

**CITY OF MONROE PUBLIC WORKS
DESIGN, CONSTRUCTION AND OPERATIONS STANDARDS**

**SECTION 3
STREETS AND RELATED WORK**

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CITY OF MONROE PUBLIC WORKS DESIGN, CONSTRUCTION AND OPERATIONS STANDARDS

SECTION 3 STREETS AND RELATED WORK

3.1 GENERAL REQUIREMENTS

All work performed in the design, preparation of plans, and construction or improvement of all streets and appurtenances, whether public or private, is the responsibility of the Developer and must be completed to the satisfaction of the Public Works Director in accordance with these standards.

All design and construction of public and private streets and appurtenances shall conform to these Standards, the latest editions of the WSDOT/APWA Standard Specifications and the AASHTO Policy on Geometric Design of Highways and Streets. If inconsistencies arise, the City of Monroe Design and Construction Standards shall take precedence.

No permits will be issued to start work until plans for the work are approved and the necessary bonds have been provided.

Any revisions to previously approved civil construction plans must be submitted to and approved by the Public Works Director before construction. A set of record drawings must be submitted at the completion of the project. Final acceptance of the work is conditioned on approval of record drawings. See individual utility sections of the City of Monroe Design and Construction Standards for more specific record drawing requirements.

The Monroe Municipal Code and the City of Monroe Design and Construction Standards establish requirements for the installation of street improvements. Permit applications may be reviewed at a scheduled pre-application conference with the Developer or at the time of permit application submittal and/or issuance.

See Section I – General Considerations, for construction plans requirements and required Standard Notes on Plans.

3.2 ROADWAY CLASSIFICATION AND GEOMETRICS

3.2.1 General

3.2.1.1 Road Classifications

1. Contact the Public Works Department for the roadway functional classification of existing roads. Minimum requirements for each classification are shown in Standard Detail 300. Additional right-of-way and traffic lanes may be required to accommodate turning movements at intersections and

parking, as determined by a traffic impact analysis for a proposed project and future anticipated needs.

2. The minimum structural sections and location of curb & gutter and sidewalk are shown on Standard Details 301 through 304. The Public Works Director may require the final lift of asphalt to be bonded and delayed for up to one year from final plat approval or final acceptance of street improvements, whichever is longer. A geotechnical study including recommendations will be required for any proposed new road construction, widening of existing roadways, or major repair and overlay work to verify structural section requirements. The Developer must submit such reports, prepared by a professional engineer licensed in the state of Washington, for review by the Public Works Department. Modifications to the minimum road structural sections may be required to address site specific soil conditions, drainage considerations, and vehicle loads, and when necessary increased over the minimum section shown in the Standards. The proposed road section shall have a structural number equal to or greater than the standard. Where transit or truck traffic is anticipated, the Developer's traffic and geotechnical engineers should evaluate the adequacy of the proposal and recommend additional specific measures to ensure a minimum 20-year design life for the new asphalt pavement section. A minimum 40-year design life is to be used for concrete pavement sections.

3.2.1.2 Rights-Of-Way and Easements

1. Deeded or dedicated right-of-way is required for all public roadway improvements. All portions of the traveled way, curbs, gutters, sidewalks, medians, bike lanes, drainage facilities, traffic signal system components, and other required improvements must be located within the right-of-way. If traffic control signage is not within the right-of-way, an easement must be provided that specifically allows the installation of traffic signage. That easement need not be exclusively for traffic signage.
2. Where existing right-of-way width is not sufficient to construct the required or planned future improvements, the Developer must obtain and dedicate to the City the necessary additional right-of-way.
3. Easements for construction, access, maintenance, sight distance preservation, roadway slopes, utilities, and storm drain installation may be required, in addition to required rights-of-way, in conjunction with roadway improvements. Street landscaping, as required, must be included in the easements if it is not within the right-of-way. If those easements are not within the boundaries of the proposed development under review, the Developer must obtain necessary easements and provide recorded copies of such easements to the City prior to approval of construction plans.

4. When off-site or on-site easements for the extension of streets are required, the easements must be approved and recorded prior to the approval of the construction plans and permits.
5. If an existing residential lot with a dwelling unit is short platted to add one additional residential dwelling unit, paved access can be 16 feet wide within a private access easement. However, only two dwelling units can use the access regardless of any future re-platting of the property.

3.2.1.3 Bike Lanes

On-street bikeways are generally shared with other motor vehicles on local access streets. It is desirable to provide dedicated bike lanes or off-street shared use paths on Collector and Arterial corridors. Bikeways are categorized below, based on degree of separation from motor vehicles and other transportation modes.

Shared use paths are at least 10 feet wide, with 12 feet being the preferred, but not required, width.

Bike lanes are 5 feet wide on a curbed road as measured from the face of curb and a minimum of 5 feet wide as a shoulder bike lane. On collector and arterial streets with on-street parking, the bike lane must be a striped 5-foot-wide lane outside of the 8-foot-wide parking strip. As a general rule, bike lanes are required on collector and arterial streets, but the design engineer must verify with the Director on a project specific basis.

Exact locations of bike lanes with respect to sidewalks and road lanes will be determined on a project specific basis. If the required bike lane will not fit within the existing right-of-way available, then the Developer must obtain, at their cost, and dedicate to the City the additional right-of-way and easements necessary. All bicycle facilities must conform to AASHTO/WSDOT standards for bike lanes, trails, and paths.

3.2.1.4 Private Streets

At a minimum all proposed private streets must satisfy all of the following requirements:

1. Must be located in an established tract providing legal access to each affected lot, sufficient to accommodate the required improvements; and
2. Must be located in a development where future road extension or half-road access to adjacent properties and/or existing or proposed streets is not feasible because of environmental constraints or full build-out of adjacent parcels; and
3. Must be meet the street standards outlined in Standard Detail 300 and the Monroe Municipal Code; and
4. Must be less than 150 feet long as measured from the curblines of the intersecting public road along the centerline of the private road to the end of

pavement or curb or, if longer than 150 feet, terminate in an approved emergency vehicle turn-around that is accessible at all times for emergency and public service vehicle use; and

5. Must not conflict with the goals of the City of Monroe Comprehensive Plan or the Capital Facilities Plan; and
6. Must not result in land locking of present or future parcels; and
7. Must be maintained by an owner or homeowners association or other legal entity made up of all benefited property owners, as noted on the face of the plat; and
8. Must be clearly described on the face of the plat, and clearly signed at appropriate locations as a private street, not maintained by the City of Monroe.

3.2.1.5 Clear Zones

Roadside obstacles in the right-of-way shall be located so that adequate clear zones are provided.

1. Clear zone standards for road with posted speed limits of 35 mph or less shall be:
 - A. Two (2) feet behind the face of curb, or
 - B. Ten (10) feet beyond the edge of traveled way (for uncurbed shoulders).
2. Clear zone standards for roads with posted speed limits greater than 35 mph shall comply with Chapter 7 of the WSDOT Design Manual.
3. New roadside features that could present a public hazard shall be placed outside the clear zone areas.
4. Installation of poles and other above ground appurtenances will not be permitted in sidewalks, walkways, or bikeways. There shall be an unobstructed vertical clearance of at least seven (7) feet above the surface of any sidewalk or walkway and eight (8) feet above any bikeway.

3.2.2 Horizontal and Vertical Alignment

Alignment of roadways, both horizontally and vertically, must be in conformance with the guidelines of the AASHTO Policy on Geometric Design of Highways and Streets and the WSDOT Design Manual. All new frontage improvements or other street improvements, whether public or private, must conform to the AASHTO minimum design geometrics for safe stopping and entering sight distance, consistent with the procedure described in the AASHTO Policy or the Monroe Standards.

3.2.2.1 Street Layout

Design considerations for street layout in new developments must be consistent with the City of Monroe Comprehensive Plan, MMC Title 22, and include the following:

1. Provide for the continuation or appropriate projection of existing streets in surrounding areas. This includes, but is not limited to, new/completed street linkages compatible with an overall city circulation network to provide improved connectivity of the street system, half-street improvements to provide access to adjacent developable or re-developable properties to minimize intersection spacing, and temporary road terminations to provide future extension to adjacent developable or re-developable properties.
2. Where a subdivision abuts or contains an existing or proposed arterial street, the City may require marginal access streets, reverse frontage lots with screen planting contained in a non-access reservation along the rear property line, deep lots with rear service alleys, or such other treatment as may be necessary for adequate protection of residential properties and to afford separation of through and local traffic.
3. A tangent must be introduced between reverse curves. The tangent must be at least 100 feet long for arterial and collector streets, and 50 feet long for residential access streets.
4. Street intersections with centerline offsets of less than 300 feet for arterials and collectors and 150 feet for residential access streets must be avoided.
5. Streets must intersect at right angles, plus or minus 5 degrees, measured along the street centerlines 10 feet beyond the intersection of the rights-of-way.
6. Property lines at street intersections must be rounded with a radius of at least 10 feet. A greater radius may be required in some situations and comparable cutoffs or chords in place of rounded corners may be permitted.
7. Street right-of-way widths must be as shown in Standard Detail 300. A wider right-of-way may be required to accommodate bicycle facilities, additional travel lanes, or other needs as determined by the traffic analysis and approved by the City.
8. The use of shared driveways is encouraged on arterials to minimize the number of access points.
9. Commercial and multifamily driveway centerline offsets must align with any opposing driveways or be offset by no less than 125 feet where possible.
10. Driveway access directly onto arterials may be denied if an alternate access is available.
11. Street layout shall provide access to adjoining, undeveloped property wherever feasible.

12. Where more than 30 dwelling units are designed or ultimately intended in a residential development, either single family, multifamily, retirement, or similar, there must be a minimum of two access points to the public street system. Such access points must be located at least one-half the maximum diagonal dimension of the development site apart and provide circulation, alternate emergency vehicle access routes, through access, and meet general area transportation design considerations.
13. Street grade must not exceed 12 percent.

3.2.2.2 Half Streets (see Standard Detail 332)

1. A half street may be permitted as an interim Local Access street facility when:
 - a. Such street will not serve as primary access to more than 30 dwelling units or parcel; and
 - b. Such alignment is consistent with or will establish a reasonable circulation pattern; and
 - c. There is reasonable assurance of obtaining the prescribed additional right-of-way from the adjoining property with topography suitable for completion of a full-section road.
2. A half street must meet the following requirements:
 - a. Right-of-way width of the half street must equal at least 32 feet and encompass all required improvements; and
 - b. If feasible, the half street must be graded consistent with the centerline of the ultimate road section on the property line; and
 - c. The traveled way must be surfaced the same as the designated road type to a width not less than 22 feet (28 feet with parking lane); the sidewalk and landscape must be constructed as required for the designated road type; and
 - d. The property line edge of the street must be finished with temporary curbing, shoulders, ditches, and/or side slopes so as to ensure proper drainage.
 - e. Bank stability must be placed on the unfinished side of the street; and
 - f. Half streets must not intersect other half streets.
3. When a half street is eventually completed to a whole street, the completing builder must reconstruct the portions of the original half street as necessary to produce a proper full-width street meeting all criteria of these Standards.
4. The Developer must obtain any right-of-way or easements needed to accomplish the above.

3.2.2.3 Alleys

1. An alley must have at least a 20-foot-wide paved surface within a right-of-way or tract at least 25 feet wide.
2. Alleys will have an inverted crown to keep drainage facilities readily accessible, with appropriate storm drainage facilities to collect and convey stormwater runoff.
3. Alley intersections and sharp horizontal changes in alignment must meet low speed turning radii and sight distance requirements to permit safe vehicular movement.
4. Dead-end alleys are not permitted.

3.2.2.4 Driveways

Driveways must be sized and located in a manner that maintains or provides safe traffic movement on the accessed street.

No driveway approach will be permitted to encompass any infrastructure, such as hydrants, meters, blow-offs, pump stations, etc. Permit conditions may require the Developer to relocate such infrastructure, including any within the limits of a curb return, which may be encroached upon as allowed.

1. At intersections, no portion of any driveway approach, including end slopes, will be permitted closer than 4 feet to the end of the curb return. Residential Driveways/Approaches must comply with the following:
 - a. A driveway approach width is the length of curb fully depressed to match street grade to allow vehicular access into the property, not including any tapering height curb. Where there is no curb, the approach width is the driveway width at the edge of street pavement.
 - b. Where a driveway approach in excess of 16 feet is requested for a single lot, the maximum approaches are as follows:

Table 1

Frontage	Maximum Driveway Approach One Driveway	Maximum Driveway Approach Two Driveways
30 to 60 feet	20 feet	NA
Over 60 feet but not exceeding 100 feet	25 feet	20 feet each

2. Areas of Limited Street Improvements.
 - a. Where standard gutters and curbs have been installed, but concrete sidewalks have not, the permit may authorize the Developer to construct the driveway approach, from the curb line to the subject property, of Hot Mix Asphalt. Such driveway approach must be constructed to approved

grade and must be adequate and suitable for the traffic to be carried by it. The permit will require that, if and when thereafter concrete sidewalks are constructed, the Developer or their successor must obtain a right-of-way permit and install concrete driveway approaches.

- b. Where standard gutters and curbs have not been installed, the apron length must be measured along the property line and there must be not less than 20 feet of frontage between driveway approaches serving any one property. Permits will not be issued for any surface improvement or paving on the street right-of-way between driveway approaches unless a concrete curb or other physical obstruction of a design satisfactory to the Public Works Department is constructed and maintained by the owner along their property line so that the entrance and exit of vehicles to and from the owner's property will be restricted to the established driveway approaches. Pursuant to the permit conditions, the Developer may surface the driveway approaches or other areas within the right-of-way, extending the same type paving used on the subject property so that it merges with the street pavement; provided the paving is adequate and suitable for the traffic to be carried. Such extended paving between the property line and the street pavement must be to established grade or other slope, as designed by the Developer's engineer and approved by the Public Works Department, to provide for proper runoff.
 - c. Such paving between the property line and the street pavement may meet the street pavement at a point ahead of the curb opening in order to provide for safe deceleration of vehicles turning into the driveway. If the project paving is extended beyond the property line into a street right-of-way at an intersection or crossroad, the City may require the Developer to construct a suitable traffic island or curb to protect municipal facilities, as may be necessary.
 - d. Approaches - Encroachment on public property is prohibited. City street rights-of-way may not be used for private residential or commercial purposes. A permit for the construction of driveway approaches will not be issued unless vehicles to be served or serviced can be parked entirely within the private property lines.
3. Driveways accessing any arterial or collector street and serving more than 10 vehicle trips in any given hour may be required to align at all times with opposing driveways or be offset by a minimum of 125 feet. Restrictions on the access of a development may be imposed by the Public Works Department if the development is likely to exacerbate or create potential safety hazards as a result of the development.
 4. The use of shared driveways is highly encouraged to minimize the number of access points on arterials and collector streets.

5. Driveways that extend more than 150 feet from a Public Road, or Fire Department accessible Private Road, must be designed as a Fire Lane.
6. Driveways giving access directly onto arterials may be denied if alternate access is available.
7. Commercial Driveways

When allowed, driveways located closer than 100 feet from the approach to an arterial intersection may require medians, Type C curbs, and/or signing to restrict access to safe movements only.

See Standard Details 310, 311, and 312.

Grade: A maximum grade of 15 percent is allowed. Vertical curves must be used for smooth transitions at significant grade differentials.

8. Intersection Type Driveways

Private intersection type driveway openings will be considered in lieu of conventional driveways in commercial areas if all the criteria below are met. However, meeting the criteria does not guarantee that an intersection type driveway will be allowed.

- a. Projected driveway usage is greater than 1,000 vehicles per day.
- b. The opening is at least 160 feet from any other intersection.
- c. The opening is at least 160 feet from any other driveway on the property frontage under control of the Developer.
- d. A minimum 100 feet throat length is provided between the curb line on the street and any area required for turning or parking maneuvers within the development.
- e. If a driveway intersects with state route right-of-way, the Developer must also coordinate with WSDOT.

9. Driveway throat Length Requirements for Commercial Properties

The throat length is the unobstructed area measured from the inside face of curb to the first driveway or parking stall. The minimum throat length must be 25 feet for all land uses, and the throat length must be of sufficient length to eliminate interruption of through traffic on the primary roadway. Throat lengths for collectors and arterials will be at least 50 feet to accommodate higher driving speeds and traffic site distance requirements. The throat length for any driveway that will carry 50 or more trips in any single hour must be evaluated and addressed in the development traffic impact analysis for review by the City. The City reserves the right to require longer throat lengths if necessary to maintain traffic safety and uniform flow on the accessed street.

3.2.2.5 Private Access Tracts

Private Access Tracts are privately owned and maintained tracts that conform to the requirements shown on Standard Details 300, 302, and 303.

3.2.3 Sight Distance

In general, sight distance requirements must comply with the current AASHTO Policy on Geometric Design. The area within the sight distance triangles will be subject to restrictions as necessary to maintain a clear view on the intersection approaches.

Intersection sight distances must be evaluated based upon the values noted on Standard Detail 331 for Sight Distance setback lines at controlled intersections. Sight distance requirements for each approach must be based upon the posted speed of the cross street. For uncontrolled and yield intersections along 25 mph local streets, the sight distance must be evaluated based upon the values noted in Standard Detail 332.

Driveways are also subject to sight distance triangle restrictions, including landscaping and placement of view obstructions, and landscape medians or islands. See Standard Detail 333.

Other factors, such as vertical and horizontal curves and roadway grades, need to be taken into account. Such factors may necessitate a modification to the intersection sight distance requirements.

The vertical clearance area within the sight distance triangle must be free from obstructions to a motor vehicle operator's view.

3.2.4 Intersections

Every intersection must be designed to accommodate the design vehicle appropriate for the highest classified street forming the intersection. Design vehicle must be SU for residential streets, and WB-40 for commercial area roadways. When the intersection is along a transit or school bus route, BUS design vehicle must be used as a minimum. If an intersection is utilized frequently by large vehicles, WB-50 may be used for design vehicle. All elements of the intersection, including turning lanes and channelizing islands, must be designed so that a design vehicle will not encroach onto curbs, sidewalks, traffic control devices, channelizing islands, or center divisional medians, or encroach into the travel lanes of opposing flow traffic.

3.2.5 Curb Return Radius

Intersection turning radii are 25 feet for local/local access roads, 30 feet for collector and arterial streets, and 40 feet for intersections with frequent bus or large truck turning movements. Auto turn diagram may be required to verify the adequacy of turning radii.

Where high concentrations of pedestrians would warrant a lesser radius, a reduced radius to minimize pedestrian crossing length will be considered so long as the turning movements are not subject to a high degree of large truck/bus movements.

3.2.6 Street Ends

All roadways greater than 150 feet in length and serving three or more dwelling units require an approved turnaround. Private access roads are allowed in short plats that serve less than ten single family lots or full plats in the infill zone that serve 30 or fewer dwelling units. The turnaround for short plats must be a cul-de-sac or hammerhead designed per Standard Detail 304. Cul-de-sacs must be provided at all permanent public street ends, and/or on any temporary dead-end public streets when the length of the street is more than 150 feet. Cul-de-sacs must be designed per Standard Detail 304. Permanent street ends may not exceed 600 feet in length. Private access roads and tracts serving one or two single family lots do not require a turnaround regardless of length, but fire suppression systems may be required by the Fire Marshall.

3.2.7 Transit Amenities

If a project is conditioned to widen or reconstruct a roadway section on an established transit route designated as either a collector or an arterial, an in-line bus stop or pullout must be constructed using concrete pavement. At such locations, a concrete pad for a bus shelter must be provided. Design of the concrete bus stops, bus pullouts, and bus shelter pads require review and approval by both the City and Community Transit.

3.3 TRAFFIC IMPACT ANALYSIS

3.3.1 Responsibility and Purpose

A Traffic Impact Analysis (TIA) is required for any development activity that adds 10 or more vehicle trips to a road during either the AM or PM peak hour or adds more than 20 daily trips to a roadway or near an intersection that operates at or below Level of Service E. Such analysis must be prepared by a professional engineer, registered in the state of Washington, with experience in traffic engineering and/or transportation planning.

The extent of the analysis will be determined at the pre-application conference for the project and must be consistent with Public Works Department policies and procedures for the preparation of such analyses. Scoping the requirements for the analysis is intended to identify key issues early in the project planning and development stage, and assist the City during the review and approval process. The City will prepare a checklist documenting the requirements for the analysis. An electronic copy of the TIA must be submitted with the development permit application and other completed forms as required by the Public Works Department application procedures. A copy of the completed checklist must also be submitted with the application. Studies submitted without the completed application material will be considered incomplete, requiring a resubmittal.

Traffic Impact Analyses must show how the proposed development will affect the existing and future transportation network. If the final use(s) of the proposal are not determined at the time of the study, the land use with the greatest overall traffic impact must be assumed for the study. Once the City has reviewed the analysis and comments

have been returned to the Developer, any required changes must be incorporated in the analysis and a revised report must be submitted to the City for final review and approval.

3.3.2 Traffic Impact and Analysis Contents

While individual reports may vary in style and format, certain information must be included as identified in the Public Works Department TIA checklist and guidelines for preparation of TIAs. The amount of detail required, as well as the overall extent of the study, will be determined during the pre-application conference on a project-specific basis. General requirements of the TIA are outlined below. More detailed requirements are provided in the TIA checklist and guidelines.

1. Project Description
 - a. Project type and size.
 - b. Project location, with vicinity map.
 - c. Proposed site access, with site plan, at an appropriate scale for the project and vicinity.
 - d. Minimum two-year (from existing condition) planning horizon. Longer planning horizon may be necessary when determining ultimate size of a roadway facility or addressing multiple phases of a project.
2. Existing Conditions
 - a. Existing traffic volumes, daily turning movements.
 - b. Daily and intersection counts completed within one year prior to the development application is deemed complete.
 - c. Roadway network, including traffic control.
 - d. Level of service calculations at impacted intersections and site entrances, if applicable.
 - e. Parking supply.
3. Accident/Safety Conditions
 - a. Sight distance analysis at intersections and access points. Minimum stopping and entering sight distance as defined by AASHTO must be shown on the site plan or similar plan.
 - b. Clear zone analysis (document poles, hydrants, or other obstructions near travel edge).
 - c. Evaluation of accident data as available.

4. Trip Generation and Distribution
 - a. Trip generation using the latest ITE Generation manual or other approved method.
 - b. Trip distribution and assignment map showing turning movements assigned to roadway network. The proposed development's trips are to be distributed through the street network to a level as prescribed in the City's TIA guidelines, typically five (5) peak hour trips.
 - c. Parking generation analysis using the latest ITE Parking Generation manual or other approved method.
5. Public Transit and Non-Motorized Facilities
 - a. Identification of existing transit service.
 - b. Identification of existing trails, bicycle lanes, and other non-motorized facilities.
6. Future Conditions
 - a. Annual growth rate determined by actual data or other approved source.
 - b. Future conditions, with and without the project, with commentary on compliance with concurrency requirements as needed.
 - c. Level of service calculations sheets at all impacted intersections and site access points, with and without the proposed project.
 - d. Parking demand analysis.
 - e. Effect of proposed development on public transit and non-motorized facilities.
 - f. Any transportation facilities proposed by the Monroe Comprehensive Plan or adopted Transportation Improvement Plan which may affect the development.
7. Mitigation Measures
 - a. All development activities in the City are subject to the Transportation Mitigation requirements of the MMC.
 - b. Proposed mitigation to correct any deficiencies not addressed through the capital improvements identified in the latest Transportation Impact Fee Study.
 - c. Dedication of right-of-way and associated frontage improvements.
 - d. Evaluation of change in accident potential with proposals to correct safety deficiencies.
8. Other
 - a. Analysis of internal site circulation for vehicles, transit, non-motorized users, and handicap access.
 - b. Safe walk analysis—evaluation and coordination with the Monroe School District and the Public Works Department for providing safe walking conditions and routes for all new residential short plats, subdivisions, and commercial uses.

3.4 TRAFFIC CONTROL

3.4.1 Traffic Control Signage – Permanent

All permanent traffic control signing, striping and pavement marking for new development shall conform to the most current edition of the MUTCD and these standards. It shall be the developer's responsibility to furnish all materials and labor to install the traffic control features as shown on the approved permit construction plans.

Standard details 322 to 324 and 327 to 329 provide additional information and requirements.

3.4.2 Channelization Plans

All designs must be consistent with the MUTCD, AASHTO, WSDOT Design Manual, and the Monroe Standards. Plans must be prepared by a licensed engineer, registered in the state of Washington, with experience in preparation of channelization plans. A pre-design meeting may be required to identify key parameters of the design.

Standard Details 325 and 326 show typical lane configurations, and pavement markings. All new crosswalk installations must be thermoplastic or equal with supplemental signing as necessary. Mid-block crosswalks will require supplemental lighting or special treatment to maximize safety. Use of raised pavement markers supplemental to pavement lane striping may be required.

3.4.3 Traffic Signal Plans and Specifications

Traffic signal plans and specifications and other traffic control devices must be consistent and in conformance with regulations, policies, procedures, and specifications of the MUTCD, AASHTO, and WSDOT.

The Developer is responsible for securing any state and local permits needed for traffic signalization and regulatory signing and marking.

All signals must be equipped with preemption that is compatible with the equipment approved by the Fire District. New traffic signals installations must include a minimum of one spare conduit run for any arterial crossing.

Warrants for traffic signals must be consistent with the practices set forth in the MUTCD. The Public Works Director will determine consistency with these practices based on submitted information by the Developer when determining if a traffic signal is warranted and consistent with city planning.

Traffic signal interconnect to nearby affected signals may be required for any new traffic signal installation to promote progression of traffic and improved efficiency of the travel stream.

New mast arm street name signs must conform to Standard Detail 323.

3.5 SURVEYING AND MONUMENTATION

3.5.1 Description

This work consists of all the surveying and monumentation required to construct the project as described in the approved plans and the Monroe Standards.

All monumentation must comply with the requirements found in MMC 22.68.040. The Developer must furnish all materials and install monuments and castings in accordance with the approved plans. The monument disk must be furnished and installed by the Developer per Standard Detail 316.

Surveying, as required to construct a given project per the approved plans, must be furnished by the Developer at no expense to the City. It is required that, as a minimum, survey stakes be set for new curb and gutter construction, for both horizontal and vertical control corresponding to the City's current datum. Any water, storm drain, or sanitary sewer mains which are to be constructed in easements, are to have survey offset stakes set prior to starting work. Any deviation from that staked line must be left uncovered and re-surveyed to realign the easement as required and for as-built information.

Any project that impacts an existing monument must re-survey the monument after the work is completed so it can be used for horizontal and vertical control.

3.5.2 Materials

Materials for monumentation must conform to Standard Detail 317. The cover and seat must be machined so as to have perfect contact around the entire circumference and full width of bearing surface.

3.5.3 Construction

The Developer must provide the surveying required to establish or perpetuate land corner monumentation as may be required on the project. All surveying associated with final plat approvals for subdivisions or short subdivisions must comply with MMC 22.68.040(D)9.

All land corner surveying must conform to the requirements of RCW 58.09. If the Developer's surveyor replaces or restores an existing or obliterated General Land Office (GLO) corner, it is the Developer's responsibility to file Land Corner Records for these monuments with the County Auditor's Office. When all land corners have been established, replaced, or restored and monumented as described herein, the surveyor must certify this information with a letter to the Community Development Director and Public Works Director and transmit copies of any recorded surveys and documents. This certification letter must include the location of the monumented corner(s) and certify that all land corner(s) have been monumented as described herein.

The City reserves the right to check survey points and/or the correct locations and elevations of new construction. These spot-checks will not change the requirements for normal checking and testing as described elsewhere, and do not relieve the Developer of the responsibility of producing a finished product that is in accordance with the

approved plans. If errors are found due to errors or omissions by the Developer's survey activities, the Developer must correct the errors, including removing and replacing improvements, and pay all expenses, including the cost to re-survey.

The Developer's surveyor must provide the City with a copy of the recorded survey, survey notes, and a reproducible final drawing. If the survey was prepared on CADD, a disk of drawing must also be provided to the City.

3.6 STREET ILLUMINATION AND ELECTRICAL POWER

3.6.1 General

Street lighting systems must conform to the applicable portions of the APWA/WSDOT Standard Specifications Section 8-20 and the Illuminating Engineering Society (IES) manuals, except as modified by the City of Monroe herein.

Streetlights must be provided with the development of all new subdivisions, short plats, multifamily/townhome projects, planned unit developments, and for other commercial, industrial, or institutional property development. Streetlight poles on arterials must be aluminum or steel with a concrete base. On residential access streets, direct-buried fiberglass poles or better must be provided. The extent of lighting must include as a minimum, illumination of all affected frontage roads and internal roads, whether public or private, related to the development. Additional lighting beyond project limits may be required to address safe walk connections, as determined by the traffic impact analysis for the development.

Existing street lighting systems need not conform with the illumination standards contained herein.

3.6.1.1 Street Light Utility Maintenance

Streetlights located within Monroe will generally be owned and maintained by the Snohomish County PUD. The Developer is responsible for construction of streetlights and all accessories necessary to energize the streetlight system, which must be consistent with Monroe Standards. When feasible, all new streetlight wiring, conduit and service connections must be located underground. Other special luminaires, which are not consistent with Snohomish County PUD requirements, must be approved by the City. The installation and maintenance of special luminaires, not provided by Snohomish County PUD, is the responsibility of the Developer.

3.6.2 Design Standards

For all new streetlight installations, the Developer must coordinate with the Snohomish County PUD to prepare a street lighting plan for submittal to and approval by the Public Works Department.

All new developments must submit the lighting plan on a separate drawing to the City for review and approval.

3.7 ASPHALT, CONCRETE AND PAVEMENT PATCHING

3.7.1 Description

This work consists of asphalt concrete paving and the patching of various types of pavement cuts, the performance of which must be in accordance with the Monroe Standards, the current WSDOT/APWA Standard Specifications and Standard Detail 317.

3.7.2 Materials

All materials must conform to the requirements in the WSDOT/APWA Standard Specifications as follows:

1. Asphalt concrete pavement, including patching, must conform to hot mix asphalt meeting the requirements of 5-04, 9-02, and 9-03.
2. Paving asphalt must conform to Grade PG 58H-22.
3. Asphalt for a temporary patch must meet the requirements of 9-02.
4. Tack coat must be emulsified asphalt Grade CSS-1H or Performance Graded (PG) asphalt for tack coat as specified in 9-02.1(6).
5. Crack sealing must conform to asphalt rubber material.
6. Geotextile fabric for pavement reinforcement must be needle-punch non-woven 100 percent polypropylene. Products such as Petromat or Supac as manufactured by Phillips Fiber Corporation are acceptable. Other products may be submitted by the Developer for review as equal substitutions.
7. Asphaltic binder for use with geotextile fabric must conform to the manufacturer's recommendations for the fabric used. Cutback asphalts cannot be used with polypropylene fabrics due to reactions with solvents at high temperatures.
8. Crushed Surfacing Top and Base Courses must meet the requirements of 9-03.9.(3).
9. Cement concrete pavement patch must be Class 4000 meeting the requirements of 6-02.
10. Permeable pavement and pervious concrete pavement specifications have not yet been universally adopted by a broad cross-section of public and private agencies. Proposed permeable pavement and pervious concrete sections and materials will be reviewed on a case-by-case basis utilizing the most current best management practices at the time of submittal. The City reserves the right to make the final decision on all permeable pavement proposals on streets that will ultimately be owned and maintained by the City.

3.7.3 Construction Requirements

3.7.3.1 General

Signs, barricades, lights, and other warning devices must be installed per the requirements of the current MUTCD and must be maintained 24 hours a day until the roadway work is completed and ready for traffic.

The placing and compaction of the trench backfill and the preparation and compaction of the subgrade must be in accordance with the various applicable sections of the WSDOT/APWA Standard Specifications.

Compaction of the subgrade must be completed prior to the required asphalt work or patching as determined in the WSDOT Design Manual.

A minimum full-lane width, 2-inch minimum thickness grind and overlay is required for road widening or utility patches parallel to roadway. Up to full width, 2-inch minimum thickness overlay may be required for any road cutting or excavation. This additional pavement removal and replacement must extend a 5-foot minimum beyond trench edge. Transverse utility trenches must be restored with full road width Trench Cut patch (additional pavement removal and replacement) extending a 5-foot minimum beyond trench edge. On roads paved within the past 36 months, the patch will include a grind/overlay a minimum of 25' beyond the trench edge.

Pavement patching must be scheduled to accommodate the demands of traffic and must be performed as rapidly as possible to provide maximum safety and convenience to public traffic.

Before the pavement patch is constructed, the pavement must be saw cut or ground so that the marginal edges of the patch will form a rectangular shape with straight edges and vertical faces.

When required, cold patching along the edge of existing roadways and at interfaces with existing pavements must be completed to the widths and depths established in the approved plans, specifications, and Monroe Standards.

Geotextile fabric materials, when required in the approved plans, specifications, and Monroe Standards, must be placed and constructed according to the manufacturer's recommendations. Only developers experienced in the placement of the material shall perform the work. The Developer must review the project conditions, proposed placement methods, and equipment to be used with the City Inspector well in advance of the actual construction.

3.7.3.2 Asphalt Concrete on Granular Base

After the crushed surfacing course aggregate base has been leveled and compacted, asphalt treated bas or hot mix asphalt must be placed to the thickness indicated on the approved plans. Asphalt must be compacted to a minimum 91 percent of the reference maximum density as determined by AASHTO method T209 or current WSDOT Standards.

3.7.3.3 Temporary Pavement Patching

The Developer must furnish, place, and maintain temporary pavement patching, at locations as directed by the engineer, until such time as a permanent pavement patch can be made. Generally, the permanent patch must be completed within two weeks of the completion of trenching and road repairs.

A temporary pavement patch must consist of ½ HMA or approved cold mix paving product compacted to a firm and unyielding surface.

Temporary asphalt patching will be required where roadway or walk is needed for vehicular or pedestrian traffic during the construction period, until permanent pavement and sidewalks can be constructed.

In the event that the temporary surface subsides after the initial placement, additional asphalt or Crushed Surfacing must be applied to maintain the surface.

3.7.3.4 Cement Concrete Pavement Patching

Streets that have cement concrete pavements overlaid with asphalt concrete must be patched as shown on Standard Detail 317. After the Crushed Surfacing Top Course subgrade for the pavement has been constructed and compacted to line and grade, the cement concrete pavement patch must be placed and struck off to a thickness of 1 inch greater than the existing pavement or six (6) inch minimum, whichever is greater. All work must be in accordance with 5-05 of the WSDOT/APWA Standard Specifications, except as modified by the Monroe Standards.

The top surface of the concrete patch must match the top surface of the existing concrete base. In no case may the top of the concrete be higher than the top of the existing concrete base. Joints must be placed to match existing joints. Dowling of the new patch into the surrounding concrete may be required depending on patch size, location in the roadway, and other relevant factors.

Expansion joints and control joints must be placed to match existing joints. The surface of the concrete patch must be finished and brushed with a fiber brush to improve bonding with the asphalt overlay. Approved curing compound must be placed on the finished concrete immediately after finishing.

Asphalt concrete plant mix must not be placed until three days after the cement concrete base has been placed or 80% design strength verification provided by a licensed geotechnical laboratory. The asphalt concrete plant mix must not be placed until the concrete base has received a tack coat of CSS-1 at a rate of 0.12 to 0.20 gallons per square yard. The edges of the existing asphalt and castings must also be painted with the tack coat. The asphalt concrete pavement must then be placed, leveled, and compacted to conform to the surface of the existing asphalt pavement. Immediately thereafter, all joints between the new and original asphalt pavement must be painted with CSS-1, CCS-1H Emulsified Asphalt or Performance Graded (PG) Asphalt.

3.8 GUARDRAILS

Beam guardrails must be installed at locations determined during the project design and plan review process and as shown on the approved plans. Beam guardrails must conform to the current WSDOT Design Manual Chapter 1610.06. Project requirements for clear zone must conform to the current WSDOT Design Manual 1600.02(2). All plan submittals must include the current WSDOT Standard Plans specific to the project as noted in the current WSDOT Design Manual Chapter 1610.06. Alternative methods proposed by the Developer for providing roadway vehicle and pedestrian protection will be considered on a case-by-case basis.

3.9 MAILBOXES

New developments must provide mailboxes of the type, number, and at locations determined by the Monroe Postmaster and comply with clear zone location requirements within Section 3.2.1.6. The Developer must provide the Postmaster with two copies of the preliminary project site plans for use in establishing locations, types, and numbering of the mailboxes. The Postmaster will retain one copy and return the other redlined set to the Developer for use in preparing final plan.

1. In the case of new road construction or reconstruction requiring mailboxes to be relocated or rearranged, the Developer must coordinate through the Monroe Postmaster for acceptable mailbox locations and to ensure uninterrupted mail service. Approved locations for mailboxes must be shown on street construction plans.
2. For new construction where existing sidewalks are located adjacent to the curb, the sidewalk must be widened to provide an obstruction free clear width of not less than 5 feet, from back of mailbox structure to back of sidewalk per Standard Detail 320.

3.10 ROCKERIES AND ROCK WALLS

Concrete and structural retaining walls must be designed and constructed to meet the current adopted edition of the International Building Code. All retaining walls greater than 4' in height as measured from the bottom of the foundation to the top of the wall must obtain a building permit.

3.10.1 Description

Work must be performed in accordance with these standards and Standard Detail 321. Any rockeries over 4 feet high, measured as exposed wall face excluding buried base course, must be designed by an engineer licensed in the state of Washington. Shorter walls with surcharging from slopes above the wall and/or building foundations near the wall may also require a permit and engineering design. Additional geotechnical analysis and recommendations may be required for design and construction inspection.

3.10.2 General

Surfaces accessible to pedestrians above and adjacent to rockeries over 30 inches high must be protected by a pedestrian guardrail conforming to the current International Building Code.

3.10.3 Materials

Rock for constructing new rock facings must be large broken pieces of igneous rock obtained from a commercial quarry. Rock material must be rectangular selected pieces or rock, sound and resistant to weathering. Rock must be free of soft, weathered material and seams of soft rock susceptible to deterioration.

Perforated drainpipe must be Schedule 40 machine-perforated PVC pipe. No. 2 Coarse Aggregate must conform to Section 9-03 of the WSDOT/APWA Standard Specifications.

Concrete for rockery cap must be Class 3000. Lamp black coloring agent to match the color of the rockery must be added to the cement concrete during mixing in an amount not to exceed 1½ pounds per cubic yard of concrete.

Quarry Rock must meet the requirements of Section 9-13.6 of the WSDOT/APWA Standard Specifications.

3.10.4 Construction Requirements

The first course of rock should be placed on undisturbed soil or compacted fill. There should be full contact between the rock and soil, which may require shaping of the ground surface or slamming or dropping the rocks into place so that the soil foundation conforms to the rock face bearing on it.

As the rockery is constructed, the rocks should be placed so that there are no continuous joint planes in either the vertical or lateral direction. Each rock should bear on at least two rocks below it. Rocks should be placed so that there is some bearing between flat rock faces rather than on joints. Joints between courses should slope downward towards the material being protected (away from the face of the rockery). Voids in the rockery face must not be greater than 50 square inches for rocks over 3 feet high and 36 square inches for rocks under 3 feet high. The maximum through void area will be 15 square inches over 3 feet high and 10 square inches under 3 feet high. Any large voids existing between each course of rock as it is placed must be filled by wedging smaller rock of the same quality into the voids in the back side of the rockery. Backfill material must not be allowed to spill freely between the voids in the rockery. The rockery must be backfilled in uniform layers as construction proceeds.

Backfill materials must be Quarry Rock per 3.14.3 of the Monroe Standards. No. 2 Coarse Aggregate per 9-03 must be used around the perforated drainpipe behind the rockery wall.

The density of rock material must be a minimum of 160 pounds per cubic foot. The size categories for rock must be as follows:

Table 2

Commercial Rock Size	Approx. Weight	Minimum Dimensions	Approx. Size Volume
One-man rock	160 to 400 lb.	12 inches	1.75 c.f.
Two-man rock	500 to 800 lb.	13 inches	4 c.f.
Three-man rock	900 to 1,200 lb.	16 inches	6.6 c.f.
Four-man rock	1,300 to 1,600 lb.	18 inches	9 c.f.

Rocks less than one (1) cubic foot in volume or weighing less than 160 pounds must not be used.

3.11 CEMENT CONCRETE SIDEWALKS

3.11.1 Description

3.11.1.1 General

This work must consist of constructing cement concrete sidewalks and curb ramps, including excavation for the depth of the sidewalk and subgrade preparation, in accordance with the Monroe Standards, the WSDOT/APWA Standard Specifications and Standard Details 309, 313, 314 and 315. Work must comply with ADA RCW 35.68.075-35.68.076.

3.11.2 Materials

Materials must meet the requirements of the following section of the WSDOT/APWA Standard Specifications:

Table 3

Material	Section
Portland Cement	9-01
Aggregates	9-03
Pre-Molded Joint Filler	9-04
Concrete Curing Materials and Admixtures	9-23
Pervious Concrete WSDOT/APWA General Special Provisions Division 5	

The use of Calcium Chloride as an admixture is prohibited.

3.11.3 Construction Requirements

3.11.3.1 General

The curb and gutter section must be placed prior to the placement of the sidewalk section.

Subgrade must be approved by the construction inspector prior to concrete placement. Expansion joints must be 3/8 inch wide by full depth and placed adjacent to structures within the sidewalk, such as foundations for mailbox structures, vault lids, etc. Control joints must be placed to match any joints in adjacent curbs and be at least ¼ the thickness of the concrete on 5-foot centers.

The sidewalk must provide a minimum obstruction free width of at least 5 feet. Mailboxes must be set at locations approved by the Postmaster and must provide a 2-foot clearance from the face of the curb. Refer to Section 3.9 and Detail 320.

Where there is insufficient suitable native material on the project site, the Developer must furnish, place and compact gravel borrow. All sidewalks must be constructed over a minimum 4 inches of crushed surfacing top course meeting the requirements of 9-03.9(3) of the WSDOT/APWA Standard Specifications compacted to 95 percent of maximum dry density.

3.11.3.2 Form and Fine Grading

Steel forms must be 4 inch wide by 10 feet long. If wood forms are used, the wood must be 2-inch x 4-inch (nominal) in lengths of not less than 10 feet. Forms must be staked to a true line and grade.

3.11.3.3 Placing and Finishing Concrete

The concrete must be spread uniformly between the forms and thoroughly compacted with a steel shod strike board. Expansion joints and control joints must be located and constructed in accordance with Standard Detail 309. In construction of expansion joints, the pre-molded joint filler must be adequately supported until the concrete is placed on both sides of the joint.

Whenever castings are located in the sidewalk area, joints must be installed at the casting location to control cracking of the sidewalk. If spacing of joints or scoring is such that installation of joint material would be unsuitable, the Developer must install rebar to strengthen the sidewalk section.

Control joints must be formed by first cutting a groove in the concrete with a tee bar of a depth equal to, but not greater than, the joint filler material and then working the pre-molded joint filler into the groove. Pre-molded joint filler for both expansion and control joints must be positioned in true alignment at right angles to the line of the sidewalk and be normal to and flush with the surface.

After the concrete has been thoroughly compacted and leveled, it must be floated with wood floats and finished at the proper time with a metal float. Joints must be edged with a ¼ inch radius edger and the sidewalk edges must be tooled with a ½ inch radius edger with a 4-inch flash.

The surface must be brushed with a fiber hairbrush in a transverse direction except that at driveway and alley crossings, it must be brushed longitudinally.

After brush finish, the edges of the sidewalk and all joints must be lightly edged again with an edging tool to give it a finished appearance.

3.11.3.4 Curing and Protection

The curing materials and procedures shall be as specified in 5-05.3(13) of the WSDOT/APWA Standard Specifications.

The Developer must have readily available sufficient protective covering, such as plastic sheeting, to cover the pour of an entire day in event of rain or other unsuitable weather.

The sidewalk must be protected against damage or defacement of any kind until it has been accepted by the construction inspector. Sidewalk which is not acceptable to the City because of damage or defacement must be removed and replaced by the Developer.

3.11.3.5 Curing and Hot Weather

In periods of low humidity, drying winds, or high temperatures, a fog spray must be applied to concrete as soon after placement as conditions warrant in order to prevent the formation of shrinkage cracks. The spray must be continued until conditions permit the application of a liquid curing membrane or other curing media.

3.11.3.6 Cold Weather Work

When the air temperature is expected to reach the freezing point during the day or night, the concrete must be protected from freezing. The Developer must provide a sufficient supply of straw, hay, grass, blankets, or other suitable blanketing material and spread it over the concrete to a sufficient depth to prevent freezing of the concrete. The Developer is responsible for the quality and strength of the cured concrete. All concrete damaged by frost action or freezing must be removed and replaced at the Developer's expense.

3.11.3.7 Curb Ramps

In accordance with state and federal law, curb ramps must be provided at all pedestrian crossings with curb sections. When a ramp is constructed giving handicap access to the roadway area, a corresponding ramp at the opposite side of the roadway must also be provided that meets current ADA requirements. Exact locations at each curb return will be as shown in the approved plans.

Curb ramps must be constructed in accordance with Standard Details 313, 314, and 315 and as shown on the approved plans. This work must include curb ramps installed in new sidewalks and in existing sidewalks. Existing sidewalks must be neatly saw-cut full depth prior to construction of curb ramps.

Curb ramps must not be poured integral with the sidewalk. Curb and gutter must be isolated by expansion joint material on all sides. Ramp texture must

have a horizontal broom finish as shown on Standard Details referenced above.

3.12 CURB AND GUTTER SECTIONS

3.12.1 Description

The standard curb and gutter section must be a vertical curb and gutter per Standard Detail 305. Vertical curb and gutter must be used on all public and some very low traffic volume private roadways. Refer to Standard Detail 300 for additional information.

3.12.2 Materials

Materials must meet the requirements of the following Sections of the WSDOT/APWA Standard Specifications:

Table 4

Material	Section
Portland Cement	9-01
Concrete Aggregate	9-03
Reinforcing Steel	9-07
Pre-Molded Joint Filler	9-04
Curing Compound	9-23

The Portland Cement concrete must meet the requirements of Section 5-05 of the WSDOT/APWA Standard Specifications. Concrete mix for curbs must be Class 3000. Slump of the concrete must not exceed 3 ½ inches.

All new curb and gutter must be placed over not less than 3 inches of crushed surfacing top course or bottom course compacted to 95 percent maximum dry density.

Forms may be of wood or metal at the option of the developer, provided that the forms as set will result in a curb or curb and gutter of the specified thickness, cross section, grade, and alignment shown on the approved plans.

3.12.3 Placing Concrete

The subgrade must be properly compacted and brought to specified grade before placing concrete. The subgrade must be thoroughly dampened immediately prior to the placement of concrete. No new curb and gutter is to be placed until the construction inspector has checked and approved the forms for line, grade and compaction.

Concrete must be spaded and tamped thoroughly into the forms to provide a dense, compacted concrete, free of rock pockets. The exposed surfaces must be floated, finished, and brushed longitudinally with a fiber hairbrush approved by the construction inspector.

The rate of concrete placement must not exceed the rate at which the various placing and finishing operations can be performed in accordance with the Monroe Standards.

If concrete is to be placed by the extruded method, the Developer must demonstrate, to the satisfaction of the construction inspector, that the machine is capable of placing a dense, uniformly compacted concrete to exact section, line, and grade.

3.12.4 Curing and Protection

Transparent curing compounds must be applied to all exposed surfaces immediately after finishing. Transparent curing compounds must contain a color dye of sufficient strength to render the film distinctly visible on the concrete for a minimum period of four hours after application.

The Developer must have readily available sufficient protective covering, such as plastic sheeting, to cover the pour of an entire day in event of rain or other unsuitable weather.

The curb must be protected against damage or defacement of any kind until it has been accepted by the construction inspector. Curb and gutter which is not acceptable to the construction inspector because of damage or defacement must be removed and replaced by the Developer at their own expense.

The curing materials and procedures shall be as specified in 5-05.3(13) of the WSDOT/APWA Standard Specifications, except that white pigment curing compounds must not be used on sidewalks.

3.13 CEMENT CONCRETE DRIVEWAY

3.13.1 Description

This work consists of cement concrete driveway and alley returns constructed at the locations shown on the approved plans and where directed by the construction inspector, and must be in accordance with the Monroe Standards, the WSDOT/APWA Standard Specifications, and Standard Details 310, 311 and 312. See 3.2.2.4 for additional conditions for driveways.

3.13.2 Materials

Materials must meet the requirements of the following sections of WSDOT/APWA Standard Specifications:

Table 5

Material	Section
Portland Cement	9-01
Fine Aggregate	9-03
Coarse Aggregate	9-03
Joint Materials	9-04

Material	Section
Curing and Admixtures	9-23
Pervious Concrete WSDOT/APWA General Special Provisions Division 5	

The concrete mix must be as specified for Class 4000 and the slump of the concrete must not exceed 3 inches.

3.13.3 Construction Requirements

1. General

- a. No driveway approach may project beyond the extension of the side property line to the curb, unless the owner of the adjacent property is a co-signer of the driveway permit.
- b. There must be at least 20 feet of full height curb between driveways serving any one property frontage.
- c. There must be at least 6 feet of full height curb between driveways on adjacent lots.
- d. Driveway aprons must be constructed per Standard Details 310, 311 or 312, as applicable. The minimum thickness of the driveway apron must be 6 inches, placed over a minimum of 4 inches of crushed surfacing top course compacted to 95 percent maximum dry density over a compacted subgrade. In all cases, subgrade and rock grade must be approved by the construction inspector prior to concrete being placed. Driveway aprons over 15 feet wide must have an expansion joint placed in the center of the apron.
- e. In locations where a new driveway is to be constructed and sidewalk, curb, and gutter is already existing, it must be totally removed and replaced to driveway standards. It is not permissible to knock off existing curb and install driveway apron. The total curb and gutter section must be removed, either by sawcutting or to the nearest expansion joint, and replaced to driveway standards.
- f. New driveways installed in areas where curb and gutter improvements are not existing, and not required, must be paved from the existing edge of pavement to the property line, regardless of whether the remainder of the driveway on the private property is paved.
- g. In areas not fully improved with curbs and sidewalks, the elevation of the driveway at the point where it crosses the property line must not be more than 3 inches higher than the elevation of the centerline of the existing paved street, if the driveway is rising on the private property side, and no lower than level with the elevation of the centerline of the existing street, if the driveway is sloping down on the private property side.

- h. Driveways that cross bike/pedestrian trails must be designed to safely accommodate both the vehicles and the trail users. Any ramp in the trail must meet the current ADA design standards.
2. Excavation and Subgrade
 - a. Unsuitable material in the subgrade must be removed and replaced with select material such as gravel borrow conforming to 3.14.2 , CSTC or CSBC and properly compacted to specifications.
 - b. Before any concrete is placed, the Developer must bring the subgrade to the required line, grade, and cross-section. The Developer must maintain the subgrade in the required condition until the concrete is placed. Compaction must be to 95 percent standard density.
 3. Forms and Fine Grading
 - a. Forms for the straight sections of the driveway or alley return must have a minimum nominal thickness of two (2) inches and be equal to the nominal depth of the concrete. Plywood or one (1) inch lumber may be used on radii. All forms must be securely staked and blocked to true line and grade.
 - b. A template must be set upon the forms and the subgrade must be fine graded to conform to the required section. The subgrade must then be compacted to the approval of the construction inspector. Prior to placement of the concrete, the subgrade must be thoroughly dampened.
 4. Placing and Finishing
 - a. The concrete must be spread uniformly between the forms and thoroughly compacted with an approved type of strikeboard. Expansion joints and contraction joints must be located and constructed in accordance with Standard Detail 310, 311, or 312, whichever applies. In the construction of expansion joints, the pre-molded joint filler must be adequately supported until the concrete is placed on both sides of the joint.
 - b. Contraction joints (control joints) must be formed with a tee bar by first cutting a groove in the concrete to a depth equal to, but not greater than the joint filler material and then working the pre-molded joint filler into the groove. Pre-molded joint filler for both expansion and control joints must be positioned in true alignment and at right angles to the centerline of the driveway or alley return.
 - c. After the concrete has been thoroughly compacted and leveled, it must be floated with wood floats and finished at the proper time with a metal float. Joints must be edged with $\frac{1}{4}$ inch radius edger and the driveway or alley return edges must be tooled with $\frac{1}{2}$ inch radius edger with 4-inch flashing.
 - d. The surface must be brushed in a transverse direction in relation to the centerline of the driveway or alley return with a fiber hairbrush of a type approved by the construction inspector.

5. Curing and Protection

- a. The curing materials and procedures specified in Sections 5-05 and 9-23 of the WSDOT/APWA Standard Specifications and 3.12.4 of the Monroe Standards must be used. The driveway and the alley return must be protected against damage or defacement of any kind until acceptance by the construction inspector. Any driveway or alley return not acceptable, in the opinion of the construction inspector because of damage or defacement, must be removed and be replaced by the Developer.
- b. Before placing any concrete, the Developer must have on the job site enough protective paper to cover the pour of an entire day, in event of rain or other unsuitable weather conditions.

3.14 PROPORTIONING OF MATERIALS

3.14.1 Controlled Density Fill (CDF)

CDF must conform to the requirements of Section 2-09.3(1)E of the WSDOT/APWA Standard Specifications but must have a 28-day design compressive strength of between 50 PSI and 100 PSI.

3.14.2 Gravel Borrow

The gradation for gravel borrow must conform to the requirements of Section 9-03.14(1) of the WSDOT/APWA Standard Specifications.

3.14.3 Quarry Rock

Quarry Rock must meet the requirements of Section 9-13.6 of the WSDOT/APWA Standard Specifications. All percentages are by weight.

3.14.4 Non-Shrink grout

Non-shrink grout must meet the requirements of Section 9-20.3(2) of the WSDOT/APWA Standard Specifications. The grout must be covered with burlap sacks after the initial concrete set and wetted at regular intervals until the required strength is obtained.

3.15 PARKING

3.15.1 General

Off street parking lots must be designed in conformance with MMC 22.44.130 OFF-STREET PARKING AREA DESIGN STANDARDS and constructed in conformance with MMC 22.44.150 OFF-STREET PARKING CONSTRUCTION STANDARDS.

3.15.2 Construction

The City construction inspector must inspect all parking lot construction for conformance to approved plans for size, layout, drainage control, and structural section.

The minimum acceptable structural section for parking lots must be 3 inches of HMA placed over 4 inches of crushed surfacing top course, or Permeable HMA in accordance with WSDOT Local Agencies GSPs – Divisions 2-9. The City will consider alternative pavement sections as long as an equivalent structural strength (SN value) is provided. Heavier pavement sections may be required for truck traffic, vehicle storage, or as determined by the Developer's soils engineer due to soil conditions.

Prior to placing any surfacing material on the parking lot, the Developer must provide density test reports of the subgrade certified by a professional engineer or testing laboratory registered in the state of Washington.

Crushed surfacing top course must be compacted to 95 percent maximum density. Density testing for asphalt pavement, including the necessity and frequency of core samples, will be determined by the City construction inspector on a case by case basis.

3.15.3 Parking Lot Illumination

Illumination must be provided for parking lots having more than 10 parking spaces, and must:

1. Provide adequate illumination for security and safety to all parking spaces, pedestrian walkways, and sidewalks. Driveway entries and exits should have special illumination and signage, where necessary. Pedestrian scale lighting may be required to illuminate pedestrian trails, paths, and walkways.
2. Be shielded in a manner that does not disturb residential uses.

3.16 STREET TREES AND LANDSCAPING

Landscaping must conform to MMC 22.46 LANDSCAPING STANDARDS.

3.16.1 Purpose

The purpose and intent of this section is to provide a list of approved street trees and a list of approved landscape buffer shrubs and ground cover for landscape development and buffering areas. Density and other requirements can be found in MMC 44.46.

3.16.2 Implementation

The Developer may use plant materials on the adopted plant lists or may use other plant materials, as approved by the Community Development Department. The City may require the Developer to modify a plant choice to provide:

1. Desired diversity of species.
2. Plantings more in scale and comparable with the uses in the immediate vicinity of the property.
3. Plant materials that will fulfill the buffering or landscaping purpose on a year-around basis.

The City may require additional landscaping where it is deemed necessary to screen or buffer the development from its surroundings, or to comply with the spirit of the landscape zoning code.

Trees planted within the public right-of-way shall include root barrier installation. The barrier shall be centered at the tree and generally be 2 feet longer than the predicted mature dripline of the tree specimen. Install the barrier 18 inches deep along the sidewalk edge and 24 inches deep along the back of curb.

3.16.3 Street Tree List

Small Trees less than 20' spread									
Common Name	Scientific Name	Cultivar	Height	Width	Shape	Features/ Considerations	Drought Tolerant	Overhead Utilities	Soil Type
Trident Maple	<i>Acer buergerianum</i>		25	20	round	red in fall			all
Rocky Mountain Glow Maple	<i>Acer grandidentatum</i>	Schmidt	25	15	oval	orange/red in fall	X	X	well drained
Flame Maple	<i>Acer ginnala</i>	Flame	20	20	low branching	hardy/available; orange/red in fall		X	all
Rocky Mountain Maple	<i>Acer glabrum</i>		25	15	oval	deep lobed leaves; orange/red in fall; red twigs		X	well drained
Paperbark Maple	<i>Acer griseum</i>		25	20	upright/round	peeling brown bark; red in fall		X	all
Autumn Brilliance Serviceberry	<i>Amelanchier x grandiflora</i>	Autumn Brilliance	20	15	upright/spreading	white flowers, edible fruit; red in fall		X	all
Cole's Select Serviceberry	<i>Amelanchier x grandiflora</i>	Cole	20	15	rounded	red in fall		X	all
Princess Diana Serviceberry	<i>Amelanchier x grandiflora</i>	Princess Diana	25	15	gracefully spreading	white flowers, edible fruit		X	all
Japanese Dogwood	<i>Cornus kousa</i>		20	20	horizontal	large white flowers; red in fall		X	well drained
Carnelian Cherry Dogwood	<i>Cornus mas</i>		25	20	oval/rounded	yellow flowers; red in fall		X	all
Crimson Cloud Hawthorn	<i>Crataegus laevigata</i>	Crimson Cloud	25	18	shrubby / round	red flowers, fruit with star-shaped area in center	X	X	all
Snowbird Hawthorn	<i>Crataegus mordenensis</i>	Snowbird	22	20	upright oval	double white flowers		X	all

Small Trees less than 20' spread									
Washington Hawthorn	<i>Crataegus phaenopyrum</i>		25	20	oval/ rounded	white flowers, red fruit; orange/red in fall	X	X	all
Lavalle Hawthorn	<i>Crataegus x lavallei</i>		28	20	irregular /vase	white flowers, orange fruit	X	X	all
Carolina Silverbells	<i>Halesia carolina</i>		30	20	broadly/ pyramidal	white/bell flowers		X	well drained
Amur Maackia	<i>Maackia amurensis</i>		25	20	vase	white flower clusters	X	X	all
Victoria Magnolia	<i>Magnolia grandiflora</i>	Victoria	20	20	pyramidal	creamy flowers, non -windy site	X	X	well drained
Adirondack Crabapple	<i>Malus spp.</i>	Adirondack	18	10	columnar	white/pink flowers, red/orange fruit	X	X	all
Red Jewel Crabapple	<i>Malus spp.</i>	Jewelcole	15	12	rounded	white flowers, red fruit until mid-Dec	X	X	all
Centurion Crabapple	<i>Malus spp.</i>	Centzam	20	15	narrow	red flower; purple bronze leaves	X	X	all
Golden Raindrops	<i>Malus spp.</i>	Golden Raindrops	20	15	vase	deep cut leaves; golden fruit	X	X	all
Sugar Tyme Crabapple	<i>Malus spp.</i>	Sutyzam	18	15	oval	pink buds, white flower	X	X	all
Sentinel Crabapple	<i>Malus spp.</i>	Sentinel	20	12	columnar	pale pink flowers	X	X	all
Tschonoskii Crabapple	<i>Malus tschonoskii</i>		28	14	narrowly oval	white flowers, greenish fruit	X	X	all
Sourwood	<i>Oxydendrum arboreum</i>		20	15	rounded	white bell clusters; orange in fall		X	well drained, acidic
Persian Parrotia	<i>Parrotia persica</i>		30	20	rounded	early flowers; mix of fall color			well drained
Krauter Vesuvius Plum	<i>Prunus cerasifera</i>	Krauter Vesuvius	20	15	upright	light pink flowers; tolerates heat; purple leaves	X	X	all
Summer Glow Bird Cherry	<i>Prunus padus</i>	Summer Glow	25	20	oval/ round	white flowers; purple leaves		X	all
Capital Pear	<i>Pyrus calleryana</i>	Capital	35	12	columnar	white flowers; red in fall	X		all
Chanticleer	<i>Pyrus</i>	Chanticleer	40	15	pyramidal	white flowers;	X		all

Small Trees less than 20' spread									
Pear	<i>calleryana</i>					red in fall			
Fragrant Snowbell	<i>Styrax obassia</i>		25	15	oval	fragrant flowers in summer	X	X	all
Ivory Silk Japanese Tree Lilac	<i>Syringa reticulata</i>	Ivory Silk	20	15	upright/rounded	creamy panicles, heavy flowering		X	well drained

Medium Trees (20'-30' Canopy Spread +/-)									
Common Name	Scientific Name	Cultivar	Height	Width	Shape	Features/ Considerations	Drought Tolerant	Overhead Utilities	Soil Type
Columnar Norway Maple	<i>Acer platanoides</i>	Columnar	35	15	narrow	column of green foliage; yellow in fall	X		all
Crimson Sentry Maple	<i>Acer platanoides</i>	Crimson Sentry	25	15	oval	purple leaves maroon in fall	X	X	all
Globe Norway Maple	<i>Acer platanoides</i>	Globosum	15	18	dense/ globe	yellow in fall		X	all
Armstrong Maple	<i>Acer rubrum</i>	Armstrong	45	15	narrow	fast growing; yellow orange in fall			all
Bowhall Maple	<i>Acer rubrum</i>	Bowhall	40	15	narrow	great fall color			all
Goldspire Sugar Maple	<i>Acer saccharum</i>	Goldspire	45	15	columnar	yellow in fall			all
American Hornbeam	<i>Carpinus caroliniana</i>		25	20	oval	smooth gray trunk; yellow to orange in fall		X	all
European Hornbeam	<i>Carpinus betulus</i>	Fastigiata	35	25	upright/ oval	catkins turn brown in November; yellow in fall	X		all
Japanese Hornbeam	<i>Carpinus japonicus</i>		30	25	rounded/ vase	white/yellow flowers; red in fall	X		all
Eastern Redbud	<i>Cercis canadensis</i>		35	25	horizontal	purple-pink flowers; yellow in fall			all
Dawyck Purple Beech	<i>Fagus sylvatica</i>	Dawyck Purple	40	12	columnar	purple leaves			all
Dawyck Pyramidal Beech	<i>Fagus sylvatica</i>	Dawyck Pyramid Beech	45	20	columnar	purple leaves			all

Medium Trees (20'-30' Canopy Spread +/-)									
Flowering Ash	<i>Fraxinus ornus</i>		30	15	pyramidal/ round	yellow in fall	X		all
Raywood Ash	<i>Fraxinus oxycarpa</i>	Raywood	35	25	oval	fast grower; purple fall color			all
Summit Ash	<i>Fraxinus pennsylvanica</i>	Summit	45	25	narrowly oval	yellow in fall	X		all
Princeton Sentry Ginkgo	<i>Ginkgo biloba</i>	Princeton Sentry	40	15	columnar	seedless male; yellow in fall	X		all
Indian Summer Crabapple	<i>Malus spp.</i>	Indian Summer	18	20	rounded	red flower; wide	X	X	all
Prairifire Crabapple	<i>Malus spp.</i>	Prairifire	20	20	upright/ rounded	pinkish/red buds, flowers; dark red-purple fruit wide	X	X	all
Snowdrift Crabapple	<i>Malus spp.</i>	Snowdrift	20	20	spreading/ round	white flowers, orange fruit	X	X	all
Sour Gum/Black Tupelo	<i>Nyssa sylvatica</i>		35	20	pyramidal	red yellow in fall			all
European Hophornbeam	<i>Ostrya carpinifolia</i>		40	25	rounded	nutlets in hop- like bunches	X		all
European Bird Cherry	<i>Prunus padus</i>		30	25	round	white flowers in long clusters			all
Canada Red Chokecherry	<i>Prunus virginiana</i>	Canada Red	25	22	rounded	unusual bark; purple leaves; red in fall			all
Spire Cherry	<i>Prunus x hillieri</i>	Spire	30	10	dense	soft pink flowers; orange/red in fall			all
Redspire Pear	<i>Pyrus calleryana</i>	Redspire	35	25	pyramidal	white flowers; red in fall	X		all
Common Oak	<i>Quercus robur</i>	Fastigata	45	15	narrow	yellow/brown in fall	X		well drained, acidic
Japanese Stewartia	<i>Stewartia pseudocamellia</i>		30	20	pyramidal /oval	white flowers; peeling bark; yellow red/purple in fall			moist acidic

Large Trees more than 30' spread									
Common Name	Scientific Name	Cultivar	Height	Width	Shape	Features/ Considerations	Drought Tolerant	Overhead Utilities	Soil Type

Large Trees more than 30' spread									
							t		
Hedge Maple	<i>Acer campestre</i>	Queen Elizabeth	30	30	rounded	low maintenance; yellow in fall	X		all
State Street Manie	<i>Acer miyabei</i>	Morton	45	30	rounded	red in fall			all
Japanese Maple	<i>Acer palmatum</i>		25	30	horizontal	fine-textured leaves; orange/red in fall		X	well drained
Cleveland Maple	<i>Acer platanoides</i>	Cleveland	40	30	oval/dense	yellow in fall			all
Crimson King Maple	<i>Acer platanoides</i>	Crimson King	40	35	oval/rounded	purple leaves; reddish bronze in fall			all
Deborah Maple	<i>Acer platanoides</i>	Deborah	45	40	oval/rounded	dark bronze green leaves; bronze in fall			all
Summershade Maple	<i>Acer platanoides</i>	Summershade	42	40	broad/rounded	fast growing; yellow in fall			all
Spaethii Maple	<i>Acer pseudoplatanus</i>	Atropurpureum	40	30	oval/upright	salt tolerant; green/purple leaves			all
Red Sunset Maple	<i>Acer rubrum</i>	Franksred	45	35	upright/oval	vigorous/symmetrical; orange/red in fall	X		all
October Glory Maple	<i>Acer rubrum</i>	October Glory	40	35	oval/round	reddish purple in fall			all
Schlesinger Maple	<i>Acer rubrum</i>	Schlesingeri	45	35	vase shaped	orange/red in fall			all
Green Mountain Sugar Maple	<i>Acer saccharum</i>	Green Mountain	45	35	oval	hardest Sugar Maple; orange/red fall color	X		all
Jacquemontii Birch	<i>Betula jacquemontii</i>		40	30	upright/oval	yellow in fall			all
River Birch	<i>Betula nigra</i>		40	35	pyramidal/rounded	yellow in fall			all
Katsura Tree	<i>Cercidiphyllum japonicum</i>		40	40	pyramidal/rounded	heart shaped leaves; red orange in fall			all

Large Trees more than 30' spread									
Yellowwood	<i>Cladrastis kentukea</i>		30	40	round	fragrant summer flowers; yellow in fall	X		all
Dove Tree	<i>Davidia involucrata</i>		35	30	broad pyramidal	white bracts	X		well drained
Rosehill Ash	<i>Fraxinus americana</i>	Rosehill	50	35	upright/oval	strong leader; red/purple in fall	X		all
Marshall Ash	<i>Fraxinus pennsylvanica</i>	Marshall	50	40	broadly oval	tough/adaptable; yellow in fall	X		all
Shademaster Honeylocust	<i>Gleditsia triacanthos</i>	Shademaster	45	35	vase shaped	upright branching; yellow in fall	X		all
Skyline Honeylocust	<i>Gleditsia triacanthos</i>	Skycole	45	35	broadly pyramidal	tolerant of pollution; golden in fall	X		all
Goldenrain Tree	<i>Koelreuteria paniculata</i>		30	30	rounded	yellow clusters	X	X	all
Tulip Tree	<i>Liriodendron tulipifera</i>		60	30	oval	yellow flowers; yellow in fall			all
Macho Cork Tree	<i>Phellodendron amurense</i>	Macho	40	30	vase shaped	seedless; yellow in fall			all
Sagent Cherry	<i>Prunus sargentii</i>	Columnaris	30	30	upright	single pink flowers; purple-black fruit in July; red in fall		X	all
Kwanzan Cherry	<i>Prunus serrulata</i>	Kwanzan	30	25	vase/rounded	pink/double; hardiest <i>Prunus serrulata</i> ; orange in fall			
Mount Fuji Flowering Cherry	<i>Prunus serrulata</i>	Shirotae	15	20	spreading	fragrant flowers, white/pink buds, red fruit		X	all
Akebono Cherry	<i>Prunus x yedoensis</i>	Akebono	25	30	upright	delicate pink flowers; yellow in fall		X	all
Aristocrat Pear	<i>Pyrus calleryana</i>	Aristocrat	40	30	pyramidal	open formal appearance; red in fall			all
Scarlet Oak	<i>Quercus coccinea</i>		50	40	upright/oval	red in fall	X		all

Large Trees more than 30' spread									
Pin Oak	<i>Quercus palustris</i>		55	40	pyramidal	strong leader; retains leaves in winter; orange/red in fall	X		well drained acidic
English Oak	<i>Quercus robur</i>		50	40	broadly /rounded	yellow/ brown in fall	X		well drained
Shumard Oak/Texas Red Oak	<i>Quercus shumardii</i>		50	40	upright/ oval	red in fall	X		well drained acidic
Crimean Linden	<i>Tilia x euchlora</i>		40	35	pyramidal/ oval	golden green twigs; yellow in fall			all
Village Green Zelkova	<i>Zelkova serrata</i>	Village Green	40	38	vase shaped	clean appearance; red in fall			all

3.16.4 Wetland Plants

Native wetland plants are preferred for wetland areas. Plant materials as identified by Ecology and the Washington State Department of Fish & Wildlife must be used. Invasive species such as Purple Loose Strife or Reed Canary Grass are not allowed.

3.17 STANDARD STREET DRAWINGS

Drawing #	Description
300	Roadway Classifications
301	Typical Roadway Section
301H	Half Road Section
302	Private Road Development
303	Private Road Short Plat
303A	Private Road
303B	Alley
304	Cul-De-Sac
305	Concrete Curb and Gutter
306	Cement Concrete Curbs
307	Extruded Concrete Cement Curb
308	Extruded Asphalt Concrete Sections
309	Cement Concrete Sidewalk
310	Driveway Type I
311	Driveway Type II
312	Driveway Type III
313	Curb Ramp Type I
314	Curb Ramp Type II
315	Curb Ramp Locations
316	Survey Monument
317	Pavement Patch
318	Pavement Restoration
319	Residential Mailbox
320	NDCBU Mailbox
321	Rockery
322	Street Sign Mounting
323	Street Sign
323PR	Private Road Sign
324	Sign Installation
325	Stop Bar and Crosswalk
326	Left Turn Pocket
327	Road End Sign
328	Prohibited Parking Sign
329	Permissive Parking Sign
330	Bollard
331	Sight Lines Controlled Intersection
332	Sight Lines Uncontrolled Intersection
333	Sight Lines Driveway