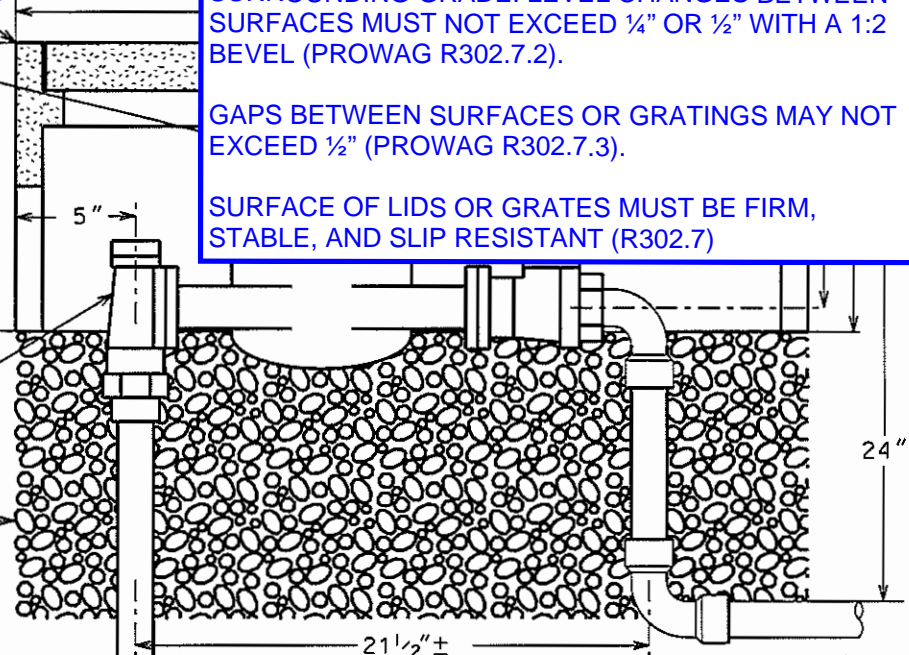
CURB & GUTTER

ANGLE INVERTED KEY 1 1/2" METER VALVE

3/4"-0 CRUSHED AGGREGATE 12" DEEP



SERVICE SADDLE STAINLESS
 STEEL BAND AWWA APPROVED



TO BUILDING. LAY PIPE AT
 RIGHT ANGLE TO R.O.W. LINE

TYPE "K" RIGID COPPER, 1 1/2" MIN. TUBE WITH
 BRASS COMPRESSION PACK OR GRIP JOINT ELBOWS
 AND OTHER FITTINGS

NOTE:

1. FLUSH LINE AFTER CONNECTION TO CORPORATION STOP AND BEFORE CONNECTING TO METER
2. MAXIMUM CONTINUOUS FLOW RATE SHALL NOT EXCEED 50 GPM
3. APPROVED EQUAL VALVES & FITTINGS FROM FORD OR MUELLER SHALL MEET THE REQUIREMENTS OF AWWA C-800

ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATES MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

REVISED: 3/2008
VALID ID: 3/2008

SCALE: 1:8

DRAWN: S.N.
APPROVED: K.L.H.

DWG NO. 633

CITY OF TUALATIN, OR

WATER SERVICE
2" METER

METER BOX No.	SIDEWALK	DRIVEWAY
NEWBASIS #66 17"X30"	#66	#66 D.I.
CHRISTY FL36	FL36D	

CONFIRM PRODUCT MODEL NUMBERS.

CITY SHALL SUPPLY & INSTALL
2" METER AND STRAIGHT BALL
VALVE 2" METER X 2" I.P.

CURB & GUTTER

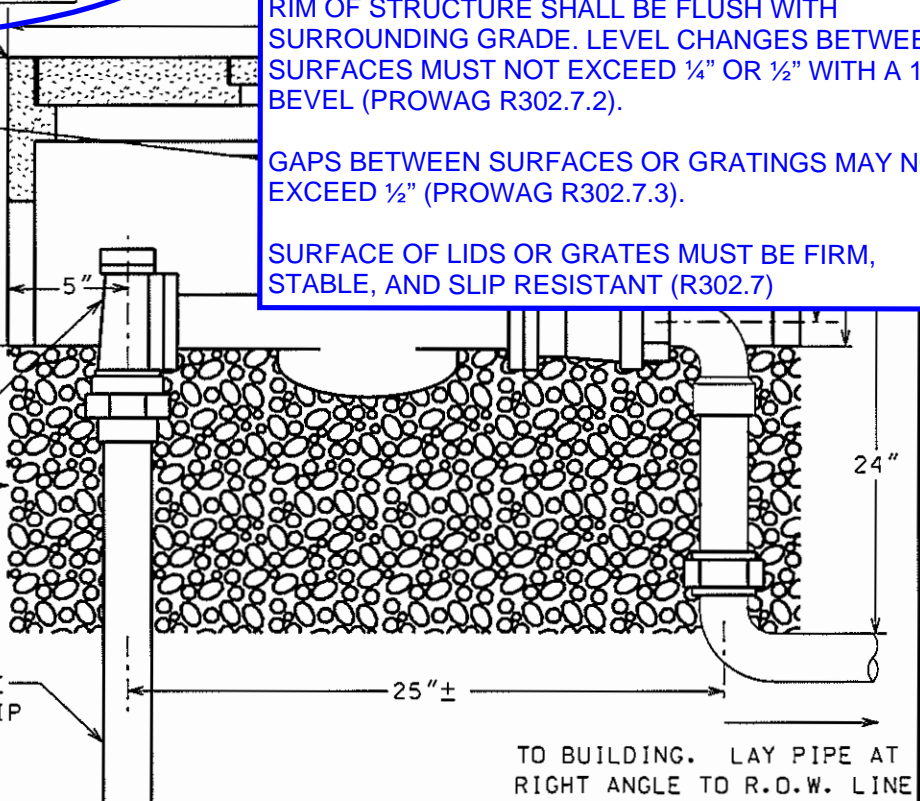
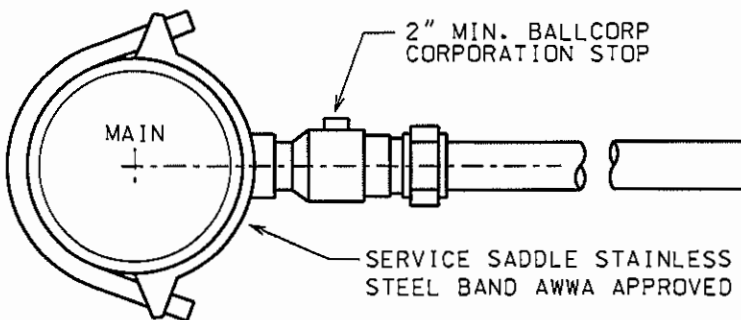
ANGLE INVERTED KEY 2" METER VALVE
(1 1/2" AND 2" METERS)

3/4"-0 CRUSHED AGGREGATE 12" DEEP

TYPE "K" RIGID COPPER 2" MIN. TUBE
WITH BRASS COMPRESSION PACK OR GRIP
JOINT ELBOW AND OTHER FITTINGS

2" MIN. BALLCORP
CORPORATION STOP

SERVICE SADDLE STAINLESS
STEEL BAND AWWA APPROVED



TO BUILDING. LAY PIPE AT
RIGHT ANGLE TO R.O.W. LINE

ADD NOTES TO ADDRESS THE FOLLOWING:

AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)

NOTE:

1. FLUSH LINE AFTER CONNECTION TO CORPORATION STOP AND BEFORE CONNECTING TO METER
2. MAXIMUM CONTINUOUS FLOW RATE SHALL NOT EXCEED 80 GPM
3. APPROVED EQUAL VALVES & FITTINGS FROM FORD OR MUELLER SHALL MEET THE REQUIREMENTS OF AWWA C-800

ADD NOTES TO ADDRESS THE FOLLOWING:

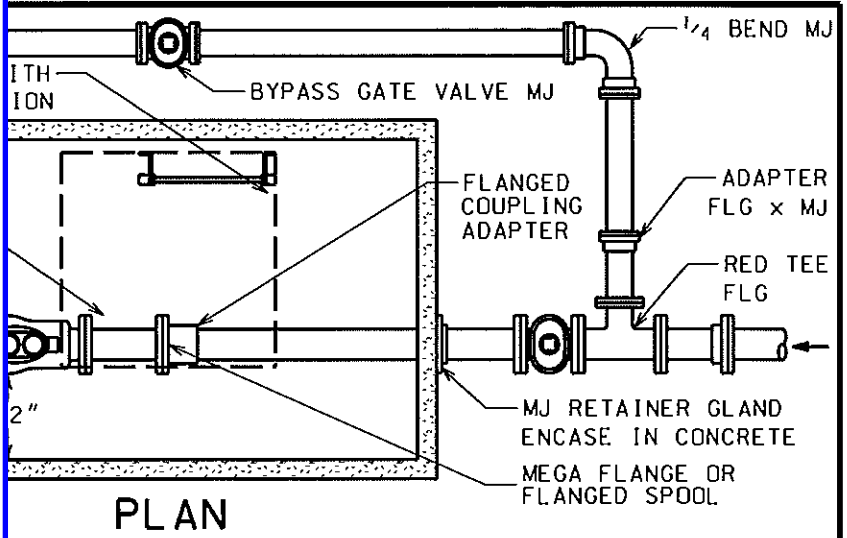
AVOID LOCATING STRUCTURES IN THE PEDESTRIAN PATH OF TRAVEL.

IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

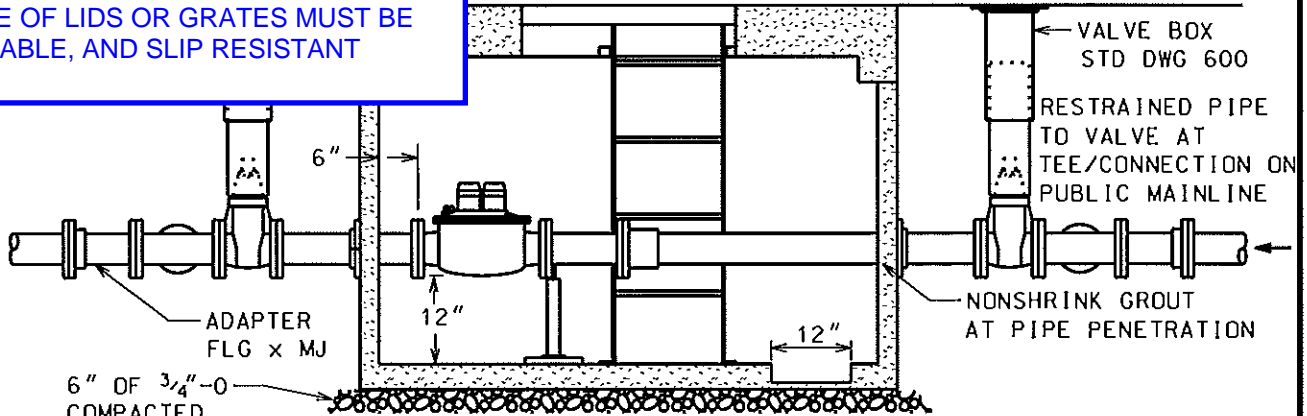
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GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)



PLAN



ELEVATION

METER SIZE	UTILITY VAULT	COVER	BY-PASS DIAMETER	MAX. CONTINUOUS FLOW RATE GPM	METER LENGTH
3"	575-LA	1-332P	4"	320	17"
4"	575-LA	1-332P	4"	500	20"
6"	575-LA	1-332P	4"	1000	24"
8"	675-WA	2-332P	6"	1600	56.3"

CONFIRM PRODUCT MODEL NUMBERS.

NOTES:

1. USE DUCTILE IRON PIPE CL 52 THROUGH VAULT AND BYPASS
2. NEPTUNE TRU/FLO COMPOUND METER COMPLYING WITH AWWA C702 READING IN 100 CUBIC FEET AND INCORPORATING A NEPTUNE PROREAD ENCODER WITH EACH PIT RECEPTACLE FASTENED TO THE VAULT TOP WITH TWO S.S. ANCHOR BOLTS, LABEL S AND L. ELECTRICAL WIRING FED THROUGH HOLES DRILLED IN CONCRETE TOP AND NEATLY SPIRAL WRAP PROTECTED AND TIED. PROVIDE CERTIFIED TEST FOR METER AND ENCODER BEFORE ACCEPTANCE.
3. PROVIDE MANUFACTURED ADJUSTABLE GALVANIZED STEEL SUPPORT AT INLET END OF METER
4. USE APPROVED RETAINER GLANDS WITH MJ FITTINGS. USE NO THRUST BLOCKS OR RODS.
5. MEGA FLANGES MAY BE USED IN PLACE OF FLANGED SPOOLS
6. PROVIDE RULE A53S SUMP PUMP WITH 1" PVC CHECK VALVE AND PIPE DISCHARGE TO DAYLIGHT. SUPPLY POWER THRU GFCI WALL MOUNT INTERNALLY 12" BELOW CEILING.



CITY OF TUALATIN, OR

3" WATER SERVICE AND LARGER METER COMPOUND TYPE

REVISED: 3/2008
VALID: 3/2008

SCALE: 1:30

DRAWN: S.N.
APPROVED: K.L.H.

DWG NO. **634**

ADD NOTES TO ADDRESS THE FOLLOWING:

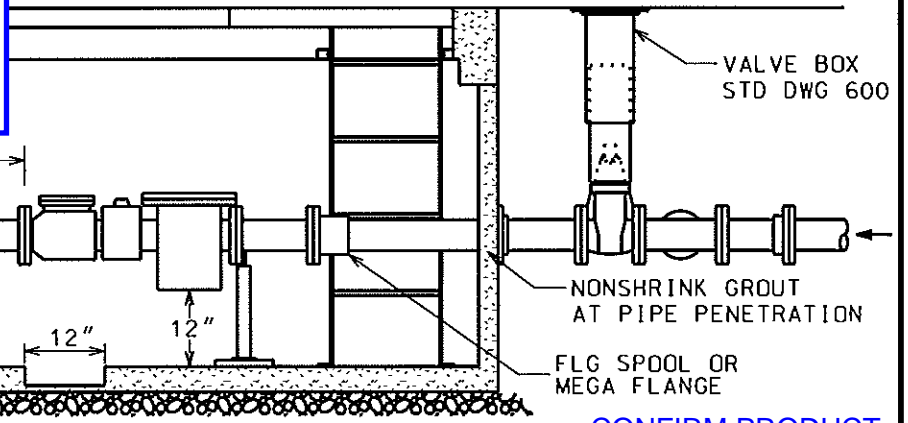
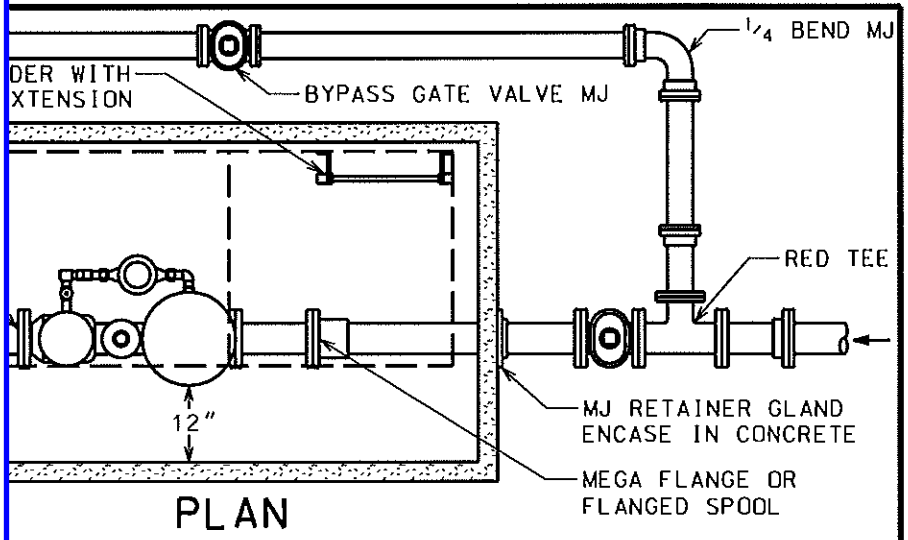
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IF STRUCTURES ARE REQUIRED TO BE LOCATED IN THE PEDESTRIAN PATH OF TRAVEL DUE TO EXISTING CONSTRAINTS, THE STRUCTURES MUST ADHERE TO PROWAG'S SURFACE REQUIREMENTS.

RIM OF STRUCTURE SHALL BE FLUSH WITH SURROUNDING GRADE. LEVEL CHANGES BETWEEN SURFACES MUST NOT EXCEED 1/4" OR 1/2" WITH A 1:2 BEVEL (PROWAG R302.7.2).

GAPS BETWEEN SURFACES OR GRATINGS MAY NOT EXCEED 1/2" (PROWAG R302.7.3).

SURFACE OF LIDS OR GRATINGS MUST BE FIRM, STABLE, AND SLIP RESISTANT (R302.7)



CONFIRM PRODUCT MODEL NUMBERS.

METER SIZE	UTILITY VAULT	COVER	BY-PASS DIAMETER	MAXIMUM FLOW RATE GPM
4"	575-WA	2-332P	4"	700
6"	575-WA	2-332P	4"	1600
8"	675-WA	2-332P	6"	2800
10"	5106-WA	3-332P	8"	4400

NOTES:

1. USE DUCTILE IRON PIPE CL 52 THROUGH VAULT AND BYPASS
2. NEPTUNE HP PROTECTUS III METER COMPLYING WITH AWWA C703 READING IN 100 CUBIC FEET AND INCORPORATING A NEPTUNE PROREAD ENCODER WITH EACH PIT RECEPTACLE FASTENED TO THE VAULT TOP WITH TWO S.S. ANCHOR BOLTS, LABEL S. AND L. ELECTRICAL WIRING FED THROUGH HOLES DRILLED IN CONCRETE TOP AND NEATLY SPIRAL WRAP PROTECTED AND TIED. PROVIDE CERTIFIED TEST OF METER AND ENCODER BEFORE ACCEPTANCE.
3. PROVIDE MANUFACTURED ADJUSTABLE GALVANIZED STEEL SUPPORT AT INLET END OF METER
4. USE APPROVED RETAINER GLANDS WITH MJ FITTINGS. USE NO THRUST BLOCKS OR RODS
5. MEGA FLANGES MAY BE USED IN PLACE OF FLANGED SPOOLS
6. PROVIDE RULE A53S SUMP PUMP WITH 1" PVC CHECK VALVE AND PIPE DISCHARGE TO DAYLIGHT. SUPPLY POWER THRU GFCI WALL MOUNT INTERNAL 12" BELOW CEILING.



CITY OF TUALATIN, OR

**WATER SERVICE
4" AND LARGER METER
FIRE SERVICE TYPE**

REVISED: 3/2008
VALID: 3/2008

SCALE: 1:30

DRAWN: S.N.
APPROVED: K.L.H.

DWG NO. 635



PUBLIC WORKS CONSTRUCTION CODE

CITY OF TUALATIN

ENGINEERING DIVISION

18880 S.W. MARTINAZZI AVENUE
TUALATIN, OR 97062-7092

NOVEMBER 2001

LATEST REVISION: APRIL 24, 2017

The selection and use of the enclosed specifications and standards, while in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a registered professional engineer.

REVISIONS SUMMARY

April 24, 2017 Revisions (Adopted under Resolution No. 5314-17)

Revised Specification Sections:

- Section 102.3.3 “Erosion Control Fees”
- Section 102.3.4 “Water Quality Fees”
- Section 203.2.01 “Design Speed”
- Section 312.5.00 “Sidewalk Repair”

Revised Standard Drawings:

- Commercial Driveway Approach – Curbside Planter Strip (Drawing No 440)
- Commercial Driveway Approach – Curbside Sidewalk (Drawing No 441)
- Residential Driveway Approach – Curbside Planter Strip (Drawing No 442)
- Residential Driveway Approach – Curbside Sidewalk (Drawing No 443)
- Curb and Gutter (Drawing No 470)
- Curb (Drawing No 471)

New Standard Drawings:

- Example Single Family Erosion & Sediment Control Site Plan (Drawing No 001)

Deleted Standard Drawings:

- Approach Private Driveway (Drawing No 444)

December 12, 2016 Revisions (Adopted under Resolution No. 5302-16)

Revised Specification Sections:

- Section 202.1.00 “Scope”
- Section 202.2.00 “Plan View”
- Section 203.2.02 “Sight Distance”
- Section 203.2.04 “Superelevation”
- Section 203.2.08 “Intersections”
- Section 203.2.11C “Accessways”
- Section 203.2.14 “Sidewalks”
- Section 203.2.15 “Curb Ramps”
- Section 203.2.24A “Design and Installation Requirements”
- Section 203.2.25 “Traffic Signs”
- Section 203.2.27 “Traffic Marking”
- Section 311.3.05 “Control Joints”
- Section 312.3.05 “Control Joints”
- Section 312.3.07 “Finish”

Revised Standard Drawings:

- ADA Ramp – General Notes (Drawing No 460)
- ADA Ramp – Perpendicular (Drawing No 461)
- ADA Ramp – Parallel (Drawing No 462)
- ADA Ramp – Midblock (Drawing No 463)
- Concrete Sidewalk (Drawing No 475)
- Street Sign Post (Drawing No 516)

New Standard Drawings:

- ADA Ramp – Details (Drawing No 464)
- Street Name Sign (Drawing No 517)

CHAPTER 100
GENERAL SPECIFICATIONS

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101 DEFINITIONS AND ABBREVIATIONS

The following definitions and abbreviations shall apply wherever used.

The words directed, required, permitted, ordered, requested, instructed, designated, considered necessary, prescribed, approved, acceptable, satisfactory, or words of like import, refer to actions, expressions and prerogative of the City Engineer.

Command type sentences are used throughout the Code. In all cases the command expressed or implied is directed to the **Permittee**.

PERMITTEE OR CONTRACTOR? MANY
COMMAND TYPE SENTENCES ARE
DIRECTED TO THE CONTRACTOR
PERFORMING THE WORK.

101.1.00 **Definitions**

Accessway - A non-vehicular, paved, pathway designed for pedestrian and bicycle use and providing convenient linkages between a development and adjacent residential and commercial properties and areas intended for public use such as schools, parks, and adjacent collector and arterial streets where transit stops or bike lanes are provided or designated. **An accessway is not a sidewalk.**

Acts of God - An act of God is to be construed to mean an earthquake, flood, cloudburst, tornado, hurricane or other phenomenon of nature of catastrophic proportions or intensity.

Applicant - The applicant is the person, firm, partnership, association, agency of corporation making application for a Public Works Construction Permit.

Approved Equal - A product, component or process whose use in or on a particular project is specified as a standard for comparison purposes only. The "equal" product, component or process shall be the same or better than that named in function, performance, reliability, quality and general configuration. Determination of equality in reference to the project design requirements will be made by the City Engineer.

As Approved - Whenever the phrases "as approved by the City" or the like is used in these standards, it shall be interpreted to allow the City through their authorized representatives, to interpret the provisions in question in a manner to protect the public health and safety, consistent with other applicable laws and other standards of the City, and to preserve the safe and reliable operation of the public works facilities.

As Built Drawings - The drawings made or revised by the Contractor and design engineer during progress of construction and approved by the City Engineer, illustrating how various elements of the work were constructed.

Attorney - The City Attorney of the City of Tualatin, Oregon.

Bike (Bicycle) Facilities - On and off street improvements and facilities designed to accommodate bicycles.

Bike (Bicycle) Lane - A portion of roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.

Bike (Bicycle) Path - A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way or easement.

Bikeway - Any street, road, path or way open to bicycle travel regardless of whether such facilities are designated for the preferential use of bicycles or are to be shared with other transportation modes.

City - The City of Tualatin, Oregon, a municipal corporation organized and operating pursuant to the City of Tualatin Charter of 1967, as amended, the Oregon Constitution, Article XI, Section 2 and its municipal ordinances and resolutions.

City Engineer - The person appointed by the City Manager to fulfill the responsibilities of City Engineer as set forth in this Code, or the person authorized by the City Manager to fulfill such responsibilities.

IS THERE ANY REFERENCE TO THE TUALATIN DEVELOPMENT CODE?

Code - The City of Tualatin Public Works Construction Code as defined by Resolution No. 4766-08, and any amendments thereto.

Confined Space - As defined by Oregon Administrative Rules (OAR) Chapter 437, a confined space means a space that:

- (1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- (2) Has limited or restricted means for entry or exit (for example: tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
- (3) Is not designed for continuous employee occupancy.

Constructed Wetlands - Those wetlands developed as a water quality or quantity facility, subject to change and maintenance as such. These areas must be clearly defined and/or separated from existing or created wetlands. This separation shall preclude a free and open connection to such other wetlands.

Contractor - The person, company, or corporation duly licensed or approved by the State of Oregon and designated by the Permittee to do the work in question. The Contractor shall be registered and in good standing with the Contractor's Board of the State of Oregon.

Created Wetlands - Those wetlands developed in an area previously identified as a non-wetland to replace or mitigate wetland destruction or displacement. A created wetland shall be regulated and managed the same as an existing wetland.

Design Engineer - The Design Engineer is the Permittee's representative and shall be responsible for preparation of the Plans, Special Specifications, and As-built Drawings for proposed public works facilities. The design engineer shall be registered in the State of Oregon.

ARE THERE ANY
RECORDING
REQUIREMENTS?

Easement - The right to use or occupy a defined area of property for a specific purpose or purposes as set forth in a document which has been approved and accepted by the City.

Existing Wetlands - Those areas identified and delineated as set forth in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, January 1989, by a qualified wetland specialist.

Extra Work - An item of work not provided for in the Permit as issued, but determined by the City Engineer as essential to the proper completion of the Permit within its intended scope.

Field Order - An order issued by the City Engineer to the Permittee to carry out minor revisions in the work.

Final Completion - The completion of all of the work called for under the Permit including but not limited to satisfactory operation of all equipment, by means of acceptance tests, correction of all punch list items to the satisfaction of the City Engineer, settlement of all claims, if any, delivery of all guarantees and maintenance warranties, equipment operation and maintenance manuals, as-built drawings, building certificate required prior to occupancy, electrical certificates, mechanical certificates, plumbing certificates, all other required approvals and acceptances by city, county and state governments, or other authority having jurisdiction, and removal of all debris, tools, scaffolding, equipment, and surplus materials and equipment from job site.

Highway - The whole area within the boundaries of a public right-of-way which is reserved for and secured for public use in constructing and maintaining a roadway and its appurtenances.

Holiday - Those days designated by the President or the Congress of the United States or by the Governor or Legislature of the State of Oregon or by the City Council of Tualatin as a holiday.

Improvement - General term encompassing all phases of the work to be performed under the Permit and is synonymous to the term Project.

Inspector - The authorized representative of the City Engineer entrusted with making detailed inspections of the work or materials.

Land Development - Land development shall have the meaning of Oregon Administrative Rules, Section 340-41-006(22), adopted December 14, 1989.

CONFIRM CODE
REFERENCE

Notice - A written communication delivered to the authorized individual, member of the firm or officer of the corporation for which it is intended. If delivered or sent by mail, it shall be addressed to the business address of the individual, firm or corporation as specified on the Permit Application. In the case of a Permit with two (2) or more persons, firms or corporations, notice to one shall be deemed notice to all.

Outdoor Recreation Access Route - A pedestrian path that provides access to a recreation trail. These routes are on City-owned property, exclusive rights-of-way or easements, but are not necessarily located in a designated greenway. They are typically 1/4 mile or less in length.

Outdoor Recreation Trail - A pedestrian path that provides access to and through recreational elements and open spaces. These trails are generally located within the City's designated greenways. Typically they are 1/4 mile or more in length and serve as part of the recreation experience, but can also function as routes for commuter or destination-oriented trips.

Pedestrian Facilities - Facilities such as sidewalks, walkways, pedestrian paths, outdoor recreation trails, outdoor recreation access routes, accessways, and other amenities designed to accommodate pedestrians.

Pedestrian Paths - Pedestrian paths are generally located within the City's designated greenways, but may be located elsewhere to provide access between residential, commercial, public, and semi-public uses. The paths serve as routes for recreational, commuter, and destination-oriented trips.

Permit - Permit means Public Works Construction Permit.

Permit Documents - The Permit, Plans, Standard Drawings and Specifications, and the Code.

Permittee - The person or firm which has made application to the City to construct public works facilities with the intention that such facilities will become the property of the general public.

Plans - The official plans, profiles, cross sections, elevations, details and other working, supplementary and detail drawings, or reproductions, signed by the Design Engineer, which show the location, character, dimensions and details of the work to be performed.

Prequalification - See definition and provisions, subsection 102.5.00.

Project - General term encompassing all phases of the work to be performed under the Permit and is synonymous with "improvement".

Provide - When related to an item of work, provide shall be understood to mean furnish and install the work complete in place, so that the work is functional.

Public Works Construction - Any construction or improvement of public right-of-way or easements, natural drainage ways, creek, or other public works to be dedicated to the City. Domestic wells, septic tanks and any other works by the State Building Code shall not be included in the definition of Public Works Construction.

EVEN THOUGH CONSTRUCTION PERFORMED BY CITY AGENTS OR EMPLOYEES DO NOT REQUIRE A PUBLIC WORKS PERMIT, APPROPRIATE PUBLIC NOTIFICATION, VEHICULAR & PEDESTRIAN TRAFFIC CONTROL AND OTHER ADA RELATED REQUIREMENTS ARE STILL MANDATORY.

Public Works Construction Permit - The Permit issued by the City Engineer for public works construction performed by any private party, quasi-public body, public agency or governmental agency, **excepting construction performed by City agents or employees.**

Public Works Facilities - Any and all on-site and off-site improvements and related accessories to be accepted for ownership, maintenance and operation by the City, including but not limited to sanitary sewers, pump stations, water lines and hydrants, storm drain systems, streets, alleys, street lights, street name signs, greenways, bikepaths, traffic control systems and devices.

Punch List - A list of the Contractor's incomplete work requiring correction or modification, prepared by the City Engineer.

REMOVE DATES FROM THESE REFERENCES THROUGHOUT THIS CODE. MANY DATED REFERENCES LISTED IN SUBSEQUENT CODE SECTIONS ARE NOT THE LATEST EDITION.

Reference Specifications - Bulletins, standards, rules, methods of analysis or testing, codes and specifications of other agencies, engineering societies, or industrial associations referred to in the Code. All such references refer to the latest edition, including amendments which are in effect and published at the time issuing the Permit for the project.

Right-of-Way - A general term denoting land, property, or interest property acquired for or devoted to public use.

Road - Every road or roadway, thoroughfare, and place including bridges, viaducts and other structures used or intended for use of vehicles.

Sensitive Area -

A. Includes:

1. Existing and created wetlands;
2. Rivers, streams, and springs, whether flow is perennial or intermittent;
3. Natural lakes, ponds, and in-stream impoundments.

B. Does not include:

1. Stormwater infrastructure;
2. A Vegetated corridor (a buffer) adjacent to the Sensitive Area;
3. An off-stream recreational lake, wastewater treatment lagoon, fire pond, or reservoir; or
4. Drainage ditches.

Shop Drawings - Supplementary plans or data which the Permit or Specifications requires the Contractor to submit to the Engineer including, but not limited to, steel bending details, erection plans, and catalog data explaining equipment proposed for use.

Shown - Work shown on the plans.

Special Specifications or (Special Provisions) - Requirements peculiar to the project and changes and modifications of the standard specifications. Special specifications are used interchangeably with special provisions.

Specified - Means as required by the Public Works Construction Code.

Standard Plans or Drawings - Details of structures, devices, or instructions adopted by the City as a standard and referred to in this Code by title or number.

Standard Specifications - The terms, directions, provisions and requirements set forth in this Code.

Station - A distance of 100 feet measured horizontally along a surveyed centerline.

Stop Work Order - A written notice delivered by hand and/or by mail to the Permittee or Contractor, directing the work performed under a Permit to be stopped because deficiencies in materials or workmanship or for lack of compliance with the approved Plans and this Code. A Stop Work Order shall be signed by the City Engineer or his designated representative.

Street - Any road, highway, parkway, freeway, avenue, alley, walk, or way, including sidewalks, bike lanes, parking strips and all other structures including utilities above and below the surface, land and improvements within the public right-of-way between property lines.

Substantially Complete – The water quality facility can be deemed substantially complete once active green growth has occurred to an average growth of 3-inches and plant density is an average of approximately 6 plants per square foot!

SHOULD THIS DEFINITION BE BROADER TO ADDRESS TYPICAL CONSTRUCTION CONTRACT TERMS?

Ton - The short ton of 2,000 pounds avoirdupois.

Use of Pronoun - The singular shall include the plural, and the plural the singular; any masculine pronoun shall include the feminine or neuter gender; and the term "person," includes natural person or persons, firm, co-partnership, corporation or association or combination thereof.

Utility - Tracks, overhead or underground wires, pipelines, conduits, ducts, or structures, owned, operated, or maintained in or across a public right-of-way or public easement.

Water Quality Facility - Water quality facility is a used to temporarily store, route or filter runoff for the purpose of improving water quality.

Water Quality Permit – The permit issued by the City Engineer for construction of a water quality facility.

Work - That which is proposed to be constructed or performed under the Permit, including the furnishing of all material, labor, tools, machinery and appurtenances necessary to complete the requirements of the Permit, and such additional items not specifically indicated or described which can be reasonably inferred as belonging to the item described or indicated as required by good practice to provide a complete and satisfactory system or structure.

Working Days - Working days shall be Monday through Friday, excluding holidays. The Contractor shall provide the City Engineer at least one (1) working day's notice prior to performing work on holidays, Saturdays, or Sundays.

Working Drawings - Stress sheets, shop drawings, erection plans, falsework plans, framework plans, cofferdam plans, bending diagrams for reinforcing steel, or any other supplementary plans or similar data which the Contractor is required to submit to the City Engineer for approval.

101.2.00 Abbreviations

AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AGC	Associated General Contractors of America
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
APWA	American Public Works Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association
BLI	Oregon Bureau of Labor and Industries
CRSI	Concrete Reinforcing Steel Institute
CWS	Clean Water Services
DEQ	Department of Environmental Quality
DFPA	Division for Product Approval of American Plywood Association
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
ITE	Institute of Traffic Engineers
JIC	Joint Industry Conferences of Hydraulic Manufacturers
MUTCD	Manual of Uniform Traffic Control Devices
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NPDES	National Pollution Discharge Elimination System
NLMA	National Lumber Manufacturer's Association
OAR	Oregon Administrative Rules
ODOT	Oregon Department of Transportation
ORS	Oregon Revised Statutes
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
TDC	Tualatin Development Code
UBC	Uniform Building Code
UL	Underwriter's Laboratories, Inc.
WWPA	Western Wood Products Association
PROWAG	Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way by the U.S. Access Board
ADA	Americans with Disabilities Act

102 PERMIT REQUIREMENTS

102.1.00 Permits Required

No person shall perform construction within the City of Tualatin's right-of-easements, tracts, stream, creeks, or natural drainage ways without first obtaining a Public Works Construction Permit from the City Engineer. **NOT REVIEWED**

When a Water Quality Facility is required to be constructed, a Water Quality Permit will need to be obtained. This applies to public and private facilities

102.2.1 Public Works Construction Permit Application Procedure

102.2.2 Public Works Construction Permit

A person desiring a Public Works Construction Permit shall make application to the City Engineer on **the forms provided**. The application shall be accompanied by a Permit fee deposit as set forth in subsection ~~102.3.00~~ and complete plans and specifications as set forth in subsection ~~102.4.01~~. ~~102.4.1~~ ~~102.3.1~~

Any public utility company operating under a franchise agreement with the City shall be exempt from the Permit fees provisions of this Code.

Prior to submittal of a Public Works Construction Permit application, the applicant shall attend a preapplication meeting with the Engineering Division. Required attendees include the owner, the design engineer, and the contractor (if known).

WHAT FORMS?

102.2.3 Water Quality Permit

A person desiring a Water Quality Permit shall make application to the City Engineer on **the forms provided**. The application shall be accompanied by a permit fee deposit as set forth in subsection ~~102.3.00~~ and complete plans and specifications as set forth in subsection ~~102.04.03~~. ~~102.4.3~~ ~~102.3.1~~

102.3.1 Permit Fees and Deposits

102.3.2 Public Works Construction Permit Deposits **NOT REVIEWED**

The applicant for a Permit shall pay a Permit deposit as follows:

To reinstate the Permit, the applicant shall submit a written request for reinstatement to the City Engineer giving the reasons for failure to begin construction and a date when construction will be commenced. In reinstating the Permit, the City Engineer may impose any additional conditions deemed necessary or require amendment to the Permit.

Any Permittee holding an unexpired Permit may apply for an extension of the time within which to may commence work under that Permit when the Permittee is unable to commence work within the time required by this section for good and satisfactory reasons. The City Engineer may extend the time for action by the Permittee for a period not exceeding 180 days upon written request by the Permittee showing that circumstances **NOT REVIEWED** control of the Permittee have prevented action from being taken. No Permit shall be extended more than once.

The City Engineer may, in writing, suspend or revoke a Permit issued under this code whenever the Permit is issued in error or on the basis of incorrect information supplied, or in violation of any ordinance or regulation or this Code. The Permittee may appeal the suspension or revocation of the Permit as set forth in Section 104.6.00 of this Code.

Changes to the approved Plans and Special Specifications requested by Permittee and approved by the City Engineer. Authority incorporated by amendment to the Permit and approved Plans. **THIS ON-LINE FORM IS TITLED CONSTRUCTION IMPROVEMENT AGREEMENT.**

https://www.tualatinoregon.gov/sites/default/files/fileattachments/engineering/page/5103/construction_improvement_agreement_form_2015a.pdf

102.14.00

Performance of the Work

In order to protect the safety of the public and the integrity of the City's public facilities, the Contractor shall enter into a **Public Improvement Agreement** for work proposed on an existing public facility. **Public facilities include any public transportation, sanitary sewer, storm drainage, water, or park facility.** **WORKS**

WORKS

If the scope of work necessitates a **Public Improvement Agreement**, the Public Works Permit for the project will not be issued until the Contract is executed and filed with the City. The contract shall be enforceable by and against the parties, their heirs, successors and assigns.

PUBLIC WORKS FACILITIES IS MORE EXTENSIVE AS DEFINED IN SECTION 101.1.00 THAN LISTED HERE AND INCLUDES PEDESTRIAN ACCESS IMPROVEMENTS.

As a condition of the agreement, a bond, cash deposit, or other security will be required from the applicant in an amount equal to the value of the improvements to the existing public facilities, but not less than \$25,000. **NOT REVIEWED** ensure that the applicant constructs and completes all required improvements to public facilities.

NOT REVIEWED

The conditions of the agreement shall be fulfilled within the time limitations specified. Failure to fulfill a condition within the time may result in the City collecting the assurance and completing the improvements.

Further, notwithstanding any other provision, the City shall have the authority to deny a Public Works Construction Permit upon a determination that the applicant, or any officer, or

WITH THE UNDERSTANDING THAT STREETS INCLUDES SIDEWALKS AS DEFINED IN SECTION 101.1.00, WE RECOMMEND THAT YOU SPECIFICALLY IDENTIFY PEDESTRIAN FACILITIES THAT REQUIRE CITY APPROVAL BEFORE CLOSING.

actions as are made of record in the manner specified and records, rulings, instructions or decisions of the Contractor expressly waives any protest or objection for which on (10) days after date of receipt of the City Engineer's

NOT REVIEWED

104.7.00

Notifications Relative to Contractor's Activities

The Contractor shall obtain prior approval from the City Engineer for the closing or partial closing of any road, street, alley or other public thoroughfare. The Contractor shall give advance notice of such closure to all agencies providing public services including, but not limited to, the sheriff, police, fire, ambulance services, Tri-Met and the school district transportation services.

The Contractor shall notify all utilities before commencing work including, but not limited to, gas, communications, cable, power, traffic signals, water, sanitary and storm sewers.

Utilities may not be located as shown or marked as the location may have been established from records and not from on-site inspection. The Contractor shall notify utilities at least two (2) working days prior to commencing work of the closure, in order to give the utilities a reasonable opportunity to examine the work area and to relocate utilities by on-site examination prior to commencing the work. The Contractor shall also notify utilities of the above notification requirements during the progress of the work at that location of utilities is necessary as the work progresses.

IS THERE ANY PUBLIC NOTIFICATION REQUIREMENTS FOR THE CONTRACTOR? HOW IS THE PUBLIC NOTIFIED OF CLOSURES OR SHUT DOWNS? CONFIRM THE PUBLIC NOTIFICATION PROCEDURE IS ADA COMPLIANT.

The Contractor shall notify all agencies affected by the operations so as to properly coordinate and expedite the work in such a manner as to cause the least amount of conflict and interference between such operations and those of other agencies.

Notification shall include, but not be limited to, the time of commencement and completion of work, names of streets or location of alleys to be closed, schedule of operations and routes of detours where possible.

Damages or claims resulting from improper or insufficient notification to all agencies shall be the responsibility of the Contractor.

WITH THE UNDERSTANDING THAT STREETS INCLUDES SIDEWALKS AS DEFINED IN SECTION 101.1.00, WE RECOMMEND THAT PEDESTRIAN FACILITIES TO BE CLOSED ARE SPECIFICALLY IDENTIFIED .

104.8.00

Utilities and Existing Improvements

No person shall block, obstruct or interfere with any portion of the City's public works facilities.

The Contractor shall provide for the protection of sewers, drains and water courses not interrupted during the progress of the work, and shall restore such drains and water courses as approved by the City Engineer. The Contractor shall make excavations and borings

NOT REVIEWED

WE RECOMMEND THAT PEDESTRIAN REROUTING WITH ADVANCED NOTIFICATION OF SIDEWALK CLOSURE AND DETECTABLE BARRIERS ARE SPECIFICALLY IDENTIFIED IN SECTION 104.13.00. PER PROWAG R205, WHEN A PEDESTRIAN CIRCULATION PATH IS TEMPORARILY CLOSED BY CONSTRUCTION, ALTERATIONS, MAINTENANCE OPERATIONS, OR OTHER CONDITIONS, AN ALTERNATE PEDESTRIAN ACCESS ROUTE COMPLYING WITH SECTIONS 6D.01, 6D.02, AND 6G.05 OF THE MUTCD (INCORPORATED BY REFERENCE, SEE R104.2) SHALL BE PROVIDED. WHERE PROVIDED, PEDESTRIAN BARRICADES AND CHANNELIZING DEVICES SHALL COMPLY WITH SECTIONS 6F.63, 6F.68, AND 6F.71 OF THE MUTCD (INCORPORATED BY REFERENCE, SEE R104.2).

ig Construction

gineer, Contractor will be relieved of the work which are approved to be placed in accordance with the plans and specifications. Upon final acceptance of the improvement, the City Engineer will release the Contractor from full responsibility for the work. Such action by the City Engineer shall not constitute an admission of liability or damage to said completed portions of the project. The action of the City Engineer shall be the action of the City Engineer.

NOT REVIEWED

WITH THE UNDERSTANDING THAT STREETS INCLUDES SIDEWALKS AS DEFINED IN SECTION 101.1.00, WE RECOMMEND THAT PEDESTRIAN FACILITIES ARE SPECIFICALLY IDENTIFIED .

104.13.00 Traffic Maintenance

The Contractor shall erect and maintain all barricades, guards, standard construction signs, warning signs, and detour signs, as are necessary to warn and protect the public at all times from injury or damage as a result of the work operations on highways, roads, or streets affected by such operations. All detours/signs, traffic control devices and markings shall be installed and maintained per the requirements of MUTCD and Oregon Supplement. A plan for detours/signs, traffic control devices and markings shall be submitted by the Contractor and approved by the City Engineer prior to installation and before construction starts.

Upon failure to immediately provide the necessary flaggers or to provide, erect, maintain and remove barricades, detours, lights and standard signs when so ordered, the City may without further notice to the Contractor or Permittee, do so and assess all of the costs to the Public Works Construction Permit fee. Nothing contained in this section, however, shall require the City to do so nor relieve the Permittee and Contractor of their responsibilities to provide traffic control for public safety.

When traffic will pass over backfilled trenches before they are paved, the top of the trench shall be cold patched prior to the end of each work day and maintained in a condition that will allow normal vehicular movement to continue. Access driveways shall be provided where needed. Cleanup operations shall follow immediately behind backfilling and the work site shall be kept in an orderly condition at all times.

See Section ~~302~~ 302.0.00 for additional traffic control requirements.

104.14.00 Dust Control, Water and Air Pollution

During all phases of the construction work, and when directed, the Contractor shall take precautions to abate dust nuisance by cleaning up, sweeping, sprinkling with water, or other means as necessary to accomplish the suppression of dust.

NOT REVIEWED

Contractor's operations shall conform to applicable laws and regulations of the Oregon

2) Certification shall either be accompanied with a certified copy of test results, or certify that such test results are on file with the manufacturer and will be furnished to the City Engineer upon request.

3) Certification shall give the name and address of the manufacturer and testing agency and the date of tests; and shall set forth the means of identification which will permit field determination of the product delivered to the project as being the product covered by the certification. **NOT REVIEWED**

4) The City shall not be responsible for costs of certification, sampling and testing products.

WITH THE UNDERSTANDING THAT STREETS INCLUDES SIDEWALKS AS DEFINED IN SECTION 101.1.00, WE RECOMMEND THAT BICYCLE AND PEDESTRIAN FACILITIES SUBGRADE AND BASE ROCK ARE SPECIFICALLY IDENTIFIED. THE CITY MAY ALSO WANT TO IDENTIFY ALL UNDERGROUND UTILITIES AND NOT JUST CONDUIT.

105.4.00

Inspection Requirements

The Contractor shall allow access to the City Engineer or the City Engineer's representatives to all parts of the work. Furnish all samples required for testing purposes at no expense to City.

No work shall be covered until inspected and approved by the City Engineer or inspector. This provision shall apply to **street subgrade, base rock, and all buried conduits.** Inspector shall be notified 24-hours in advance of any required inspection. If any work should be covered up without approval or consent of the City Engineer, it shall, if required by the City Engineer, be uncovered for examination at Contractor's expense.

105.5.00

Inspection by Others

Inspection of work by persons other than representatives of the City Engineer shall not constitute inspection by the City Engineer, except as set forth in Section 105.3.00. **NOT REVIEWED**

105.6.00

Storage and Protection of Materials

Contractor shall store materials to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located so as to facilitate their prompt inspection. **Portions of the right-of-way may be used for storage purposes,** including Contractor's equipment, upon issuance of a Permit therefore by the City Engineer. Contractor shall not use private property for storage purposes without written permission of the property owner or lessee. When requested, the Contractor shall furnish copies of such written permission to the City Engineer.

IDENTIFY THAT NOTIFICATION OF RIGHT OF WAY CLOSURE AND TRAFFIC CONTROL PLAN (INCLUDING PED AND BIKE TRAFFIC) ARE REQUIRED PER SECTIONS 104.7.0, 104.13.00 AND 302.0.00.

106.6.00

Permits, Licenses and Taxes

NOT REVIEWED

The Contractor shall procure all permits and licenses, pay all and give all notices necessary and incidental to the due and lawful performance of the work, except those listed in the special conditions.

REFERENCE SECTIONS 104.7.0, 104.13.00 AND 302.0.00 FOR NOTIFICATION OF RIGHT OF WAY CLOSURE, TRAFFIC MAINTENANCE AND TRAFFIC CONTROL PLAN (INCLUDING PED AND BIKE TRAFFIC) REQUIREMENTS.

106.7.00

Public Safety and Convenience

The Contractor shall conduct the project with proper regard for the safety and convenience of the public. When the project involves use of public rights-of-way, the Contractor shall provide flaggers when directed, and install and maintain means of free access to all fire hydrants, service stations, warehouses, stores, houses, garages and other property. Private residential driveways shall be closed only with approval of the City Engineer or specific permission of the property owner. **The Contractor shall not obstruct or interfere with travel over any public street or sidewalk without approval.** The Contractor shall provide adequate barricades for open trenches and excavation. At night, the Contractor shall mark all open work and obstructions by lights. The Contractor shall install and maintain all necessary signs, lights, flares, barricades, railings, runways, stairs, bridges and facilities.

Emergency traffic such as police, fire, and disaster units shall be provided reasonable access to the work area at all times.

The Contractor shall comply with all requirements of the US Postal Service with regard to the location of mail boxes which must be disturbed during construction. Mail boxes shall be moved to temporary locations as designated by the US Postal Service. At the completion of the work in each area, the Contractor shall replace them in their original location and in a condition satisfactory to the US Postal Service.

NOT REVIEWED

The Contractor shall be liable for any damages which may result from failure to provide such reasonable access or failure to notify the appropriate authority.

106.8.00

Personal Safety

The Contractor shall be responsible for conditions of the job site, including safety of all persons and property during performance of the work. Contractor shall protect the project and materials from damage due to the nature of the work, the elements, carelessness of other contractors or from any cause whatever until the completion and acceptance of the project. Contractor shall be responsible for all loss or damages arising out of the nature of the work. This requirement will apply continuously and not be limited to normal work hours. Safety provisions shall conform to the applicable federal, state, county and local laws, ordinances and codes. Where any of these are in conflict, the more stringent requirement shall apply.

NOT REVIEWED

The duty of the City Engineer to conduct construction reviews of the Contractor's performance is not intended to include a review of the adequacy of the Contractor's safety measures in, on or near the construction site. If obvious safety concerns are not addressed, OSHA may be contracted to review on-site conditions.

NOT REVIEWED

REFERENCE SECTIONS 104.7.0, 104.13.00 AND 302.0.00 FOR NOTIFICATION OF RIGHT OF WAY CLOSURE, TRAFFIC MAINTENANCE AND TRAFFIC CONTROL PLAN (INCLUDING PED AND BIKE TRAFFIC) REQUIREMENTS.

106.9.00 **Detours**

The Contractor shall construct and maintain detours needed by work operations. The Contractor shall submit plans for such detours to City Engineer for approval.

The Contractor shall construct and maintain temporary detours to provide safe passage of public traffic and protection of the work at all times.

RECOMMEND DEFINING PUBLIC TRAFFIC TO INCLUDE VEHICLES, BIKES AND PEDESTRIANS.

The Contractor assumes full responsibility for detours within the limits of the project such as side street crossings, temporary bridges over freshly placed concrete, or utilization of one or more lanes of the construction area for maintenance of traffic.

The Contractor shall install, maintain, and/or remove detours or detour bridges when directed to do so by City Engineer. City may without notice to Contractor or Contractor's surety, provide, maintain, or remove the detour with the expense to be assessed to the permit fee.

106.10.00 **Labor**

Upon notification in writing from the City Engineer, the Contractor shall remove immediately from the job any laborer, worker, mechanic, foreperson, superintendent, or other person employed who is found to be incompetent, intemperate, troublesome, disorderly, or otherwise objectionable, or who fails or refuses to perform work properly and acceptably.

106.11.00 **Use of Explosives**

Blasting or use of explosives requires a Public Works Permit and is subject to all the laws, orders, provisions, and regulations of the City and any other governmental whose jurisdiction such work may be done.

NOT REVIEWED

106.12.00 **Railroad Crossings or Right-of-Way**

The Contractor shall submit a program of proposed operations whenever the project or work involves the crossing of a railroad or the encroachment on any railroad right-of-way. This program of proposed operations shall be approved by the appropriate railroad officials, ODOT Rail, and the City Engineer before the work is started within such area. The Contractor shall provide for services of flaggers and/or watchpersons required by the railroad company and shall provide and install piling, cribbing, bridges, tunnels, pipe casing and do



PUBLIC WORKS CONSTRUCTION CODE

CITY OF TUALATIN

ENGINEERING DIVISION

18880 S.W. MARTINAZZI AVENUE
TUALATIN, OR 97062-7092

NOVEMBER 2001

LATEST REVISION: APRIL 24, 2017

The selection and use of the enclosed specifications and standards, while in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a registered professional engineer.

REVISIONS SUMMARY

April 24, 2017 Revisions (Adopted under Resolution No. 5314-17)

Revised Specification Sections:

- Section 102.3.3 “Erosion Control Fees”
- Section 102.3.4 “Water Quality Fees”
- Section 203.2.01 “Design Speed”
- Section 312.5.00 “Sidewalk Repair”

Revised Standard Drawings:

- Commercial Driveway Approach – Curbside Planter Strip (Drawing No 440)
- Commercial Driveway Approach – Curbside Sidewalk (Drawing No 441)
- Residential Driveway Approach – Curbside Planter Strip (Drawing No 442)
- Residential Driveway Approach – Curbside Sidewalk (Drawing No 443)
- Curb and Gutter (Drawing No 470)
- Curb (Drawing No 471)

New Standard Drawings:

- Example Single Family Erosion & Sediment Control Site Plan (Drawing No 001)

Deleted Standard Drawings:

- Approach Private Driveway (Drawing No 444)

December 12, 2016 Revisions (Adopted under Resolution No. 5302-16)

Revised Specification Sections:

- Section 202.1.00 “Scope”
- Section 202.2.00 “Plan View”
- Section 203.2.02 “Sight Distance”
- Section 203.2.04 “Superelevation”
- Section 203.2.08 “Intersections”
- Section 203.2.11C “Accessways”
- Section 203.2.14 “Sidewalks”
- Section 203.2.15 “Curb Ramps”
- Section 203.2.24A “Design and Installation Requirements”
- Section 203.2.25 “Traffic Signs”
- Section 203.2.27 “Traffic Marking”
- Section 311.3.05 “Control Joints”
- Section 312.3.05 “Control Joints”
- Section 312.3.07 “Finish”

Revised Standard Drawings:

- ADA Ramp – General Notes (Drawing No 460)
- ADA Ramp – Perpendicular (Drawing No 461)
- ADA Ramp – Parallel (Drawing No 462)
- ADA Ramp – Midblock (Drawing No 463)
- Concrete Sidewalk (Drawing No 475)
- Street Sign Post (Drawing No 516)

New Standard Drawings:

- ADA Ramp – Details (Drawing No 464)
- Street Name Sign (Drawing No 517)

CHAPTER 200
DESIGN REQUIREMENT SPECIFICATIONS

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202.2.00 Plan View

Plan views must show the following:

- 1) Right-of-way, property lines, tract, permanent and temporary easement lines.
- 2) Subdivision name, lot numbers, street names, and other identifying labels. Street names are subject to the approval of the City.
- 3) Location and stationing of existing and proposed street centerlines and curb faces at a minimum of 100-foot intervals.
- 4) Horizontal alignment and curve data of street centerline and curb returns.
- 5) Public utilities and trees (8" in diameter and larger) in conflict with construction or operation of the street and drainage facilities. **NOT REVIEWED**
- 6) Location, stationing, and size of drainage and water quality facilities. Facility stationing must be located in relationship to the street stationing. Show drainage facilities both upstream and downstream of the project. Direction of drainage flows must be shown with arrows.
- 7) Match lines with sheet number references.
- 8) Top of curb elevations along curb returns and cul-de-sacs at quarter-points, PC and TL points, and at 100-foot stations.
- 9) Location of the low points of street grades and curb returns.
- 10) Curb ramp locations and designs including slopes, elevations and other dimensions necessary to construct curb ramps in accordance with PROWAG AND THE STANDARD DRAWINGS.
- 11) Crown lines along portions of streets transitioning from one type to another. **NOT REVIEWED**
- 12) Traffic control plan, including temporary and permanent striping and signing. **VEHICULAR, PEDESTRIAN AND BICYCLE**
- 13) Centerline stationing of all intersecting streets.
- 14) Location and description of existing survey monuments including, but not limited to, property corners, section corners, quarter corners, and donation land claim corners. **NOT REVIEWED**
- 15) Legend.
- 16) Permittee and developer's name, address, and phone number (including emergency after hours number).

202.3.00 Profile View

Profile view shall show the following:

- 1) Stationing, elevations, vertical curve data and slopes for centerline of streets or top of curbs. For offset or superelevation cross sections, both curbs shall be profiled. Where curbs are not to be constructed, centerline of street and ditch inverts shall be shown.
- 2) Original ground along the centerline and, if necessary, at the edges of the right-of-way if grade differences are significant.
- 3) Centerline of existing streets for a distance of at least three hundred (300) feet each way at intersections with proposed streets or project boundaries. Show original ground beyond existing streets for like distances.
- 4) Extension of the profile of streets that will be extended in the future (stub streets). The extended profile shall be at least two hundred (200) feet for local and minor streets and as required for streets with higher classifications and be designed to be compatible with the restraints of the terrain.
- 5) The top of curb elevation for all cul-de-sacs, eyebrows, and intersection curb returns.
- 6) All proposed and existing utilities, their types, all invert and top elevations, slopes, materials, bedding, and backfill.
- 7) Existing drainage and water quality facilities, including off-site facilities, upstream and downstream that affect the design (e.g. downstream restrictions that back water onto project site).
- 8) Profiles for ditch and creek flow lines shall extend a minimum of two hundred (200) feet beyond the project, both upstream and downstream. Typical cross sections at fifty (50) foot intervals shall also be submitted.
- 9) All existing and proposed sanitary, storm, water, gas, telephone, cable television, or other lines crossing the profile.
- 10) Anything else deemed **NOT REVIEWED** necessary by the City Engineer.

202.4.00 Site Grading Plan

A site grading plan shall be submitted showing existing and proposed elevations. Grading contours (existing and proposed) shall be at no more than two (2) foot intervals and shall extend off-site a minimum of 50 feet. Structural fill areas shall be "shaded".

ADD A REQUIREMENT TO PROVIDE DETAILED GRADING INFORMATION AT CURB RAMPS AND LANDINGS TO ENSURE THE DESIGN OF THE PROPOSED CURB RAMPS MEETS ADA REQUIREMENTS. IF RETROFIT CONDITIONS DO NOT ALLOW A CURB RAMP TO FULLY COMPLY WITH ADA REQUIREMENTS, REQUIRE THE PERMITEE TO SUBMIT DOCUMENTATION JUSTIFYING WHY OR HOW THE DESIGN OF CURB RAMP IS TO THE MAXIMUM EXTENT FEASIBLE.

45 mph or greater

$$L = S \times W$$

Where:

L = Minimum length of taper (feet)

S = Design speed (mph)

W = width of offset (feet)

Pavement markers and markings, as approved by the City Engineer and in accordance with the applicable sections of this chapter shall be installed to define the configuration. Maximum spacing of markers shall be the numerical value, **NOT REVIEWED**
speed, in feet [i.e., thirty-five (35) foot spacing for thirty-five (35) MPH].

203.2.04 Superelevation

Where superelevation is required as indicated by AASHTO guidelines, street curves should be designed for a maximum superelevation of 0.06 with appropriate transitions per AASHTO standards. Wherever possible, street design must conform to the standard street cross section.

Where superelevations coincide with crosswalks or pedestrian crossings, limit roadway cross section to **5% max** counter slope for **4 feet approaching curb ramp.**

REDUCE MAXIMUM DESIGN SLOPE TO ALLOW FOR CONSTRUCTION TOLERANCE SIMILAR TO THE MAX CROSS-SLOPE OF 1.5% FOR SIDEWALKS PER STANDARD DRAWING 475.

Horizontal Alignment

REDUCE CROSS-SLOPE OF ROADWAY TO BE LESS THAN 5% WITHIN ENTIRE WIDTH OF THE CROSS-WALK MARKED OR UNMARKED (INCLUDING THE ROADWAY IN FRONT OF THE CURB RAMP).

Alignments shall meet the following requirements:

- A. Streets shall be aligned horizontally to match existing street improvements and possible future street extensions.
- B. Horizontal curves in alignments shall meet the minimum centerline radius requirements of the most current edition of AASHTO based on the design speeds set forth in 203.2.01.

NOT REVIEWED

203.2.06 Vertical Alignment

Alignments shall meet the following requirements.

- A. Minimum tangent street gradients shall be one-half (0.5) percent along curb and gutter.
- B. Grades shall not exceed 12% on collector or arterial streets, or up to 15% on any other street.

INTERSECTION LANDINGS SHOULD BE DESIGNED TO ALLOW FOR CURB RAMP DESIGNS TO MEET PROWAG REQUIREMENTS ON ALL CORNERS OF THE INTERSECTION. INTERSECTION LANDINGS MAY NEED TO BE EXTENDED BEYOND 20 FEET IN ORDER TO ENSURE PROPOSED CURB RAMP THAT FULLY COMPLY WITH PROWAG CAN BE INSTALLED.

- C. Streets intersecting with a minor collector or greater functional classification street shall provide a landing averaging two (2) percent or less. Landings are that portion of the street within twenty (20) feet of the curb line of the intersecting street at full improvement.
- D. Grade changes of more than one percent shall be accomplished with vertical curves.
- E. Street grades, intersections and superelevation transitions shall be designed to not allow concentrations of stormwater to flow across the street.
- F. Off-set crowns shall be a minimum of 10.5-feet in width as measured from face of gutter.
- G. Streets not constructed to full urban standards shall be designed to match both the present and future vertical and horizontal alignments of any street which may be intersected. The requirements of this chapter shall be met for both present and future conditions.
- H. Vertical curves shall conform to the requirements of the most current edition of AASHTO.
- I. Slope easements shall be granted or obtained for the purposes of grading outside of the rights-of-way.
- J. Streets shall be aligned vertically to match existing street improvements and the topography of adjacent parcels for possible future street extensions.

203.2.07 Slope Design

All slopes shall be stable. Side slopes, both cut and fill, generally shall be no steeper than 3 (horizontal) : 1 (vertical). The City Engineer may approve steeper slopes where dictated by site constraints and allowed by geotechnical data and sound engineering practice.

203.2.08 Intersections

The following are the minimum requirements for intersections:

- A. The interior angle at intersecting streets must be kept as near to ninety (90) degrees as possible and in no case will it be less than seventy-five (75) degrees.

NOT REVIEWED

PER PROWAG R207.1, ONE CURB RAMP FOR EACH STREET CROSSING IS REQUIRED. A TYPICAL INTERSECTION WILL REQUIRE INSTALLATION OF TWO CURB RAMPS PER CORNER.

B. Minimum intersection spacing must be at least 100 ft., measured centerline to centerline.

C. Curb ramps must be provided at all corners of all intersections, regardless of curb type, and must conform to the Standard Drawings and Section 203.2.15.

D. Curb radii at intersections must be as shown in Table 203-1 for the various function classifications. The right-of-way radii at intersections must be sufficient to maintain at least the same right-of-way to curb spacing as the lower classified street.

TABLE 203-1

Street Classification	Curb Radii (feet)				
	<u>Edge of Pavement/Curb - Minimum</u>				
	Arterial Street	Major Collector Street	Minor Collector Street	Local Commercial Industrial	Local Residential Street
Expressway	55	40	30	35	25
Arterial	55	40	40	35	25
Major Collector	40	40	30	35	25
Minor Collector	30	30	30	35	25
Local Commercial Industrial					
Industrial	35	35	35	35	25
Local Residential	25	25	25	25	25

203.2.09 Cul-de-Sacs, Eyebrows, Turnarounds

The following specifies the minimum requirements for cul-de-sacs, eyebrows, and turnaround areas. Other turnaround geometrics may be used when conditions warrant and the City Engineer approves the design and application of its use.

- A. Cul-de-sacs, eyebrows and turnaround areas shall be allowed only on local residential and local commercial/industrial streets.
- B. Cul-de-sacs shall not be more than six hundred (600) feet in length. The length of a cul-de-sac shall be measured along the centerline of the roadway from the near side right-of-way of the nearest through traffic intersecting street to the radius point of the cul-de-sac bulb.
- C. The minimum curb radius for cul-de-sac bulbs shall be forty-five (45) feet and the right-of-way radius shall be sufficient to maintain the same right-of-way to curb spacing as the tangent section of street.

NOT REVIEWED

3. Where bike paths are separated from vehicular traffic, the minimum separation between a bike path and the edge of pavement of an adjacent roadway is 5-feet. When this is not possible a suitable physical divider may be constructed. The divider shall be designed with a minimum height of 4.5-feet and shall be approved by the City Engineer.

4. The standard vertical clearance to obstructions is 10-feet measured from the bike path and from the side graded area. When this standard is not practical, the City Engineer may approve a minimum of 8-feet vertical clearance with proper warning signage.

5. The maximum desirable grade of bike paths is 5% **NOT REVIEWED** excess of 5%, but no greater than 10%, may be acceptable where terrain dictates, where sight distance is adequate and as approved by the City Engineer. Where grades exceed 5%, the design speed and width shall be modified according to AASHTO "Guide for the Development of Bicycle Facilities".

6. Superelevation of bike paths shall be a minimum of 2% and a maximum of 5%.

7. Horizontal alignment and the minimum curve radius shall meet the design criteria in the AASHTO "Guide for the Development of Bicycle Facilities".

8. **Portland Cement Concrete (PCC) is required for construction of bike paths.** ← **CONFIRM PCC IS ONLY PAVEMENT TYPE ALLOWED FOR BIKE PATHS.**

9. Where illumination of bike paths is specified by the City, lighting shall be in conformance with the AASHTO "Guide for Development of Bicycle Facilities".

10. Electrical conduit with 2-inch diameter, and pull lines, shall be installed with maximum spacing of 200-feet between pull boxes or as otherwise specified by the City Engineer.

11. Sight distance shall meet the design criteria in the AASHTO "Guide for the Development of Bicycle Facilities".

12. Bike paths shall be separated from industrial areas or areas that present a hazard to bicyclists by means of fencing or impenetrable landscaping as may be specified by the City Engineer. **NOT REVIEWED**

13. Any design requirement not specified above shall be governed by the City's interpretation of the AASHTO "Guide for the Development of Bicycle Facilities" and "Oregon Bicycle and Pedestrian Plan".

14. A suitable storm drainage system for removal of surface water

shall be provided.

15. Landscaping and vegetation shall comply with TDC 72.060(2)(f) for bike paths within greenways and TDC 73.230 through 73.290, inclusive, for all other bike paths. TDC 71.064(2)(d) shall apply for areas in the Wetland Protection District.

203.2.11B Bike Lanes

1. Bike lanes shall be separated from a motor vehicle travel lane by an 8-inch wide white stripe. The common edge of the bike lane travel lane shall also be the centerline for the 8-inch wide bike lane stripe. **NOT REVIEWED**

2. Bike lanes shall be signed and marked as described in the most recent *Oregon Bicycle and Pedestrian Plan* and in the *Manual of Uniform Traffic Control Devices, with Oregon Supplement*, with final approval by the City Engineer.

3. Illumination of bike lanes shall be consistent with AASHTO's most recent *An Informational Guide for Roadway Lighting*.

4. Any design requirement not specified above shall be governed by the City's interpretation of the most recent AASHTO *Guide for the Development of Bicycle Facilities* and *Oregon Bicycle and Pedestrian Plan*.

203.2.11C Accessways

The following standards must be used when designing and constructing public accessways:

1. Public accessways must be designed and constructed in accordance with the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG)
2. Public accessways must be designed to comply with the TDC.
3. Accessways must be constructed of Portland Cement Concrete.
4. Materials and workmanship in the construction of accessways must conform to the standards used in construction of public sidewalks.

5. An accessway must be 8-feet in width inside an 8-foot wide tract dedicated to the City.

DOES AN 8-FOOT WIDE TRACT ALLOW CONSTRUCTION AND/OR FUTURE MAINTENANCE/REPLACEMENT OF AN 8' WIDE ACCESSWAY?

PEDESTRIAN PATHS ARE DEFINED AS IT'S OWN CATEGORY SEPARATE FROM AN OUTDOOR RECREATIONAL TRAIL IN SECTION 101.1.00.

WHAT IS THE WIDTH OF A HARD SURFACE TRAIL?

THIS WIDTH REQUIREMENT CONFLICTS WITH ITEM 4 BELOW WHICH REFERS TO THE "ACCESSIBILITY STANDARDS" LISTED IN TABLES 203-2A AND 203-2B.

203.2.11D Pedestrian Path Standards

The following standards shall be used when designing pedestrian paths:

1. **The width of soft surface recreation trails should be 6-feet.**
2. A minimum one foot zone on both sides of the path shall be maintained to provide horizontal clearance from trees, shrubs, and other obstructions.
3. Trees, vines and shrubs should be trimmed to provide a minimum vertical clearance of eight feet.
4. **Pedestrian paths shall meet the "Accessibility Standards" listed in Tables 203-2A and 203-2B.**
5. Trail construction should entail use of geotextile filter fabric, topped with a 5-inch base of 3/4-inch minus rock and a 3-inch surface layer of 1/4-inch minus crushed rock. Refer to the Greenway Development Plan for a concept drawing of this trail. Note: Other materials may also be used to achieve a stable and firm surface. Departures from the crushed rock standard by the use of other materials, designs, or technologies may be considered by the Parks and Recreation Department where it can be demonstrated that they will provide adequate access and durability given soil conditions and expected use.
6. **Portland Cement Concrete shall be used for outdoor recreation access routes in high use areas, as determined through development approval.**
7. **Use elevated boardwalks for paths through wetland areas. Boardwalks should be constructed of pressure treated Douglas fir or cedar. Planks must run perpendicular to the direction of travel and joints must be no more than 1/2-inch. Planks must be securely fastened so they do not warp and should be treated with an appropriate preservative to avoid decay and drying. Boardwalks shall be designed by a registered professional engineer. Refer to Greenway Development Plan for concept drawings of these structures.**
8. Minimize impact on natural areas. Balance cut and fill where possible along cross slopes to create a level trail surface.
9. Provide a 10-foot setback between the path and edge of wetland and creeks, unless otherwise approved by the City Engineer.

ITEM 4 CONFLICTS WITH ITEM 1 ABOVE.

RECOMMEND REFERENCING 2015 ABA STANDARDS WITH OUTDOOR DEVELOPED AREA PROVISIONS.

PEDESTRIAN PATHS ARE DEFINED AS IT'S OWN CATEGORY SEPARATE FROM AN OUTDOOR RECREATIONAL TRAIL IN SECTION 101.1.00.

IF AN OUTDOOR RECREATION ACCESS ROUTE IS PAVED, THEN PROWAG'S REQUIREMENTS FOR A PEDESTRIAN ACCESS ROUTE (OUTSIDE A ROADWAY) APPLY - NOT TABLE 203-2A.

REDUCE MAXIMUM OPENING SIZE BETWEEN PLANKS TO LESS THAN 1/2" TO ALLOW FOR CONSTRUCTION TOLERANCE SIMILAR TO THE MAX CROSS-SLOPE OF 1.5% FOR SIDEWALKS PER STANDARD DRAWING 475.

MAY WANT TO REFERENCE 2015 ABA STANDARDS WITH OUTDOOR DEVELOPED AREA PROVISIONS FOR BOARDWALKS.

RECOMMEND DELETING TABLE AND REFERENCING 2015 ABA STANDARDS WITH OUTDOOR DEVELOPED AREA PROVISIONS INSTEAD OF US FOREST SERVICE RECREATIONAL OPPORTUNITY SPECTRUM.

TABLE 203-2A

Outdoor Recreation Access Routes

The following table summarizes design parameters for outdoor recreation access routes in urban/rural and more natural settings. All trails within the Tualatin Greenway system should attempt to meet the "Easier" standard. However, unusual site constraints may justify shifting to the "Moderate" or "Difficult" standard. Design of the facility shall be in accordance with the standard designated by the Greenway Development Plan, or as part of development approval.

Summary of Design Standards for Recreation Access Routes:

Level of Development:

	Urban/Rural Easier	Roaded/Nat. Moderate	Semi-Primitive Difficult
Clear width (minimum):	48 inches	36 inches	36 inches
Sustained running grade (maximum): *	5 percent	5 percent	8.3 percent
Max. grade allowed: *	8.3 percent	10 percent	10 percent
For max. distance of:	30 feet	50 feet	50 feet
Cross slope (max.): **	3 percent	3 percent	3 percent
Passing space interval (maximum):	200 feet	300 feet	400 feet
Rest area interval (maximum):	400 feet	900 feet	1200 feet
Small level changes (maximum):	1/2 inch	1/2 inch	1 inch

* No more than 20% of the total length of the outdoor recreation access route shall exceed the maximum sustained running grade.

** The measurement of a maximum grade and cross slope should be made over a 30" measurement interval to correspond to the footprint of a wheelchair operating in that environment.

RECOMMEND DELETING TABLE AND REFERENCING 2015 ABA STANDARDS WITH OUTDOOR DEVELOPED AREA PROVISIONS INSTEAD OF US FOREST SERVICE RECREATIONAL OPPORTUNITY SPECTRUM.

TABLE 203-2B

Outdoor Recreation Trails

The following chart summarizes design parameters for outdoor recreation trails in urban/rural and more natural settings. All trails within the Tualatin Greenway system should attempt to meet the "Easier" standard. However, unusual site constraints may justify shifting to the "Moderate" or "Difficult" standard. Design of the facility shall be in accordance with the standard designated by the Greenway Development Plan, or as part of development approval.

Summary of Design Standards for Recreation Trails:

Level of Development:

	Urban/Rural Easier	Roaded Nat. Moderate	Semi-Primitive Difficult
Clear width (minimum):	48 inches	36 inches	28 inches
Sustained running slope* (maximum)	5 percent	8.3 percent	12.5 percent
Max. grade allowed**	10 percent	14 percent	20 percent
For a max. distance of:	30 feet	50 feet	50 feet
Cross slope (maximum.):**	3 percent	5 percent	8.3 percent
Passing space interval (maximum):	200 feet	300 feet	400 feet
Rest area interval (maximum):	400 feet	900 feet	1200 feet
Small level changes (maximum):	1/2-inch	2-inch	3-inch

* No more than 20% of the total trail length shall exceed the sustained running grade.

** The measurement of maximum grade and cross slope should be made over a 30" measurement interval to correspond to the footprint of a wheelchair operating in that environment.

RECOMMEND REFERENCING 2015 ABA STANDARDS WITH OUTDOOR DEVELOPED AREA PROVISIONS FOR EXCEPTIONS TO ACCESS ROUTE AND TRAIL REQUIREMENTS IN TABLES 203-2A AND 203-2B.

203.2.11E Exceptions

The following exceptions are allowed to Tables 203-2A and 203-2B are allowed:

1. Where the City Engineer determines that compliance with any of the standards would have such significant environmental impacts as to threaten or destroy the unique environmental, natural, geologic, cultural or religious character of the site, then the specific standard in question, and only that standard may be modified to meet the highest level of access practicable and feasible.

2. When it is determined in accordance with the procedures in ~~ADAAG 4.1.7(2)~~ that compliance with any of the standards would threaten or destroy the historic significance of a site, then the specific standard(s) in questions, and only that standard(s) may be modified to meet the highest level of access practicable.

3. When a trail is developed for a specific purpose, such as a challenging or rugged hike, and compliance with any of the standards would change the fundamental nature of that experience, then the specific standard(s) in question, and only that standard(s), may be modified to meet the highest level of access practicable and feasible.

Requests for exceptions shall include documented evidence that people with disabilities or their representatives were involved in the design process.

REFERENCE IS OUT OF DATE. UPDATE REFERENCE IF THIS SECTION ISN'T REVISED PER COMMENT ABOVE.

203.2.12 Private Streets

Private streets are not subject to the requirements in this document.

203.2.13 Driveways

RE-TITLE AS "DRIVEWAY APPROACHES" SINCE DRIVEWAYS ARE TYPICALLY LOCATED ON PRIVATE PROPERTY AND ARE NOT A PUBLIC WORKS PROJECT?

The following specifies the minimum requirements for driveways:

A. Driveways shall not be permitted on streets with existing or proposed non-access reserve strips or as set forth in the Tualatin Development Code.

B. **The widths and spacing requirements** shall conform to the requirements of the Tualatin Development Code, Section 73.400 and Standard Drawings 440-~~446~~. 443

DRIVEWAY WIDTHS AND SPACING REQUIREMENTS ARE NOT PROVIDED IN STANDARD DRAWINGS 440-443.

203.2.14 Sidewalks

The following specifies the requirements for sidewalks:

- A. Sidewalks must be designed and constructed in accordance with the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) **AND STANDARD DRAWING 475.**
- B. The location and width of the sidewalks must conform to the requirements of City's Transportation System Plan Street Design Standards in Table 3 and Figure 2 (pages 17 through 24), or as otherwise provided by the City Engineer. Location and width are relative to the centerline.
- C. Where existing clustered mailboxes, utility poles, fire hydrants, or other objects are within a sidewalk, the sidewalk must be widened or **meandered** to provide clearance equal to the required sidewalk width. Easements in the name of the City are required for sidewalks outside of the right-of-way.
- D. Where it is required to install sidewalks and a permanent sidewalk cannot be constructed, a temporary walkway may be constructed. The temporary walkway may consist of an asphaltic concrete or Portland Cement concrete to a width, location **and structure** approved by the City Engineer and meeting requirements of the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG).
- E. In the Town Center, the sidewalks must be 10-feet wide and, rather than a planter strip, must have tree wells. These wells must have a grate per Standard Drawing 514. These grates must be installed per manufacturers recommended specifications and additional details as identified by the Project Engineer.

AVOID INSTALLATION OF MEANDERED SIDEWALKS WHEREVER POSSIBLE WHILE MAINTAINING MINIMUM CLEARANCE REQUIREMENTS PER PROWAG.

AND STRUCTURE?? CONFIRM INTENT OF THIS SENTENCE.

203.2.15 Curb Ramps

Curb ramps must be designed and constructed in accordance with Standard Drawings 460-464. ~~Design and construct curb ramps in accordance with the~~ **AND THE** Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG). The City Engineer may approve engineered curb ramp designs provided they meet all requirements of the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) ~~may be used.~~

203.2.16 Right-of-Way and Grading

Grading outside the improved areas shall be as follows:

APPEARS TO CONFLICT WITH 1.5% CROSS-SLOPE REQUIREMENT FOR SIDEWALKS PER STANDARD DRAWING 475.

A. All streets functional classifications shall have a two (2) percent upward grading from back of curb through the right-of-way line, and within the public utility easement.

PARAGRAPH A IS REQUIRING A 2% SLOPE. RETAINING WALLS ARE TO BE A HEIGHT TO ALLOW A 66.7% SLOPE. CONFIRM INTENT OF PARAGRAPH B. RECOMMEND PROVIDING A STANDARD DRAWING TO DETAIL THESE REQUIREMENTS

B. Retaining walls shall be used if slopes are greater than the requirements in paragraph A. above. Retaining walls shall be constructed to a height where the slope is no more than one and one-half (1-1/2) horizontal to one (1) vertical. Retaining wall design shall be prepared by a registered engineer in the State of Oregon and approved by the City Engineer. Due consideration shall be given to ground water pressures in any retaining wall design. Retaining wall shall be located outside of the right-of-way unless otherwise approved by the City Engineer.

REMOVE OR COMPLETE SENTENCE.

C. Cross-slope of the street section shall be no less than two (2) percent and no greater than five (5) percent. Whenever possible, the crown of

CONFIRM MINIMUM DEPTH OF ROOT BARRIER. BIOBARRIER RECOMMENDS A DEPTH OF 19.5" FOR THEIR PRODUCT TO BE INSTALLED ADJACENT TO SIDEWALK AND CURB.

D. A root control system, such as Biobarrier or approved equal, shall be installed at both sides of the planter strip. It shall be installed vertically 12" deep from finished grade per manufacturers recommendation.

REDUCE MAXIMUM CROSS-SLOPE OF STREET SECTION TO ALLOW FOR CONSTRUCTION TOLERANCE SIMILAR TO THE MAX CROSS-SLOPE OF 1.5% FOR SIDEWALKS PER STANDARD DRAWING 475.

203.2.17 Subsurface Drainage

Subgrade drainage shall be provided for the purposes of collecting and conveying subsurface water only. The flow volume shall not be considered part of the storm drainage system for storm drain pipe sizing purposes unless the volume collected and conveyed is significant to warrant consideration during a design storm event.

Subgrade drains shall be provided:

NOT REVIEWED

1. On uphill sides of road cuts.
2. Transverse to the road centerline at the low point of sag vertical curves and at 300-foot intervals uphill thereafter.
3. At naturally occurring springs or other wet areas.

Subgrade drains shall be sloped to and connect into the storm drainage system at catch basins, manholes, roadside ditches or other suitable point of discharge. Storm water shall not be allowed to back up into the subgrade drains during design storm events.

203.2.18 Raised Medians

Where raised medians are constructed, the following criteria must be met:

ADD A REQUIREMENT TO PROVIDE PEDESTRIAN CROSSINGS THROUGH MEDIANS AT CROSSWALK LOCATIONS PER PROWAG R305.2.4. RECOMMEND CREATING A STANDARD DRAWING TO DETAIL THE CITY'S PREFERRED TYPE OF PEDESTRIAN CUT-THROUGH OF MEDIAN.

- A. The raised median shall be set back at least two (2) feet from the travel lane on both sides.
- B. Street lighting, painting, and reflective markers shall be sufficient to provide illumination and delineation of the raised median.
- C. Objects, such as trees, shrubs, signs, light poles, etc., shall not physically or visually interfere with vehicle or pedestrian traffic.
- D. The style and design of the raised median shall be site specific. The raised median shall be safe for the design speed, and shall be approved by the City Engineer.
- E. Landscape islands are not permitted in residential local streets.

203.2.19 Structural Section

Streets may be constructed of:

- A. Asphaltic concrete with **crushed rock base or treated bases.**
The minimum asphalt concrete and crushed rock sections shall be as follows:

<u>Street Classification</u>	<u>Min. Section</u>
Local Commercial Industrial Streets	4" A.C. 2" 3/4"-0 rock 10" 1 1/2"-0 rock
Local Residential Streets	3" A.C. 2" 3/4"-0 rock 6" 1 1/2"-0 rock
Collectors / Arterials / Expressway	Per asphalt pavement design for anticipated traffic loading

- B. Portland Cement concrete with **cushion course of crushed rock or on a base of crushed rock or treated base.**

Soil testing to obtain the strength of the soil is required to analyze and design the road structural section. Soil tests are needed on samples of the materials that are expected to be within three (3) feet of the planned subgrade elevation. A sample is needed for each five hundred (500) feet of roadway and visually observed soil type. A minimum of two tests are needed for each site.

REVISE WORDING TO USE TERMS TREATED SUBGRADE, BASE COURSE AND LEVELING COURSE AS DEFINED IN SECTIONS 305 AND 308.

CHANGE TO ROADS SINCE IT IS DEFINED AS A STRUCTURE INTENDED FOR VEHICLES WHILE STREETS ARE DEFINED TO INCLUDE ALL IMPROVEMENTS WITHIN THE PUBLIC RIGHT OF WAY PER SECTION 101.1.00.

NOT REVIEWED

maximum thickness of untreated aggregate base shall be four (4) inches. Design modulus of rupture (MR) shall be six hundred fifty (600) psi.

A higher value of modulus of rupture shall be allowed if adequately supported test data is submitted and approved by the City Engineer.

Use a forty (40) year design period.

203.2.23 Franchise Utilities

New utilities shall be located beneath the paved road surface or easements outside of right-of-way when required. On all phased improvements, the necessary utilities shall be stubbed across the paved surface to assure cuts are not necessary when the road is extended to its full width in a future phase.

NOT REVIEWED

Replacement or upgraded underground utilities that must be installed across an existing paved street shall be installed by methods which do not cut into the paved surface unless approved by the City.

Underground utilities shall be buried a minimum depth of thirty (30) inches as measured from finished grade to top of utility. To avoid the possibility of a conflicting utility, the franchise utility may be required to be placed deeper if required by the City

Engineer. Any utility proposed to be encased in concrete shall be installed at a depth and location determined by the City Engineer.

All trench excavation and backfill shall conform to the requirements of Section 220 Trench Excavation and Backfill.

UPDATE SECTION TO INCLUDE PEDESTRIAN SIGNAL REQUIREMENTS PER PROWAG SECTIONS R209, R306.2 AND R306.3.2 AND THE LATEST MUTCD MANUAL INCLUDING OREGON REVISIONS.

203.2.24 Traffic Signals

203.2.24A Design and Installation Requirements

Traffic signal installation must conform to the most current edition of the MUTCD.

NOT REVIEWED

203.2.24B Design Drawing Requirements

Traffic signal installation plans shall consist of the following separate sheets:

1. Construction plan (street), 1" = 20'

2. Signal wiring including electrical service, 1" = 20'
3. Underground detection plan, 1" = 20'
4. Sign and striping plan, 1" = 40'

203.2.24C Modification to General Specifications

Modification, or specific to general specifications are:

1. Specific micro processor prom program shall be the current version of W4IKS supplied with each controller, unless otherwise specified. **NOT REVIEWED**
2. Approved fire preemption devices shall be installed on all approaches to signal.
3. Traffic detection shall consist of magnetometer or preformed (State specifications) loops, as directed by the City Engineer.
4. The traffic signal design and installation shall provide for interconnection to other area signals (existing and proposed future signals).
5. The traffic signal design and installation shall provide for transit preemption.

203.2.25 Traffic Signs

Traffic signs must be furnished and erected in conformance with the most **current edition of the MUTCD and the Standard Specifications supplemented by the State of Oregon and/or modified as follows:**

Category A

Regulatory signs are classified in the following groups:

1. Right-of-way series
2. Speed series
3. Movement series
4. Pedestrian series
5. Miscellaneous series

CONFIRM WORDING OF THIS SENTENCE. SHOULD THIS READ AS "...CURRENT EDITION OF THE MUTCD SUPPLEMENTED BY THE STATE OF OREGON, PUBLIC WORKS CONSTRUCTION CODE AND STANDARD DRAWINGS AND/OR MODIFIED AS FOLLOWS:"?

NOT REVIEWED

Warning signs that may warrant the use due to hazards and typical locations are:

1. Changes in horizontal alignment
2. Intersections
3. Advance warning of control devices
4. Converging traffic lanes
5. Narrow roadways
6. Changes in highway design

- 7. Grades Roadway surface conditions
- 8. Railroad crossings
- 9. Entrances and crossings
- 10. Miscellaneous

Category C

School Areas:

- 1. School advance sign
- 2. School crossing sign
- 3. School bus stop ahead sign
- 4. School speed limit signs

NOT REVIEWED

Category D

Guide signs and street name signs

203.2.26 Street Name Signs

PROVIDE REFERENCE TO STANDARD DRAWING 516 FOR STREET SIGN POST AND SIGN INSTALLATION AND STANDARD DRAWING 517 FOR STREET NAME SIGNS.

In business districts and on major arterials, street name signs should be placed in diagonally opposite corners so that they will be on the right-hand side of the intersection for traffic on the minor street.

In residential districts, at least two street name signs will be mounted at each intersection.

On T-intersections, the street name signs will be designated at two locations. One street name sign being placed at the end of "T" inter placed at the right-hand corner of the intersecting street.

ARE CROSSWALK MARKINGS REQUIRED TO BE THERMOPLASTIC? ADD CROSSWALKS TO LIST. IF LADDER STYLE CROSSWALKS ARE REQUIRED, RECOMMEND THEY BE THERMOPLASTIC. PAINT WITH GLASS BEADS MAY NOT BE SLIP RESISTANT.

203.2.27 Traffic Marking

Traffic marking must be designed and installed in accordance with the most current edition of the MUTCD.

Paint is allowed for line striping only. All other pavement markings, including arrows, stop bars, bike lane symbols, railroad crossing legends, and word legends, must be pre-formed thermoplastic material.

203.2.28 Street Lights

Street lights shall be designed and installed in accordance with PGE (Option B) standards, and Table 203-3.

NOT REVIEWED

Street lighting plans shall be submitted to PGE for review and approval, with

RECOMMEND CLARIFYING TITLE
TO AVOID CONFUSION WITH
REQUIREMENTS FOR PEDESTRIAN
GUARDRAILS/GUARDS.

203.2.29 **VEHICULAR**
Guardrails

The following specifies the minimum requirements for the location and type of guardrails:

- ♦ The decision of whether to install a guardrail or not shall be based on information found in AASHTO publication, Guide for Selecting, Location and Designing Traffic Barriers.
- ♦ Guardrails shall be designed and constructed per QDOT's Standard Drawings for Design and Construction.

NOT REVIEWED

Fire systems shall be designed with a pressure based upon the lowest pressure that occurs in the summer during the peak-shaving period, rather than the higher winter pressures.

204.2.02 Location and Alignment

To allow for the logical extension of the overall system, completion of loops, and to minimize the impacts to existing improvements, water mains shall be determined by the City Engineer. **NOT REVIEWED**

Wherever possible, dead-ends shall be eliminated by looping into existing lines for improved hydraulic performance and redundancy, and shall be allowed only after receiving prior approval of the City Engineer. A blowoff assembly will be required on all dead-end lines.

Sampling stations shall be installed where directed by the City Engineer.

Mains shall be extended to the boundary for future developments.

SEE OUR COMMENTS ON STANDARD PLANS REGARDING PLACEMENT OF STRUCTURE OUTSIDE OF PEDESTRIAN PATH OF TRAVEL, SURFACE REQUIREMENTS, FLUSH WITH PAVEMENT, MAX JOINTING WIDTH AROUND STRUCTURE AND STABLE AND SLIP RESISTANT COVERS.

204.2.03 Valves

Valves will be located at intersections whenever possible. In general, sufficient valves should be provided to permit shutting down any section of line, not exceeding 800-feet, with valve operations at no more than three locations.

Butterfly valves shall be installed on pipe sizes 18-inches and larger, and gate valves shall be installed on pipes sizes 4-inches to 16-inches.

Mains extended to the property line or subdivision boundary for future extension shall be terminated with a mainline valve and blowoff assembly. Where permanent dead ends are installed, or low points exist, a blowoff assembly of appropriate size shall be provided to allow a minimum flow of 4-feet/second in the main line.

Air release valves shall be installed at all high points. Pressure reducing/pressure sustaining valves complete with SCADA equipment shall be installed at pressure level interfaces.

Valves shall be pressure rated with minimum of 150 psi to meet maximum pressures.

204.2.04 Fire Hydrant

REFERENCE STANDARD DRAWING 610 FOR PLACEMENT. SEE COMMENTS ON STANDARD DRAWING FOR REGARDING PROPOSED OFFSETS FROM SIDEWALKS.

Fire hydrants shall be located so that no part of any single-family residential building is greater than 400-feet from a hydrant, and such that no part of any commercial,

industrial, or multiple-family building is greater than 250-feet from a hydrant, both as measured along the most practicably accessible route by fire fighting equipment.

No fire hydrant shall be connected to mains less than 6-inches in diameter. A main supplying water to two or more fire hydrants shall be at least 8-inches in diameter.

NOT REVIEWED

Insofar as practical, all fire hydrants shall be located at street intersections to facilitate hose deployment by fire fighting equipment. Fire hydrant location shall be subject to City Engineer and Fire District approval, and shall be analyzed for minimum fire flow requirements at design peak flow demand during the summer peak-shaving period.

SEE OUR COMMENTS ON STANDARD PLANS REGARDING PLACEMENT OF STRUCTURE OUTSIDE OF PEDESTRIAN PATH OF TRAVEL, SURFACE REQUIREMENTS, FLUSH WITH PAVEMENT, MAX JOINTING WIDTH AROUND STRUCTURE AND STABLE AND SLIP RESISTANT COVERS.

204.3.00 Water Meters and Services

204.3.01 Size

Water meters and services shall be sized for maximum demand and approved by the City Engineer.

204.3.02 Vaults

Vaults shall be sized to meet the minimum requirements of the Standard Drawings.

All vaults shall be of precast concrete properly designed to carry anticipated soil pressures and traffic loading. The vault design and calculations are subject to review and approval by the City Engineer.

All vaults shall include the following:

- 1) A drain with a sump and pump discharge to daylight.
- 2) In high ground water areas, anchors to prevent uplift or floatation that may result from the buoyant forces of the ground water.
- 3) Backfill around vault is to be per manufacturer's specifications.
- 4) Standard Bilco door or equal.
- 5) An approved ladder if greater than 4'0" in depth, with entry through the vault chamber door.
- 6) A moisture-proof lighting fixture and wall mounted switch.
- 7) Installation on a compacted gravel base.

NOT REVIEWED

NOT REVIEWED

~~Whenever it is necessary for sanitary sewer and water lines to cross each other, the crossing should be at an angle of approximately 90 degrees. The shall be located 18-inches or more below the water line or be constructed of PVC pressure pipe per ASTM D2241 SDR 32.5 for a distance of 10-feet on both sides of the water line.~~

SEE OUR COMMENTS ON STANDARD PLANS REGARDING PLACEMENT OF STRUCTURE OUTSIDE OF PEDESTRIAN PATH OF TRAVEL, SURFACE REQUIREMENTS, FLUSH WITH PAVEMENT, MAX JOINTING WIDTH AROUND STRUCTURE AND STABLE AND SLIP RESISTANT COVERS.

205.2.08 Manholes

Manholes are mainly for the purpose of facilitating maintenance and access to the sewer line. Accordingly, manholes shall be located as follows unless otherwise approved by the City Engineer.

- 1) Every change in grade or alignment of sewer
- 2) Every point of change in size or elevation of sewer
- 3) Each intersection or junction of sewer
- 4) Upper end of all sewers, except as noted in Section 205.2.09
- 5) At intervals of 400-feet or less
- 6) 0.20-foot fall through manhole.

All manholes shall be a minimum of 48-inches in diameter and shall have a minimum 12-inch ledge in the base.

Location of steps and elevations of proposed inlets and outlets are required on the plan submittals.

All manholes located in the 100 year floodplain, creek areas, areas outside of the street right-of-way, and/or as directed by the City engineer, shall be equipped with water-tight covers and frames.

205.2.09 Cleanouts

~~Cleanouts shall be allowed only on pipe lines where the distance between the cleanout and a manhole is a maximum of 150-feet. The stand pipe shall be the same material and size as the pipe line.~~

NOT REVIEWED

~~Cleanouts may be temporarily installed within the right-of-way at the end of a stub street: (1) where the street is expected to be extended in the future; and (2) the design of the sewer system does not warrant a manhole be constructed at this location. The City Engineer will make the determination of when and where cleanouts will be allowed.~~

G) Pipe Cover. Storm drains shall be installed per CWS Design and Construction Standards June 2007, 5.06.7. Where this requirement cannot be met, the City Engineer may approve a lesser amount of cover, with the use of properly designed pipe material.

H) Headwalls. When headwalls are required, their design will be based on the ODOT Hydraulics Manual standards.

I) Access. Manholes shall be provided as specified in Section 206.6.00.

J) Rip rap. Where rip rap is required, the design of a rip rap outfall area will be approved by the City Engineer (see CWS Table 5-5). Place suitable geotextile fabric under and around the sides of riprap.

K) Pipe Material. Concrete, PVC, ductile iron, and aluminum spiral rib pipe materials are acceptable for the construction of public storm drain systems. All systems shall be designed for permanent loading and construction loading. Polymer type protective coatings may be required if the pipe is to be installed in possible aggressive soils or where cathodic protection is present.

NOT REVIEWED

206.5.00 Catch Basins

A) The catch basins for use within the City are the oversized gutter and curb inlet catch basin. The curb inlet catch basin (oversize) with alternate top (manhole frame and cover) shall be used in roadways with bike lanes.

B) All catch basins shall be constructed with an 18-inch minimum sump unless a part of a series catch basin system. A series catch basin system exists when a maximum of three unsumped catch basins are constructed in a row, a pollution control manhole, Standard Drawing No. 060, shall be installed at the point where three unsumped catch basins connect to a main storm line. Unsumped catch basins are not to be part of a main storm line. No ditch inlet may be part of a series catch basin system.

C) A main storm line shall not pass through a sumped catch basin or pollution control manhole.

D) The spacing between catch basins shall be as required hydraulically. Gutter flow shall not exceed 4" depth at the curb during a 25-year storm. Catch basins and gutter inlets shall be of sufficient size and number to accept the inflows without backing up water on the street during the 25-year storm event.

REMOVE THE TERM "HANDICAP" IN ALL DOCUMENTATION.
THIS TERM IS CONSIDERED OFFENSIVE.

E) Catch basins shall be provided on the tangent just prior to curb returns on streets and outside of the ~~handicap ramp~~ ADA CURB RAMP.

F) Catch basins shall be installed at the low point of all sag vertical curves in streets.

G) Catch basins may connect to a main storm line with a tee connector. **NOT REVIEWED** main storm line is at least one size larger than the catch basin line. When the catch basin line

is the same size as the main storm line, the connection shall be made at a manhole. The maximum length of pipe line between the catch basin and the main line shall be 60-feet.

H) Pavement tapers shall be required for

SEE OUR COMMENTS ON STANDARD PLANS REGARDING PLACEMENT OF STRUCTURES OUTSIDE OF PEDESTRIAN PATH OF TRAVEL, SURFACE REQUIREMENTS, FLUSH WITH PAVEMENT, MAX JOINTING WIDTH AROUND STRUCTURE AND STABLE AND SLIP RESISTANT COVERS.

206.6.00 Manhole

A) Manholes shall be provided at least every 400-feet (or as required for maintenance purposes), at every change in alignment, at every change in pipe size or material, and at every grade change unless otherwise approved by the City Engineer. A manhole shall be located at the upstream end of the pipe. Manholes shall not be closer than 5-feet to a curb line and not in a wheel path.

B) All manholes shall be a minimum of 48-inches in diameter. All manholes shall have a minimum 12-inch ledge in the base. Minimum wall distance between connecting pipes shall be 8-inches.

C) Elevations of the inlets and outlets will be required on the plan submittals.

D) Lateral storm sewers are allowed to be connected directly into the manhole base providing that they are properly channelized and approved by the City Engineer.

206.7.00 Pipe Stubouts/Adaptors

Install storm drainage laterals and adaptors to a maximum of one pipe length outside the manhole wall. Install stubouts integrally with manhole base and construct base channel for stubout.

Install a rubber gasketed water-tight plug in stubouts and secure the plug to withstand internal or external hydrostatic test pressures without leakage. Plugs shall not be grouted into place or otherwise secured by cast in place concrete.

NOT REVIEWED

206.8.00 Surface Water Quality / Detention Facilities

The Surface Water Management (SWM) Ordinance requires new development projects to construct permanent water quality facilities to remove 65% of the phosphorus from the storm water runoff from 100% of the newly constructed impervious surfaces. The facilities shall be designed to meet the removal efficiency for a mean summertime storm event totaling 0.36 inches of precipitation falling in four hours with an average return period of 96 hours.



PUBLIC WORKS CONSTRUCTION CODE

CITY OF TUALATIN

ENGINEERING DIVISION

18880 S.W. MARTINAZZI AVENUE
TUALATIN, OR 97062-7092

NOVEMBER 2001

LATEST REVISION: APRIL 24, 2017

The selection and use of the enclosed specifications and standards, while in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a registered professional engineer.

REVISIONS SUMMARY

April 24, 2017 Revisions (Adopted under Resolution No. 5314-17)

Revised Specification Sections:

- Section 102.3.3 “Erosion Control Fees”
- Section 102.3.4 “Water Quality Fees”
- Section 203.2.01 “Design Speed”
- Section 312.5.00 “Sidewalk Repair”

Revised Standard Drawings:

- Commercial Driveway Approach – Curbside Planter Strip (Drawing No 440)
- Commercial Driveway Approach – Curbside Sidewalk (Drawing No 441)
- Residential Driveway Approach – Curbside Planter Strip (Drawing No 442)
- Residential Driveway Approach – Curbside Sidewalk (Drawing No 443)
- Curb and Gutter (Drawing No 470)
- Curb (Drawing No 471)

New Standard Drawings:

- Example Single Family Erosion & Sediment Control Site Plan (Drawing No 001)

Deleted Standard Drawings:

- Approach Private Driveway (Drawing No 444)

December 12, 2016 Revisions (Adopted under Resolution No. 5302-16)

Revised Specification Sections:

- Section 202.1.00 “Scope”
- Section 202.2.00 “Plan View”
- Section 203.2.02 “Sight Distance”
- Section 203.2.04 “Superelevation”
- Section 203.2.08 “Intersections”
- Section 203.2.11C “Accessways”
- Section 203.2.14 “Sidewalks”
- Section 203.2.15 “Curb Ramps”
- Section 203.2.24A “Design and Installation Requirements”
- Section 203.2.25 “Traffic Signs”
- Section 203.2.27 “Traffic Marking”
- Section 311.3.05 “Control Joints”
- Section 312.3.05 “Control Joints”
- Section 312.3.07 “Finish”

Revised Standard Drawings:

- ADA Ramp – General Notes (Drawing No 460)
- ADA Ramp – Perpendicular (Drawing No 461)
- ADA Ramp – Parallel (Drawing No 462)
- ADA Ramp – Midblock (Drawing No 463)
- Concrete Sidewalk (Drawing No 475)
- Street Sign Post (Drawing No 516)

New Standard Drawings:

- ADA Ramp – Details (Drawing No 464)
- Street Name Sign (Drawing No 517)

CHAPTER 300

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302.0.00 TRAFFIC CONTROL

TRAFFIC CONTROL PLAN SHOULD INCLUDE PEDESTRIAN REROUTING, SIGNAGE, BARRIERS, ETC PER PROWAG AND MUTCD REQUIREMENTS. ADD SPECIFIC REFERENCE TO PEDESTRIANS IN REQUIREMENTS BELOW FOR CLARITY.

302.1.00 General

Prior to the issuance of the Permit, the Contractor shall provide to the City Engineer a proposed traffic control plan. The traffic control plan shall be prepared in accordance with this Code, and the ~~“2003~~ Manual of Uniform Traffic Control Devices” **FOR THE CITY'S REVIEW AND APPROVAL.**

The Contractor shall provide for the safe and proper routing of vehicular and pedestrian traffic in a manner that will minimize congestion and delay, and shall furnish, install, and maintain all construction signs and detour signs, temporary signs, temporary striping and pavement markings, lights, flares, barricades, cones, guard rail, runways, pavement, bridges, stairs, and other devices and facilities necessary to safeguard the general public and the work. Such devices and facilities shall be relocated as necessary to accomplish the proper routing of traffic as the work progresses and when no longer needed, shall be removed from the site of the work.

The Contractor shall conduct his/her operations with proper regard for the convenience of the public and shall not unnecessarily obstruct or discontinue any public street, way, sidewalk, or access to properties.

The Contractor shall notify the City Engineer, Fire Department, other Emergency Services, Police Department, appropriate School District, and Tri-Met before closing any street or portion of a street. No closing shall be made without the City Engineer's approval. Notify those departments when the streets are again passable for emergency vehicles. Do not block off emergency vehicle access to consecutive arterial crossings or dead-end streets without special written permission from the Fire Department. Conduct operations with the least interference to the fire equipment access, and at no time prevent such access.

The Contractor shall leave his/her night emergency telephone number or numbers with the City Engineer, Police Department, and Fire Department, so that contact may be made easily at all times in case of barricade and flare trouble or other emergencies.

302.2.00 Work Hour Restrictions

To reduce impacts on traffic and the public, all work on collectors and arterials (as defined and listed in the Tualatin Development Code) shall be subject to the following restrictions:

1. In non-residential areas, the work shall be performed between the hours of 7:00 p.m. and 5:00 a.m., unless otherwise approved by the City Engineer.
2. In residential areas, and areas of exception to 1. Above, no work that impedes traffic in any way will be allowed between the hours of 6:00 a.m. and 9:00 a.m. and between the hours of 3:00 p.m. and 6:00 p.m.

The City Engineer may revise, reduce, or extend the work hour restrictions, and apply restrictions to work in local streets, as necessary to reduce and minimize impacts to traffic.

The Contractor shall conduct its operations such that no work occurs during the restricted time periods. If at any time the Contractor's operations extend into the restricted time periods, all permit work shall immediately cease.

302.3.00 Project Information Signing

On all public works permit projects, including franchise utility projects, where the work duration will exceed one week, the Contractor shall provide and install project information signs.

The signs shall be a minimum of 48" x 60" and shall contain the following information:

Project: _____
Estimated Duration: ____ (Date) ____ to ____ (Date)
Project Owner: _____
Project Contractor: _____
For More Information Contact: ____ (name / phone #)

The signs shall consist of 4" to 6" black letters on a white background, and the signs shall be the product of a commercial sign manufacturer.

The Contractor shall prominently display the signs so that they are visible to the public with one sign facing each direction of traffic, as directed by the City Engineer. No project work will be allowed until the installation of the information signs is complete, and the Contractor shall maintain the signs through the duration of the project.

302.4.00 Maintenance Of Traffic

The Contractor shall not store, stockpile or place on a public street, way or sidewalk, any equipment, materials or supplies without first obtaining the authorization of the City Engineer and then only within the limits the City Engineer may designate.

ANY LAY DOWN AREA IN THE RIGHT-OF-WAY SHOULD BE SHOWN IN THE TRAFFIC CONTROL PLAN.

Those parts of public streets, ways and sidewalks that are occupied by the Contractor shall be immediately vacated by the Contractor and returned to public use when his/her use thereof is no longer necessary for the prosecution of the work.

The Contractor shall not impede, at any time, free access for vehicles and pedestrians to warehouses, offices, dwellings, garages and other properties in the vicinity of the work and on adjacent streets. The Contractor shall provide for local access by phasing operations,

bridging or employing other approved means, however, he/she may make special mutual arrangements with occupants and the City Engineer for temporary impediment of such access.

The Contractor shall maintain postal service facilities in accordance with the requirements of the U.S. Post Office Department. The Contractor shall move mailboxes to temporary locations designated by the Post Office Department, and at the completion of the work in each area, replace them in their original location and in a condition satisfactory to the U.S. Post Office Department.

302.5.00 Diversion Of Vehicular Traffic

PROVIDE REQUIREMENTS FOR REROUTING PEDESTRIANS PER PROWAG AND MUTCD.

When it becomes necessary to close one or more lanes to vehicular traffic or to otherwise divert such traffic from its normal paths, the Contractor, upon approval of the City Engineer, shall clearly delineate a temporary centerline separating two-way traffic, and dividing lines for other temporary traffic lanes, by employing cones, barricades, reflectors or other approved methods or devices. Placing of devices shall commence sufficiently in advance of the obstruction or other cause of the diverting of traffic, to minimize congestion and shall enable traffic to enter, traverse and leave the site of the work without abrupt or unwarranted changes in direction. The Contractor shall not place devices in the roadway until the City Engineer has approved the type of device and its location.

302.6.00 Use Of Construction Area Signs, Lights, Barricades, Delineators And Other Devices

Construction area signs, lights, barricades, delineators and other devices furnished by the Contractor for use ~~on an existing public travel way~~ shall be in accordance with the "~~2003~~ Manual of Uniform Traffic Control Devices" (MUTCD). Regulatory and construction signs shall conform to ~~OSHD~~ specifications and drawings. During the hours of darkness, approved lights shall be maintained in sufficient numbers, in proper working order, and locations to adequately alert approaching traffic.

IN THE RIGHT-OF-WAY

ODOT

VEHICULAR & PEDESTRIAN

All construction area signs shall conform to the dimensions, color, legend and reflectorization or lighting requirements of the plans, the ~~2003~~ MUTCD and ~~these special provisions~~ **THIS CODE.** All sign panels shall be the product of a commercial sign manufacturer, but used sign panels, in good repair as determined by the City Engineer, may be furnished.

Construction area signs shall not be used until needed and when no longer needed they shall be removed from the site of the work. The Contractor may be required to cover certain signs during the progress of the work.

Covers for construction area signs shall be of sufficient size and density to completely block out the message so that it is not visible either during the day or night and shall be securely fastened to prevent movement by wind action.

Signs damaged by any cause shall be repaired or, if determined by the City Engineer to be irreparable, replaced by the Contractor at the Contractor's expense. To properly provide for changing traffic conditions and damage caused by public traffic or otherwise, the Contractor shall be prepared to furnish on short notice additional construction sign panels, posts and mounting hardware or portable sign mounts. The Contractor shall maintain an inventory of the commonly required items at the job site or shall make arrangements with a supplier who is able, on a daily basis, to furnish such items on short notice.

Prior to starting work which will affect the normal flow of traffic, the Contractor shall furnish and install, wherever necessary or directed by the City Engineer, approved signs mounted on pedestals, posts, barricades or other supports which will orient the sign vertical and normal to the direction of traffic.

Barricades shall be furnished and maintained by the Contractor to channelize traffic in the normal path of travel or to direct traffic along a limited channel. Delineators include lane, edge and channelizing striping, raised pavement markers, various forms of posts, and cylindrical or cone shaped objects commonly known as delineators. Delineation for night time use must be reflectorized.

302.7.00 Relocation And Removal Of Existing Permanent Traffic Control And Other Signs

On projects, such as rechannelization and street widening work, where changes in traffic patterns require either relocation, removal or installation of permanent regulatory traffic control and other signs, the Contractor shall relocate, remove or install signs and standards shown on the plans, or directed by the Engineer.

For all existing permanent traffic control signs which are to be removed and not relocated, the Contractor shall remove signs, hardware and standards and place them where directed by the City Engineer. Any signs, standards or hardware damaged by the Contractor through his/her negligence shall be replaced by the Contractor, at no cost to the City.

Temporary relocation of each STOP or other traffic regulatory sign shall be done by the Contractor immediately upon its removal. The relocation of each sign shall be as close as possible to the original position of the sign or as directed by the City Engineer.

302.8.00 Use Of Flaggers

During the time of any approved temporary use of any part of the roadway where traffic must be directed through or around the work, the Contractor shall provide trained and properly equipped flaggers, whose sole duty shall be to assist the movement of traffic through or around the work, as applicable.

304.2.04 Foundation Stabilization

Foundation stabilization material shall be 4" minus or 1-1/2" minus crushed rock, well graded from coarse to fine, and free of clay or organic material. **NOT REVIEWED** geotextile may also be specified at the discretion of the City geotechnical Engineer or the designated representative.

304.3.00 Workmanship

304.3.01 Excavation

Excavation shall be carried to the lines and grades shown on the Plans and approved by the City Engineer. Special care shall be taken to not excavate below subgrade. Where the street has been excavated below subgrade due to faulty workmanship, it shall be brought to grade with base course material or other suitable material approved by the City Engineer. **AT CONTRACTOR'S EXPENSE.**

304.3.03 Embankment

304.3.03A Preparation of Embankment Foundations

Prior to construction of embankments, excavate unstable or unsuitable foundation material and dispose of as directed. Limit excavation to lines, grades, and cross sections shown on the Plans or approved by the City Engineer. Scarify, moisture condition and compact natural ground underlying embankments to the depth of grubbing or a minimum of 12-inches, to percentage density specified for the embankment material to be placed. The requirement to scarify and recompact the subgrade may be waived at the discretion of the City Engineer or the City Engineer's designated geotechnical representative on the basis of proof rolling, probing, or other ev **NOT REVIEWED** ground with slopes steeper than 5:1 (horizontal:vertical) bench into the existing slope "stair-step" fashion, approved by the City Engineer, to place the embankment material in relatively horizontal compacted lifts to prevent slippage at the embankment-existing slope interface.

304.3.03B Embankment Construction

Place embankments and fills of all kinds in approximately horizontal layers of a maximum of 8-inches in thickness and compact each layer separately and thoroughly to density specified.

In the immediate vicinity of curbs, walks, driveways, inlets, manholes and

308 BASE AND LEVELING COURSES

308.1.00 General

308.1.01 Scope

This section covers the material quality and work necessary for the construction of the base and leveling courses, including the gravel base under concrete sidewalks and ~~driveways~~, complete as shown on the plans and specified under these items.

DRIVEWAY
APPROACHES

308.1.02 Subgrade Approval

Base course work shall not start until subgrade preparation work has been completed and approved by the City Engineer.

308.2.00 Materials

IS CRUSHED GRAVEL ALLOWED AS
BASE COARSE OR LEVELING COARSE
IN ASPHALT INSTALLATIONS?

Aggregates for base and leveling coarse shall be **crushed gravel** or crushed rock conforming to the requirements contained herein.

308.2.01 Base and Leveling Course Rock

Base and leveling course rock shall conform to the following:

GRADING REQUIREMENTS

Sieve Size Passing	Base 1-1/2"	Leveling 3/4"
2"	100	
1-1/2"	95-100	
1"		100
3/4"	55- 75	90-100
3/8"		55- 75
1/4"	35- 50	40- 60
Fraction Pass 1/4"		
# 10	40- 60	40- 60

Where a tolerance range is set forth in the above grading requirements, the midpoint of the tolerance range is the target value and the product shall conform as closely as realistically possible to this target value. The purpose of the tolerance range is only to permit occasional minor variations from the target value that are, for

practical reasons, unavoidable. The determination of sizes and grading of aggregate shall conform to AASHTO T27.

LIQUID LIMIT AND PLASTICITY INDEX

Test	Test Method	Requirements
Liquid Limit	AASHTO T 89	N.P. or 33 max.*
Plasticity Index	AASHTO T 90	N.P. or 6 max.*

* When tested as specified, both the liquid limit and plasticity index test results shall conform to the following:

Percent of Material Passing # 40 Sieve	Liquid Limit (Max.)	Plasticity Index (Max.)
AASHTO T 90		
0.0 to 5.0, incl.	33	6
5.1 to 10.0, incl.	30	5
10.1 to 15.0, incl.	27	4
15.1 to 20.0, incl.	24	3
20.1 to 25.0, incl.	21	2
Over 25.0	21	0 or N.P.

CONFIRM WORDING - IS GRAVEL "ROUNDED ROCK"?

FRACTURE OF **ROUNDED ROCK**

CONFIRM REFERENCE.

Fracture of **rounded rock** will be determined according to **ODOT TM 213**.

Provide at least one mechanically fractured face based on the following percentage of particles retained on the 1/4" sieve for the designated size:

Designated Size	Minimum % of Fractured Particles (by mass) of Material Retained on 1/4" Sieve
1 1/2" – 0 and larger	50
Smaller than 1 1/2" – 0	70

DURABILITY

Base aggregate shall meet the following durability requirements:

Test	Test Method	Requirements
Abrasion	AASHTO T 96	30.0% Max.
Degradation (Coarse Aggregate):		
Passing 850µm sieve	ODOT TM 208	30.0% Max.
Sediment Height	ODOT TM 208	3.0" Max.

REVISED TO MATCH
WORDING USED IN NOTES IN
STANDARD DRAWING 475.

308.2.02

~~Gravel~~ **Base Under Sidewalks and Driveways**

ROCK

~~Gravel~~ base rock shall be the same as leveling course rock described in Section 308.2.01 above.

308.3.00 Workmanship

No rock shall be placed or compacted against concrete, curb or gutter, or other structures, until seven days after the concrete has been placed, and they have been backfilled to provide lateral support.

308.3.01 Base Course

Spread base course material on the prepared subgrade to such a depth that when thoroughly compacted it will conform to the grades and dimensions shown on the Plans, with proper allowance for the leveling course hereinafter specified. The base course shall be built up in layers, none of which shall exceed 6 inches in compacted thickness. Crushed rock shall be spread in an even course of uniform thickness from vehicles equipped with spreading devices. Segregation of material shall be avoided and the material as spread shall be free from pockets of large or fine material.

In general, the spreading shall begin at the end of the work farthest from the point of loading materials. The dumping of base course materials in piles upon the subgrade will not be permitted.

After the base course has been spread and brought to line and cross section, it shall be compacted with approved equipment to achieve a minimum of 91 percent of the maximum density when tested in accordance with AASHTO Standard T 180, , as determined by the City Engineer. Sufficient water shall be added as needed to facilitate the movement of key material into the voids. Remove all soft or otherwise unsuitable material disclosed by the proofrolling as directed and replace with an approved material as specified herein.

The surface of the base course shall parallel the cross section and grade established for the top of base course within 0.04 foot.

308.3.02 Leveling Course

Spread leveling course material on the completed base course to such a depth that when thoroughly compacted, it will conform to the grades and dimensions shown on the Plans with proper allowance for the finished pavement. The leveling course shall be bladed and rolled to a true surface and cross section. The finished surface of the leveling course shall not vary more than 0.02 foot above or below the specified cross section or grade at any **NOT REVIEWED** on and watering of the leveling

ASPHALT CEMENT CONCRETE PAVEMENT

309.1.00 General

309.1.01 Scope

CONSIDER ADDING THIS WORDING TO THIS PARAGRAPH:
WITH PRIOR APPROVAL FROM CITY ENGINEER AND/OR AT NO ADDITIONAL EXPENSE TO OWNER?

This work consists of constructing one or more courses of asphalt cement concrete pavement, plant mixed into a uniformly coated mass, hot laid on a prepared foundation, compacted to specified density and finished a specified smoothness to the lines, grades, thicknesses, and cross sections shown on the Plans or established by the City Engineer.

Asphalt concrete shall be a hot mixture of asphalt cement (HMAC); well graded, high quality aggregate; mineral filler and additives as required.

The Contractor may substitute warm mixed asphalt concrete (WMAC) where HMAC is called for.

Warm mixed asphalt concrete is an asphalt concrete mix following all requirements of HMAC, except that through use of additives or processes, it is mixed and placed at lower temperatures.

309.1.02 Prior Approval

Asphalt concrete work shall not start until base and leveling course work has been completed and approved and all underground utility tests (e.g. mandrel, pressure test, television inspection) have been completed and approved by the City Engineer. Repair or replace curbs prior to top/final lift.

309.2.00 Materials

309.2.01 New Aggregates

NOT REVIEWED

309.2.01A General

New aggregates shall be hard, sound, durable, and free of deleterious substances. No sandstone, shale, or other soft material will be allowed.

Prior to producing aggregates, the Contractor shall advise the City Engineer as to the type of bituminous mixing plant to be used and the size or sizes of coarse and fine aggregate to be produced. The supplier shall maintain current records of the test results at the plant and make them available to the

SPECIFY DESIGN
OR CITY ENGINEER.

SPECIFY DESIGN
OR CITY ENGINEER.

Engineer for information and use in the approval of mixtures. The Contractor shall modify or adjust crushing and screening operations as necessary to produce materials meeting the specifications. During production of aggregates, samples of each size shall be provided as frequently as the **Engineer** considers necessary to determine conformance to the specifications.

When treatment of aggregates with hydrated lime is required, all testing requirements will apply prior to treatment.

The aggregate shall be stockpiled and removed from stockpiles in a manner that will minimize segregation.

Provide and stockpile new aggregates and RAP aggregates according to the following requirements:

- (a) General - Produce and stockpile aggregate as follows: SPECIFY DESIGN OR CITY ENGINEER.
 - (1) Separated Sizes – Advise the **Engineer** of the separated size(s) of coarse and fine aggregate that will be used and the proposed targets for each individual sieve size for each stockpile. If the contractor wishes to produce coarse and fine aggregates in separated sizes other than those specified, request the proposed size changes in writing, and state the proposed target value and specified tolerance for each of the individual sieve sizes of the proposed materials.
 - (2) Scalping – Scalp the rock on a 3/4" sieve screen deck (after it has passed through the primary crusher if quarry rock is used). The material remaining may be accepted for use by visual inspection. The **Engineer** may perform verification testing of the gradation. The material shall meet the following: SPECIFY DESIGN OR CITY ENGINEER.

Table 1 - Scalping

<u>Sieve Size</u>	<u>Percent Passing (by Mass)</u>
8"	95-100
3/4"	5 Max.

NOT REVIEWED

309.2.01B Fracture of Gravel

A minimum of 75 percent of crushed gravel retained on the 1/4-inch sieve shall have two fractured faces. A minimum of 75 percent of the material passing the 1/4-inch sieve but retained on the #10 sieve shall have one fractured face. Testing for fracture shall conform to WAQCT TM 1.

309.2.01H Aggregate Treatment

When specified or directed, new aggregates shall be treated with lime in the following proportions to undergo an aging process.

Table 6 – Lime Treatment

<u>Separated Sizes</u>	<u>Percent Hydrated Lime (by Weight of Aggregate)</u>	<u>Tolerance (Percent)</u>
3/4"-1/4", 3/4"-1/2", 1/2"- 1/4"	0.35	+0.15
1/4"-0	1.5	+0.15
1/4"-#10	1.0	+0.15
#10-0	2.0	+0.15

Each size of aggregate shall be stockpiled separately. One of the following treatment procedures shall be used.

NOT REVIEWED

- 1) Dry Hydrated Lime Added to Wet Aggregates - At the time of mixing the aggregate and hydrated lime, the minimum moisture content of the coarse and fine aggregate shall be 2.5 percent and 5.0 percent, respectively. Hydrated lime, water, and aggregate shall be thoroughly mixed in a pug mill or other approved mechanical mixer and shall then be stockpiled. If the aggregate contains free water (water not adhering to the aggregate surface), the excess moisture shall be removed before adding hydrated lime. The mixed material shall remain in the stockpile for a minimum of 24 hours before being used in the production of asphalt concrete mixture.
- 2) Lime Slurry Added to Aggregates - The lime shall be added to the aggregate in the form of a slurry. The lime slurry shall contain a minimum of 70 percent water by weight. The slurry and aggregate shall be thoroughly mixed in a pug mill or other approved mechanical mixer and shall then be stockpiled. The mixed material shall remain in the stockpile for a minimum of 24 hours before being used in the production of asphalt concrete mixture.

309.2.02 Recycled Aggregates

Recycled material used in the asphalt concrete pavement shall have a maximum size of 1 inch prior to entering the cold feed. Any recycled material larger than 1 inch shall be separated by screening or broken down by mechanical means to pass a 1-inch sieve and reincorporated with the balance of the recycled material to form a mixture acceptable to the **Engineer**.

SPECIFY DESIGN
OR CITY ENGINEER.

309.2.03 Asphalt Concrete

Asphalt concrete pavement shall be Class B or Class C, as shown on the project plans conforming to and manufactured in accordance with the applicable provisions of this section. The asphalt cement shall be PG64-22.

309.2.04 Job Mix Formula (JMF)

The contractor shall submit a complete mix design with material and mix test results to the City Engineer at least 7 days prior to paving. Should a change in source of material be made or should conditions arise which the City Engineer determines to justify, a new complete mix design with associated material tests shall be submitted for approval by the City Engineer.

Class "B" and "C" asphalt concrete shall meet the following qualifying test requirements:

Table 7 – Qualifying Test Requirements

		Level 2	Level 3
Design Method:	Base	50 Blow Marshall	75 Blow Marshall/ Hveem or Superpave
	Wearing	50 Blow Marshall	Hveem
Air Voids %		4.0	Base 4.0 Wearing 4.0 – 4.5
VMA % Minimum		3/4" – 14.0	3/4" – 13.0 1/2" – 14.0
Pass #200/Effective AC Ratio		0.8 to 1.6	0.8 to 1.6
TSR % Minimum		80	80
VFA %		65-78	65-75
IRM _R		70	70

Prior to producing any asphalt concrete pavement, the Contractor shall use a job mix formula according to one of the following options.

309.2.04A Previously Approved

The job mix formula has been approved within the previous year by the City Engineer, for the material sources to be used.

309.2.04B Contractor Provided

The Contractor may submit to the City Engineer for approval, a mix formula developed by an approved laboratory. Upon written request, plant adjustments to the JMF to establish a new JMF without a new mix design may be approved within the following tolerances:

NOT REVIEWED

Table 8 – Allowable JMF Variation

Aggregate Passing Sieve Size	% from JMF
3/4"	±2
No. 10	±1
No. 200	±0.5

NOT REVIEWED

A new JMF is required if the asphalt cement grade, additives (if any), or the source of the aggregate or RAP, change during production.

309.2.05 Composition and Proportion of Mixtures

The class of asphalt concrete to be used shall be as shown and shall conform to the following requirements:

Table 9 – Composition and Proportions of Mixtures

Sieve Size Passing	Broadband Limits		
	Class "B"	Class "C"	Class "D"
1"	99 - 100		
3/4"	92 - 100	99 - 100	
1/2"	75 - 91	90 - 100	99 - 100
1/4"	50 - 70	52 - 80	85 - 100
No. 10	21 - 41	21 - 46	37 - 57
No. 40	6 - 24	8 - 25	13 - 29
No. 200*	2 - 7	3 - 8	4 - 9
Asphalt Cement**	4 - 8	4 - 8	4 - 8

ONLY CLASS "B" AND "C" ARE ALLOWED PER SECTION 309.2.03.

* Including Lime or Cement Filler.

** Percent of total mix by weight.

Aggregate proportions are given in percentages by weight.

309.2.06 Reclaimed Asphalt Pavement Material

The use of processed reclaimed asphalt pavement (RAP) material in the production of new asphalt concrete is optional. A maximum of 30 percent material will be allowed and the asphalt content when blended with new material shall provide properties equivalent to the asphalt specifications of this section.

NOT REVIEWED

The aggregates shall be hard, sound and durable and no larger than 1 inch before entering the cold feed. Blend the RAP material with new aggregate, asphalt and other constituents to provide a mix conforming to the job mix formula within the tolerances specified.

309.2.07 Tolerances

CONFIRM THESE TITLES - SHOULD THESE BE TITLED FINE AGGREGATE AND COURSE AGGREGATE FOR AGGREGATE IN THE JOB MIX FORMULA?

After the JMF is determined, the mixture shall conform to the formula within the following tolerances:

Table 10 – JMF Tolerances

Constituents of Mixture	Narrow Band Tolerance (from job mix formula)	
	Leveling Courses	Base and Surface Course
Aggregate passing 1", 3/4", and 1/2" sieves specified in subsection 309.2.03	Within the broadband ranges specified in subsection 309.2.03	
Aggregate passing 1/4" sieve	± 7.0%	± 6.0%
Aggregate passing #10 sieve	± 5.0%	± 4.0%
Aggregate passing #40 sieve	± 5.0%	± 4.0%
Aggregate passing #200 sieve	± 2.0%	± 2.0%
Asphalt cement	± 0.6%	± 0.5%
Moisture content at time of discharge from the mixing plant (upper limit)	0.6% max.	0.6% max.
RAP Material (if used in mixture)		±2.0%
Temperature of mixture, after adjustment, at the time placed in final position		±20°F
Temperature at mixer		325°F Max
Temperature behind paver		240°F Min

Compaction Density (lower limit):

- Normal Lift Pavement (asphalt concrete thickness 1 1/2" or greater) - 91 percent of the theoretical maximum density (AASHTO T 209). SPECIFY DESIGN OR CITY ENGINEER.
- Control Strip Method (asphalt concrete thickness less than 1 1/2" or at Engineer's discretion) - 98 percent of target density or 91 percent of theoretical maximum density, whichever is lower.

309.2.07A Modification of Mixes

The City Engineer reserves the right to modify specified mixes for use under various traffic conditions on various segments of the work and for feathering, spot patching, and other special purposes. The Contractor shall provide mixes proportioned as directed by the Engineer for such purposes.

NOT REVIEWED

Modifications of the mix as directed may require changes in the Contractor's plan and sequence of operations. Such changes shall be allowed for by the Contractor.

309.3.00 Workmanship

309.3.01 Reinforcing Fabric

SPECIFY DESIGN
OR CITY ENGINEER.

At the discretion of the **Engineer**, reinforcing fabric may be used as a remedial treatment to correct distress of existing pavement surfaces scheduled for Asphaltic Concrete overlay. Subsequent to this determination, reinforcing fabric shall be placed in the proper sequences of the paving operation over the designated areas.

The fabric shall be placed with equipment recommended by the fabric manufacturer and specifically designed for the purpose of laying pavement reinforcing fabric. The fabric shall be placed in an asphalt sealant without wrinkles prior to the asphalt sealant's cooling and loss of tackiness. The fabric shall be unrolled so that the bearded (fuzzy) side is down. Wrinkles ½-inch or larger in height and/or 3 inches or larger in length shall be split, laid flat, and additional tack coat applied to ensure fabric saturation.

The fabric shall be overlapped 4 to 6 inches at all joints. No joints shall be lapped with more than two (2) layers of fabric. Transverse joints shall be shingled in the direction of the paving to prevent edge pick-up by the paver. The paving operation shall closely follow fabric placement and no more fabric than can be covered up with the hot mix that working day shall be placed.

Utility covers, such as manhole lids and valve covers shall have the fabric neatly cut around to cover to allow for smooth transition of the cover to finish grade.

309.3.02 Hauling Equipment

Vehicles used for hauling asphalt concrete mixtures shall have tight, clean, and smooth metal beds equipped with covers.

Provide a 3/8-inch diameter hole near the middle of the left sidewall of the bed for temperature testing.

Coat the beds with a minimum amount of an approved material to prevent the mixture from adhering to the beds. Prior to loading, the vehicle bed shall be drained of all excess coating material by raising the truck bed, opening belly dump gates or operating the conveyor belt as appropriate.

Do not use diesel oil unless approved by the City Engineer. Its use will be terminated by the City Engineer if it is not being used as specified or is a source of contamination of the asphalt mix.

Vehicles which cause excessive segregation, which leak badly, or which the City Engineer has determined delay normal operations, shall not be used.

NOT REVIEWED

309.3.09A-2

Temperature

The surface of each layer and of each course shall be rolled when the mixture is in proper condition. All breakdown and intermediate compaction shall normally be performed while the temperature of the mixture is above 180°F.

For WMAC, complete breakdown and intermediate compaction before the WMAC temperature drops below the threshold recommended by the additive supplier or equipment manufacturer.

When the rolling causes undue tearing, displacement, cracking or shoving the Contractor shall, with approval of the City Engineer, make changes in compaction temperature, type of compaction equipment and/or rolling procedures necessary to achieve the applicable density requirements.

No additional compactive effort with rollers in the vibratory mode shall be undertaken when the temperature of the mixture has dropped below 180°F. Finish rolling shall continue until all roller marks are eliminated.

NOT REVIEWED

Unless otherwise directed by the City Engineer, compaction shall be completed before the temperature of the mixture has fallen below 180°F.

309.3.09A-3

Rollers

Rollers shall move at a slow but uniform speed with the drive rolls or wheels nearest the paver. Normally rolling shall begin at the sides and proceed longitudinally parallel to the road centerline, each trip overlapping one-half the roller width, gradually progressing to the center. On superelevated curves the rolling shall begin at the low side and progress to the high side, each trip overlapping one-half the roller width. When paving is in echelon or when abutting a previously placed lane, the longitudinal joint shall be rolled first followed by the regular rolling procedure. Rollers shall not make sharp turns on the course being compacted and they shall not be parked on the hot asphalt mixture. Alternate trips of a roller shall terminate in stops at least five feet distant longitudinally from adjacent preceding stops.

The type of rollers to be used and their relative position in the compaction sequence shall generally be the Contractor's option provided specified densities are attained **AND THE ROLLERS MEET THE EQUIPMENT REQUIREMENTS IN SECTION 309.3.04.**

Finish rolling shall be performed with tandem steel-wheeled rollers and shall continue until all roller marks are eliminated.

309.3.10 Density Requirements

NOT REVIEWED

309.3.10A Normal Lift Density Requirements

For a specified lift thickness of 1 1/2" or greater, the mixture shall be compacted to at least 91 percent of the theoretical maximum density as determined by AASHTO T 209.

309.03.10B Control Strip Density Requirements

SPECIFY DESIGN OR CITY ENGINEER.

For a specified thickness of less than 1 1/2", or at the **Engineer's** discretion, the asphalt concrete shall be compacted to 98% of the target density established by the control strip procedures described below, or compacted to 91% of the theoretical maximum density as determined by AASHTO T 209, whichever is the lower value.

Complete breakdown and intermediate compaction of each layer and each course by applying the established rolling procedure (pattern and equipment) before the temperature of the asphalt concrete has fallen below 180 degrees F, unless otherwise specified or directed by the **Engineer**.

SPECIFY DESIGN OR CITY ENGINEER.

Compaction shall be performed with steel-wheeled vibratory and/or pneumatic tired rollers. It is recommended at least one pneumatic-tired roller be used in the breakdown or intermediate compaction sequence.

At the beginning of the work on each course of pavement, construct a control strip at least 200 feet long that is:

- part of the roadway;
- placed to the specified width and thickness;
- composed of the same materials as the rest of that course;
- compacted with the same equipment as the rest of that course.

NOT REVIEWED

The control strip shall be compacted with at least four coverages by the rollers, excluding finish rolling. The density obtained during the compaction process will be monitored by testing the compacted surface with a nuclear gauge. Roller coverages shall be continued until the density tests indicate that maximum density has been achieved. Once maximum density has been achieved, five density tests will be taken at randomly selected sites within the control strip. The average of these five tests will be established as the Target Density. The equipment and roller pattern used to obtain the maximum density in the control strip shall be designated as the established rolling procedure and thereafter be used for compaction until a new procedure is established by another control strip.

A new control strip shall be constructed when:

- there is a new job mix formula;
- a change in equipment or roller pattern is proposed;
- a new lift of pavement is started;
- the **Engineer** determines that the target density being used is suspect.

SPECIFY DESIGN
OR CITY ENGINEER.

309.3.10C Modification of Compacting Requirements

On detours and in areas of restricted width or limited length where the City Engineer determines that it is impracticable to achieve compaction to a specified density, compaction shall be achieved in conformance with the following:

REQUIREMENTS FOR A STEEL-WHEELED ROLLER
IS ALREADY DEFINED IN SECTION 309.3.04A.

309.3.10C-1

Restricted Areas

Compacting of restricted width or limited length areas with sufficient width (normally 8 feet or more) shall be performed with a steel-wheeled roller **having a minimum gross static weight of 8 tons and a minimum static weight on the drive wheel of 250 pounds per inch width,** or with a pneumatic ~~tired~~ roller. The mixture shall be compacted with at least four coverages by the roller and such additional coverages as the City Engineer may elect.

309.3.10C-2

Irregular Areas

~~Along curbs and walls, on walks, irregular areas, and other areas not practicably accessible to specified rollers, the mixture shall be compacted with small self-propelled rollers, mechanical tampers, not hand tampers or heavy hand rollers. On depressed areas, a trench roller may be used or cleated compression strips may be used under the roller to transmit compression to the depressed area.~~

NOT REVIEWED

309.3.10C-3

Detours

On temporary detours, compaction shall be performed as set forth in **309.3.08B-1** above.

UPDATE REFERENCE

309.3.11 Quality Control/Quality Assurance

SPECIFY DESIGN
OR CITY ENGINEER.

The Contractor is responsible for process control and shall conduct sampling, testing, measurement and inspection as necessary. The **Engineer** will determine the suitability of the final product through final acceptance testing.

Results of these tests will be used to determine payment deductions, if any, to be assessed against the contract.

Compliance with the density requirements for pavement courses that have a nominal compacted thickness of 1-1/2 inches or greater will be determined by random testing of the compacted road surface with nuclear gauges, or laboratory analysis of pavement core samples by the City or its appointed representative.

NOT REVIEWED

The density of each section of pavement will be determined by random acceptance tests with the nuclear gauge operated in the backscatter or AC mode or laboratory analysis of pavement core samples. Acceptance tests will not be made within one foot from the edges of the panel or from areas where the nominal compacted thickness is less than 1-1/2 inches. Nuclear gauge density testing shall be performed after completion of the finish rolling the same day the section of pavement is placed. The Engineer shall have the right to test any areas that appear defective in compaction. If the areas are found deficient, the Engineer may require the contractor to bring the areas into conformance with the specifications.

SPECIFY DESIGN OR CITY ENGINEER.

SPECIFY DESIGN OR CITY ENGINEER.

309.3.11A Sampling

The samples shall be taken on a random basis at the rate of one sample per 500 tons of production or at least one sample per day of production but not from the first 25 tons of mix produced each day.

The samples shall be taken in accordance with AASHTO T 168. Samples shall be marked with the project name, class of mix, date and time of sampling, and the daily tonnage.

309.3.11B Testing

- 1) Testing to determine aggregate gradation and asphalt cement content shall be conducted for each sample of the mix. Testing shall be conducted in accordance with AASHTO T 308, "Determination of Asphalt Content of Hot Mix Asphalt Concrete Mixtures by the Ignition Method" (calibration in accordance with ODOT TM 323 with a 60 minute burn time).
- 2) Asphalt cement content shall be determined by the nuclear method in accordance with OSHD TM 319.
- 3) Testing to determine the theoretical maximum density of the mix shall be conducted on the initial sample of each day's production for work whose compaction is specified as

WHO TAKES SAMPLES?
WHO TESTS SAMPLES?
WHO PAYS?

a percentage of the theoretical maximum density. The theoretical maximum density test shall be conducted in accordance with AASHTO T 209.

309.3.11C

Test Results

Results of the testing through the last completed section of pavement will be made known to the Contractor as soon as possible, and indicated on the pavement, with a hard copy of the test furnished as soon as practical, if the Contractor so desires. It shall be the responsibility of the Contractor to obtain specified density at all times, and delay in advising the Contractor of test results shall not act as a waiver of this responsibility. When it is determined that specified density is not being obtained, all paving operations shall be discontinued and the work shall not be resumed until corrective measures have been taken.

309.3.11D

Corrective Actions

In areas with a density lower than 88.0%, remove and replace the deficient course. This work shall be completed within 10 working days following notification from the City Engineer that the pavement does not meet the specified density, unless otherwise directed by the City Engineer. Upon completion of the work, if the City Engineer finds it is still not satisfactory, the Contractor shall repeat the above.

AT CONTRACTOR'S EXPENSE.

309.3.12 Longitudinal Joints

309.3.12A Dropoffs

At the end of each working day, the Contractor shall construct a wedge of asphalt concrete at a slope of 10:1 or flatter along an exposed longitudinal joint. The wedge shall be removed and disposed of prior to continuing paving operations.

Where abrupt or sloped dropoffs occur within or at the edge of the paved surface, the Contractor shall provide suitable warning signs.

IT IS ASSUMED THAT THIS SECTION IS MEANT FOR VEHICULAR TRAVEL ON ASPHALT ROADS AND NOT PEDESTRIAN ROUTES ON ASPHALT PATHS. SLOPES FOR PEDESTRIAN PATHS OF TRAVEL THAT ARE OPEN TO THE PUBLIC SHALL MEET REQUIREMENTS IN PROWAG

309.3.12B Construction Joints

The mixture shall be laid in strips of such widths as to hold to a practical minimum the number of longitudinal joints required. Longitudinal joints in the wearing course shall not occur within the area or width of a traffic lane or auxiliary lane; and on median lanes and on shoulder areas such joints shall

workability and compaction requirements are attained. In no case shall the lay-down temperature of the mixture be less than 240°F.

For WMAC, the maximum temperature at the mixer shall be 275°F. The minimum temperature shall be 215°F.

NOT REVIEWED

309.3.15 Finishing and Details

Special care shall be taken at longitudinal joints to provide positive bond and to provide density and finish of the new mixture equal in all respects to the mixture against which it is placed.

Segregation of materials, non-uniform texture, fouled surfaces preventing full bond between successive spreads of mixture and other defects in material and workmanship, determined by the City Engineer as detrimental, shall be corrected by the Contractor as directed by the City Engineer. **AT THE CONTRACTOR'S EXPENSE.**

The plan of the work, order of paving and other details of performance shall meet with the approval of the City Engineer.

309.3.16 Pavement Smoothness

The Contractor shall furnish and operate a 12-foot straightedge or a 12-foot rolling straightedge and test parallel and perpendicular to the centerline. The City Engineer may observe this testing or may require additional testing to be done under his supervision. Areas not meeting surface tolerances shall be marked, and corrective action on the deficiencies, specified herein and approved by the City Engineer, shall be taken by the Contractor **AT THE CONTRACTOR'S EXPENSE.**

When tests show the pavement is not within the below tolerances, the Contractor shall take immediate action to correct equipment or procedures in his paving operation to eliminate further unacceptable pavement roughness **AT THE CONTRACTOR'S EXPENSE.**

309.3.16A Single Lift Construction

The pavement surface shall not vary by more than 0.02 feet.

309.3.16B Multiple Lift Construction

NOT REVIEWED

Where two or more lifts of pavement are being placed, the surface of the top lift of the asphalt concrete pavement shall not vary by more than 0.015 feet. The surface of base lifts shall not vary by more than 0.02 feet.

309.3.16C Utility Appurtenances

When utility appurtenances such as manhole covers are located in the traveled way and they cannot be adjusted during paving operation **NOT REVIEWED** required to be adjusted before paving, these tolerances will not apply.

These tolerances shall apply when water valve boxes and other utility appurtenances can be adjusted during paving operations.

309.3.16D Corrective Action

Corrective measures by the Contractor requiring one or more of the following actions approved by the City Engineer shall be performed on deficient areas: **AT THE CONTRACTOR'S EXPENSE.**

- (a) Remove and replace the surface course.
- (b) Grind the pavement surface up to a maximum depth of 0.3 inch and apply an emulsion fog seal coat as directed by the **Engineer**.
- (c) On coarse, open textured areas, apply "resurfacer" (produced by Special Asphalt Products, Inc., Portland, OR), or a like product, per the manufacturer's specifications.

SPECIFY DESIGN OR CITY ENGINEER.

All corrective work shall be completed within 10 working days following notification from the City Engineer that the pavement does not meet the specified tolerances, unless otherwise directed by the City Engineer.

After completion of the corrective work, if the City Engineer finds it is still not satisfactory, the Contractor shall perform additional corrective work on areas still not meeting the above tolerances. **AT THE CONTRACTOR'S EXPENSE.**

309.3.17 Pavement Samples

The City Engineer shall be permitted to take samples from the truck or paver, cut samples or take cores from the separate layers and courses or full depth of compacted mixture, for testing purposes at such locations and at such frequency **NOT REVIEWED** the City Engineer determines as required for proper representation. Where samples have been taken and when directed by the City Engineer, the Contractor shall furnish new like material and fill the holes as directed with no compensation beyond the unit price for asphalt concrete in place.

309.3.17A Pavement Thickness

SPECIFY DESIGN
OR CITY ENGINEER.

The **Engineer** will select locations for non-destructive measurement or core samples to determine pavement thickness.

SPECIFY DESIGN
OR CITY ENGINEER.

If non-destructive measurement indicates a pavement section is less than the thickness shown on the Plans, or is otherwise out of specification, the Contractor may take cores at the same location to verify the **Engineer's** measurements. If the pavement section is found to comply with the specifications, the coring and restoration will be paid for as extra work. Pavement found to be out of specification shall be subject to replacement or to payment adjusted prices.

SPECIFY DESIGN
OR CITY ENGINEER.

In determining deficient or excessive thickness in asphalt concrete overlays, the **Engineer** shall adjust the cross section measurement sequence, average series of measurements, or take other appropriate steps to allow for the desirable leveling of low or high areas on the existing pavement.

SPECIFY DESIGN
OR CITY ENGINEER.

Where a deficiency is found and the **Engineer** determines the deficiency serious enough to impair the traffic service expected from the pavement, the area of such deficiency shall be removed by the Contractor and shall be replaced with pavement meeting the specifications. The cost of the deficient pavement and of the removal shall be borne by the Contractor.

309.3.18 Special Protection Under Traffic

In addition to other required provisions for traffic, the following shall apply to pavement construction:

- (a) No traffic or equipment shall come in contact with the compacted mixture until it has cooled and set sufficiently to prevent marking.
- (b) Edges shall be protected from being broken down; and edge dropoffs 1" or more in height shall be marked with adequate warning devices and night to the traveling public.

NOT REVIEWED

309.3.19 Joint Seal Coat

Immediately after the new paving is compacted, all joints between new and original asphalt pavement shall be painted with hot asphalt or asphalt emulsion and be covered with dry paving sand before the asphalt solidifies. Width of joint seal coat shall be no less than 4-inches and no more than 6-inches.

310 PORTLAND CEMENT CONCRETE PAVEMENT

310.1.00 General

310.1.01 Scope

This work shall consist of constructing Portland cement concrete (P.C.C.) pavement, with or without metal reinforcement, composed of Portland cement, water, fine aggregate, coarse aggregate, and special purpose additives when required or permitted. The P.C.C. pavement shall be constructed on a prepared base in accordance with these specifications and in conformity to the lines, grade, thicknesses and cross sections shown on the plans or established by the City Engineer. P.C.C. paving construction shall be in accordance with these specifications, ACI 318 (Building Code Requirements for Structural Concrete) and ACI 325.9R (Guide for Construction of Concrete Pavements and Concrete Bases). All concrete, unless otherwise specified, shall be mixed and deposited in accordance with ASTM C 94 (Specifications for Ready-Mixed Concrete). Concrete placed during hot weather or cold weather shall be mixed, placed, cured, and tested in accordance with the recommendations of ACI 305R or ACI 306, respectively. When a conflict exists between various governing codes, the more stringent code requirement shall be followed.

NOT REVIEWED

310.1.02 Prepaving Conference

The Contractor and the Contractor's supervisory personnel, testing personnel, plus any subcontractors and their supervisory personnel who are to be involved in the P.C.C. paving work, including P.C.C. aggregate production, shall meet with the **Engineer** for a prepaving conference at a time mutually agreed upon. At this conference, the Contractor shall discuss his methods of accomplishing all phases of the paving work including placement methods, techniques, equipment, consolidation, fresh properties, finishing, curing, etc. The plan of the work, order of paving and other details of performance shall meet with the approval of the City Engineer.

SPECIFY DESIGN
OR CITY ENGINEER.

310.2.00 Materials

Materials shall meet the requirements of the applicable sections of the City of **Tualatin Public Works Construction Code, applicable provisions of ASTM as well as modifications and/or additions given in this Specification and the Special Provisions, Section 201.0.00.**

REVIEW WORDING FOR INTENT AND CONFIRM REFERENCES:
CONSTRUCTION CODE IS LISTED. "THIS SPECIFICATION" IS THE CONSTRUCTION CODE.
IS SECTION 201.0.00 SUPPOSED TO BE PART OF THE SPECIAL PROVISIONS OR IS THIS REFERRING TO CONSTRUCTION CODE SECTION 201.0.00?
CONSTRUCTION CODE SECTION 201 IS GENERAL PROVISIONS. DO YOU MEANT TO REFERENCE GENERAL PROVISIONS NOT SPECIAL PROVISIONS?

310.2.01 Portland Cement

The Portland cement shall be Type I, IA, II, IIA, III, or IIIA, conforming to the requirements of ASTM C 150 for low alkali cement (total equivalent alkali content not exceeding 0.6%, sodium and potassium oxide calculated as Na₂O + 0.658K₂O) and shall contain a maximum of 8% tricalcium aluminate (15% type III and IIIA). **NOT REVIEWED**

310.2.02 Aggregates

Aggregates shall conform to the requirements of Section 308.0-00 of the City of Tualatin Public Works Code, ASTM C 33 and the following:

CONSTRUCTION

310.2.02A Fine Aggregates

Must be graded coarse to fine within the following limits:

GRADING REQUIREMENTS

<u>Sieve Size</u>	<u>Passing</u>	<u>Percentages by Weight</u>
3/8"		100
# 4		95 - 100
# 8		80 - 100
# 16		50 - 85
# 30		25 - 60
# 50		10 - 30
# 100		2 - 10

NOT REVIEWED

Shall have a sand equivalent of not less than 68.

The fineness modulus as determined according to ASTM C136 shall not show a variation greater than 0.20 from the fineness modulus used in the Contractor's mix design, at the option of the City Engineer, who may accept a change in mix proportions, necessary by reason of such variation.

Equipment for dispensing water and admixtures shall provide a separate feed, accurate quantity measurement, and shall inject the water and admixture at the time in the mixing process to insure thorough and complete mixing throughout the batch of P.C.C.

Automatically controlled batchers shall have automatically interlocked mechanisms providing the following:

- 1) Positive weighing and discharge of cement, and of each separate size of aggregate.
- 2) Interlocking between weighing hoppers to prevent any part of the batch from being discharged until each separate hopper has been **NOT REVIEWED** correct proportion.
- 3) Simultaneous discharge of all hoppers.
- 4) A lockable compartment containing the time setting controls.

310.3.02 Mixers

Each mixer shall carry a clearly visible manufacturer's plate showing the capacity of the mixer and other pertinent operating rates and limits. Provision shall be made at the mixer for the controlled addition of air-entraining admixtures or other special components of the mix, when such items are required.

Central plant mixers shall be equipped with a timing device that will not permit the batch to be discharged until the specified mixing time has elapsed. **The means of storing, measuring and introducing water into the**

← COMPLETE SENTENCE

310.3.03 Handling, Measuring, and Batching of Materials

The plant site, layout, equipment, and provisions for transporting materials shall be adequate to assure a continuous supply of material to the work site.

The aggregate shall be stockpiled and removed from stockpiles in a manner that will hold segregation to a minimum. Aggregates from different sources and of different gradings shall not be stockpiled together.

NOT REVIEWED

Aggregates that become segregated or mixed with earth or foreign material shall not be used. Frozen aggregates or aggregates containing frozen lumps shall not be used.

The fine aggregate, each separated size of coarse aggregate, and cement shall be separately weighed into the hoppers in the respective amounts set by the mix design. A device to indicate positively that the full amount of cement was discharged

- 9) Time loaded or of first mixing of cement and aggregates
- 10) Water added by receiver
- 11) Type and brand, and amount of cement
- 12) Type and brand, and amount of admixtures
- 13) Information necessary to calculate the total mixing water added by the producer. Total mixing water includes free water on the aggregates, water, and ice batched at the plant, and water added by the truck operator from the mixer tank.
- 14) Maximum size of aggregate
- 15) Weights of fine and coarse aggregate

NOT REVIEWED

310.3.06 Hauling Equipment

P.C.C. may be transported in nonagitating equipment or truck mixers. Hauling equipment shall conform to the Truck Mixer Manufacturer's Bureau of the National Ready Mixed Concrete Association. If non-agitating hauling equipment is used, discharge should be completed within 45 minutes. If truck mixers are used, discharge should be completed within 90 minutes.

310.3.07 Paving Equipment

CHANGE TITLE - WHY IDENTIFY TWO SEPARATE MACHINES UNDER THE TITLE FOR ONE OF THESE MACHINES?

310.3.07A Slipform Paver

The P.C.C. shall be placed with two separate machines, one a spreader and one a slipform paver. The machines, when operating in tandem shall spread, consolidate, screed, and float-finish the freshly-placed P.C.C. in one pass with a minimum of hand finishing. Each machine shall be fully self-propelled and equipped with electronic controls to control line and grade from both sides.

The spreader shall be able to deliver the mix without segregation or displacing the reinforcing steel.

The slipform paver shall be able to vibrate the P.C.C. for the full width and depth of the P.C.C. being placed, and be equipped with vibrating tubes or arms to work in the P.C.C. The sliding forms shall be held together to prevent them from spreading. The form shall be long enough so that slumping of the P.C.C. will not exceed 1/4-inch, according to 310.3.14.

NOT REVIEWED

310.3.07B Bridge Deck Finisher/Paver

A bridge or similar finishing/paving machine may be used with the prior approval of the City Engineer, utilizing the previously constructed and cured

curb and gutter as side forms, and support for machine rails. Any damage or displacement to the curb or gutter shall be corrected by removal and replacement of the curb and gutter and/or P.C.C. pavement at the discretion of the City Engineer **AT THE CONTRACTOR'S EXPENSE.**

310.3.08 Concrete Saws

The Contractor shall provide power driven concrete saws for sawing joints, adequate in number of units and power to complete the sawing at the required rate. The saws and related equipment shall be of proven adequacy and design to perform efficiently and shall be subject to immediate replacement if the specified results are not obtained. A standby saw shall be available at the site.

IF YOU ARE GOING TO LIST CONCRETE SAWS, DO YOU NEED TO ADD A SECTION REQUIRING ALL FINISHING TOOLS?

310.3.09 Smoothness Testing Equipment

Two 12-foot straightedges for determining smoothness shall be supplied by the Contractor.

310.3.10 Weather Limitations

It will be the Contractor's responsibility to protect the pavement from weather damage, and placement of P.C.C. pavement shall not occur when a descending air temperature falls below 40°F, nor shall it resume until an ascending air temperature reaches 35°F. Air temperature shall be measured in the shade and away from artificial heat.

NOT REVIEWED

When P.C.C. is being placed during cold weather, or has been in place less than 7 days, and the air temperature is forecast to drop below 35°F, insulating materials shall be placed on the pavement deep enough to prevent freezing of the P.C.C. Any weather damaged P.C.C. shall be removed and replaced at the Contractor's expense. P.C.C. pavement shall not be placed on frozen bases.

Placing P.C.C. pavement during periods of rain will not be permitted. The Contractor shall protect the unhardened P.C.C. from precipitation with protective material.

During the hours of darkness, work areas shall be illuminated at the Contractor's expense to the satisfaction of the City Engineer.

SHOULD THIS BE A GENERAL REQUIREMENT FOR CONSTRUCTION WORK DURING THE HOURS OF DARKNESS AND NOT LIMITED TO CONCRETE PAVEMENT?

310.3.11 Preparation of Base

Before paving operations begin, the base on which the pavement is to be constructed shall be brought to the finished condition required by the ~~specifications.~~

PLANS AND STANDARD SPECIFICATIONS.

310.3.14 Placing Portland Cement Concrete

The P.C.C. shall be delivered from the hauling vehicles to the paving machine hopper. The Contractor's equipment hauling P.C.C. or reinforcement will not be permitted on the subgrade but will be allowed on the base, with turns or other maneuvering kept to a minimum. Any damage to the subgrade or base due to the Contractor's operations shall be corrected by the Contractor, at the Contractor's expense, to the satisfaction of the City Engineer.

The P.C.C. shall be placed in final position by the slipform or other approved method, uniformly in one layer, so that a minimum of finishing will be necessary to provide a dense, homogenous pavement conforming to true grade and cross section.

- 1) The spreader shall receive the P.C.C. mixture in its hopper and uniformly spread and strike it off at the proper thickness for the full width of the area being paved.
- 2) The paver shall vibrate, consolidate, and finish the slab to the proper grade and cross section.

NOT REVIEWED

The paver shall be operated with as nearly continuous forward movement as possible, and all operations of mixing, delivering, and spreading P.C.C. shall be coordinated to provide uniform progress. Stopping and starting the paver shall be held to an absolute minimum. If, for any reason, it is necessary to stop the forward motion of the paver, the vibratory and tamping elements shall also be stopped immediately. No external force shall be applied to the paver except with the approval of the City Engineer.

While placing P.C.C., provision shall be made for constructing joints, placing dowels, tie bars, and other devices as called for by the plans, as directed by the City Engineer, and as provided in 310.3.13.

P.C.C. shall be rejected if it:

- 3) Has exceeded the batch to discharge time requirements of ~~310.3.05~~, 310.3.06
- 4) Has begun to take an initial set prior to placement, or
- 5) Has been retempered with water.

CONFIRM REFERENCE TO SECTION ON HAULING EQUIPMENT.

Supports of the paver, and other equipment which ride on previously placed pavement which meets the requirements of 310.3.06, shall be equipped to prevent marring, edge breaking, or chipping of the previously placed pavement.

Hand spreading and distributing shall be with shovels, not rakes. The P.C.C. shall not be fouled with foreign matter. The Contractor shall furnish hand operated mechanical vibrators satisfactory to the City Engineer. These vibrators shall be used

NOT REVIEWED

EXPANSION JOINTS ARE NOT DEFINED OR MENTIONED ELSEWHERE IN THE CONSTRUCTION CODE. DEFINE EXPANSION JOINT IN SECTION 310.3.15.

to consolidate the P.C.C. pavement at least 6 feet each side of construction and expansion joints, or when using bridge finishing or other approved machines.

PER SECTION 310.3.15

310.3.15 Joints

Joints shall be the kinds called for by the plans and/or otherwise directed by the City Engineer. Joints in the P.C.C. pavement will be referred to as contraction or construction either of which may be transverse or longitudinal, as called for by the plans or as directed by the City Engineer. All joints and joint filler shall extend to pavement edges or to each other, as the case may be, and shall be constructed normal to the surface of the pavement. Joints shall not vary from specified or indicated line by more than 1/4-inch.

The Contractor shall submit to the City Engineer for approval, a jointing plan, 7-days prior to placement of any concrete street. The Contractor shall take into consideration the placement of joints in curb and gutter, at catch basins, and the position of manholes and other structures, as well as the other limitations herein mentioned.

Compensation for jointing and fillers shall be incidental to paving.

310.3.15A Contraction Joints

Contraction joints shall be of the sawed type with poured rubber-asphalt filler. Sawing shall be to a depth of 1/4 the thickness of the P.C.C. with a maximum width of 1/4-inch and a minimum width of 1/8-inch, in straight lines as shown or directed. Saw-cuts shall be performed as soon as the P.C.C. has set enough to permit sawing without tearing or raveling, before uncontrolled cracking results, and within 24-hours of placing the P.C.C. Saws may be single or tandem, as the Contractor may elect, and shall be controlled by guides to true line. The Contractor is wholly responsible for the timing of sawed concrete joints. The joints shall be thoroughly cleaned of all foreign matter before pouring the approved rubber-asphalt filler. The tops of joint filler shall be true to pavement cross section within 1/8-inch and shall be protected from damage by P.C.C. operations. Any area containing uncontrolled cracks shall be removed and replaced by the Contractor, at the Contractor's expense, at the direction of the City Engineer. Curing agents broken or damaged by the sawing operations shall be restored.

Longitudinal joints shall be spaced as shown on the plans at the interface between lanes, normally at intervals between 10 to 14-feet.

Transverse joints shall be skewed (except at intersections) as shown on the plans or as approved by the City Engineer, with intervals of 12 to 15-feet. A transverse type joint shall also be placed radial to and at the 1/2-angle point of a curb return, extended to meet a transverse or longitudinal contraction joint.

NOT REVIEWED

SPECIFY DESIGN
OR CITY ENGINEER.

presence of the **Engineer**. The surface shall be free from laitance, soupy mortar, marks, or irregularities.

- 4) The surface shall be finished as set forth in ~~310.3.14~~. 310.3.16.

Any areas of minor honeycomb or other minor defect in composition of the P.C.C. along the exposed edges of P.C.C. shall be filled with a stiff mortar of cement and fine aggregate and applied to the moistened P.C.C. to the satisfaction of the **Engineer**. Areas showing serious defects in composition of the concrete shall be removed and replaced with pavement of specified quality for full width of strip between longitudinal joints or edges and for a length not less than between the nearest transverse joints **AT THE CONTRACTOR'S EXPENSE**.

SPECIFY DESIGN
OR CITY ENGINEER.

310.3.18 Curing of Portland Cement Concrete

Concrete (other than high-early-strength) shall be maintained above 50°F and in a moist condition for at least the first 7 days after placement. High-early-strength concrete shall be maintained above 50°F and in a moist condition for at least the first 3 days after placement.

DOES THIS CONFLICT WITH THE AIR TEMPERATURE REQUIREMENTS FOR POURING IN SECTION 310.3.10? OR IS THE CONTRACTOR REQUIRED TO PROVIDE EQUIPMENT/PROTECTION TO MAINTAIN THE TEMPERATURE OF THE CONCRETE ABOVE 50 DEGREES? WHO PAYS FOR THIS POTENTIAL EFFORT?

Immediately after the finishing operations have been completed and the water evaporated from the surface or as soon as marring of the concrete will not mar the entire surface of the newly placed concrete should be covered and cured for 72 hours in accordance with one of the following methods:

a) Membrane curing – Immediately after the water film has disappeared from the surface of the pavement, the surface should be uniformly coated with liquid membrane curing material conforming to ASTM C 309 (type 2 white pigmented curing compound) by a suitable means of an approved mechanical spray machine at the rate of not less than 1 gal. Per 150 ft² of surface (one L per 2 m²), or as recommended by the manufacturer. To insure uniform consistency and dispersion of the pigment in the curing material, it should be agitated in the supply container immediately before transfer to the distributor and kept thoroughly agitated during application.

NOT REVIEWED

Irregular areas or sections of pavement where the use of a mechanical spraying machine is impracticable may be sprayed with approved hand spraying equipment. The sides of the pavement slab should be coated within 60 minutes after the removal of forms. Any areas of the coating which are damaged within the specified curing period should be immediately repaired.

- b) Mono-molecular coatings – This type of membrane coating material may be desirable under adverse drying construction conditions to retard surface evaporation. This is not a substitute for curing.
- c) Cotton mats or burlap – The surface and edges of the pavement should

condition as long as they may be required. Leaving gaps in the pavement to facilitate movement of traffic will not be allowed unless prior written permission is obtained from the City Engineer.

NOT REVIEWED

All joints that have been constructed in the concrete surface shall be protected from impact and the infiltration of foreign matter before the installation of joint filler, in a manner satisfactory to the City Engineer.

The Contractor shall not operate construction equipment or allow traffic on newly placed P.C.C. until the following requirements are met:

- 1) The joints have been filled as per ~~310.3.13~~ 310.3.15.
- 2) The concrete shall have attained a compressive strength of at least 4,000 pounds per square inch (corrected f_c as per 310.2.07) ← CONFIRM SECTION
- 3) The concrete shall have been in place at least 14 days. ← SPECIFY DESIGN OR CITY ENGINEER.

If the Contractor desires to allow traffic on the P.C.C. before 14 days have elapsed, but no earlier than 7 days, the Contractor shall have requested the Engineer prior to pouring the pavement that the City designated test facility retrieve sufficient material for an extra five compressive strength tests for each 1,500 square yard increment in pavement, which extra cost shall be paid to the City by the Contractor.

4) The surface of the concrete shall be protected from scarring or abrasion and shall be free of stones, loose mortar and other matter apt to be deleterious to the concrete in the paths of equipment. All equipment shall be operated without damage to the new concrete.

Any part of the pavement damaged by traffic or damaged from any other cause, prior to its official acceptance, shall be repaired or replaced by the Contractor, at the Contractor's expense, to the satisfaction of the Engineer. ← SPECIFY DESIGN OR CITY ENGINEER.

310.4.00 Quality Assurance

← WHO TAKES SAMPLES?
← WHO TESTS SAMPLES?
← WHO PAYS?

Samples for flexural strength tests of each class of concrete placed each day shall be taken not less than once a day. Flexural strength tests shall consist of one set of four laboratory-cured specimens with one seven-day break, two twenty-eight day breaks and one sample to be retained as a hold specimen. Samples for flexural strength tests shall be taken in accordance with ASTM C 172. Beams shall be molded and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 78. The strength level of an individual class of concrete shall be considered satisfactory if both the following requirements are met:

- (a) Every arithmetic average of any three consecutive flexural strength tests equals or exceeds the specified modulus of rupture;
- (b) No individual flexural strength test (average of two beams) falls below the specified modulus of rupture by 75 psi.

NOT REVIEWED

WHO TAKES SAMPLES?
WHO TESTS SAMPLES?
WHO PAYS?

In addition, samples for compressive strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 100 yd³ of concrete. Compressive strength tests shall consist of one set of four laboratory-cured specimens with one seven-day break, two twenty-eight day breaks and one sample to be retained as a hold specimen. Samples for compressive strength tests shall be taken in accordance with ASTM C 172. Cylinders for strength tests shall be molded and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39. The strength level of an individual class of concrete shall be considered satisfactory if both the following requirements are met:

- (a) Every arithmetic average of any three consecutive compressive strength tests equals or exceeds $f'c$;
- (b) No individual compressive strength test (average of two cylinders) falls below $f'c$ by more than 500 psi.

Slump (test method ASTM C 143), air content (test method ASTM C 138, C 1730, or C 231) and temperature tests shall be taken when strength specimens are made and at the option of the inspector as often as is necessary for control checks.

BY WHO?

AT THE CONTRACTOR'S
EXPENSE

Prior to concreting, compliance of the reinforcing steel placement with the contract documents shall be verified. The inspector shall be present continuously during concrete placement. The inspection agency shall promptly notify the contractor and the Engineer of observed irregularities or deficiencies of work or products.

SPECIFY DESIGN
OR CITY ENGINEER.

311 CONCRETE CURB AND GUTTER/STANDARD CURB

311.1.00 General

311.1.01 Scope

This section covers the work necessary for the construction of curb and gutter, and standard curb including, but not limited to: furnishing materials; forming, mixing, placing and curing all concrete; placing construction joints; finishing concrete as specified; backfill behind the curbs; and cleanup. References herein to curbs shall also be deemed to mean curb and gutter. Concrete construction shall be in accordance with these specifications and ACI 318 (Building Code Requirements for Structural Concrete). All concrete unless specified, shall be mixed and deposited in accordance with ASTM C 94 (Specifications for Ready-Mixed Concrete). When a conflict exists between various governing codes, the more stringent code requirement shall be followed.

311.2.00 Materials

311.2.01 Concrete

SPECIFY DESIGN
OR CITY ENGINEER.

Mix design shall be submitted to the **Engineer** a minimum of 7 calendar days prior to placement of concrete for approval. Concrete shall have a minimum compressive strength of 3300 psi, 28 days after placement. An air-entraining admixture shall be used. It shall be added to the mixer at the time of mixing in such a manner as to insure uniform distribution of the admixture throughout the batch. Entrained air (percent of volume) range shall be 4 percent to 7 percent (ASTM C 138, C 173 or C 231). The maximum water/cement ratio shall be 0.52 and the slump shall be a maximum of 5 inches. Concrete aggregates shall conform to ASTM C 33 requirements.

311.2.02 Forms

Prefabricated steel forms may be used. Lumber used in forms shall be of 2-inch material free from loose knots or other defects. Forms shall be thoroughly cleaned before being reused. Reuse of forms and form lumber will be permitted only when their condition is approved by the City Engineer.

311.2.03 Curing Compound

Liquid curing compound shall meet the requirements of ASTM C 309, Type 2, white pigmented.

311.2.04 Polyvinyl Chloride Pipe

Pipe shall conform to ASTM D 1785, Schedule 40.

NOT REVIEWED

311.3.00 Workmanship

311.3.01 Excavation

Excavation shall be done in conjunction with the excavation of the street. Any portion of the curb subgrade excavated below grade shall be corrected with compacted leveling ~~base~~ rock conforming to Section 308.0-0. **AT THE CONTRACTOR'S EXPENSE.**
COURSE

311.3.02 Extruded Curb

PROVIDE A STANDARD DRAWING FOR EXTRUDED CURB. STANDARD DRAWINGS 470 & 471 SHOW CURB & GUTTER AND CURB. WHERE IS EXTRUDED CURB TO BE USED?

The machine for extruding Portland cement concrete curb shall be of the self-propelled type equipped with a material hopper, distributing screw, and adjustable curb forming devices capable of placing and consolidating Portland cement concrete or asphalt concrete to the lines, grades and cross section as shown, in an even homogeneous manner. Portland cement concrete curb shall be free of honeycomb.

Set top of curb grade by an offset guide line. The forming tube portion of the extrusion machine shall be readily adjustable vertically during the forward motion of the machine to provide, when necessary, a variable height of curb conforming to the predetermined curb grade. A grade line gauge or pointer shall be attached to the machine in such a manner that a continual comparison can be made between the curb being placed and established curb grade as indicated by the offset guide line.

In lieu of the above method for maintaining the curb grade, the extrusion machine may be operated on approved rails or forms set at the proper relative grade.

Prior to placing the curb on Portland cement or asphaltic concrete, **NOT REVIEWED** the pavement shall be dry and cleaned of loose and deleterious material. Immediately after cleaning the pavement surface, an epoxy bonding agent meeting the requirements of ASTM C 881, shall be applied to the pavement which will bind the extruded curb to the pavement surface.

311.3.03 Forms

Forms shall conform to the shape, lines, grades, and dimensions shown on the Plans. Inside of forms shall be coated with a light, non-staining form oil. Forms shall be braced and supported to permit thorough tamping of the concrete.

311.3.04 Drainage Pipe

NOT REVIEWED

Polyvinyl Chloride (PVC) pipe, of 3-inch diameter shall be installed 1/2-inch above the invert of the gutter, at positions shown on the plans or determined by the City Engineer.

ADD A SECTION DEFINING CONSTRUCTION JOINTS IN COORDINATION WITH NOTE 3 ON STANDARD DRAWINGS 470 & 471 AND SECTION 311.3.06 BELOW.

311.3.05 Control Joints

AND AT POINTS OF TANGENCY.

Place control joints in curbs, at intervals not exceeding 15 feet. Control joints must be of the open joint type and must be provided by inserting a thin, oiled steel sheet vertically in the fresh concrete to force coarse aggregate away from the joint. The steel sheet must be inserted one-half the depth of the curb. After initial set has occurred in the concrete and prior to removing the front curb form, the steel sheet must be removed with a sawing motion.

311.3.06 Concrete Placement

Before depositing concrete, work crews and all equipment and tools shall be on the job site, all forms, string lines and base shall be in place and approved by the City Engineer, all debris shall be removed from the space to be occupied by the concrete, and the subgrade shall not be frozen. The base shall be thoroughly wetted, but no pools of water will be permitted.

Concrete shall be deposited in its proper place without delay in a continuous operation. An interval of more than 45 minutes between any two consecutive batches or loads, or a placing rate of less than 8 cubic yards of concrete per hour, shall constitute cause for a **construction joint** at the location and of the type directed by the City Engineer in the concrete already placed.

In hot weather, concrete in place shall be protected until final finishing can be completed. With a hot dry breeze, windbreaks may be erected, or fog nozzles may be used. Curing operation should begin as soon as concrete has set enough to avoid surface damage.

Placing concrete during periods of rain will not be permitted. If concrete has been placed and rain commences, it shall be protected by plastic sheeting positioned off the concrete surface, and maintained to prevent ponding.

NOT REVIEWED

Concrete shall be placed only when the outside air temperature is 35°F and rising, and is forecast to remain above 35°F.

At time of placement, the temperature of the concrete shall not be less than 50°F nor more than 90°F.

311.4.01 Quality Assurance

WHO TAKES SAMPLES?
WHO TESTS SAMPLES?
WHO PAYS?

Samples for compressive strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 100 yd³ of concrete. Compressive strength tests shall consist of one set of four laboratory-cured specimens with one seven-day break, two twenty-eight day breaks and one sample to be retained as a hold specimen. Samples for compressive strength tests shall be taken in accordance with ASTM C 172. Cylinders for strength tests shall be molded and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39. The strength level of an individual class of concrete shall be considered satisfactory if both the following requirements are met:

- (a) Every arithmetic average of any three consecutive compressive strength tests equals or exceeds f'c;
- (b) No individual compressive strength test (average of two cylinders) falls below f'c by more than 500 psi.

AT THE CONTRACTOR'S
EXPENSE

Slump (test method ASTM C 143), air content (test method ASTM C 138, C 1730, or C 231) and temperature tests shall be taken when strength specimens are made and at the option of the inspector as often as is necessary for control checks.

BY WHO?

Prior to concreting, compliance of the reinforcing steel placement with the contract documents **shall be verified**. The inspector shall be present continuously during concrete placement. The inspection agency shall promptly notify the contractor and the **Engineer** of observed irregularities or deficiencies of work or products.

SPECIFY DESIGN
OR CITY ENGINEER.

312 CONCRETE SIDEWALK, PATHWAYS, AND DRIVEWAY APPROACHES

312.1.00 General

312.1.01 Scope

STANDARD
This section covers the work necessary for installing and repaving concrete sidewalk, sidewalk ramps, and driveway approaches. Concrete construction shall be in accordance with these specifications and ACI 318 (Building Code Requirements for Structural Concrete). All concrete unless specified, shall be mixed and deposited in accordance with ASTM C 94 (Specifications for Ready-Mixed Concrete). When a conflict exists between various governing codes, the more stringent code requirement shall be followed.

312.2.00 Materials

312.2.01 Gravel Base

Gravel base shall conform to the 3/4-inch minus grading and compaction requirements of Section 308.0-00.

312.2.02 Concrete

SPECIFY DESIGN
OR CITY ENGINEER.

ENSURE

Engineer
Mix designs shall be submitted to the Engineer for approval a minimum of 7 calendar days prior to placement of concrete. The concrete shall have a minimum compressive strength of 3300 psi, 28 days after placement. An air-entraining admixture shall be used. It shall be added to the mixer at the time of mixing in such a manner as to ensure uniform distribution of the admixture throughout the batch. Entrained air (percent of volume) range shall be 4 percent to 7 percent (ASTM C 138, C 173 or C 231). The maximum water/cement ratio shall be 0.52 and the slump range shall be between 3- and 5-inches (ASTM C 143). Temperature of the concrete at time of placement shall range from 50°F to 90°F (ASTM C 1064). Concrete aggregates shall conform to ASTM C 33 requirements.

312.2.03 Forms

Lumber used in forms shall be S4S, free from loose knots or other defects. Form material shall be 2-inches by 6-inches for driveway approaches. Reuse of thoroughly cleaned form lumber must be approved by the City Engineer.

312.2.04 Curing Compound

Liquid curing compound shall meet the requirements ASTM C 309, Type 2, white pigmented.

NOT REVIEWED

312.2.05 Wire Reinforcing

Wire reinforcing shall conform to ASTM A 82, 10 gauge. **NOT REVIEWED**

312.2.06 Polyvinyl Chloride Pipe

PVC pipe shall conform to ASTM D 1785, Schedule 40.

312.3.00 Workmanship

312.3.01 Excavation, Fill, and Sidewalk Base

Excavation and fill for sidewalks shall be constructed in conformance with Section 304, Road Excavation and Embankment.

The sidewalk base shall be prepared to the thickness shown on the standard drawings and approved plans, and shall be constructed in conformance with Section 308, Base and Leveling Courses.

REMOVE REFERENCE TO SIDEWALK SINCE SECTION 312 COVERS SIDEWALKS, PATHWAYS AND DRIVEWAY APPROACHES.

312.3.02 Line and Grade

Concrete walks shall be constructed so that they do not deviate more than 1/4-inch laterally or 1/8-inch vertically from the required line and grade.

312.3.03 Forms

Forms shall conform to the shape, lines, grades, and dimension Plans, unless the City Engineer requires modifications to conform to existing site or driveway conditions. **NOT REVIEWED**

312.3.04 Drainage Pipe

Polyvinyl Chloride (PVC) pipe, of 3-inch diameter shall be installed from the concrete curb to the right-of-way line, graded to fall to the curb and 1/2-inch above the gutter invert, at positions shown on the plans or determined by the City Engineer.

312.3.05 Control Joints

SPECIFY MAXIMUM WIDTH OF CONTROL JOINT. PREFER 1/4" MAX WIDTH.

Scoring of sidewalk control joints must be ~~transverse~~ ^{TRANSVERSE} to the centerline of the sidewalk at a spacing of 5.0 foot on center. All control joints must be straight, 1/4-inch in depth, and finished with a 1/4-inch radius edge.

312.3.06 Concrete Placement

REVISE RADIUS TO 1/8" TO MINIMIZE WIDTH OF OPENING TO LESS THAN 1/2" PER PROWAG R302.7.3.

Before depositing concrete, work crews and all equipment and tools shall be on the job site, all debris shall be removed from the space to be occupied by the concrete,

the subgrade shall not be frozen, and all forms and base shall have been approved by the City Engineer. The base shall be thoroughly wetted, but no pools of water will be permitted.

Concrete shall be deposited in proper place without delay in a continuous operation. An interval of more than 45 minutes between any two consecutive batches or loads, or a placing rate of less than 8 cubic yards of concrete per hour, shall constitute cause for a construction joint at the location and of the type directed by the City Engineer. Concrete shall be spread uniformly between forms and thoroughly consolidated with approved methods.

In hot weather, concrete in place shall be protected until final finishing can be completed. With a hot dry breeze, windbreaks may be erected, or fog not used. Curing operation should begin as soon as concrete has set enough to avoid surface damage. **NOT REVIEWED**

Placing concrete during periods of rain will not be permitted. If concrete has been placed and rain commences, it shall be protected by plastic sheeting positioned off the concrete surface, and maintained to prevent ponding.

Concrete shall be placed only when the outside air temperature is 35°F and rising, and is forecast to remain above 35°F.

At time of placement, the temperature of the concrete shall not be less than 50°F nor more than 90°F.

312.3.07 Finish

Construct concrete walks so longitudinal slope, cross slope, surface, and other features do not exceed maximum allowable slope according to the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG), **THE STANDARD DRAWINGS AND THE PLANS.**

After the concrete has been thoroughly consolidated and leveled, it must be floated with a wood or magnesium float and finished at the proper time with a steel float. Joints must be edged with **1/4-inch** radius edger. The surface must be light broomed in a transverse direction to the centerline of the sidewalk with a fiber hair brush approved by the City Engineer.

The finished surface must be free of humps, sags or other irregularities and must be constructed within **0.02 feet** of the specified line, grade, cross section, slope, and thickness.

REVISE RADIUS TO 1/8" TO MINIMIZE WIDTH OF OPENING TO LESS THAN 1/2" PER PROWAG R302.7.3.

312.3.08 Concrete Curing

Protection against loss of moisture shall be accomplished by keeping the surface continuously wet for seven days or by application of an approved curing compound. **0.02' ALLOWANCE CONFLICTS WITH MAXIMUM 1/8" VERTICAL DEVIATION IDENTIFIED IN SECTION 312.3.02.**

compound applied immediately after completion of the finishing. Concrete shall be maintained above 50°F for at least the first 7 days after placement.

312.3.09 Protection of Concrete

Until the concrete has set and cured, the Contractor shall erect and maintain suitable barriers to protect the concrete from vandalism, traffic, weather (including rain and freezing temperatures), or other detrimental trespass. The Contractor shall remove and replace those sections of concrete upon which vandalism, trespass, or weather damage occurs **AT THE CONTRACTOR'S EXPENSE.**

~~**312.3.10 Backfill**~~

~~After the concrete has set for at least one day, backfill voids left by edge forms and grade backfill.~~

NOT REVIEWED

~~Backfill in planter strip areas and behind the sidewalk shall be clean topsoil free of weeds, debris, rock, concrete, and other detrimental or toxic matter.~~

312.4.00 Quality Assurance/Quality Control

WHO TAKES SAMPLES?
WHO TESTS SAMPLES?
WHO PAYS?

Samples for compressive strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 100 yd³ of concrete. Compressive strength tests shall consist of one set of four laboratory-cured specimens with one seven-day break, two twenty-eight day breaks and one sample to be retained as a hold specimen. Samples for compressive strength tests shall be taken in accordance with ASTM C 172. Cylinders for strength tests shall be molded and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39. The strength level of an individual class of concrete shall be considered satisfactory if both the following requirements are met:

- (a) Every arithmetic average of any three consecutive compressive strength tests equals or exceeds f'c;
- (b) No individual compressive strength test (average of two cylinders) falls below f'c by more than 500 psi.

AT THE CONTRACTOR'S EXPENSE

Slump (test method ASTM C 143), air content (test method ASTM C 138, C 1730, or C 231) and temperature tests shall be taken when strength specimens are made and at the option of the inspector as often as is necessary for control checks.

BY WHO?

Prior to concreting, compliance of the reinforcing steel placement with the contract documents **shall be verified**. The inspector shall be present continuously during concrete placement. The inspection agency shall promptly notify the contractor and the **Engineer** of observed irregularities or deficiencies of work or products.

SPECIFY DESIGN OR CITY ENGINEER.

312.5.0 Sidewalk Repair

When sidewalk, curb, and gutter require repair, the following requirements apply.

ADD REQUIREMENT FOR
SIDEWALK REPLACEMENT IF
VERTICAL SEPARATION IS
GREATER THAN 1"

312.5.01 Vertical Separation

General. Grind sidewalk joints and cracks with vertical discontinuities (offsets) between 1/4-inch and 1-inch to reduce trip hazards. The maximum taper of ground areas shall conform to the Americans with Disabilities Act (ADA) requirements. The minimum width of grind shall be 6”.

Height of vertical offset	Requirement
Less than 1/4-inch	No grinding is required
Between 1/4-inch and 1/2- inch	Bevel with a slope not steeper than 50 percent (1:1) (1:2)
Between 1/2-inch and 1-inch	Do not exceed 8.33 percent (1:12) in the direction of travel

Finish and Appearance. Grind vertical offsets to produce a smooth non-skid surface closely resembling the appearance and skid resistance of the adjacent concrete. Perform grinding so the sidewalk surface has essentially the same or slightly rougher texture as the surface adjacent to either side of the joint or crack. Provide a slip-resistant surface for all ground surfaces.

Perform grinding so the shape of grind is approximately rectangular with a straight back line and no stray grinding marks. Grind bevel uniformly across entire length of vertical offset. Smooth sharp edges left by the grinding operations. Do not grind adjacent concrete. Repair all scars or damage caused by the grinding operation.

Grind and fill holes and cracks as directed in accordance with Public Works Construction Code Section 312.5.02 – Horizontal Separations.

Hand Grinding. Grind areas that are inaccessible to the grinding machine with a hand held grinder to the same standards as required for **machine grinding**. DEFINE MACHINE GRINDING. MACHINE GRINDING IS NOT SPECIFIED ABOVE.

~~**Dust Control.** Control visible dust from grinding operations by equipping grinding machines with a vacuum dust control system to provide a dust free work area or by using small amounts of water as a dust control agent. Size vacuum dust collection system according to manufacturer's recommendations with minimum suction sufficient to eliminate visible dust and a 2-inch diameter hose. Apply water to work~~

NOT REVIEWED

area using an automatic water feed system designed for use with the grinding equipment or apply water to the work area by hand using a spray nozzle.

Control and Clean up. Throughout all phases of construction keep the work site clean and free from rubbish and debris. If water is used as a dust control agent, remove slurry using a wet-dry shop vacuum. Do not allow concrete dust or other debris to leave the work area and enter the drainage system including the curb and gutter, roadside ditches, or overland flow.

NOT REVIEWED

Ownership and Disposal of Grinding Residue. Before moving on to the next vertical offset, sweep work area clean and vacuum all slurry and dust produced during grinding. Grinding residue becomes the property of the Contractor. Dispose of the residual material in accordance with State and Federal laws.

Public convenience and safety. Meet requirements of Public Works Construction Code Section 302.0-00. When the work requires a section of sidewalk to be closed and pedestrian traffic prohibited, place **Type 1** barricades with "sidewalk closed" signs on the sidewalk facing the direction of travel and **cone off** the work area as need to maintain a safe environment.

Payment. Payment for each "Grind" and "Grind and Fill" shall be made at the unit bid price per each, regardless of the height or horizontal extents of the "Grind" and regardless of the height, horizontal extents, or depth of the "Grind and Fill".

Payment for each item will include full compensation for furnishing all labor, materials, tools, equipment and backup equipment; mobilization; traffic control, transportation and technical competence for performing all work necessary to complete each item as directed and as specified in these Contract Documents, including but not limited to obtaining all applicable certifications necessary for specialty personnel and equipment and all applicable permits; equipment and materials to be used on the job, disposal of waste materials, and restoration of each work area site.

NOT REVIEWED

312.5.02 Horizontal Separation

Sidewalk shall be repaired when the horizontal separation is 1/2-inch or greater by filling the void with **grout**.

DEFINE GROUT IN MATERIALS SECTION. GROUT IS NOT A DEFINED MATERIAL.

ADD FINISH AND APPEARANCE PARAGRAPH, CONTROL AND CLEANUP PARAGRAPH, PUBLIC CONVENIENCE AND SAFETY PARAGRAPH, PAYMENT PARAGRAPH, ETC. TO HORIZONTAL SEPARATION SECTION.

A TYPE 1 BARRICADE PER ODOT STANDARD DRAWING TM820 IS NOT DETECTABLE TO LOW VISION USERS. LOWEST RAIL ON BARRICADE SHALL BE 2.25' MAX PER PROWAG R402.3.

CONES PLACED ON SIDEWALK TO BLOCK PEDESTRIAN TRAFFIC ARE ALSO NOT DETECTABLE.

REROUTE PEDESTRIAN TRAFFIC AS REQUIRED PER MUTCD.

313 SURFACE RESTORATION

313.1.00 General

313.1.01 Scope

This section covers the work necessary for replacement of surface structures including the work necessary for the installation of driveways, extruded curb, trench repaving and the adjustment of miscellaneous structures to grade.

313.1.02 Surfacing Depths

The depths in inches, of base and leveling course rock, and asphalt cement concrete shall conform to Section ~~203.2.18~~. 203.2.19

312.2.00 Materials

312.2.01 Base and Leveling Course Rock

Shall meet the requirements of ~~308.0.00~~ SECTION 308.0.00, Base and Leveling Courses ~~Rock~~.

313.2.02 Asphalt Concrete

313.2.02A Surface Course

Asphalt concrete for the surface course shall be Class C mix as specified in Section 309, Asphalt ~~Concrete~~. CEMENT CONCRETE PAVEMENT.

313.2.02B Base Course

When more than 3 inches of asphalt concrete is required, the asphalt concrete shall be placed in two courses. The base course shall be Class B or C mix as specified in Section 309, Asphalt ~~Concrete~~. CEMENT CONCRETE PAVEMENT.

313.2.02C Tack Coat

Tack coat shall be as specified in Section 309, ASPHALT ~~CONCRETE~~ CEMENT CONCRETE PAVEMENT.

313.2.02D Cold-Mix Asphalt

← WHERE IS THIS TO BE USED?

Asphalt shall be SC-800 meeting the requirements of **specification series No. 2 of the Asphalt Institute**. Maximum aggregate size shall be 3/4-inch. Final mixture shall contain from 4 to 6 percent liquid asphalt by weight of total mix.

↓ CONFIRM REFERENCE.

313.2.03 Concrete

Concrete shall conform to ASTM C 94, Alternate 3, and shall have a design mix proportioned for 3,300 pounds per square inch compressive strength at 28 days. Concrete mix shall contain no less than 5-1/2 sacks of cement per cubic yard.

313.3.00 Workmanship

313.3.01 Driveway

313.3.01A Subgrade Preparation and Compaction

Driveway subgrade shall be brought to the required elevation and shaped, with suitable equipment to provide a smooth transition from the back of the driveway approach to the grade of the existing driveway. After the subgrade has been graded as hereinbefore specified, it shall be thoroughly compacted by means of equipment which will achieve the desired density specified. The material in the upper one foot of the subgrade shall have a density of not less than 91 percent of maximum dry density when tested according to AASHTO T180 .

NOT REVIEWED

313.3.01B Crushed Rock

Spread base and/or leveling course material on the compacted subgrade to the thickness indicated hereinbefore. The base and/or leveling course shall be bladed and thoroughly compacted to provide a firm base on which to place the asphalt or Portland cement concrete.

313.3.01C Asphalt Concrete

CEMENT
CONCRETE
PAVEMENT.

Asphalt concrete shall be placed as specified in Section 309, Asphalt Concrete. In lieu of using a self-propelled type paver, the Contractor may use a towed-type paver meeting the approval of the City Engineer.

313.3.01D Portland Concrete

Before depositing concrete, work crews and all equipment and tools shall be on the job site, all debris shall be removed from the space to be occupied by the concrete, the subgrade shall not be frozen and all forms shall have been approved by the City Engineer. The base shall be thoroughly wetted, but no pools of water will be permitted.

Concrete shall be deposited in its proper place without delay in a continuous operation. An interval of more than 45 minutes between any two consecutive batches or loads, or a placing rate of less than 8 cubic yards of concrete per hour, shall constitute cause for a construction joint at the location and of the type directed by the City Engineer in the concrete already placed.

In hot weather, concrete in place shall be protected until final finishing can be completed. With a hot dry breeze, windbreaks may be erected, or fog nozzles may be used. Curing operation should begin as soon as concrete has set enough to avoid surface damage.

Placing concrete during periods of rain shall not be permitted. In wet weather, the concrete shall be protected by plastic sheeting positioned off the concrete surface, and maintained to prevent ponding.

Concrete shall be placed only when the outside air temperature is 35⁰F and rising, and is forecast to remain above 35⁰F.

AT TIME OF PLACEMENT, THE TEMPERATURE OF THE CONCRETE SHALL NOT BE LESS THAN 50⁰F NOR MORE THAN 90⁰F.

313.3.02 Extruded Curb

← WHERE IS THIS TO BE INSTALLED?

Extruded curb shall be placed per Section 311.3.02, Extruded Curb.

313.3.03 Trench Repaving

313.3.03A Trench Preparation and Backfill

Bring the trench to a smooth, even grade at the correct distance below the top of the existing pavement surface, allowing for base rock, leveling rock and asphalt concrete. Sawcut existing pavement to a straight line to remove

NOT REVIEWED

any pavement which has been damaged or which is broken and unsound and to provide a smooth, vertical edge for joining the new pavement.

Compact the pavement subgrade to 91 percent relative density, as determined by AASHTO T 180. Accomplish supplementary compaction where required with approved mechanical vibrating or power tampers.

NOT REVIEWED

313.3.03B Base Course and Leveling Course

SPECIFY DESIGN OR CITY ENGINEER.

Obtain approval of the subgrade by the **Engineer** prior to placing any base course material on the subgrade. Workmanship in manufacturing, placing, compacting, and maintaining base, or leveling course shall be as specified in Section 308, BASE AND LEVELING COURSES.

313.3.03C Tack Coat

Prior to paving, apply an asphalt tack coat, at 0.25 to 0.45 square yard to the edges of the existing pavement and manhole frames.

NOT REVIEWED

313.3.03D Asphalt Concrete

Asphalt concrete pavement shall be placed as specified in Section 309, Asphalt Concrete. **CEMENT CONCRETE PAVEMENT.**

313.3.03E Joint Seal Coat

Immediately after the new paving is compacted, all joints between new and original asphalt pavement shall be painted with hot asphalt or asphalt emulsion and be covered with dry paving sand before the asphalt solidifies. Width of joint seal coat shall be no less than 4-inches and no more than 6-inches.

313.3.03F Contractor's Responsibility

NOT REVIEWED

All trenches, within a roadway surface, shall be paved in accordance with these specifications, cold patched, or covered with steel plating acceptable to the City Engineer, prior to the end of each work day. At no time shall trenches be left such that traffic is required to traverse a crushed rock or unpaved surface.

Maintain and repair all settlement of pavement over trenches, so that traffic can traverse the roadway in a safe manner.

The Contractor shall restore all striping, traffic signal loops, and/or other facilities impacted by the trench work.

313.3.04 Manhole Frame Adjustment

PLACE MANHOLE LID OUTSIDE OF
CROSS-WALKS AND/OR OTHER
PEDESTRIAN PATHS OF TRAVEL.

The height and position of manhole frames (including cone position) of existing manholes shall be adjusted to conform to new grades and cross sections, and **to avoid conflict with any new curb and gutter that may be shown on the Plans.**

~~The Contractor shall remove the material around the manhole without disturbing a greater area than necessary, rotate the cone or adjust riser, and raise or lower the manhole frame until the top surface is at the correct elevation and position. If the cone is rotated, new steps shall be provided in the lower section of the manhole, aligned with the existing steps in the cone. The manhole frame, grade rings, steps and shall be mortared or gasketed to provide a watertight seal. The excavation shall be backfilled with approved material in 6-inch layers, and each layer shall be thoroughly compacted with a mechanical tamper before the next layer is placed, until the backfill is up to the subgrade elevation.~~

NOT REVIEWED

314 HYDROSEEDING AND MULCHING

314.1.00 General

314.1.01 Scope

NOT REVIEWED

This work shall consist of surface preparation, and the supply and application by hydraulic means, of fertilizer, seed and/or mulch, to develop plant growth for erosion control. The work and type of seeding shall be performed as indicated by the plans, and specifications or as directed by the City Engineer.

314.1.02 Construction Season

Unless otherwise specified or approved, this work is to be performed during either the spring season, between February 1st and May 15th, or the fall season, between August 1st and November 15th. Areas may be seeded between November 1st and March 31st, with the approval of the **Engineer**, but must be protected by clear polyethylene sheet of a minimum thickness of 6 mil., which is to remain in position until the vegetation is firmly established.

SPECIFY DESIGN
OR CITY ENGINEER.

The work shall be performed in the presence of the City Engineer, only at times when local weather and the soil surface are in a condition favorable for the germination of seed and the growth of grass, otherwise the surface shall be maintained in a manner acceptable to the City Engineer until the following construction season.

314.2.00 Materials

314.2.01 Fertilizer

Fertilizer shall be of standard commercial manufacture and grade, furnished in standard, unopened, moisture proof containers in a dry condition. The fertilizer shall be inorganic 22-16-8, which shall analyze at 22% nitrogen, 16% available phosphoric acid and 8% soluble potash, and include a minimum 2% sulfur. The fertilizer shall contain not less than 30% available water insoluble nitrogen derived by incorporating one of the following:

NOT REVIEWED

- 1) A minimum 800 lbs., of urea formaldehyde per ton of fertilizer which has a minimum Activity Index (AI) of 40. The AI shall be determined by the Association of Official Agricultural Chemists method.

316 MAILBOX INSTALLATIONS

316.1.00 General

316.1.01 Scope

This section covers the work necessary for relocating existing mailboxes and the installation of new mailboxes.

NOT REVIEWED

316.2.00 Materials

316.2.01 Mailboxes

Contractor shall utilize existing mailboxes for relocated installations. Damaged mailboxes shall be replaced with materials equal to or better than original.

New installations shall incorporate mailboxes conforming to the requirements of the United States Postal Service.

316.2.02 Posts

Posts shall be of adequate strength and size to support the proposed installation **PER STANDARD DRAWING**.

316.3.00 Workmanship

316.3.01 Location and Position

Mailbox locations shall be as directed by the Post Master and the City Engineer, and shall be located outside the vision clearance areas specified in the TDC.

All mailbox installations shall be vertically plumb and at right angles to the street. Bury depth and spacing in relation to the curb shall be as specified on the Standard Drawing, and mounting height shall be as directed by the mail carrier and City Engineer **AND PER STANDARD DRAWING**.

317 PAVEMENT MARKING

317.1.00 General

This section covers the work necessary for the installation or removal of pavement markers, markings, and paint.

Striping paint shall be allowed for line striping only. All other pavement markings, including arrows, stop bars, railroad crossing legends, and word legends, shall be preformed thermoplastic material.

ARE CROSS-WALKS INCLUDED IN THE LIST FOR THERMOPLASTIC MATERIAL?

The Design Engineer shall layout the configuration of all striping, markers, and pavement markings for review and approval by the City Engineer prior to any installation.

317.2.00 Materials

317.2.01 Permanent Pavement Markers

REVISE TO ODOT AND UPDATE SECTION REFERENCE.

Pavement markers shall conform to OSHD specification 02840.60

317.2.01A Type I Reflectorized

Reflectorized markers shall have one or two reflective faces as required to reflect incident light in the specified directions. Reflective pavement markers shall be of the following types:

(a-1) **Type Ia** - Prismatic reflector lens (approximately 3 sq.in.) set in a 4" x 4" base.

NOT REVIEWED

(a-2) **Type Ib** - Acrylic rod lens reflector (approximately 0.55 sq.in.) set in a 4-inch diameter base or 4" x 4-3/4" oval base for bidirectional reflectors.

(a-3) **Type Ic** - Prismatic reflector lens (approximately 2 sq.in.) set in a base approximately 2" x 4".

317.2.01B Type II Nonreflectorized

Nonreflectorized markers shall be polyester binder 4-inch diameter.

317.2.01C Adhesive

The adhesive shall be a two-component epoxy conforming to the requirements of AASHTO M 237, Class II, except that the viscosity of the individual components at 77±1°F shall be 1000 to 5000 poises. **NOT REVIEWED**
average viscosity requirement. Type I, or II shall be used.

317.2.02 Temporary Pavement Markers

Temporary flexible raised pavement markers shall be made from 0.060-inch thick amber polyurethane with a minimum tensile strength of 4600 psi (ASTM D412), 4-inches wide, 2-inches upstanding with 4-inch long by 0.25-inch wide metalized polycarbonate microprism retroreflective tape on both sides, 1-inch base with factory applied solid butyl rubber adhesive protected by release paper.

317.2.03 Striping Paint

Striping paint and glass beads shall conform to the requirements of the ~~OSHD~~ ODOT standard specifications.

317.2.04 Preformed Thermoplastic Pavement Markings

Preformed thermoplastic pavement markings shall be "Premark" markings, or approved equal.

317.3.00 Workmanship

317.3.01 Permanent Pavement Markers

NOT REVIEWED

Pavement markers shall be installed as shown on the plans by means of an epoxy adhesive. Reflectorized markers shall be placed so that future painting, if required, will not cover the marker.

The portion of the roadway surface to which the marker is affixed shall be free of dirt, curing compound, paint, grease, oil, moisture, loose or unsound layers and any other material which would adversely affect the bond of the adhesive.

318 PERMANENT TRAFFIC CONTROL

318.1.00 General

NOT REVIEWED

318.1.01 Traffic Signals

This section covers the removal and installation of traffic signals.

318.1.02 Signs and Traffic Control Devices

This section covers all work necessary to remove and reinstall existing traffic signs or install new traffic control signs as required on a construction project. Traffic control provisions are contained in Section 104.13.00 and Section 106.9.00 of the General Specifications.

TEMPORARY

318.2.00 Materials

318.2.01 Traffic Signals

DELETE DATE

Materials shall meet all requirements of the English-unit equivalent of the 1996 Oregon Department of Transportation Standard Specifications for Highway Construction.

318.2.02 Signs and Traffic Control Devices

318.2.02A Uniform Traffic Control Devices

NOT REVIEWED

Provide signs and traffic control devices built in conformance with the Manual of Uniform Traffic Control Devices (current edition), and the Oregon Supplements to the Manual published by the Oregon Department of Transportation.

318.2.02B Signs

SIGN THICKNESS CONFLICTS WITH STANDARD DRAWING 517

Use aluminum only for traffic control signs. The aluminum sheet must meet ASTM B 209 requirements and be fabricated from aluminum alloy 6061-T6, 5154-H38, or approved equal. The minimum sign thickness shall be 0.063 when the sign is to be mounted more than 6-feet above the ground. If the sign is to be mounted 6-feet or less above the ground, the minimum sign thickness

shall be 0.125". Sign height is measured from the ground to the lowest portion of the sign.

IF MOUNTING HEIGHT IS 7' MINIMUM TO BOTTOM OF SIGN PER MUTCD, SIGNS ARE APPROXIMATELY 2' TALL MINIMUM AND POST ANCHOR IS 30" PER SECTION BELOW, DOES THIS MINIMUM POST LENGTH NEED TO BE INCREASED TO 12'?

318.2.02C Sign Posts

A minimum of 2" x 2" x 10' galvanized quick-punch post, or approved equivalent shall be used. When the sign, or combination of signs, is more than 36" in height, a 2" x 2" x 12' galvanized quick-punch post shall be used. Wood or round metal posts will not be permitted.

318.2.02D Post Base

The base shall consist of one galvanized quick-punch piece of square tubing, with dimensions of 2-1/4" x 2-1/4" x 30".

NOT REVIEWED

318.2.02E Fastening

The sign shall be fastened onto the post with drive rivets. To prevent vandalism, no nuts or bolts will be permitted to fasten any sign to the posts.

318.2.02F Reflective Material

Signs shall be diamond sheet reflectorized as per ODOT ~~OSHD~~ specification 02910.20.

UPDATE SPECIFICATION SECTION REFERENCE.

318.2.02G Date

All traffic control signs shall have the date of installation stamped, in a permanent manner, on the back of the sign.

318.2.02H Certification

NOT REVIEWED

Furnish certification that signs, posts, brackets, and hardware delivered to the project site are as specified.

318.3.00 Workmanship

DELETE
DATE

318.3.01 Traffic Signals

The removal and installation of traffic signals shall meet all requirements of the 1994 Oregon Department of Transportation Standard Specifications for Highway Construction.

318.3.02 Signs and Traffic Control Devices

318.3.02A Existing Signing

Remove existing traffic signing as required on the plans. Signs that are to be reused on the project will be stored by the Contractor until needed. The Contractor will be responsible for the replacement of any signs that are damaged while being stored. Signs, posts, and hardware not to be reused on the project will be removed from the project by the Contractor. When reinstalling traffic signing, use materials specified in Section 318.2.02 Signs and Traffic Control Devices (above). **NOT REVIEWED**

Relocate existing signs to the position shown on the plans. Improperly relocated signs shall be relocated **AT THE CONTRACTOR'S EXPENSE**.

DOES THE CITY INSTALL ANY ANGLED NO PARKING SIGNS WITH AN ARROW INSTEAD OF LISTING THE DIRECTION? IF YES, UPDATE PARAGRAPH.

Reset all signs plumb with, or at right angles to the street.

318.3.02B New Signing and Traffic Devices

Provide and install all new signing as required. New new manufacture. **NOT REVIEWED**

318.3.02C Street Name Signs

EXISTING Street name signs will be handled in the same manner as traffic control signs as provided in Section 318.3.02A, Existing Signing.

319.0.00 TREE PRESERVATION AND PROTECTION

319.1.00 General

319.1.01 Scope

319.1.01A General Requirements

Preservation and protection of existing trees indicated on the plans to remain.

319.1.02 Project Conditions

319.1.02A Protect and preserve all trees on-site indicated to remain.

STANDARD SPECIFICATIONS?

319.1.02B Comply with the requirements of the plans and **specifications** for protection and preservation of existing trees to remain.

319.1.02C Provide temporary construction fencing, minimum 4' high on steel fence posts (no more than 10 foot center to center spacing), as directed by the City Engineer, to protect and preserve trees which are to remain. Erect prior to commencement of clearing and demolition work and remove only after all work potentially injurious to trees is complete, or at the direction of the City Engineer.

319.1.02D Protect all trees from stockpiling, material storage, vehicle parking and driving within the drip line.

319.1.02E Protect the root systems of all trees from:

- 1) Dumping of refuse
- 2) Chemically injurious materials and liquids.
- 3) Noxious materials in solution caused by runoff and spillage during mixing and placement of construction materials, and drainage from stored materials.
- 4) Continual puddling of water.

319.1.02F Restrict vehicular and foot traffic to prevent compaction of soil within the root zone.

NOT REVIEWED

NOT REVIEWED

319.2.00 **Workmanship**

319.2.01 **General**

319.2.01A Protect root systems of all trees to remain from damage due to noxious materials in solution caused by runoff and spillage during mixing and placement of construction materials and drainage from stored materials.

NOT REVIEWED

319.2.01B Protect all trees to remain from flooding, erosion, excessive wetting and drying resulting from dewatering and other operations.

319.2.01C Protect all trees to remain against cutting, breaking and skinning of roots and branches, skinning and bruising of bark.

319.2.01D Do not allow fires to be placed under or adjacent to trees to remain.

ADD A REQUIREMENT FOR AN ARBORIST TO PRUNE TREES TO PROVIDE MINIMUM REQUIRED CLEARANCE OVER VEHICULAR AND PEDESTRIAN PATHS OF TRAVEL.

319.2.01E Removal of branches from trees which are to remain, if required for construction, tree root pruning and relocation work is to be performed under the direction of the City Engineer.

319.2.01F Cut branches and roots with sharp pruning instruments and do not break, chop, and/or mutilate.

319.2.01G Water trees which are to remain as necessary to maintain their health during the course of the project. Maintain a water schedule and documentation.

NOT REVIEWED

319.3.02 **Excavation Around Trees**

319.3.02A Excavate within the drip line of trees to remain only where indicated on the plans and as construction staked.

320 TRENCH EXCAVATION AND BACKFILL

320.1.00 General

NOT REVIEWED

320.1.01 Scope

This section covers the work necessary for trench excavation and backfill, complete except for pipe base and pipe zone backfill which are included under other sections.

320.1.03 Excavation

, STANDARD DRAWING 240

Excavation covers, but is not limited to, work necessary to remove and dispose of all material encountered in the trench excavation to the depths and widths as shown on the Plans and as specified herein. Excavation shall include the removal of material for the installation of all valves, fittings, manholes, and other appurtenances along its length. Shoring, bracing, dewatering, drainage and all other appurtenances are incidental to this item.

320.2.00 Materials

320.2.01 Trench Excavation

Trench excavation is unclassified. Excavate all materials regardless of formation encountered. Contractor shall make his own estimate of the kind and extent of the various materials that may be encountered.

320.2.02 Foundation Stabilization

NOT REVIEWED

Use approved gravel or crushed aggregate ranging in size from 4-inch minus to 1-1/2 inch minus, well graded from coarse to fine, free of clay or organic material.

320.2.03 Gravel for Trench Backfill

Granular material conforming to the 1-1/2 inch-minus or 3/4 inch-minus requirements of Section 308 Base and Leveling Courses.

320.3.00 Workmanship

320.3.01 Clearing

Where clearing is necessary, complete prior to the start of trenching. Cut trees and brush as near to the surface of the ground as practicable. Stumps within 4 feet of the trench centerline shall be removed. Prior to trenching all trees, brush, and other flammable debris from the clearing shall be disposed of off the construction site in an approved location.

Do not remove existing trees or tree limbs over 2 inches in diameter on public property unless they are within 4 feet of the trench centerline, without permission from the City Engineer. Protect from damage, unless otherwise marked by the City Engineer, all trees, shrubs, or plants within the limits of the easement on private property.

320.3.02 Pavement Removal

NOT REVIEWED

Saw cut existing permanent pavement along trench sides prior to excavating. Width of pavement cut shall be 12 inches wider than the width of trench excavation. Cuts shall be continuous and for full depth of pavement. Pavement removal shall be of sufficient width to insure that excavating equipment can function without disturbing remaining pavement. Under no circumstances shall the remaining pavement be subject to a lifting force, either by direct contact with the excavating equipment or by inadequate pavement precutting. Any pavement beyond the trench line that is lifted shall be removed and replaced. If asphalt is removed by means of a mechanical chipper, the saw cut may be waived by the City Engineer if a clean edge can be produced.

All strips of pavement 3 feet wide or less, which are outside the limits of the pavement removal for trench excavation, shall be removed and repaved in accordance with Section 313, Surface Restoration.

320.3.03 Trench Width

Minimum width of the trench in the pipe zone shall be 18 inches greater than the inside diameter of the pipe, except by permission of the City Engineer.

Maximum width of the trench below the top of pipe shall be 1.5 times the nominal pipe diameter plus 18 inches. Trenches wider than maximum width may cause a greater backfill load than normally allowed, for the class of pipe shown on the plans. If maximum trench width is exceeded without authorization from the City Engineer, the Contractor may be required to provide pipe of higher strength classification **AT THE CONTRACTOR'S EXPENSE.**

ADD A NOTE ADDRESSING THAT ADDITIONAL BACKFILL REQUIRED TO FILL THE UNAUTHORIZED WIDER TRENCH SHALL BE AT THE CONTRACTOR'S EXPENSE.

320.3.04 Grade and Pipe Zone

Excavate the bottom of the trench to the trench subgrade. Trench subgrade shall be at least 4 inches below the outside bottom of the pipe barrel. If the trench is excavated below the required grade, correct with pipe base material, as directed. Place the material over the full width of the trench in compacted layers not exceeding six (6) inches deep to the established trench subgrade. Pipe zone material placed along the sides and above pipes shall also be compacted in layers not exceeding six (6) inches in thickness utilizing hand operated mechanical tampers.

NOT REVIEWED

320.3.05 Shoring

Whenever necessary to prevent caving during excavation, or to protect adjacent structures, property, workmen, or the public, adequately shore the trench. All sheeting, shoring, and bracing of trenches shall conform to the safety requirements of the Federal, State or local public agency having jurisdiction.

REFER TO TEMPORARY TRAFFIC CONTROL ALREADY SUBMITTED AND APPROVED AS REQUIRED IN CHAPTER 100.

320.3.06 Excavated Materials

During trench excavation, the Contractor shall locate the excavated material so it will not completely obstruct a traveled roadway or street, and, **unless otherwise approved by the City Engineer, all streets and roadways shall be kept open to at least one-way traffic.** The Contractor shall place excavated material away from the trench to minimize risk of side wall failure.

OR SIDEWALK

When excavating trenches inside a public utility easement and/or construction easement, take care to ensure all excavated materials and construction activity are contained within the easement limits.

320.3.07 Dewatering

Excavations and trenches shall be kept free of water by dewatering equipment furnished and operated by the Contractor. Water shall be disposed of so as not to cause injury to public or private property or to cause a nuisance or menace to the public. Sufficient pumping equipment and machinery in good working condition for ordinary emergencies, including power outage, and competent workmen for the operation of the pumping equipment, shall be available at all times. Dewatering equipment shall operate at all times unless written authorization is received from the City Engineer.

NOT REVIEWED

At all times, provide and maintain ample means and devices to promptly remove and dispose of all water entering the trench excavation during the time the pipe is being prepared for the pipe laying, during the laying of the pipe, and until the backfill at the pipe zone has been completed. Surface runoff shall be controlled to prevent entry or collection of water in excavations.

320.3.08 Foundation Stabilization

When, in the opinion of the City Engineer, the existing material in the bottom of the trench is unsuitable for supporting the pipe, excavate below the subgrade of the pipe base, as directed by the City Engineer, and backfill the trench to subgrade of pipe base with foundation stabilization material specified hereinbefore. Foundation stabilization material shall be compacted by mechanical means in lifts not exceeding twelve (12) inches in thickness.

NOT REVIEWED

320.3.09 Trench Backfill Above Pipe Zone

Push the backfill material first onto the slope of the backfill previously placed and allow to roll down into the trench. Do not push the backfill material into the trench in such a way as to permit free fall of the material into the open trench until at least 2 feet of cover is provided over the pipe. Under no circumstances allow sharp, heavy pieces of material to drop directly onto the pipe or the tramped material around the pipe. Do not use backfill material of consolidated masses larger than 1 cubic foot. Flooding or jetting shall not be allowed.

The following types of backfill shall be used as shown on the Plans or as directed by the City Engineer:

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320.3.09A Class "C"

Following backfilling the pipe zone, the excavated material shall be pushed back into the trench. After the backfill has been completed, the entire working area, including the trench, shall be graded. The Contractor shall make his own estimate of the amount of settlement that will occur and shall windrow enough material over the trench to compensate for settlement. During the warranty period, if in the opinion of the City Engineer, excessive settlement occurs placing the windrowed material below normal grade, the Contractor shall correct the problem, to the City Engineer's satisfaction.

NOT REVIEWED

320.3.09B Class "D"

Backfill the trench above the pipe zone with gravel for trench backfill in lifts not exceeding 8 inch loose depth, and compact each lift to a minimum of 91 percent relative compaction. Backfill materials shall be moisture conditioned to near optimum moisture content prior to placement in the trench. Use mechanical vibrating or impact tampers. Maximum density of the backfill material shall be determined by AASHTO T 180.

Maintain the surface of the backfilled trench level with the existing grade

with crushed rock backfill material until pavement replacement is completed.

Any subsequent settlement of the finished surfacing during the warranty period shall be considered to be a result of improper or insufficient compaction and shall be promptly repaired by the Contractor **AT THE CONTRACTOR'S EXPENSE.**

320.3.10 Maintenance of Trench Backfill

Maintain the backfilled trench surfacing until pipe section has been tested and accepted, utilities have been restored, surface restoration has been completed and all work required along the pipe section has been accomplished.

This maintenance shall include, but not be limited to, the addition of surfacing rock and a minimum of 2 inches of cold-mix asphalt to keep the surface of the backfilled trenches reasonably smooth and suitable for normal traffic flow. Temporary pavement replacement of cold-mix asphalt shall be installed on the same day as backfilling, above all trenches that cross paved streets. Trenches that run approximately parallel with streets or roads shall be maintained with cold mix asphalt.

NOT REVIEWED

320.4.10 Excess Excavated Material

The Contractor shall dispose of all excess excavated materials at approved disposal sites.

321 STORM DRAIN PIPE

321.1.00 General

321.1.01 Scope

This section and CWS's Design and Construction Standards ~~June 2007~~, Chapter 8 covers the work necessary for the installation of storm drain pipe and fittings of the sizes and classes indicated, including, but not limited to, furnishing materials; laying and jointing the pipe, and connections to existing drainage structures. The standards that are more restrictive shall govern.

DELETED DATE

321.1.02 Pipe Base

For pipes 27 inches in diameter and less, the area of pipe base extends for the full width of the trench, with a minimum depth from the outside of the pipe barrel to the bottom of the trench of 4 inches. For pipes larger than 27 inches in diameter, the depth is a minimum of 6 inches.

321.1.03 Pipe Zone

The area of the pipe zone extends for the full width of the trench, from the bottom of the pipe barrel to 12 inches above the outside top of the pipe barrel.

321.2.00 Materials

321.2.01 Pipe

NOT REVIEWED

Unless a specific material is designated, pipe material shall be one of the following:

321.2.01A Concrete Pipe

Pipe 18 inches in diameter and larger shall be Class 3 reinforced concrete pipe conforming to ASTM C 76, and pipe 15 inches in diameter and smaller shall be Class 2 nonreinforced concrete pipe conforming to ASTM C 14.

Pipe ends shall normally be bell and spigot, or tongue and groove.

321.2.01B Ductile Iron Pipe

322 SANITARY SEWER GRAVITY PIPE

322.1.00 General

322.1.01 Scope

This section and CWS's Design and Construction Standards ~~June 2007~~, Chapter 8 cover all work necessary for the installation of gravity sewer pipe. The standards that are more restrictive shall govern.

DELETED DATE

322.1.02 Pipe Base

For pipes 27 inches in diameter and less, the area of pipe base extends for the full width of the trench, with a minimum depth from the outside bottom of the pipe barrel to the trench invert of 4 inches. For pipes larger than 27 inches in diameter the depth is a minimum of 6 inches.

322.1.03 Pipe Zone

The area of the pipe zone extends for the full width of the trench, from the bottom of the pipe barrel to 12 inches above the outside top of the pipe barrel.

322.2.00 Materials

322.2.01 Pipe

NOT REVIEWED

Unless a specified material is designated, pipe material shall be any one of the following:

322.2.01A Ductile Iron Pipe

Pipe shall be push-on joint ductile iron pipe, centrifugally cast of 60-42-10 iron and shall conform to AWWA C151, thickness Class 50. The pipe shall be cement-mortar lined in accordance with AWWA C104. Rubber gaskets and lubricant conforming to AWWA C111, are to be supplied by the pipe manufacturer, suitable for the specified pipe size, and in sufficient quantity for installing the pipe.

SPECIFY DESIGN
OR CITY ENGINEER.

322.3.10B Air and Infiltration Test

The **Engineer** may, at any time, require a calibration check of the instrumentation used. Use a pressure gauge having minimum divisions of 0.10 psi and an accuracy of 0.05 psi. All air used shall pass through a single control panel.

All plugs used to close the sewer for the test must be capable of resisting the internal pressures and must be securely braced. Place all air testing equipment above ground and allow no person to enter a manhole or trench where a plugged sewer is under pressure. Release all pressure before the plugs are removed. The testing equipment must include a pressure relief device designed to reduce pressure in the sewer under test to 9 psi and must allow continuous monitoring of the pressure in order to avoid excessive pressure. Use only qualified personnel to conduct the test.

The presence of ground water will affect the results of the test, therefore determine the average height of ground water over the sewer, by an approved method; immediately before starting the test.

Use the Time-Pressure Drop Method for all air testing. The test procedures are as follows:

- 1) Plug all upstream openings.
- 2) Plug the downstream opening, when infiltration flow from upstream sections of the sewer has ceased. Brace all plugs securely.
- 3) Check the average height of the ground water over the sewer. The test pressure required below shall be increased 0.433 psi for each foot of average water depth over the sewer. **NOT REVIEWED**
- 4) Add air slowly to the section of sewer being tested until the internal air pressure is raised to 4.00 psig greater than the calculated pressure of the ground water above the sewer.
- 5) After the internal test pressure is reached, allow at least 2 minutes for the air temperature to stabilize, adding or releasing only the air required to maintain pressure.
- 6) After the temperature stabilization period, disconnect the air supply.
- 7) Determine and record the time in seconds that is required for the internal air pressure to drop from 3.5 psig to 3.00 psig; greater than the calculated ground water pressure.
- 8) Compare the time recorded in step 7 with the test time determined as hereinafter.
- 9) Upon the successful completion of the air test and release of pressure, remove the downstream plug only. If there is any accumulation of water upstream of the plug, measure the subsequent rate of infiltration, which shall not exceed 0.05 fluid ounces per inch pipe diameter per foot per hour.

When the flow exceeds the allowable, reduce the infiltration to at least this rate and air test this section again. If a flexible pipe has to be

323.5.0 Timing

The facility shall be substantially complete prior to paving.

NOT REVIEWED

1. The water quality swale treatment area plantings can be deemed “substantially complete” once active green growth has occurred to an average growth of 3” and plant density is an average of approximately 6 plants (minimum 1-inch plugs or equivalent) per square foot.
2. The facility shall be deemed acceptable to begin the maintenance period when plant growth and density matches the ~~engineer's~~ design as shown on the approved plans and all other requirements have been met. The **engineer** must certify the facility to be functional, in accordance with the approved plan design to begin the two-year maintenance period.

SPECIFY DESIGN
OR CITY ENGINEER.

324 MANHOLES

324.1.00 General

324.1.01 Scope

This section and CWS's Design and Construction Standards ~~June 2007~~, Chapter 8 cover the work necessary for construction of manholes. The standards that are most restrictive shall govern.

DELETED DATE

324.2.00 Materials

324.2.01 Base Rock

Base rock shall conform to the 3/4 inch-minus requirements of Section 308 Base and Leveling Courses.

324.2.02 Precast Section

Conform to ASTM C 478. Minimum 48 inches in diameter with and steps cast in section by manufacturer.

NOT REVIEWED

324.2.03 Manhole Steps

Manhole steps shall be plastic conforming to the following requirements:

#4 (1/2-inch diameter) steel reinforcing bar conforming with ASTM A 615 Grade 60, encapsulated with injection molded copolymer polypropylene with serrated top surfaces.

324.2.04 Frame and Cover

LOCATE OUTSIDE OF PEDESTRIAN PATH OF TRAVEL.

Frame and cover shall conform to the standard drawings and be manufactured of gray cast iron conforming to ASTM A 48, Class 30. Bearing surfaces shall be planed or ground to provide flat and true surfaces.

Cover shall have the letter "S" cast into the center and shall have **two holes of 3/4 inch diameter** cast through the top plate in a symmetrical pattern for sanitary sewer or **16 holes of 3/4-inch** diameter cast through the top plate in a symmetrical pattern for storm sewer **PER STANDARD DRAWING 030.**

LOCATE MANHOLE COVERS OUTSIDE PEDESTRIAN PATH OF TRAVEL. 3/4" DIAMETER HOLES ARE GREATER THAN THE 1/2" MAXIMUM OPENING ALLOWED IN THE PEDESTRIAN PATH OF TRAVEL PER PROWAG R302.7.3.

326.3.10 Anchorage

326.3.10A Location

Securely anchor all tees, plugs, caps, bends, and other locations where unbalanced forces exist, by suitable mechanical joint restraint, bearing thrust or gravity blocks as shown on the plans or hereinafter specified. Flange connect all adjacent fittings and valves, unless otherwise directed by the City Engineer.

326.3.10B Reaction Blocking

Place bearing or gravity thrust blocks as shown on Standard Drawing No. 620 and No. 621 respectively. Place bearing thrust blocking between undisturbed ground and the fitting to be anchored and arrange all concrete placement so that the fitting joints and bolts will be accessible for repairs.

326.10C Mechanical Joint Restraint

NOT REVIEWED

The City Engineer shall check restraint length, with trench backfill and soil type information submitted by the Contractor before laying into the restrained joint area. Use pipe with approved restraining gaskets to meet the minimum restrained pipe length requirement. Approved mechanical joint restraint shall be installed in full accordance with the manufacturers instructions. If reassembly is required, tighten wedges or joint follower with a torque wrench, or as otherwise recommended by the manufacturer.

326.3.11 Hydrostatic Test

Make pressurized leakage tests on all newly laid pipe and valved sections of pipe. The maximum length of pipe to be tested at one time shall be the length of pipe between main line valves. Furnish all necessary equipment and material, make all taps, and furnish all closure pieces in the pipe as required. The City Engineer shall monitor the test.

Furnish the following equipment and materials for the tests, unless otherwise directed by the **Engineer**:

- (2) Approved graduated containers,
- (2) Pressure gauges,
- (1) Hydraulic force pump as approved by the **Engineer**

SPECIFY DESIGN OR CITY ENGINEER.

Suitable hose and suction pipe as required.

Conduct tests after the trench has been backfilled and compacted, and all

327.2.06D Surge Check Valve

The surge check valve shall allow unrestricted air flow but shall close to a throttling position when high velocity water enters the check valve, which shall return to an open position when the air and vacuum valve has closed.

327.2.07 Blowoff Valve Assembly

Shall conform to the details shown on Standard Drawings 605 **NOT REVIEWED** relevant sections of this specification.

327.2.08 Joints

Mechanical and push-on joints shall conform in all respects to AWWA C111. All fittings shall be flanged connected to adjacent valves and fittings, with all dimensions and drilling to ANSI B16.1, class 125 cast-iron flanges. Bolts and gaskets shall conform to AWWA C207.

327.2.09 Valve Boxes

SEE COMMENTS ON STANDARD PLANS

Valve boxes shall be heavy duty, by Olympic Foundry Inc., East Jordan Iron Works, or approved equal, 18-inch top section, slip type with top flange, and recessed handle cover (solid handle) manufactured of cast iron conforming to ASTM A48-76 (tensile strength 30,000 psi) and coated with a G.P.D. asphalt varnish. "W" or the word "WATER" shall be cast into the top of the lid. Valve box extensions shall be fabricated from 6-inch polyvinyl chloride sewer pipe conforming to ASTM D 3034, SDR 35. Valve stem extensions, when required, shall be fiberglass by Pipeline Products or approved equal, and shall include a lower operating nut, extension, and upper operating nut with ring.

327.2.10 Concrete

Concrete shall conform to ASTM C 94, Alternate 2, with a 28 day strength of 3300 psi. There shall be a minimum of 6-1/2 sacks of cement per cubic yard of concrete. **NOT REVIEWED**

327.3.00 Workmanship

327.3.01 Gate & Butterfly Valves

Before installation, the valve shall be thoroughly cleaned of all foreign material, and shall be inspected for proper operation, both opening and closing, and to verify that the valves are set properly.

328.2.06 Gate Valve and Valve Box

Gate valves for fire hydrant assemblies shall be 6-inch size as shown on the Plans. Valve and valve box shall conform to Section 327, Water Valves and Related Equipment.

328.2.07 Main Tee

Main tee shall be ductile iron as specified in Section 215, Water Pipe and Fittings. Side outlet of main tee shall be 6 inch flanged.

NOT REVIEWED

328.2.08 Tapping Tee and Valve

Shall be as specified in Section 327, Water Valves and Related Equipment. Side outlet of tapping tee shall be 6-inch flanged.

328.3.00 Workmanship

328.3.01 General

Hydrants shall be set-up as shown on Standard Drawing 610, and installation shall conform to Sections 3.7 and 3.8 of AWWA C600, except as otherwise specified.

328.3.02 Location and Position ← SEE COMMENTS ON STANDARD PLANS

Locate as shown or directed so as to provide complete accessibility and minimize possibility of damage from vehicles or injury to pedestrians. Improperly located hydrants shall be disconnected and relocated.

Set hydrant plumb and steamer nozzle at right angles and facing the street. Set hydrants so that the mid point of the safety flange is 3 inches above finished grade.

328.3.03 Excavation

NOT REVIEWED

Over-excavated areas shall be filled with gravel, and hand tamped to provide firm foundation. Backfill around hydrant shall be similar to adjacent pipeline as specified in Section 320, Trench Excavation and Backfill.

329.2.05 Meters ← SEE COMMENTS ON STANDARD PLANS

The City Operations Department will install meters up to 2" in size. Meters larger than 2" shall be installed by the Permittee, and shall be as shown on the appropriate standard drawings.

329.3.00 Workmanship

329.3.01 Preparation of Trench

Grade the bottom of the trench by hand to the line and grade to which the pipe is to be laid. The trench bottom shall form a continuous and uniform bearing support for the pipe. Provide and maintain ample means to remove water entering the trench during the laying operation to the extent required to properly grade the bottom of the trench and allow for proper compaction of the backfill above the pipe zone. Do not lay pipe in water. Trench excavation and backfill shall conform to applicable portions of Section 320, Trench Excavation and Backfill.

NOT REVIEWED

329.3.02 Copper Tubing

The copper tubing shall be cut with square ends, reamed, cleaned, and made up tightly. Care shall be taken to prevent the tube from kinking or buckling on short radius bends. Kinked or buckled section of copper tube shall be cut out and the tube spliced with the proper brass fittings at the Contractor's expense.

329.3.03 Installation of Meter Boxes

Meters and meter boxes or vaults shall be installed in a workmanlike manner. Finish grade of completed meter enclosure shall be flush with the top of curb and/or back of sidewalk. Meter boxes or vaults shall be set or constructed plumb, with the top set to conform to the slope of the finish grade. Lightly compacted pipe zone material shall be placed inside of the meter boxes, from the pipe zone above the pipe to the base of the meter. Prior to connection of the meter, the angle meter key valve shall be opened and the service line flushed clean of all foreign materials.

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City of Tualatin

Self-Evaluation and Transition Plan:
Appendix D: Core Area Parking District
Evaluation

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CITY OF TUALATIN

Core Area Parking District

ADA Transition Plan



3/3/2017

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Core Area Public Parking ADA Transition Plan

In 2010, the United States Department of Justice (DOJ) issued a final rule in order to adopt enforceable accessibility standards under the Americans with Disabilities Act (ADA). These standards assure that state and local government services do not discriminate against individuals on the basis of disabilities. Acting on these final standards, the City of Tualatin Core Area Board and City of Tualatin created a transition plan, outlining methodology for achieving and maintaining compliance with these rules and regulations.

Self Evaluation

First step was hiring Otak, a Portland based multi-disciplinary international firm of architects and engineers to evaluate core area lots specifically handicap parking and access. Problem areas were identified and a budget number projected based on their proposed design remedies.

Criteria - Setting Priorities

Understanding it is not feasible to fix or upgrade all deficiencies at once, due to budget or other reasons, below are criteria used in setting priorities.

1. **Not Accessible:** Significant barriers, discontinuity such as steps, no ramps, more than 100 feet of unpaved walkways, vertical heaving displacement, slopes and other types of severe stress.
 - None identified in Core Area Parking District at this time.
2. **Complaint Based:**
 - Each complaint evaluated to determine safety, solutions and followed up with remedy proposal.
3. **Partially Accessible:** Not designed to current standards, problems with slopes-geometry of sidewalks, ramps and landings, no detectable warnings, handrails, signage etc.
 - Safety, does slope create a hazard, difficulty – what is the level of accessibility.
 - What is usage, does sidewalk serve as a handicap access and serve a facility at this time.
 - Location of handicap access, does it meet 2010 guidelines.
4. **Accessible:** Meets most criteria, may need additional improvements, for example;
 - ‘Truncated domes’ are not installed.
 - Sidewalk slope slightly out of compliance without creating a hazard.
5. **Fully Accessible:** Meets all ADA criteria and is on inspection schedule.

Planning and Scheduling Improvements

Upon review of Otak’s ADA summary report identifying non compliance issues, using the priority setting criteria above, each of the core area lots are to be further evaluated for alternatives, considering timing with future improvement projects in each area such as overlay or maintenance repairs, as funding becomes available, attention will be given to the areas in the highest demand with the worst deficiencies.

The City of Tualatin uses 5-10 year Capital Improvement Plan that is updated annually each fall and includes the Core Area Parking District. This document is used for financial planning and scheduling. It is the basis for each year’s budgets that are approved each May. ADA larger projects will be listed in Core Area Budget each year unless it falls under routine maintenance. Its projected improvements will start in 2017-2018 budget year or earlier beginning with the White Lot as it has the highest impact and ADA use.

Inspections and Maintenance

Periodic routine maintenance inspections are currently scheduled to be completed every 6 months and must be completed once a year at a minimum.

Any repairs such as broken or heaved areas in sidewalks, ramps, or landings are to be brought into compliance when permanent repairs are made.



Technical Memorandum



To: Dominique Huffman City of Tualatin

From: Adrian Esteban, PE

Copies: File

Date: September 14, 2016

Subject: Core Area Parking ADA Assessment
Proposed Repairs and Cost Estimate

Project No.: 17919

Overall Assumptions

For the basis of providing the cost estimates, we included cross sections to show intent and confirm that our proposed improvements will meet ADA requirements. Due to the absence of survey data, the cross sections assumed a base elevation of 10.0' that was used for calculation purposes only. All of the elevations shown are derived from the base elevation and by existing or proposed grades and measured distances.

Based on our assessment there appears to be overlay rehabilitation in most of the parking lots so the majority of the recommended improvements assume that the pavement section will allow for a grind and inlay depending on location. In a couple of locations we are proposing an overlay to flatten grades with a transition to existing pavement.

Basis of Estimate

Blue Lot

We propose relocating the ADA stalls to the east side of the raised median as existing grades facilitate the use of this area and minimize overall impacts. Our improvements include grinding 2-inches of pavement on the south end of the parking area that would result in a 7-inch curb

exposure. This allows for installation of three (3) ADA stalls with required aisles and transition across three (3) proposed compact stalls back to existing grade at the parking island in the north-south direction (see section A-A). For the east-west direction the transition to existing grades would occur over 15-20 feet based on our measured existing grades (see section B-B). The pedestrian access from the median to the existing sidewalk improvements will require grinding existing at grade crossing to provide an ADA accessible route (see section C-C). Based on the limited information we were able to determine that maintaining the existing ADA stall on the SW corner of the lot would require extensive reconstruction of the parking lot due to existing constraints. The parking lot is in a flood zone so raising the existing stalls would require lowering other areas of the parking lot to meet the No Rise condition. Additionally the existing retaining wall adjacent to the ADA parking stall would need to be re-constructed. The information needed to provide a solution and cost estimate is beyond the scope of this assessment.

Red Lot

Proposed improvements include overlaying existing pavement between the north curb and drive aisle to allow for the existing two (2) ADA stalls to meet ADA grades of 2% or less (see section A-A). For the east-west direction the transition to existing grades would occur between the non-ADA stall to the east and the existing curb. The pedestrian ramp and adjacent sidewalk will require improvements to provide an ADA accessible

Green Lot

Proposed improvements include grinding and overlaying existing pavement between the north and south curbs to allow for the existing three (3) ADA stalls to meet ADA grades of 2% or less and include non-ADA stalls with a maximum cross grade of 3% (see section A-A). For the east-west direction the transition to existing grades would occur within the ADA stalls as existing grades are less than 0.8%. The pedestrian ramp and adjacent sidewalk will require improvements to provide an ADA accessible. Based on the limited information we were able to determine that relocating the ADA stalls adjacent to the existing sidewalk would not be feasible due to the grade difference between the existing sidewalk and existing pavement. Additional information would be needed to assess existing conditions and determine if relocation to the south side of the parking lot is a viable solution.

Yellow Lot

Proposed improvements include grinding existing pavement the north and south curbs to eliminate the existing grade breaks and allow for the existing two (2) ADA stalls to meet ADA grades of 2% or less (see section A-A). For the east-west direction the transition to existing grades would occur over the two existing stalls and drive aisle to the east of the existing ADA stalls (see section B-B).

The pedestrian ramp and adjacent sidewalk will require improvements to provide an ADA accessible route.

White Lot

We propose relocating the two existing ADA stalls along the west side of the parking lot to SW Seneca Street (see exhibit sheet 2) to provide more centrally located access to businesses.

Additionally we propose to relocate the existing ADA stall on SW Seneca across to the north of the existing median to make use of existing pavement that is ADA compliant and to minimize necessary improvements for pedestrian access (see exhibit sheet 1). Our proposed improvements for relocating ADA stalls to SW Seneca Street include grinding 1-inch of pavement on the north end of the parking area that would result in a maximum of 6.5-inch curb exposure. This allows for installation of three (3) ADA stalls with required aisles and maintains improvements within the curb and existing valley gutter at the back of the parking stalls (see section A-A). Other improvements in the white lot require grind and inlay of access aisle, pedestrian ramps and walkways to meet ADA grades of less than 2%. These locations will require minimal improvements as existing grades were 2.1% or less.

The existing grades for the ADA parking stall on the southwest corner of the lot make it difficult to develop an approach for improving the ADA stall without additional topo for the site. It would entail raising a significant portion, if not all, of the parking area on the west side of the lot. As we discussed at our last meeting the site is in a floodplain with a no-rise condition so raising the lot would require mitigation to meet no-rise conditions.

Please review the attached exhibits and cost estimates and let me know if you have any additional questions or comments.

Tualatin ADA Parking Improvements - Preliminary Construction Cost Estimate Overall Summary

Otak Project #17919

ITEM / DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
Removal of Structures and Obstructions	LS	\$2,000	5	\$10,000
Mobilization	LS	\$5,000	5	\$25,000
Erosion Control	LS	\$2,000	5	\$10,000
Asphalt roadway (4")	SY	\$25	825	\$20,625
Cold Plane Pavement Removal (3")	SY	\$10	520	\$5,200
Asphalt Sawcutting	LF	\$3	502	\$1,506
Concrete Sidewalk	SF	\$10	4,670	\$46,700
Concrete Curbs	LF	\$25	275	\$6,875
ADA Ramps	EA	\$2,500	12	\$30,000
Striping	LF	\$5	1,070	\$5,350
Disable Parking Legend	EA	\$250	5	\$1,250
Legend Removal	EA	\$50	16	\$800
Striping Removal	LF	\$1	110	\$110
			Subtotal	\$163,416
Construction Contingency	LS	30%	1	\$49,025
Soft Costs (enrg, survey, construction admin)	LS	25%	1	\$53,110

Construction Cost Total \$267,000

This preliminary estimate was prepared using the following assumptions:

1. Quantities and costs are preliminary and subject to change upon completion of detailed construction plans and geotechnical report.
2. Preliminary cost estimate based on grinding existing pavement and inlaying/overlaying new pavement
3. Pavement grinding is assumed to be 3"(avg).
4. Pavement inlay/overlay is assumed to be 4" for most areas.
5. Unit Costs based on ODOT Weighted Average Bid Item Price Report 2015

Tualatin ADA Parking Improvements - Preliminary Construction Cost Estimate Blue Lot

Otak Project #17919

<u>ITEM / DESCRIPTION</u>	<u>UNIT</u>	<u>UNIT COST</u>	<u>QUANTITY</u>	<u>COST</u>
Clearing & Grubbing	LS	\$2,000	1	\$2,000
Mobilization	LS	\$5,000	1	\$5,000
Erosion Control	LS	\$2,000	1	\$2,000
Asphalt roadway (4")	SY	\$25	375	\$9,375
Cold Plane Pavement Removal (3")	SY	\$10	150	\$1,500
Asphalt Sawcutting	LF	\$3	170	\$510
Concrete Sidewalk	SF	\$10	1,090	\$10,900
Concrete Curbs	LF	\$25	120	\$3,000
ADA Ramps	EA	\$2,500	2	\$5,000
Striping	LF	\$5	310	\$1,550
Disable Parking Legend	EA	\$250	3	\$750
Legend Removal	EA	\$50	2	\$100
Striping Removal	LF	\$1	50	\$50
			Subtotal	\$41,735
Construction Contingency	LS	30%	1	\$12,521
Soft Costs (engr, survey, construction admin)	LS	25%	1	\$13,564

Construction Cost Total \$68,000

This preliminary estimate was prepared using the following assumptions:

1. Quantities and costs are preliminary and subject to change upon completion of detailed construction plans and geotechnical report.
2. Preliminary cost estimate based on grinding existing pavement and inlaying/overlaying new pavement
3. Pavement grinding is assumed to be 3"(avg).
4. Pavement inlay/overlay is assumed to be 4" for most areas.
5. Unit Costs based on ODOT Weighted Average Bid Item Price Report 2015

Tualatin ADA Parking Improvements - Preliminary Construction Cost Estimate Red Lot

Otak Project #17919

<u>ITEM / DESCRIPTION</u>	<u>UNIT</u>	<u>UNIT COST</u>	<u>QUANTITY</u>	<u>COST</u>
Clearing & Grubbing	LS	\$2,000	1	\$2,000
Mobilization	LS	\$5,000	1	\$5,000
Erosion Control	LS	\$2,000	1	\$2,000
Asphalt roadway (4")	SY	\$25	80	\$2,000
Cold Plane Pavement Removal (3")	SY	\$10	70	\$700
Asphalt Sawcutting	LF	\$3	80	\$240
Concrete Sidewalk	SF	\$10	190	\$1,900
Concrete Curbs	LF	\$25	30	\$750
ADA Ramps	EA	\$2,500	1	\$2,500
Striping	LF	\$5	130	\$650
Disable Parking Legend	EA	\$250	0	\$0
Legend Removal	EA	\$50	2	\$100
Striping Removal	LF	\$1	0	\$0
			Subtotal	\$17,840
Construction Contingency	LS	30%	1	\$5,352
Soft Costs (engr, survey, construction admin)	LS	25%	1	\$5,798

Construction Cost Total \$29,000

This preliminary estimate was prepared using the following assumptions:

1. Quantities and costs are preliminary and subject to change upon completion of detailed construction plans and geotechnical report.
2. Preliminary cost estimate based on grinding existing pavement and inlaying/overlaying new pavement
3. Pavement grinding is assumed to be 3"(avg).
4. Pavement inlay/overlay is assumed to be 4" for most areas.
5. Unit Costs based on ODOT Weighted Average Bid Item Price Report 2015

Tualatin ADA Parking Improvements - Preliminary Construction Cost Estimate Green Lot

Otak Project #17919

<u>ITEM / DESCRIPTION</u>	<u>UNIT</u>	<u>UNIT COST</u>	<u>QUANTITY</u>	<u>COST</u>
Clearing & Grubbing	LS	\$2,000	1	\$2,000
Mobilization	LS	\$5,000	1	\$5,000
Erosion Control	LS	\$2,000	1	\$2,000
Asphalt roadway (4")	SY	\$25	130	\$3,250
Cold Plane Pavement Removal (3")	SY	\$10	100	\$1,000
Asphalt Sawcutting	LF	\$3	90	\$270
Concrete Sidewalk	SF	\$10	900	\$9,000
Concrete Curbs	LF	\$25	60	\$1,500
ADA Ramps	EA	\$2,500	2	\$5,000
Striping	LF	\$5	190	\$950
Disable Parking Legend	EA	\$250	0	\$0
Legend Removal	EA	\$50	3	\$150
Striping Removal	LF	\$1	0	\$0
			Subtotal	\$30,120
Construction Contingency	LS	30%	1	\$9,036
Soft Costs (enrg, survey, construction admin)	LS	25%	1	\$9,789

Construction Cost Total \$49,000

This preliminary estimate was prepared using the following assumptions:

1. Quantities and costs are preliminary and subject to change upon completion of detailed construction plans and geotechnical report.
2. Preliminary cost estimate based on grinding existing pavement and inlaying/overlaying new pavement
3. Pavement grinding is assumed to be 3" (avg).
4. Pavement inlay/overlay is assumed to be 4" for most areas.
5. Unit Costs based on ODOT Weighted Average Bid Item Price Report 2015

Tualatin ADA Parking Improvements - Preliminary Construction Cost Estimate Yellow Lot

Otak Project #17919

<u>ITEM / DESCRIPTION</u>	<u>UNIT</u>	<u>UNIT COST</u>	<u>QUANTITY</u>	<u>COST</u>
Clearing & Grubbing	LS	\$2,000	1	\$2,000
Mobilization	LS	\$5,000	1	\$5,000
Erosion Control	LS	\$2,000	1	\$2,000
Asphalt roadway (4")	SY	\$25	140	\$3,500
Cold Plane Pavement Removal (3")	SY	\$10	140	\$1,400
Asphalt Sawcutting	LF	\$3	62	\$186
Concrete Sidewalk	SF	\$10	450	\$4,500
Concrete Curbs	LF	\$25	20	\$500
ADA Ramps	EA	\$2,500	2	\$5,000
Striping	LF	\$5	220	\$1,100
Disable Parking Legend	EA	\$250	0	\$0
Legend Removal	EA	\$50	3	\$150
Striping Removal	LF	\$1	0	\$0
			Subtotal	\$25,336
Construction Contingency	LS	30%	1	\$7,601
Soft Costs (enrg, survey, construction admin)	LS	25%	1	\$8,234

Construction Cost Total \$42,000

This preliminary estimate was prepared using the following assumptions:

1. Quantities and costs are preliminary and subject to change upon completion of detailed construction plans and geotechnical report.
2. Preliminary cost estimate based on grinding existing pavement and inlaying/overlaying new pavement
3. Pavement grinding is assumed to be 3" (avg).
4. Pavement inlay/overlay is assumed to be 4" for most areas.
5. Unit Costs based on ODOT Weighted Average Bid Item Price Report 2015

Tualatin ADA Parking Improvements - Preliminary Construction Cost Estimate White Lot

Otak Project #17919

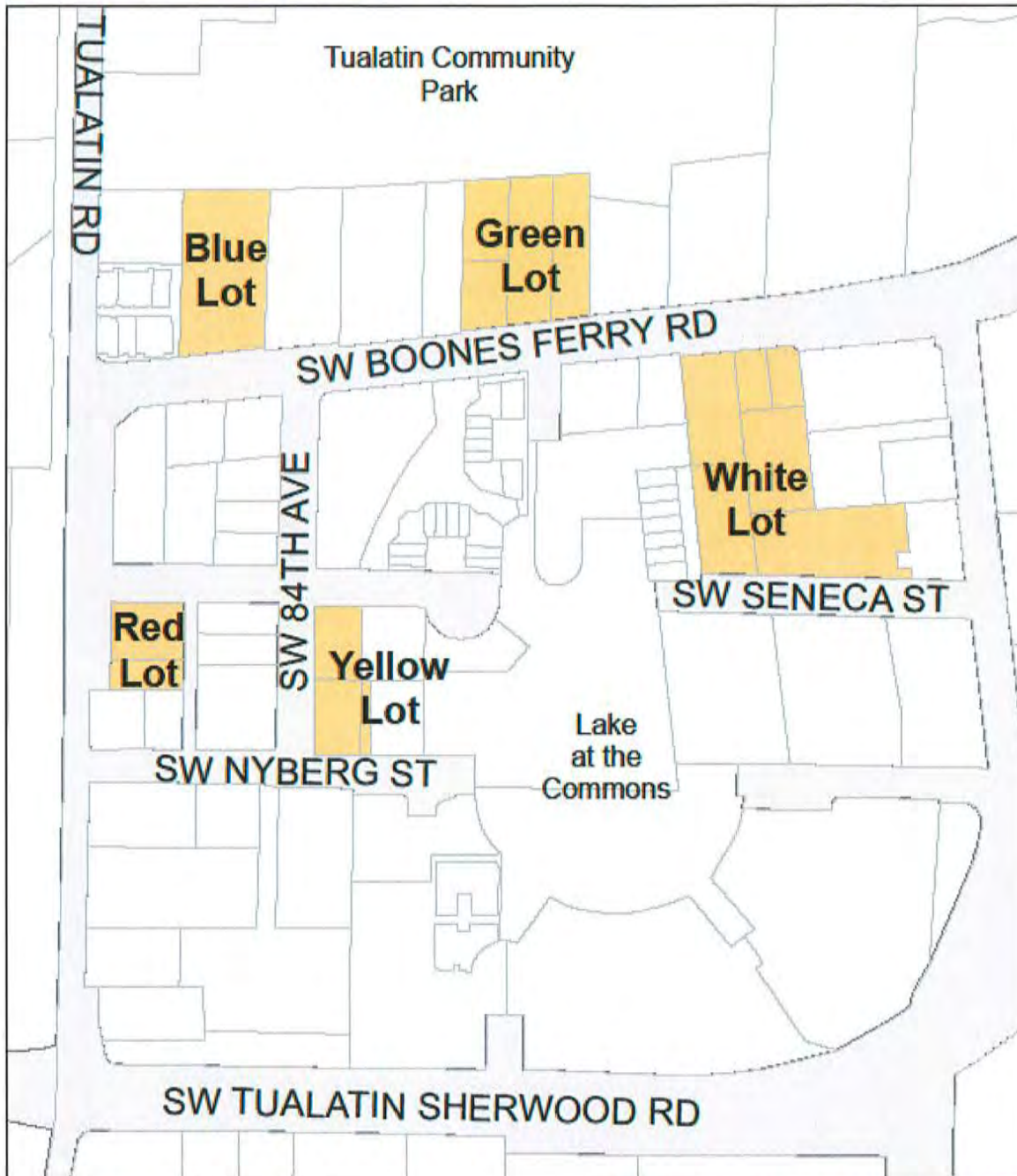
<u>ITEM / DESCRIPTION</u>	<u>UNIT</u>	<u>UNIT COST</u>	<u>QUANTITY</u>	<u>COST</u>
Clearing & Grubbing	LS	\$2,000	1	\$2,000
Mobilization	LS	\$5,000	1	\$5,000
Erosion Control	LS	\$2,000	1	\$2,000
Asphalt roadway (4")	SY	\$25	100	\$2,500
Cold Plane Pavement Removal (3")	SY	\$10	60	\$600
Asphalt Sawcutting	LF	\$3	100	\$300
Concrete Sidewalk	SF	\$10	2,040	\$20,400
Concrete Curbs	LF	\$25	45	\$1,125
ADA Ramps	EA	\$2,500	5	\$12,500
Striping	LF	\$5	220	\$1,100
Disable Parking Legend	EA	\$250	2	\$500
Legend Removal	EA	\$50	6	\$300
Striping Removal	LF	\$1	60	\$60
			Subtotal	\$48,385
Construction Contingency	LS	30%	1	\$14,516
Soft Costs (enrg, survey, construction admin)	LS	25%	1	\$15,725

Construction Cost Total \$79,000

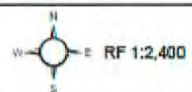
This preliminary estimate was prepared using the following assumptions:

1. Quantities and costs are preliminary and subject to change upon completion of detailed construction plans and geotechnical report.
2. Preliminary cost estimate based on grinding existing pavement and inlaying/overlaying new pavement
3. Pavement grinding is assumed to be 3"(avg).
4. Pavement inlay/overlay is assumed to be 4" for most areas.
5. Unit Costs based on ODOT Weighted Average Bid Item Price Report 2015

Public Parking Downtown



 Public Parking Lots

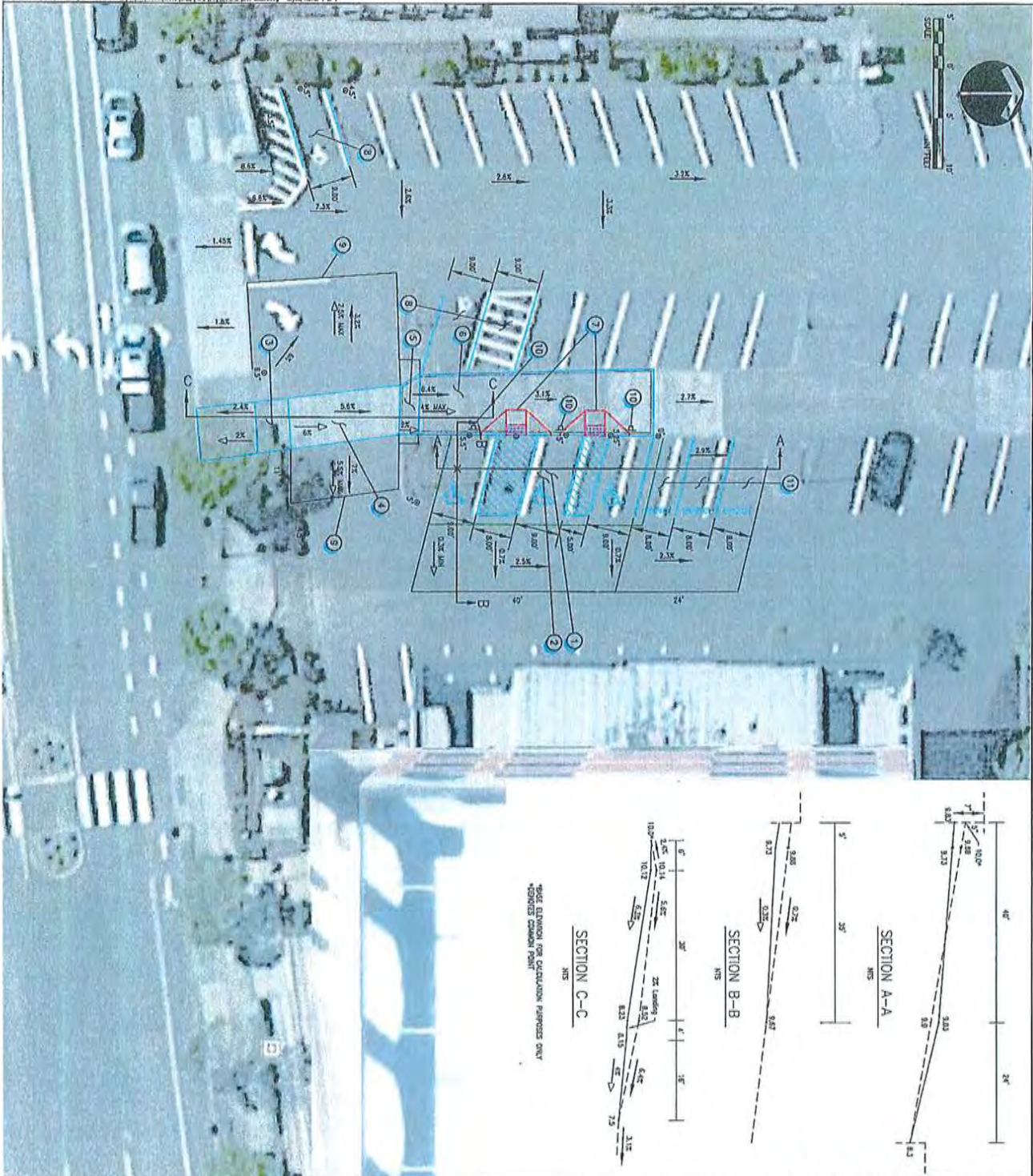


This map is derived from various digital database sources. While an attempt has been made to provide an accurate map, the City of Tualatin, OR assumes no responsibility or liability for any errors or omissions in the information. This map is provided "as is". Engineering and Building Dept. Posted 3/12/2008

Appendix: Otak Drawings of Lots and Fixes (6 attachments)

White Lot: ADA Plan (1 attachment)





- IMPROVEMENT NOTES:**
- 1) Relocate ADA stairs to east of raised median.
 - 2) Grid and show new location of stall to 2% or less.
 - 3) Replace sidewalk at 0.33% or less for 5'.
 - 4) Replace slope less at 5.00% or less for 24'.
 - 5) Install 2% parking.
 - 6) Replace sidewalk at 5.00% or less for 30'.
 - 7) Install ADA compliant ramp.
 - 8) Re-stripe existing ADA stalls to register slope.
 - 9) Transition to existing pavement.
 - 10) Install ADA compliant signage.
 - 11) Re-stripe existing stalls.

LEGEND

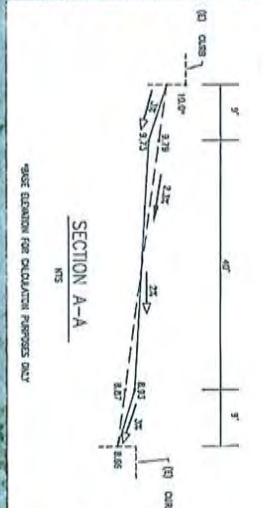
SYMBOL	DESCRIPTION
⊙	CURB AND HEIGHT
→	EXISTING GRADE % AND DIRECTION
→	PROPOSED GRADE %
⊔	ADA SIGN

NOT FOR CONSTRUCTION

TUALATIN PARKING
TUALATIN, OREGON
BLUE LOT IMPROVEMENTS



NO.	DATE	BY	REVISION COMMENTS



- IMPROVEMENT NOTES:**
1. Clear and lay out stiles to 2% or less.
 2. Initial ADA compliant temp.
 3. Replace sidewalk at 8.13% or less for 30'.
 4. Initial 2% bonding.
 5. Transition to existing sidewalk.
 6. Adjust signs.
 7. Replace sidewalk with 2% max cross slope.
 8. Transition to existing pavement.

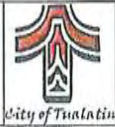
LEGEND

○	SYMBOL	DESCRIPTION
⊙		CURB AND HEIGHT
→		EXISTING GRADE % AND DIRECTION
→		PROPOSED GRADE %
LA		ADA SIGN

NOT FOR CONSTRUCTION

TUALATIN PARKING

TUALATIN, OREGON
GREEN LOT IMPROVEMENTS



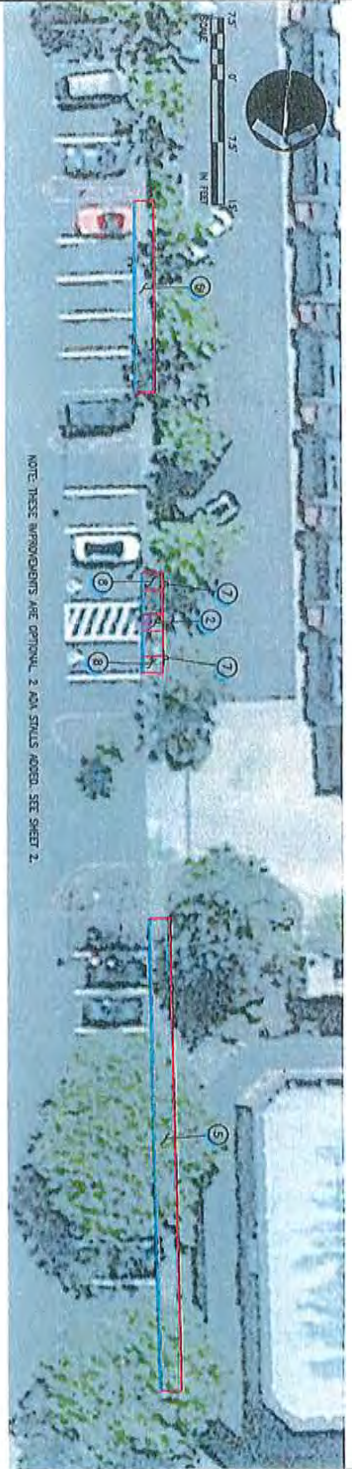
ORAK
 Municipal District
 800 W 34th Ave, Ste 200
 Portland, OR 97204
 Phone: (503) 835-2000
 Fax: (503) 835-2001
 www.orak.com

173173 Green Garage
 Project No. Drawing No.
 Sheet No. 1 of 1
 Date: Jan. 2017

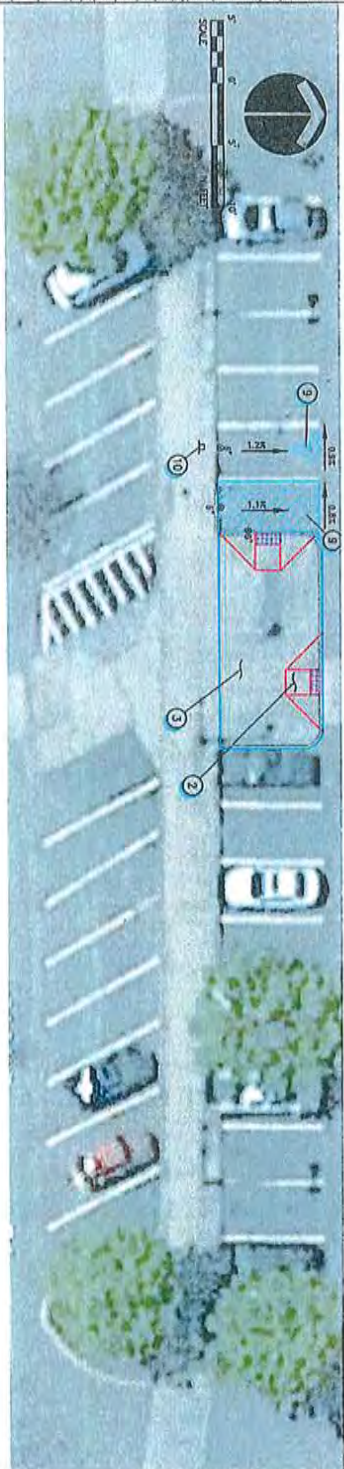
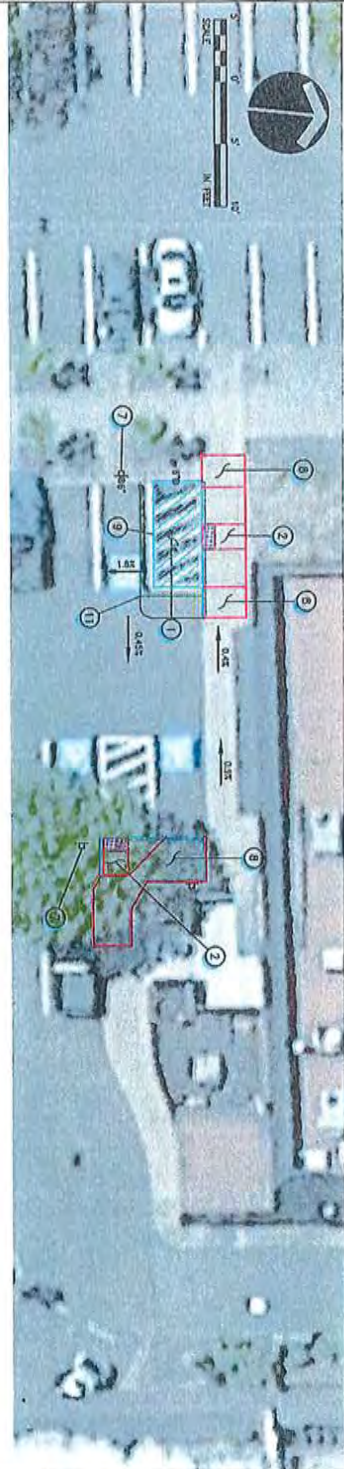
Datum: NAVD 88

NO.	DATE	BY	REVISION COMMENTS

Design: Drawn: Checked: Date: Issue Date: MAY 23, 2016



NOTE: THESE IMPROVEMENTS ARE OPTIONAL. 2 FOR STALLS AROUND SEE SHEET 2.



IMPROVEMENT NOTES:

- 1) Close end inlet stalls to 25' or less.
- 2) Initial ADA compliant ramp.
- 3) Reconstruct sidewalk to ADA specifications.
- 4) Transition to existing sidewalk.
- 5) Reconstruct 115' of sidewalk to ADA specifications.
- 6) Reconstruct 45' of sidewalk to ADA specifications.
- 7) Adjust signs.
- 8) Transition to existing sidewalk.
- 9) Re-define ADA stalls.
- 10) Reconstruct existing sign.
- 11) Transition to existing pavement.

LEGEND

SYMBOL	DESCRIPTION
⊙	CURB AND HEIGHT
→	EXISTING GRADE, % AND DIRECTION
→	PROPOSED GRADE, %
⊥	ADA SIGN

NOT FOR CONSTRUCTION

TUALATIN PARKING
TUALATIN, OREGON
WHITE LOT IMPROVEMENTS

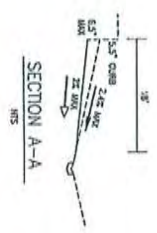


NO.	DATE	BY	REVISION COMMENTS

OTAK
 17219 S. WILSON AVENUE
 SUITE 200
 TUALATIN, OREGON 97148
 TEL: (503) 431-2000
 FAX: (503) 431-2001
 WWW.OTAK.COM

Project No: **2015-001**
 Sheet No: **012**

Date: **NOV 08**



IMPROVEMENT NOTES:

- 1) Child and baby stroller to 22" or less.
- 2) Install ADA compliant ramp.
- 3) Reconstruct sidewalk to ADA specifications.
- 4) Transition to existing sidewalk.
- 5) Reconstruct 45' of sidewalk to ADA specifications.
- 6) Reconstruct 115' of sidewalk to ADA specifications.
- 7) Install ADA signage.
- 8) Transition to existing sidewalk.
- 9) Re-align ADA stroller.
- 10) Reconstruct existing sign.
- 11) Transition to existing pavement.
- 12) Remove existing sidewalk and extend parking stall to minimum length of 15'.

LEGEND

SYMBOL	DESCRIPTION
⊙	CURB AND HEIGHT
→	EXISTING GRADE % AND DIRECTION
→	PROPOSED GRADE %
□	ADA SIGN



NOT FOR CONSTRUCTION

TUALATIN PARKING
TUALATIN, OREGON
WHITE LOT IMPROVEMENTS



NO.	DATE	BY	REVISION COMMENTS

Prepared by: **2 of 4**
Checked by: **2 of 4**
Drawn by: **2 of 4**
Scale: **2 of 4**
Date: **2 of 4**

 PARKING SPACE NUMBERS REFLECT PROPOSED CHANGES 

White Lot

174 Spaces

- One Hour - 30 Spaces
- Two Hours - 22 Spaces
- Three Hours - 45 Spaces
- Four Hours - 6 Spaces
- Long Term - 65 Spaces
- Disabled - 6 Spaces

