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PROOF OF PUBLICATION

STATE OF NEVADA
COUNTY OF WASHOE

ss. Tana Ciccotti

being duly sworn, deposes and says:
That as legal clerk of the RENO GAZETTE-JOURNAL, a daily newspaper published in Reno, Washoe County, State of Nevada, that the notice:

Ordinance 908

of which a copy is hereto attached, has been published in each regular and entire issue of said newspaper on the following dates to wit:

Sept. 27 Oct. 4 1994

Signed

Tana Ciccotti

Subscribed and sworn to before me on 10/04/94

Notary Public

Debra J. DiCianno

NOTICE OF COUNTY ORDINANCE NO. 908
NOTICE IS HEREBY GIVEN that Ordinance No. 908, Bill No. 1083, entitled,
AN ORDINANCE AMENDING CHAPTER 110 OF THE WASHOE COUNTY CODE (DEVELOPMENT CODE) TO ADD ARTICLE 340, INDUSTRIAL PERFORMANCE STANDARDS, ARTICLE 420, STORM DRAINAGE STANDARDS, AND ARTICLE 436, STREET DESIGN STANDARDS, THERETO, AND TO AMEND ARTICLE 604, DESIGN REQUIREMENTS, AND ARTICLE 902, DEFINITIONS, THEREOF TO REFLECT NEW STANDARDS.
was adopted on SEPTMEBER 20, 1994, by Commissioners Larry Beck, Steve Bradhurst, Dianne Cornwall, Gene McDowell, and Jim Shaw.
Typewritten copies of the ordinance are available for inspection by all interested persons at the office of the County Clerk at the County Courthouse, Virginia and Court Streets, Reno, Nevada.
Judi Bailey, County Clerk
No. 3834 Sept 27; Oct 4, 1994



P.O. BOX 22000. RENO. NEVADA 89520
(702) 788-6200



908 ✓

SUMMARY: Amends chapter 110 of the Washoe County Code (Development Code) by adding certain design standards thereto.

BILL NO. 1083

ORDINANCE NO. 908

AN ORDINANCE AMENDING CHAPTER 110 OF THE WASHOE COUNTY CODE (DEVELOPMENT CODE) TO ADD ARTICLE 340, INDUSTRIAL PERFORMANCE STANDARDS, ARTICLE 420, STORM DRAINAGE STANDARDS, AND ARTICLE 436, STREET DESIGN STANDARDS, THERETO, AND TO AMEND ARTICLE 604, DESIGN REQUIREMENTS, AND ARTICLE 902, DEFINITIONS, THEREOF TO REFLECT NEW STANDARDS.

THE BOARD OF COUNTY COMMISSIONERS OF THE COUNTY OF WASHOE DO ORDAIN:

SECTION 1. Chapter 110 of the Washoe County Code is hereby amended by adding thereto a new Article 340 "Industrial Performance Standards" as set forth in Exhibit "A" which is attached hereto and made a part hereof.

SECTION 2. Chapter 110 of the Washoe County Code is hereby amended by adding thereto a new Article 420 "Storm Drainage Standards" as set forth in Exhibit "B" which is attached hereto and made a part hereof.

SECTION 3. Chapter 110 of the Washoe County Code is hereby amended by adding thereto a new Article 436 "Street Design Standards" as set forth in Exhibit "C" which is attached hereto and made a part hereof.

SECTION 4. Article 604 "Design Requirements" of chapter 110 of the Washoe County Code is hereby amended as set forth in Exhibit "D" which is attached hereto and made a part hereof.

SECTION 5. Article 902 "Definitions" of chapter 110 of the Washoe County Code is hereby amended as set forth in Exhibit "E" which is attached hereto and made a part hereof.

SECTION 6. The provisions of this ordinance shall be in force and effect from and after the 15th day of October, 1994.

Proposed on the 9th day of August, 1994.

Proposed by Commissioner Bradhurst:

Passed on the 20th day of September, 1994.

Vote:

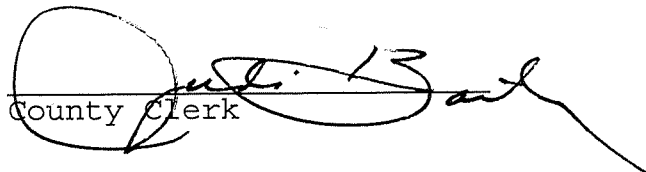
Ayes: Commissioners: Larry Beck, Steve Bradhurst, Dianne Cornwall, Gene McDowell, Jim Shaw

Nays: Commissioners: No nays

Absent: Commissioners: No one absent


Chairman of the Board

ATTEST:


County Clerk

This ordinance shall be in force and effect from and after the 4th day of October, 1994.

ARTICLE 340

INDUSTRIAL PERFORMANCE STANDARDS

Sections:

110.340.00	Purpose
110.340.05	Applicability
110.340.10	Compliance
110.340.15	Measurements
110.340.20	General Standards
110.340.25	Odors
110.340.30	Lighting
110.340.35	Vibration
110.340.40	Dust, Smoke, and Other Air Emissions
110.340.45	Access
110.340.50	Traffic Reports
110.340.55	Transportation Improvements
110.340.60	Public Services and Facilities
110.340.65	On-Site Hazardous Substance Holding

Section 110.340.00 Purpose. The purpose of this article, Article 340, Industrial Performance Standards, is to prescribe standards for development that promote compatibility with surrounding areas and land uses.

Section 110.340.05 Applicability. The provisions of this article shall apply to the development of all uses in the Industrial Regulatory Zones, as set forth in Section 110.302.05.

Section 110.340.10 Compliance. Prior to the issuance of a building permit or business license, applicants shall provide evidence to the Department of Development Review that the proposed development is in full compliance with the requirements set forth in this article and other applicable articles in this Development Code.

Section 110.340.15 Measurements. Measurements necessary to determine compliance with the provisions of this Article shall be performed in accordance with accepted engineering practices.

Section 110.340.20 General Standards. Proposed development shall be in compliance with the requirements of this section.

- (a) **Noise.** Proposed development shall conform to the noise standards set forth in Article 414, Noise Standards.
- (b) **Setbacks.** Proposed development shall conform to the setback standards set forth in Article 406, Building Placement Standards.
- (c) **Screening and Buffering.** Screening and buffering requirements for proposed development shall be as set forth in Article 434, Site Compatibility, and Article 412, Landscaping.

- (d) Parking. Proposed development shall provide sufficient on-site parking in accordance with the provisions of Article 410, Parking and Loading.
- (e) Signs. Signs for uses subject to this article shall be consistent with Division 5 of this Development Code.

Section 110.340.25 Odors. All uses subject to this article shall be so operated as not to emit odorous matter which are perceptible by the average person at or beyond the lot line of the lot containing the proposed development.

Section 110.340.30 Lighting. Uses subject to this article shall be operated consistent with the provisions of this section.

- (a) Placement. All lights shall be placed so as to prohibit spillover illumination or glare onto adjoining properties.
- (b) Bulb Type. No bare bulbs shall be permitted unless they are effectively screened and shielded so as to prevent spillover illumination and glare onto adjacent property.

Section 110.340.35 Vibration. Uses subject to this article shall be operated consistent with the provisions of this section.

- (a) Perceptibility Beyond Lot Line. Uses shall not generate ground vibration which is perceptible without instruments by the average person at or beyond the lot line of the lot containing such activities.
- (b) Adjoining Equipment and Facilities. Uses shall not generate ground vibration which interferes with the operations of equipment and facilities of adjoining lots.
- (c) Exceptions. Vibrations caused by motor vehicles, trains, aircraft, demolition, and construction are exempt from the provisions of this section.

Section 110.340.40 Dust, Smoke, and Other Air Emissions. Uses which emit, or may emit, any air contaminant shall register and operate in accordance with the Washoe County District Health Department.

Section 110.340.45 Access. Access for uses subject to this article shall be in accordance with the provisions of this section.

- (a) Access Points. Access to any development shall be limited to one (1) point for each property or two (2) per street provided they are at least two hundred (200) feet apart, except along limited access freeways where direct access is prohibited.
- (b) Additional Access Points. If, in the opinion of the County Engineer, additional access points are required to ensure public safety and traffic operation, one (1) additional driveway may be permitted for properties with a street frontage greater than two hundred-and-fifty (250) feet, or two (2) additional driveways may be permitted for properties with a street frontage greater than five hundred (500) feet.
- (c) Common Access. Adjoining parcels with less than one hundred (100) feet of street frontage each, shall share a common access constructed on or within a prescribed distance from the property line. This provision may be waived by the Director of Development Review upon the submission of evidence that this provision cannot be met or creates a hardship.

- (d) Frontage Road. When determined by the County Engineer, a frontage road shall be constructed for large or adjoining parcels rather than allowing multiple access routes to a roadway.
- (e) Access to Residential Streets. Truck route traffic shall not have access to a local street that primarily serves residential uses, with the exception of providing emergency access routes.
- (f) Access to Arterial and Collector Roads. Uses subject to this article shall have direct access to an existing or planned arterial or collector road or indirect access if the use is within an industrial park with local industrial serving streets which have no impact on non compatible uses.

Section 110.340.50 Traffic Reports. A traffic report shall be required if the proposed use will generate eighty (80) or more peak hour trips as determined by the latest edition of the Institute of Transportation Engineers Trip Generation Report or other such sources as approved by the Regional Transportation Commission (RTC).

- (a) Preparation Guidelines. Traffic reports shall be prepared in accordance with Department of Development Review Traffic Report Guidelines.
- (b) Submittal. Traffic reports shall be included in the submittal of an application for development.

Section 110.340.55 Transportation Improvements. Uses subject to this article shall comply with the provisions of this section.

- (a) Level of Service (LOS). Uses shall be required to make use-related off-site transportation improvements necessary to maintain adopted County LOS Thresholds for Roadways and LOS Criteria for Unsignalized and Signalized Intersections.
- (b) Off-Site Transportation Improvements. Off-site transportation improvements shall be sized for the number of projected trips per day and peak trips per hour, and as approved by the County Engineer.
- (c) On-Site Transportation Improvements. The proposed development shall be responsible for all on-site transportation improvements, including but not limited to driveways, internal circulation system, and roadways required to connect uses to arterial roadways.
- (d) Demand Management. Uses which generate over seven hundred fifty (750) average daily trips shall include, as part of an application for development, a description of existing or proposed public transportation services, park and ride programs, employer sponsored shuttles, or other similar programs or policies to reduce demand for automobile trips.

Section 110.340.60 Public Services and Facilities. Public services and facilities shall be provided in accordance with County requirements and the following provisions:

- (a) Fire and Emergency Medical Services. The proposed development site shall have a maximum ten (10) minute response time for fire and emergency medical services, as verified by the agency designated for fire protection.

- (b) Police Services. The proposed development site shall have a maximum fifteen (15) minute response time for police services, as verified by the agency designated for police protection.
- (c) Community Water System. The proposed development shall be connected to a community water system and shall dedicate to Washoe County or other appropriate water purveyor at least one (1) acre-foot/year/acre of water, unless otherwise determined through development review.
- (d) Community Disposal System. Consistent with the provisions of Article 704, Adequate Public Facilities: Sanitary Sewer, new development shall be connected to a community disposal system and shall provide four hundred and fifty-seven (457) gallons/day per acre of waste water disposal capacity, unless otherwise determined through development review.

Section 110.340.65 On-Site Hazardous Substance Holding. All applicants for proposed development that includes on-site hazardous substance holding shall be required to obtain a Special Use Permit pursuant to Article 810, Special Use Permits, and shall be in accordance with the provisions of this section.

- (a) Inventory. Applicants shall complete hazardous substance inventories in accordance with reporting requirements as regulated by the following:
 - (1) Federal Superfund Amendments and Re authorization Act (SARA), Title III, Tier II;
 - (2) NRS 477, Statutes of the State Fire Marshal; and
 - (3) NRS 459.3828, Registration of Highly Hazardous Substances and Registration of SARA Facilities and Substances.
- (b) Risk Management and Prevention Plan. Applicants shall be required to prepare a detailed Risk Management and Prevention Plan and obtain approval from the agency designated for fire protection. This plan shall be submitted at the time that the application for the special use permit is submitted.
- (c) Compliance. Proposed development shall be in full compliance with the Uniform Fire Code, the Uniform Building Code, National Fire Protection Association Standards, Nevada Revised Statutes, and applicable federal regulations.
- (d) Review. Proposed development shall be reviewed by and shall obtain approval from the Washoe County District Health Department and appropriate agency designated for fire protection as a condition of approval.

ARTICLE 420

STORM DRAINAGE STANDARDS

Sections:

110.420.00	Purpose
110.420.05	Applicability
110.420.10	Relation to Other Standards
110.420.15	Authorization of Alternative Standards
110.420.20	General Requirements
110.420.25	Drainage Report Contents
110.420.30	Site Drainage and Grading Plans
110.420.35	Design/Improvement Requirements
110.420.40	Easements
110.420.45	Water Supply Ditches

Section 110.420.00 Purpose. The purpose of this article, Article 420, Storm Drainage, is to set forth standards for ensuring that both private and public development provides adequate protection for citizens and property, minimizes and controls erosion and pollution impacts on the natural environment, and minimizes maintenance costs for drainage and flood control systems within Washoe County.

Section 110.420.05 Applicability. The provisions of this article shall apply to public and private improvements for projects, including but not limited to the following:

- (a) Projects that will require a Drainage Report:
 - (1) Public Works Projects;
 - (2) Subdivisions;
 - (3) Subdivision projects utilizing a Grading Permit;
 - (4) Projects in, containing, or abutting a floodplain, stream, lake or major drainage facility.
- (b) Projects that may require a Drainage Report:
 - (1) Projects requiring a Site Plan Review;
 - (2) Projects requiring a Special Use Permit;
 - (3) Projects requiring a Building Permit;
 - (4) Projects requiring a Grading Permit; and
 - (5) Parcel Maps.

Section 110.420.10 Relation to Other Standards. The standards set forth in this article make reference to and shall be used in conjunction with the *Standards and Specifications for Public Works Construction* and *Standard Details for Public Works Construction*, latest editions, and American Association of State Highway Officials (AASHTO) guidelines.

Section 110.420.15 Authorization of Alternative Standards. In instances where unique situations necessitate the application of storm drainage and flood control designs and systems not provided in this Article, the following provisions shall apply:

- (a) **Accepted Engineering Practices.** Any storm drainage or flood control systems not allowed by these standards shall be designed in accordance with accepted engineering practices, the *Standard Specification for Public Works Construction*, and the *Standard Details for Public Works Construction*, and shall be subject to the approval of the County Engineer.
- (b) **Alternative Standards.** The County Engineer may, at his or her discretion, authorize alternative standards not covered in this Article, subject to the following:
 - (1) The alternative standards shall be the equivalent of the design requirements as set forth in Sections 110.420.20, 110.420.30, and 110.420.35; and
 - (2) The alternative standards shall not be used for purposes of mere convenience or economy unless the alternative has equal or better function and/or quality.

Section 110.420.20 General Requirements. The requirements set forth in this section shall apply to all development subject to this Article.

- (a) **Required Drainage Report.** Unless waived in advance by the County Engineer, all applicants shall submit for approval a Drainage Report signed and stamped by a Nevada Registered Civil Engineer in accordance with the provisions of this Article and other applicable County standards. Drainage Reports shall be based on the land uses allowed in the Comprehensive Plan, existing uses, or Storm Drainage Master Plans, whichever result in the greater runoff. Hydrologic/hydraulic analysis and design shall be based on any existing interim drainage basin master plans, Washoe County flood control master plan concept level report(s), or adopted drainage master plans as determined by the County Engineer.
- (b) **10-Year Storm Runoff Improvements.** Whenever a Drainage Report indicates that the 10-year storm runoff from a proposed development cannot be handled by the existing storm drain system, the applicant shall be responsible for accomplishing one (1) or more of the following, as determined by the County Engineer:
 - (1) Upgrade the existing off-site system to accommodate the runoff;
 - (2) Provide on-site detention and controls for acceptable discharge into the off-site system; or
 - (3) Provide an on-site retention/infiltration system verified by a Nevada Registered Civil Engineer as being adequate to accommodate the runoff from the proposed development. The operation and maintenance of such a system shall be the responsibility of the property owner or his or her successors and assigns.

- (c) 100-Year Storm Runoff Improvements. The provisions of this section shall govern 100-year storm runoff improvements:
- (1) Discharge of the 100-year frequency storm drain waters into a major drainage facility or natural water course shall not contribute to increasing the existing peak flow of storm drainage runoff in the drainage facility or natural water course, except as provided in Subsection (c)(2) of this section.
 - (2) The County Engineer may allow an increase in peak flow from the 100 year storm if a Nevada Registered Civil Engineer provides proof in the Drainage Report that any increase in peak flow will not adversely affect or cause damage to any property along the existing drainage facility or natural water course, now or in the future, based on the existing and proposed land uses or the uses allowed in the Comprehensive Plan, whichever is more restrictive.
- (d) Natural Water Facilities. Development of property shall not adversely affect any natural drainage facility or natural water course, and shall be subject to the following provisions:
- (1) Natural facilities shall remain in as near a natural state as is practicable, with any modification proposed, including any erosion mitigating measures, addressed in the Drainage Report and drainage plans; and
 - (2) When the flows, velocity, or side slope as determined by the Drainage Report indicates a hazard, the applicant shall provide fencing in accordance with County standards.
- (e) On-Site Facilities. All drainage relating to the proposed development shall be collected on-site by facilities to accommodate, at a minimum, the storm drain waters for the 10-year return frequency storm flow, both entering the site and generated on-site. The drainage shall be piped in accordance with County standards to an existing adequate public storm drain system, major drainage facility, or natural water course. A major drainage facility is a channel or drainage way that has a drainage basin of one hundred (100) acres or more.
- (1) Where by reason of terrain or other circumstances the County Engineer determines that piping storm drain waters is inappropriate or unnecessary, alternative methods may be approved in lieu of piping, including methods pursuant to the provisions set forth in Section 110.420.15 to facilitate transporting such waters; and
 - (2) Easements to access and accommodate storm waters flowing across private property shall be provided as set forth in Section 110.420.45.
- (f) Detention. On-site detention requirements for the 10-year and 100-year frequency storm are as follows:
- (1) For a 10-year frequency storm, detention of the difference in runoff between the developed and undeveloped conditions shall be required for the 10-year frequency storm; and
 - (2) For a 100-year frequency storm, detention of the difference in runoff for the 100-year frequency storm may be required if, in the opinion of the County Engineer, the capacity of the downstream storm drainage facilities will be exceeded.

- (g) Wetlands. When the U.S. Army Corps of Engineers (C.O.E.) has determined there are wetlands on a proposed site, a wetlands delineation map approved by the C.O.E. must be submitted to the Department of Development Review and the County Engineer. Any construction proposed in the wetland will require a 404 Permit from the C.O.E..
- (h) Waters of the State of Nevada. Any work which requires fill intended to be placed within the "waters of the State of Nevada" shall receive permission from the State Division of Environmental Protection prior to beginning construction. The County Engineer shall receive a copy of this permission prior to issuance of any permit.
- (i) Construction Within a 100-Year Flood plain. Embankments and other structures shall not be placed within a 100-year flood plain, as determined by the most recent hydrologic study acceptable to the County Engineer, of a major drainage facility without prior approval by the County Engineer. Where such approval is granted, embankments and structures shall be constructed in accordance with the standards outlined in Section 110.416.70. Development within areas shown on the Flood Insurance Rate Map (FIRM) shall comply with Article 416, Flood Hazards.
- (j) Discharge Across Property Lines. Surface drainage from any developed area shall not cross any property line except by way of a natural watercourse, major drainage facility, approved drainage system within a public storm drain easement, or permanent surface drainage easement. The manner of discharge shall be approved by the County Engineer and the discharge must produce no significant adverse impacts to the downhill property. Surface flows shall cross a property line within historic drainage ways and in a similar manner and quantity (or less) as the predeveloped conditions.
- (k) Extension of Storm Drain Facilities. Storm drain facilities shall be extended from within a development to adjacent undeveloped properties for future extensions in accordance with approved drainage plans.
- (l) Adjoining Property Surface Drainage. Existing surface drainage from adjoining property shall be perpetuated through a development unless other means of disposal acceptable to the County Engineer are used.
- (m) Irrigation Waters. Irrigation waters not controlled by a ditch or utility company and storm drain waters shall be conveyed by separate systems.

Section 110.420.25 Drainage Report Contents. Drainage Reports shall contain, at a minimum, the provisions set forth in this section.

- (a) Title Page. The title page of the Drainage Report shall contain the following:
 - (1) Project name;
 - (2) Preparer's name, firm, and date; and
 - (3) Professional Engineer's Seal of preparer and signature.
- (b) Introduction. The introduction of the Drainage Report shall include, at a minimum, the following:
 - (1) Street location, assessor's parcel number(s), section reference, and adjacent developments;

- (2) Topography, ground cover, existing drainage facilities, major drainage facilities, flood hazard areas, irrigation ditches, and other site conditions, using maps to complement and clarify the project description whenever possible; and
 - (3) Proposed project description, including other previous studies relevant to the site.
- (c) Historic Drainage System. The Drainage Report shall provide sufficient information, including text and maps where possible, pertaining to the historic drainage system, including:
- (1) Major basins (100 acres or more), including relationship to major drainage facilities and major basin drainage characteristics (topography, runoff, cover, use, erosion); and
 - (2) Sub-basin and site drainage, including 10-year and 100-year storm flows for each sub-basin affecting the site, existing drainage patterns, channeled or overland flow, points of entrance and discharge, and effect of historic flows on adjacent properties. All items listed in this subsection, excluding the effects of historic flows on adjacent properties, may be tabulated on a map.
- (d) Proposed (Developed) Drainage System. At a minimum, the following information regarding the proposed drainage system shall be provided in the Drainage Report. Maps shall be used to complement and clarify the description where appropriate.
- (1) Size of major basins and tributary sub-basins, hydrologic method to be used for analysis (Rational, Soil Conservation Service or Hydrologic Engineering Center), and design storm intensities for 10-year and 100-year storms;
 - (2) Runoff analysis, including historic storm flow rates and paths, and developed storm flow rates and paths for 10-year and 100-year storms;
 - (3) Design of the storm drain system to pass the 10-year storm including all downstream improvements, with an overland system to pass up to the 100-year storm, and verified storm flows from inlets to ultimate outlets of the drainage system;
 - (4) Detention/retention/infiltration information for the 10-year and 100-year storm(s) shall be required based on limiting conditions downstream. (For example, if the off-site piped system cannot pass the 10-year storm, the 10-year storm shall be detained on-site. If the off-site overland flow facilities cannot pass the 10-year (up to the 100-year) storm, on-site detention for all storms exceeding that capacity shall be provided.) Information should include the following:
 - (i) Volume required and provided for zero increase in peak flows;
 - (ii) Release rates and methods;
 - (iii) Passage of storms exceeding the 10-year up to the 100-year storm;
 - (iv) Emergency overflow provisions which will not cause a direct impact to neighboring sites;

- (v) A detailed description provided by a Nevada Registered Civil Engineer of any downstream constraints, design calculations, and mitigation recommendations; and
 - (vi) Detention area(s) clearly identified in preliminary or schematic plan and the necessary area(s) identified on preliminary plans.
- (5) For 10-year and 100-year storms show on plan maps the depth and velocity of flow on streets and the drainage system for the streets;
 - (6) The type, depth, and velocity of open channel flow shall be shown on plan maps; and
 - (7) Storm drains and culvert layouts and all relevant data shall be shown on plan maps.
- (e) Areas Within Flood Hazard Zone. Where the proposed development is located within a flood hazard area or limited flooding area, as defined in Article 416, Flood Hazards, sufficient information shall be provided for the following:
- (1) Impacts;
 - (2) Protection; and
 - (3) Compliance with Federal Emergency Management Agency requirements and Article 416, Flood Hazards, of this Development Code.
- (f) Conclusions. The Drainage Report shall include a conclusion which discusses the impacts of the proposed drainage system improvements including:
- (1) Benefits; and
 - (2) Adverse effects with mitigation measures for these effects.
- (g) Drainage Report Appendices. The Drainage Report shall include the following information in the Appendices.
- (1) Computations. Hydrologic and hydraulic computations including:
 - (i) Off-site and on-site historic runoff;
 - (ii) Off-site and on-site developed runoff;
 - (iii) Detention/retention/infiltration for up to the 100-year storm; and
 - (iv) Hydraulic grade line (HGL) for 10-year storms and 100-year storms.
 - (2) Site Location Map. Site location map on a U.S.G.S. map, at a scale appropriate to show relation of site to major drainage basin(s) and sub-basin(s), showing flood hazard areas and 100-year flood plains, if applicable, and off-site flows through project.

Section 110.420.30 Site Drainage and Grading Plans. The contents of these plans shall include:

- (a) Provide existing and proposed contours at a distance beyond the property lines that is sufficient to analyze drainage impacts on adjacent properties, but in no case shall this distance be less than 100 feet;
- (b) Similar scales;
- (c) All sub-drainage areas per catch basin or channel;
- (d) Tabulation of existing and proposed drainage, showing length and time of concentration on various runs of materials such as grass and gutters, time of concentration, average rainfall intensity, area, runoff coefficient build-up if necessary, and peak flows for 10-year and 100-year storms;
- (e) Labels of all inlets and manholes to correspond to tabular numbering system;
- (f) Pipe sizes, grades, velocities, peak flows, and hydraulic grade lines for all parts of the system in a tabular form on the plans;
- (g) Location plan (overall drainage) and sub-drainage plan signed and sealed by a Nevada Registered Civil Engineer and included in the construction plans for the development;
- (h) Tables detailing design data of rational formula and inlet, pipe and channel design on the plan;
- (i) On grading plans, peak flows for 10-year and 100-year storms at inlets and other sub-basin points of concentration, and at discharge points and in channels;
- (j) Peak flows entering and leaving the site, tracing path leaving the site to the nearest major drainage facilities without adverse impact to downstream owners;
- (k) On plan and profile sheets, peak flows for 10-year and 100-year storms at all inlets and shows peak flows, velocity, and hydraulic grade line if above top of pipe;
- (l) Benchmarks. Benchmarks, shown on plans with description and elevation;
- (m) Property Lines. Existing and proposed property lines;
- (n) Drainage Easements and Facilities. Existing and proposed drainage easements and facilities;
- (o) Streets. Street names, grades, and widths;
- (p) Water Flows. Show routing and accumulative flows at the upstream and downstream ends of the site and at various critical points on-site for both the 10 and 100 year storms;
- (q) Sub-Basins. Inflow and outflow for both 10-year and 100-year storms for all sub-basins;
- (r) Street Cross Sections. Street cross sections showing 100-year flood levels;
- (s) Major Channel Flows. Open channel flows in major channels shall be identified with the following information on plans:

- (1) Channel and hydraulic grade line (HGL) profiles;
 - (2) Cross sections and required rights-of-way at 100-foot intervals;
 - (3) Location and size of all existing and proposed structures; and
 - (4) Channel sections and lining details.
- (t) Storm Sewers. Storm sewers shown on plans and shall include the following information:
- (1) Hydraulic grade line (HGL) profiles;
 - (2) Location and size of all existing and proposed structures;
 - (3) Proposed materials; and
 - (4) Pertinent elevations and slopes.

Section 110.420.35 Design/Improvement Requirements. Design and improvement requirements for storm drainage systems shall be in accordance with this section.

- (a) Minimum Pipe Diameter. Minimum pipe diameter for any public storm drain shall be twelve (12) inches.
- (b) Drainage Channel Lining. Lining for drainage channels shall conform to the requirements of this subsection.
 - (1) For design velocity less than six (6) feet per second (FPS), the following standards shall apply:
 - (i) Channel lining shall be a non-eroding, long-life, low maintenance material as approved by the County Engineer; and
 - (ii) Side slopes shall be a maximum of three horizontal to one vertical proportion (3:1) unless otherwise approved by the County Engineer.
 - (2) For design velocity between six (6) and ten (10) FPS, the following standards shall apply:
 - (i) Channel lining shall consist of loose rock rip rap sized for design velocity; and
 - (ii) Side slopes shall be a maximum of two horizontal to one vertical proportion (2:1).
 - (3) For a design velocity greater than ten (10) FPS, channel lining of concrete or an engineered equivalent shall be required.
 - (4) Access roads shall be constructed when required by the County Engineer.
- (c) Corrugated Metal and Plastic Piping. Corrugated metal pipe or plastic pipe for public improvements may be used only at specific locations approved by the County Engineer. Corrugated metal pipe shall not be acceptable for County-owned storm drain systems.

- (d) Storm Water Piping. Storm drains to a major drainage facility shall extend, as a minimum, to the 100-year flood line and be rip rapped from the outlet to the bottom of the channel in the direction of the flow. Channel modifications for erosion control shall be designed so that the receiving channel or entering channel will contain the flows without erosion.
- (e) Overland Flow. Overland flow shall be provided for and channeled to County standards within dedicated easements or public rights-of-way to protect structures from flood during storms that exceed the 10-year storm, up to and including the 100-year return frequency storm.
- (f) Public Drainage Facilities. Constructed public drainage facilities with design flows of sixty (60) cubic feet per second or less shall be piped in accordance with County standards. Constructed drainage facilities with flows exceeding sixty (60) cubic feet per second may be open channel construction in accordance with County standards, when approved by the County Engineer.
- (g) Piping in County Right-of-Way. All storm drain piping contained within County right-of-way shall be a minimum of Reinforced Concrete Pipe (RCP) Class III or the appropriate class when design requires a higher pipe support strength.
- (h) Headwalls. Standard headwalls shall be placed on the inlet and outlet of all public pipe culverts. Pipes up to and including seventy-two (72) inches in diameter shall comply in all cases with County design, size, and material standards. Headwalls for pipes exceeding seventy-two (72) inches require special design approved by the County Engineer.
- (i) Trash Racks. Trash racks shall be provided at the upper end of all closed public conduits as approved by the County Engineer.
- (j) Interceptor Swales. Paved interceptor swales, as per Washoe County Standard Detail, shall be provided along the top of retaining walls and cut slopes to intercept drainage. When required by the County Engineer, paved swales shall be provided to intercept drainage from adjacent property.
- (k) Manholes. Manholes for public improvements shall be located at junction points, at changes in horizontal or vertical alignment exceeding the minimum allowable pipe deflection, at changes in conduit size, and at the end of public lines, unless otherwise approved by the County Engineer.
- (1) When permitted by the County Engineer, pipe placed on curves (horizontal and vertical) shall meet manufacturer's recommendations for curved alignment.
 - (2) All curves, radii, length of pipe joints, and types of pipe shall be shown on the plans.
 - (3) Manholes shall be spaced at intervals not greater than three hundred (300) feet unless otherwise approved by the County Engineer.
- (l) Catch Basins. Catch basins are to be designed and located in accordance with the following criteria:
- (1) Catch basins shall be installed at low points of vertical curves, at all major street intersections where appropriate, and at sufficient intervals to intake the peak flow

for the 10-year return storm runoff, such that flows will not interfere with traffic or flood adjoining property;

- (2) In no instance shall the flow from a 10 year return storm extend more than fifty (50) percent onto the travel lane adjacent to the curb;
 - (3) Laterals from catch basins are to tie into manholes in the direction of the flow (catch basins shall not tie into each other unless otherwise approved by the County Engineer);
 - (4) Flow along gutters and into inlets shall be computed by the Rational Method or other recognized industry standards using coefficients based on planned land use and ultimate future development;
 - (5) Sur-traps, or an appropriate equal, shall be installed within all catch basins to provide pre treatment for petrochemicals and silt;
 - (6) Sheet flow across intersections is not permitted; and
 - (7) "Bubble up" type outlet basins are not permitted.
- (m) Structures Under County Roadways. Drainage structures located under County roadways, shall be designed to pass the 100-year storm flow resulting from a fully developed condition within the watershed.
- (n) Valley Gutters. Reinforced concrete valley gutters for public improvements may be placed at street intersections only when approved by the County Engineer, and shall not be placed transverse to collector and arterial streets.
- (o) Flood Plains. Embankment shall not be placed within the 100-year flood plain of a major drainage facility without prior approval by the County Engineer. Where such approval is given, the embankment shall be faced with rip rap or an approved lining designed for velocity to a minimum of one (1) foot above the 100-year flood line. Development within areas shown on the Flood Insurance Rate Map (FIRM) shall comply with Article 416, Flood Hazards.
- (p) Sump Conditions. Sump conditions within streets shall require paved overland concrete swales in drainage easements and a storm drain system for conveyance of storm water.
- (q) Lot Drainage Swales. Lot drainage swales on private property shall be provided in accordance with the provisions of this subsection.
- (1) Surface drainage swales collecting runoff from the area of two (2) or more lots shall be paved in accordance with County standards and shall be maintained and perpetuated by the property owners. Paving is not required for common side lot swales serving only two (2) adjacent lots.
 - (2) Easements for rear lot drainage swales shall be established by a note on the official plat that reads substantially as follows:

The rear five (5) feet of Lots _____ shall be subject to a permanent private and reciprocal drainage swale easement". When appropriate add: "This

easement shall be further reciprocal with all lots having a rear lot line which abuts such easement."

- (3) Standard lot line drainage swales shall be designed to carry the waters generated by a 100-year frequency storm, with a maximum of six (6) lots contributing runoff
 - (i) Discharge from swales shall be conveyed to a public drainage facility;
 - (ii) When inlets and piping are used, catch basins shall be Type 3-R (standard drawing of catch basins), and the pipes shall have a minimum diameter of twelve (12) inches;
 - (iii) Provisions shall be made for overland flow in the event that catch basins plug; and
 - (iv) Should it be necessary to provide for drainage from more than six (6) lots and/or to exceed the maximum horizontal or vertical alignment, a modified design capable of conveying the runoff from the 100-year storm may be submitted for consideration by the County Engineer.

- (r) Design Computations. Storm drainage systems, for both public and private improvements, shall be designed in accordance with this section.
 - (1) Mannings Formula. Mannings Formula shall be used in computing capacities of all open channels and closed conduits with the following minimum values for roughness coefficient "n":

CHANNEL/CONDUIT	"n"
PVS or ABS	0.010
Concrete Pipe	0.014
Corrugated Metal Pipe (100% paved)	0.015
Corrugated Metal Pipe (paved invert)	0.019
Corrugated Metal (plain)	0.024
Open channels with gunite lining	0.019
Open channels with paved bottom	0.025
Earth channels (no rock or gravel)	0.030
Rock or gravel - per approved Engineers Manual based on size and placement of materials.	

- (2) Rational Method. The Rational Method may be used in computations for the rate of runoff for urban and small watersheds (500 acres or less). The SCS (Soil Conservation Service) method, SCS TR-55 "Urban Hydrology for Small Watersheds," or other acceptable method may be used for larger watersheds (greater than 500 acres).
 - (i) The design flow for the Rational Method is expressed as $Q = CiA$, where:
 - Q = peak rate of runoff, cubic feet per second;
 - C = runoff coefficient;

i = average rainfall intensity, inches per hour; and

A = watershed area, acres.

- (ii) The following listed runoff coefficients, shall be used in performing computations with the Rational Method. A "build up" C value may be required in special conditions such as very small lots with large houses or duplexes.

Land Use Type	Runoff Coefficient "C"
LDR, MDR, HDR, GR	0.25 - 0.35
LDS, MDS, HDS	0.45 - 0.60
LDU, MDU, HDU	0.60 - 0.70
Community Commercial	0.85
Tourist Commercial	0.85
Office Commercial	0.85
Industrial	0.85 - 0.90
Public Services and Facilities	0.50 - 0.85
Pavement and Concrete Surfaces	0.90 - 0.95
Parks and Recreation	0.25
Open Space (0-5% grade-vegetated)	0.20 - 0.30
Open Space (0-5% grade-no vegetation)	0.30 - 0.40
Open Space (5-15% grade-vegetated or unvegetated)	0.40 - 0.50
Open Space (Over 15% grade-sparsely vegetated, rock, or clayey soils)	0.40 - 0.60

- (iii) The rainfall intensity curve shall be used for determining the average intensity. The time of concentration, with a minimum build up time of ten (10) minutes is expressed as:

$tc_1 = 10 \text{ or } \frac{L}{V \times 60} \text{ (whichever is greater)}$ <p>where:</p> <p>tc_1 = time of concentration at initial inlet (in minutes)</p> <p>L = length from uppermost point of watershed inlet (in feet)</p> <p>V = channel or overland velocity (in feet per second)</p>
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- (iv) Given the time of concentration at a design point, the time of concentration at the next design point is determined by adding travel time, expressed as:

$$t = \frac{L}{V \times 60}$$

where:

t = travel time (in minutes)

L = length of channel or conduit between design points (in feet)

V = channel or conduit velocity (in feet per second)

- (3) Minimum Design Velocity. Minimum design velocity shall be three (3) feet per second for closed conduits.

Section 110.420.40 Easements. Easements shall be provided in accordance with the provisions set forth in this section.

- (a) Vehicular Access. Easements with improved vehicular access in accordance with County standards shall be provided to publicly-owned storm drain manholes, storm drain inlets and outlets, ditches and associated structures not located within an improved street section. Improved vehicular access may be waived by the County Engineer due to rough terrain. (Refer to Development Code Section 110.436.105f)
- (b) 100-Year Flood plain. Easements for access to, and maintenance of, the 100-year storm flood plain associated with a major drainage facility or natural water course shall be provided. Improved vehicular access in accordance with County standards shall be provided when determined necessary by the County Engineer.
- (c) Public Improvements. Storm drain easements for public improvements shall be a minimum width of fifteen (15) feet. The final easement width shall be determined by pipe width, required trench clearance, and excavated trench side slopes not less than one horizontal to one vertical proportion (1:1), and as approved by the County Engineer.
- (d) Private Property. Storm drainage easement(s) will be required for storm waters generated within the boundaries of a development that discharge onto or across private property. If the storm drain waters generated within the boundaries of a development discharge from a public drain system onto and across private property, a permanent easement for access and maintenance shall be granted to the County from the property boundary to the point of discharge into an existing public storm drain system, major drainage facility, or natural water course. Improvements to County standards shall be required if the County is to maintain the easement. The County Engineer shall determine if the easement is to be accepted for maintenance.

Section 110.420.45 Water Supply Ditches. Water supply ditches shall be designed in accordance with the conditions set forth in this section.

- (a) Public Storm Drainage Runoff. No public storm drainage runoff shall be allowed to flow or discharge into any water supply ditch without approval of the ditch company or utility company.

- (b) Private Storm Drainage Runoff. No private storm drainage runoff shall be allowed to flow or discharge into any water supply ditch without the approval of the ditch company or utility company.
- (c) Discharge Into Water Supply Ditch. Discharge of storm drain waters into a water supply ditch shall not contribute to increasing the peak flow or total volume of water in the ditch for a twenty-four (24) hour period, based on a 10-year frequency storm.
- (d) Improvements and Access. Where water supply ditches are located within or adjacent to a proposed development, access and maintenance of the ditch shall not be hindered.
- (e) Improvements within Easements. Any improvements within the ditch company's easements are subject to the ditch company's approval.
- (f) Ditch or Watercourse Hazard. Fencing is required in accordance with Development Code Section 110.610.30(f).

ARTICLE 436

STREET DESIGN STANDARDS

Sections:

110.436.00	Purpose
110.436.05	Applicability
110.436.10	Relation to Other Standards
110.436.15	Authorization of Alternative Standards
110.436.20	General Requirements
110.436.25	Street Sections
110.436.30	Grades
110.436.35	Street Intersections
110.436.40	Street Crowns
110.436.45	Street Curves
110.436.50	Curbs and Gutters
110.436.55	Arterial Median Openings
110.436.60	Paving
110.436.65	Temporary Patches
110.436.70	Retaining Walls
110.436.75	Street Signs
110.436.80	Hazard Locations
110.436.85	Bus Turnouts
110.436.90	Dead-End Streets
110.436.95	Emergency Access Roads
110.436.100	Improved Maintenance Access
110.436.105	Private Access
110.436.110	Private Streets
110.436.115	Driveways
110.436.120	Cul-De-Sacs and Knuckles
110.436.125	Partial Width Streets
110.436.130	Street Extensions
110.436.135	Pedestrian and Bicycle Ways
110.436.140	Street Improvement Plans: General Requirements
110.436.145	Street Improvement Plans: Contents
110.436.150	Street Improvement Plans: Plan & Profile Sheets

Section 110.436.00 Purpose. The purpose of this article, Article 436, Street Design Standards, is to provide safe, properly designed, attractive streets that minimize environmental disturbance, including impacts on water quality, and minimize maintenance costs for the street system within Washoe County.

Section 110.436.05 Applicability. The provisions of this article shall apply to public and private street improvements for projects, including but not limited to the following:

- (a) Projects that will be subject to this article are:
 - (1) Public Works Projects;

- (2) Subdivisions;
- (3) Subdivisions utilizing a Grading Permit;
- (b) Projects that may be subject to this article are:
 - (1) Projects requiring a Site Plan Review;
 - (2) Projects requiring a Special Use Permit;
 - (3) Projects utilizing a Development Agreement; and
 - (4) Parcel Maps.

Section 110.436.10 Relation to Other Standards. The requirements set forth in this Article make reference to and are to be used in conjunction with the following standards and guidelines:

- (a) The Standard Specifications for Public Works Construction and the Standard Details for Public Works Construction, latest editions;
- (b) The Washoe County "Structural Pavement Section Design Manual"; the Washoe County Regional Transportation Commission (RTC) "Planning for Transit: A Guide for Community and Site Planning";
- (c) The Institute of Traffic Engineers (ITE) Guidelines;
- (d) The American Association of State Highway and Transportation Officials (AASHTO) guidelines;
- (e) The Manual of Uniform Traffic Control Devices (MUCTD); and
- (f) The Americans With Disabilities Act (ADA) standards.

Section 110.436.15 Authorization of Alternative Standards. In instances where unique topographical or other physical constraints suggest the use of streets and associated systems that are not provided for in this Article, the County Engineer may authorize alternative standards, provided that the alternative standards are equivalent design standards in accordance with accepted engineering practices, the Standard Specifications for Public Works Construction, and the Standard Details for Public Works Construction.

Section 110.436.20 General Requirements. Street design requirements set forth in this section, shall apply to all development subject to this Article.

- (a) Level of Service. Streets shall be designed to meet a Level of Service (LOS) standard of LOS C.
- (b) Street Improvements. All public and private streets within a development shall be improved to conform to the standards as set forth in this Article.
- (c) Ingress and Egress. Unless otherwise approved by the County Engineer at least two (2) means of ingress and egress built to County standards shall be provided to serve a subdivision development. Of the two means, one may be constructed to emergency access standards provided in Section 110.436.95, Emergency Access Roads.

- (d) Right-of-Way and Easement Acquisition. All necessary right-of-way or easement acquisition outside the boundaries of a proposed development, including any agreements pertaining to access, drainage, ownership, and maintenance, shall be completed prior to the final map approval unless otherwise approved by the County Engineer.
- (e) Streets Adjacent to Property Boundaries. The location of streets adjacent to property boundaries shall comply with the following provisions:
- (1) Unless otherwise approved by the County Engineer, a street shown by an adopted street pattern or indicated on the Street and Highways System Plan map that lies along a boundary of a development is to be dedicated and constructed at full width and to County standards; and
 - (2) A proposed street, or streets or access adjacent to or necessary to serve a proposed development, which are not within the boundaries of the development, shall be improved full width with the development in accordance with County standards as required by the County Engineer.
- (f) Additional Right-of-way. To facilitate turning movements near intersections, additional right-of-way shall be provided to the satisfaction of the County Engineer.
- (g) Partial Width Streets. Where permitted, partial width streets shall comply with the provisions set forth in Section 110.436.125, Partial Street Widths.
- (h) Street Extensions. Street extensions shall comply with the general provisions of this section and the provisions of Section 110.436.130, Street Extensions.
- (i) Asphalt Pavement Structural Section. Asphalt pavement structural sections shall be designed in accordance with the latest edition of the "Washoe County Structural Pavement Section Design Manual".
- (1) Such sections shall be prepared by a Nevada Registered Civil Engineer and submitted with street improvement plans; and
 - (2) Boring logs shall be shown on street improvement plans.
- (j) Traffic Studies. All traffic studies and reports shall be prepared in accordance with current ITE and AASHTO guidelines. Said studies and reports shall be prepared and stamped by a Nevada Registered Civil Engineer experienced in traffic engineering.
- (k) Utilities. All new utilities shall be placed underground consistent with the street specifications provided in this Article.
- (l) Construction Traffic. Prior to final map approval, a proposed Construction Traffic Haul Route Plan shall be submitted to the County Engineering Division for review and approval. Construction traffic includes all vehicles weighing in excess of 8,000 pounds unladen weight that are used to construct both off-site and on-site improvements.
- (1) Existing residential streets that will be used as construction haul routes shall be evaluated by a geotechnical study to determine the existing pavement structural section and its load supporting capability; and
 - (2) If the pavement section is inadequate to support the proposed construction

loadings but would be adequate in the absence of this construction traffic, the roadway shall be rehabilitated to support the anticipated additional loadings or reconstructed after construction use as needed to restore the existing design life, as approved by the County Engineer.

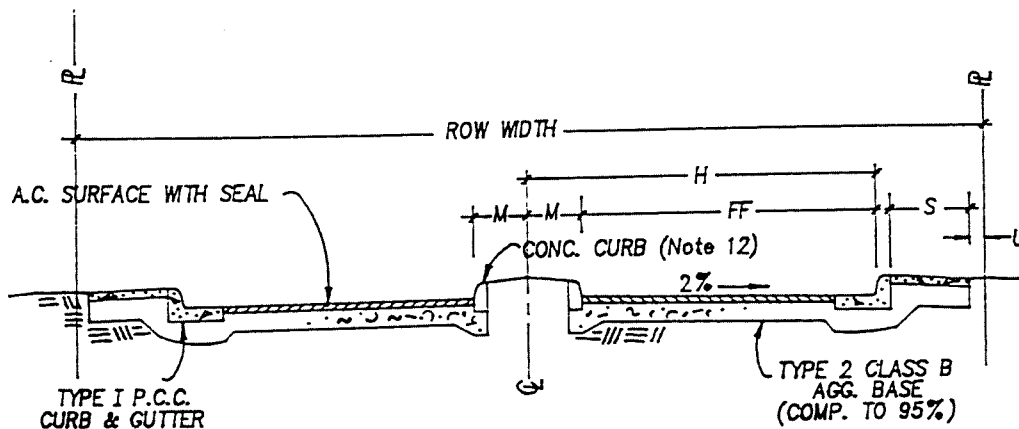
- (m) Occupancy Permits. A Permit of Occupancy shall be obtained from the Nevada Department of Transportation (NDOT) for access to, from, or under roads and highways maintained by the NDOT. Applicant shall submit approved Permits of Occupancy to the County Engineering Division.
- (n) Signs. Signs and permanent markings shall be accordance with the requirements of Section 110.436.80, Street Signs.

Section 110.436.25 Street Sections. All roadways dedicated and improved in Washoe County shall be constructed in accordance with the street sections for urban, suburban, and rural areas illustrated in Tables 110.436.25-1 to 110.436.25-4. These standards are to be used in conjunction with the Land Use and Transportation Element of the Comprehensive Plan and the standards set forth in this Article.

- (a) Variance from Street Sections. The Planning Commission may consider variations to the Street Section requirements under the provisions of Article 804, Variances, if appropriate considerations warrant different cross-section improvements.

Table 110.436.25-1: Roadway Sections - A

General Applications: Arterial Highways



ROW	H	FF	M	S	U	ADT MAX PER 2 TRAVEL LANES	REMARKS
100	44	36	8	5	0.5	12,100	MAJOR ARTERIAL
80	35	29.5	-	4	0.5	10,800	MINOR ARTERIAL

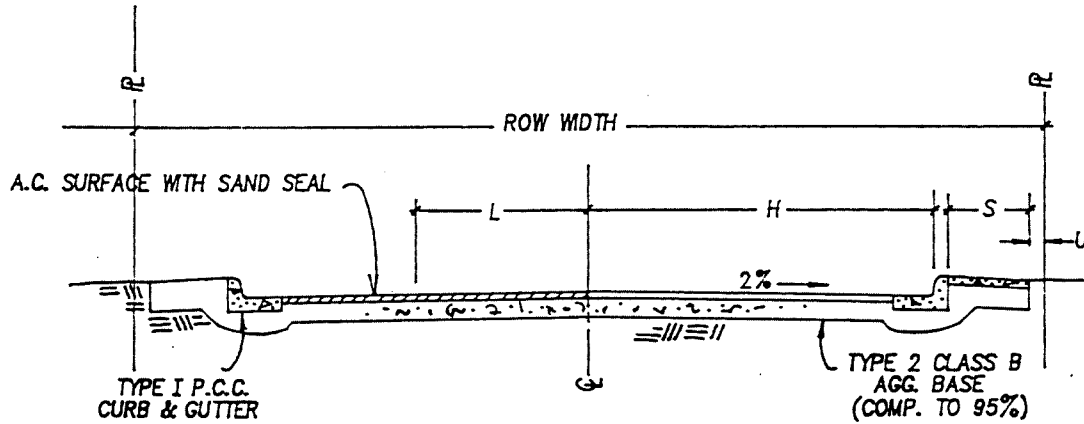
NOTES:

1. ALL WIDTHS ARE IN FEET
2. FF, H AND M ARE MEASURED TO THE FRONT FACE OF THE CURB. ROW IS RIGHT OF WAY; ADT IS AVERAGE DAILY TRAFFIC.
3. ADT REPRESENTS THE DESIGN VOLUME FOR A TWO LANE FACILITY.
4. BICYCLE LANE SHALL BE PROVIDED IN ACCORDANCE WITH THE BICYCLE AND PEDESTRIAN ELEMENT OF THE REGIONAL TRANSPORTATION PLAN AND TO THE SATISFACTION OF THE COUNTY ENGINEER.
5. ON STREET PARKING NOT ALLOWED ON ARTERIALS.
6. STRUCTURAL SECTIONS SHALL BE DETERMINED BY GEOTECHNICAL ENGINEERING DESIGN BUT IN NO CASE SHALL BE LESS THAN 5" A.C. OVER 6" GRAVEL BASE.
7. ALL CURB AND GUTTER IS MONOLITHIC CONC. AND L SHAPED PER STANDARD DETAIL.
8. ALL SIDEWALK IS CONCRETE. SIDEWALK BOTH SIDES FOR ARTERIALS.
9. ALL A.C. SURFACES SHALL BE SEALED IN ACCORDANCE WITH WASHOE COUNTY STANDARDS.
10. DESIGN OF IMPROVEMENTS TO BE DONE IN ACCORDANCE WITH ARTICLES 420 AND 436 OF WASHOE COUNTY DEVELOPMENT STANDARDS AND DESIGN GUIDELINES.
11. ALL CONSTRUCTION IS TO BE DONE TO CURRENT WASHOE COUNTY STANDARDS AND SPECIFICATIONS.
12. MEDIAN IS CONC. CURB OR OTHER MEDIAN CONSTRUCTION APPROVED BY THE COUNTY ENGINEER.
13. RESIDENTIAL DRIVEWAY ACCESS NOT ALLOWED.
14. SLOPE EASEMENTS MAY BE REQ'D. IN CERTAIN TERRAIN TO ACCOMMODATE THE ROADWAY SECTION.
15. TYPICAL STRIPPING IS FOR 12' LANES.
16. A 7.5 FOOT PUBLIC UTILITY, TRAFFIC CONTROL SIGNAGE, AND PLOWED SNOW EASEMENT ON BOTH SIDES OF THE R.O.W. IS REQUIRED PER STANDARD DETAIL.

Source: Washoe County Department of Public Works

Table 110.436.25-2: Roadway Sections - B

General Applications: Street Serving Lot Sizes Less Than 0.5 Acres



ROW	H	S	U	L	B	PL	ADT MAX PER 2 TRAVEL LANES	REMARKS
52	20	5	0.5	12	4	0	9,600	COLLECTOR
42	16	4	0.5	11	0	2	1,000	LOCAL

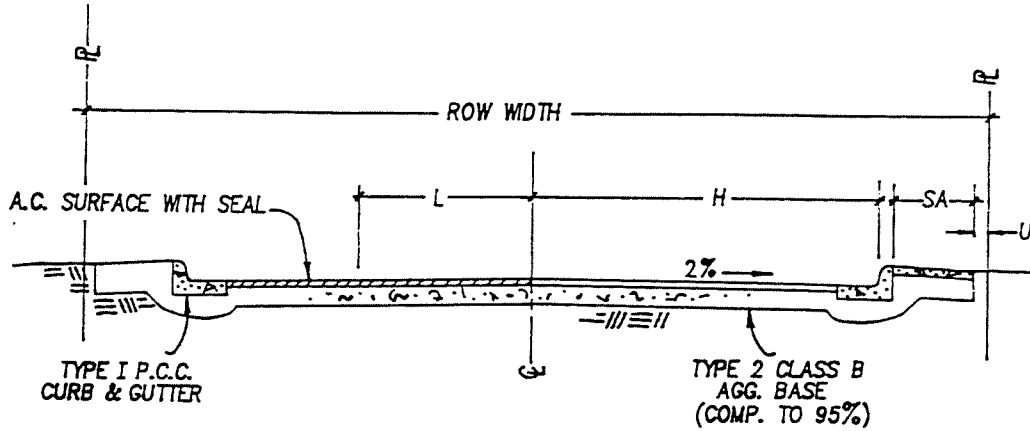
NOTES:

1. ALL WIDTHS ARE IN FEET.
2. H IS MEASURED TO THE FRONT FACE OF THE CURB.
3. L IS TRAVEL LANE; S IS SIDEWALK; B IS BICYCLE LANE; PL IS MAX NUMBER OF PARKING LANES ALLOWED; ROW IS RIGHT OF WAY' ADT IS AVERAGE DAILY TRAFFIC.
4. ADT REPRESENTS THE DESIGN VOLUME FOR A TWO LANE FACILITY.
5. BICYCLE LANE SHALL BE PROVIDED IN ACCORDANCE WITH THE BICYCLE AND PEDESTRIAN ELEMENT OF THE REGIONAL TRANSPORTATION PLAN AND TO THE SATISFACTION OF THE COUNTY ENGINEER.
6. STRUCTURAL SECTIONS SHALL BE DETERMINED BY GEOTECHNICAL ENGINEERING DESIGN BUT IN NO CASE SHALL BE LESS THAN 4" A.C. OVER 6" GRAVEL BASE FOR COLLECTOR STREETS; AND 3" A.C. OVER 6' GRAVEL BASE FOR LOCAL STREETS.
7. ALL CURB AND GUTTER IS MONOLITHIC CONC. AND L SHAPED PER STANDARD DETAIL.
8. SIDEWALK AREA IS CONC. BOTH SIDES FOR COLLECTORS, ONE SIDE FOR LOCALS. ALTERNATE SIDEWALK LOCATIONS/CONFIGURATIONS MUST BE APPROVED BY THE COUNTY ENGINEER.
9. ALL A.C. SURFACES SHALL BE SEALED IN ACCORDANCE WITH WASHOE COUNTY STANDARDS.
10. RESIDENTIAL DRIVEWAY ACCESS NOT ALLOWED TO STREETS WHICH 10 YEAR ADT DESIGN EXCEEDS 2000.
11. DESIGN OF IMPROVEMENTS TO BE DONE IN ACCORDANCE WITH ARTICLES 420 AND 436 OF WASHOE COUNTY DEVELOPMENT STANDARDS AND DESIGN GUIDELINES.
12. ALL CONSTRUCTION IS TO BE DONE TO CURRENT WASHOE COUNTY STANDARDS AND SPECIFICATIONS.
13. SLOPE EASEMENTS MAY BE REQUIRED IN CERTAIN TERRAIN TO ACCOMMODATE ROADWAY SECTION.
14. A 7.5' WIDE PUBLIC UTILITY, TRAFFIC CONTROL SIGNAGE, AND PLOWED SNOW EASEMENT ON BOTH SIDES OF THE ROW IS REQUIRED PER STANDARD DETAIL.

Source: Washoe County Department of Public Works

Table 110.436.25-3: Roadway Sections - C

General Applications: Streets Serving Lot Sizes 0.5 - 1.5 Acres



ROW	H	SA	U	L	B	PL	ADT MAX PER 2 TRAVEL LANES	REMARKS
52	20	5	0.5	12	4	0	9,600	COLLECTOR
42	16	4	0.5	11	0	2	1,000	LOCAL

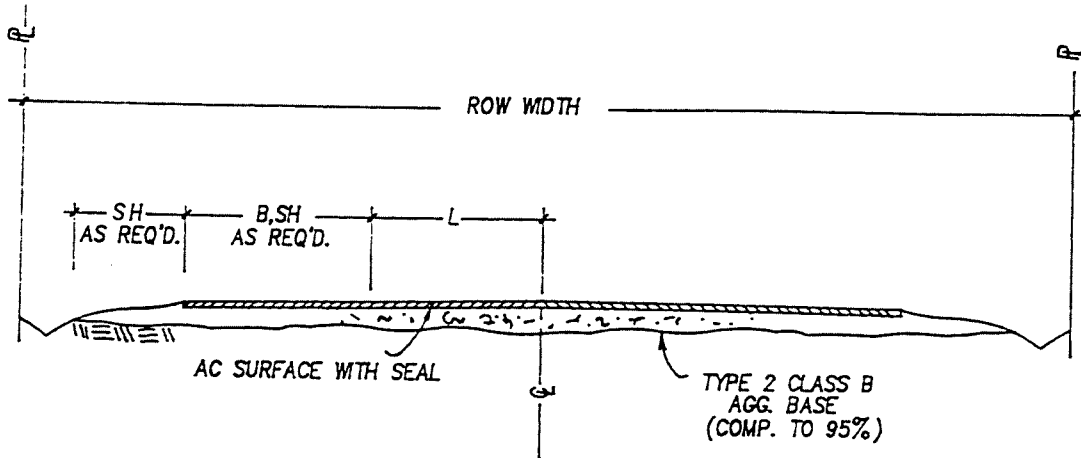
NOTES:

1. ALL WIDTHS ARE IN FEET.
2. H IS MEASURED TO THE FRONT FACE OF THE CURB.
3. L IS TRAVEL LANE; SA IS SIDEWALK AREA; B IS BICYCLE LANE; ROW IS RIGHT OF WAY; PL IS MAX NUMBER OF PARKING LANES; ADT IS AVERAGE DAILY TRAFFIC.
4. ADT REPRESENTS THE DESIGN VOLUME FOR A TWO LANE FACILITY.
5. BICYCLE LANES SHALL BE PROVIDED IN ACCORDANCE WITH THE BICYCLE AND PEDESTRIAN ELEMENT OF THE REGIONAL TRANSPORTATION PLAN AND TO THE SATISFACTION OF THE COUNTY ENGINEER.
6. STRUCTURAL SECTIONS SHALL BE DETERMINED BY GEOTECHNICAL ENGINEERING DESIGN BUT IN NO CASE SHALL BE LESS THAN 4" A.C. OVER 6" GRAVEL BASE FOR COLLECTOR STREETS; AND 3" A.C. OVER 6" GRAVEL BASE FOR LOCAL STREETS.
7. ALL CURB AND GUTTER IS MONOLITHIC CONCRETE AND L SHAPED PER STANDARD DETAIL.
8. SIDEWALK AREA IS TO BE CONSTRUCTED PER STANDARD DETAIL.
9. ALL A.C. SURFACES SHALL BE SEALED IN ACCORDANCE WITH WASHOE COUNTY STANDARDS.
10. RESIDENTIAL ACCESS IS NOT ALLOWED TO STREETS ON WHICH 10 YEAR DESIGN ADT EXCEEDS 2,000.
11. DESIGN OF IMPROVEMENTS TO BE DONE IN ACCORDANCE WITH ARTICLES 420 AND 436 OF WASHOE COUNTY DEVELOPMENT STANDARDS AND DESIGN GUIDELINES.
12. ALL CONSTRUCTION IS TO BE DONE TO CURRENT WASHOE COUNTY STANDARDS AND SPECIFICATIONS.
13. SLOPE EASEMENTS MAY BE REQUIRED IN CERTAIN TERRAIN TO ACCOMMODATE THE ROADWAY SECTION.
14. A 7.5' WIDE PUBLIC UTILITY, TRAFFIC CONTROL SIGNAGE, AND PLOWED SNOW EASEMENT ON BOTH SIDES OF THE ROW IS REQUIRED PER STANDARD DETAIL.

Source: Washoe County Department of Public Works

Table 110.436.25-4: Roadway Sections - D

General Applications: Streets Serving Lot Sizes Greater Than 1.5 Acres



ROW	L	B	SH	ADT MAX PER 2 TRAVEL LANES	REMARKS
60	12	0	0	9,600	COLLECTOR
50	11	0	0	1,000	LOCAL

NOTES:

1. ALL WIDTHS ARE IN FEET.
2. L IS TRAVEL LANE; B IS BICYCLE LANE; SH IS SHOULDER; ROW IS RIGHT OF WAY; ADT IS AVERAGE DAILY TRAFFIC.
3. ADT REPRESENTS THE DESIGN VOLUME FOR A TWO LANE FACILITY.
4. BICYCLE LANES SHALL BE PROVIDED IN ACCORDANCE WITH THE BICYCLE AND PEDESTRIAN ELEMENT OF THE REGIONAL TRANSPORTATION PLAN AND TO THE SATISFACTION OF THE COUNTY ENGINEER.
5. STRUCTURAL SECTIONS SHALL BE DETERMINED BY GEOTECHNICAL ENGINEERING DESIGN BUT IN NO CASE SHALL BE LESS THAN 4" A.C. OVER 6" GRAVEL BASE FOR COLLECTOR STREETS; AND 3" A.C. OVER 6" GRAVEL BASE FOR LOCAL STREETS.
6. ALL A.C. SURFACES SHALL BE SEALED IN ACCORDANCE WITH WASHOE COUNTY STANDARDS.
7. RESIDENTIAL ACCESS NOT ALLOWED TO STREETS ON WHICH 10 YEAR DESIGN ADT EXCEEDS 2,000.
8. THE MINIMUM PLOWED SHOULDER WIDTH SHALL BE TWO (2) FEET, OTHERWISE, THE SHOULDER SHALL BE ENGINEERED, TYPE 2 CLASS B AGGREGATE BASE COURSE OR A.C. STRUCTURAL SECTION AS ABOVE, AS REQUIRED BY THE COUNTY ENGINEER.
9. EROSION PROTECTION REQUIRED FOR DRAINAGE DITCHES.
10. DESIGN OF IMPROVEMENTS TO BE DONE TO IN ACCORDANCE WITH ARTICLES 420 AND 436 OF WASHOE COUNTY DEVELOPMENT STANDARDS AND DESIGN GUIDELINES.
11. ALL CONSTRUCTION TO BE DONE TO CURRENT WASHOE COUNTY STANDARDS AND SPECIFICATIONS.
12. SLOPE EASEMENTS MAY BE REQUIRED IN CERTAIN TERRAIN TO ACCOMMODATE THE ROADWAY SECTION.
13. A 7.5' PUBLIC UTILITY, TRAFFIC CONTROL SIGNAGE, AND PLOWED SNOW EASEMENT ON BOTH SIDES OF THE ROW IS REQUIRED PER STANDARD DETAIL.

Source: Washoe County Department of Public Works

Section 110.436.30 Grades. Street design shall comply with the following standards for minimum and maximum grades.

- (a) Minimum Grades. All streets shall have a minimum grade of five-tenths (0.5) of one (1) percent.
- (b) Maximum Grades.
 - (1) Arterials. Arterials shall have a maximum allowable grade of six (6) percent.
 - (2) Residential and Collector Streets. Residential collector and local streets shall have a maximum allowable grade of six (6) percent except as otherwise approved by the County Engineer , because of topographical constraints.
 - (3) Residential Driveways. The maximum grade for a driveway shall be fourteen (14) percent.
 - (4) Street Grade Exceptions. If approved by the County Engineer, the maximum grade for residential and collector streets may be increased as follows:
 - (i) Streets with a northern exposure may be allowed a maximum grade of nine (9) percent; and
 - (ii) Streets with a southern exposure may be allowed a maximum grade of ten (10) percent.
 - (iii) All streets with grades greater than eight (8) percent shall be limited to a horizontal length of four hundred (400) feet, and shall be provided with landings on both ends of the steeper section of the grade. The grade of the landings shall be six (6) percent or less and at least one hundred (100) feet in length.
- (c) Long Grades. On long grades, the steeper grades shall be near the bottom of the ascent wherever possible, with shallower grades near the top of the ascent.
- (d) Street Intersections. Street intersection grades shall conform to the provisions set forth in Section 110.436.35, Street Intersections, and in accordance with Washoe County Standard Details for grade changes at intersections.
- (e) Horizontal Curvature. Horizontal curves shall be designed in accordance with Section 110.436.45(b), Street Curves.
- (f) Undulating Streets. "Roller coaster" and "hidden dip" patterns are not allowed on through streets.

Section 110.436.35 Street Intersections. Street intersections shall be designed in accordance with the provisions of this section.

- (a) Street Grades. Street grades at intersections shall be as follows:
 - (1) Intersections shall not be allowed when the grade on the primary street exceeds six (6) percent on streets with a northern exposure and eight (8) percent on streets with a southern exposure, unless otherwise approved by the County

Engineer; and

- (2) Street grades on the minor legs of intersections shall not exceed four (4) percent for a minimum distance of fifty (50) feet, measured from the extension of the face of the curb of the primary street through the intersection as improved to full County standards, unless otherwise approved by the County Engineer.
- (b) Local Streets at Stop Condition. Street intersections of two (2) local streets in a stop condition shall not require a vertical curve at the intersection of the crown section with the street grade.
- (c) No Stop Condition. No stop street intersections shall require a vertical curve transition at the intersection of the crown section with the street grade.
- (d) Intersection Angles. Any street or highway intersecting any other street or highway, shall intersect at an angle as near to a right angle as is practicable, but in no event shall it intersect at an angle of less than sixty (60) degrees, unless approved by the County Engineer.
- (e) Offset Intersections. An offset distance of two hundred (200) feet or less separating two local streets shall not be permitted.
- (f) Intersection Grade Change. Grade changes at intersections shall be in accordance with Washoe County Standard Details for Public Works Construction.

Section 110.436.40 Street Crowns. Street crowns shall be designed in accordance with the provisions of this section.

- (a) Definition. Unless otherwise approved by the County Engineer, the street crown shall be at the centerline of the traveled way.
- (b) Grade Specifications. The normal street crown grades shall be two (2) percent from the centerline to the lip of the gutter. When approved by the County Engineer, street crown grades may be a minimum of one (1) percent to a maximum of four (4) percent.

Section 110.436.45 Street Curves. Street curves shall be designed in accordance with the provisions of this section. Consideration for adjusting the minimum design speeds may be given if warranted by topographic constraints.

- (a) Vertical Curves. Vertical curves shall be provided wherever the algebraic difference between two (2) intersecting grades is two (2) percent or more, excluding intersections, unless otherwise approved by the County Engineer. Such vertical curves shall be of sufficient length to provide the following:
 - (1) Minimum sight and stopping distances as established by AASHTO; and
 - (2) Minimum Design Speeds as follows:
 - (i) Twenty-five (25) mph (miles per hour) for local and collector streets;
 - (ii) Forty (40) mph for minor arterial streets; and
 - (iii) Fifty (50) mph for major arterials.

(b) Horizontal Curves. Street design shall be consistent with the horizontal curve provisions set forth in this subsection.

- (1) Horizontal curve radii shall be determined using the following design speeds:
 - (i) Fifteen (15) mph (miles per hour) for local streets of two hundred-and-fifty (250) average daily trips (ADT) or less;
 - (ii) Twenty-five (25) mph for local and collector streets;
 - (iii) Forty (40) mph for minor arterials; and
 - (iv) Fifty (50) mph for major arterial and expressway streets.
- (2) Horizontal curvatures shall not be introduced at or near the top of a pronounced crest vertical curve or near the bottom of a pronounced sag vertical curve.
- (3) The minimum design radius shall be determined using the following formula:

$$R_{min} = \frac{V^2}{15(e+f)}$$

- R = Centerline radius of roadway.
 e = Super elevation rate, decimal (for a normal crown section, e is assumed negative for adverse side). Super elevation may be required by the County Engineer on higher speed streets. Maximum allowable super elevation shall be four (4) percent.
 f = Friction factor from Table 110.436.45-1.
 V = Design speed (mph)

- (4) The friction factor (f) used in Subsection (b) (3) of this section shall be determined as follows:
 - (i) All collector and arterial streets shall be designed using the friction factor from the "High Speed Urban Streets" as set forth in Table 110.436.45-1; and
 - (ii) Local streets shall be designed using the friction factor from the "Low Speed Urban Streets" as set forth in Table 110.436.45-1.
- (5) Stopping sight distances shall be in accordance with AASHTO recommended guidelines.

Table 110.436.45-1

AASHTO Minimum Design Radius Criteria		
Design Speed V (mph)	f (Friction Factor)	
	Low Speed Urban Streets	High Speed Urban Streets
20 ¹	0.30	
25 ¹	0.25	
30	0.22	0.16
40		0.15
50		0.14

Source: AASHTO, "A Policy of Geometric Design of Highways and Streets."

- (c) Curve Separations. Curves on any street, except local streets, shall be separated by a tangent of not less than one hundred (100) feet.
- (d) Right Angle Intersections. At each right angle street intersection, the property line at each block corner shall be rounded with a curve that conforms to the curb return radii set forth in Subsection (f) of this section.
- (e) Less Than Right Angle Intersections. Where streets intersect at angles of less than right angles or where peculiar conditions of intersection occur, the County Engineer may require a different radius.
- (f) Curb Returns. Curb returns shall have minimum face of curb radii as follows:
 - (1) Twenty (20) feet on local streets;
 - (2) Twenty-five (25) feet on collector streets;
 - (3) Thirty (30) feet on minor arterial streets; and
 - (4) Forty (40) feet on major arterial and expressway streets.

Section 110.436.50 Curbs and Gutters. Curbs and gutters shall be provided in accordance with the requirements of this section.

- (a) Installation and Maintenance. When existing improvements are deteriorated or displaced, new curb and gutter shall be installed, including paving between street cut and gutter line on all streets.
- (b) Pedestrian Ramps. Curb returns shall be provided with "Pedestrian Ramps for the Handicapped" in accordance with County and ADA standards.
- (c) Construction Materials. Curbs and gutters shall be constructed in accordance with the standard specifications and "Standard Details for Public Works Construction", latest edition, unless otherwise approved by the County Engineer.

Section 110.436.55 Arterial Median Openings. Median openings on arterial streets that have continuous raised center medians shall not be permitted unless all of the provisions of this section are met.

- (a) **Major Traffic Generator.** The property to be served is a major traffic generator [to be determined by County] and has a minimum continuous frontage of six hundred (600) feet along a major street, or access easements are recorded to allow use of the opening by a minimum of two (2) properties which combined generate sufficient traffic to warrant the opening.
- (b) **Proximity to Arterial Streets.** The median opening is not less than seven hundred (700) feet from an intersection with an arterial.
- (c) **Proximity to Collector or Local Streets.** The median opening is not less than four hundred (400) feet from an intersection with a collector or local street.
- (d) **Mid-block Median Openings.** The median opening is not less than six hundred (600) feet from any other existing or planned mid-block median opening.
- (e) **Sight Distance.** Sight distance is adequate for the design speed of the major street.
- (f) **Costs.** All costs such as base material, pavements, safety lighting, traffic signals, reconstruction, or utility relocation required by a mid-block opening will be borne by the requesting party.
- (g) **Design.** The design of median openings shall be subject to the requirements and approval of the County Engineer, including storage, lengths, and tapers, and in accordance with the AASHTO and/or ITE requirements.

Section 110.436.60 Paving. Design of the structural section for asphalt concrete pavement for public and private streets shall be in accordance with the provisions of this section.

- (a) **Consistency.** The design of the paving sections shall be in accordance with the latest edition of the "Washoe County Structural Pavement Section Design Manual" and the provisions of this section.
- (b) **Approvals.** All paving shall require the approval of the County Engineer and be confirmed as adequate by the applicable soils investigation.
- (c) **Design.** The minimum design life of the structural section shall be twenty (20) years. A detailed geotechnical analysis and report shall be submitted to the County Engineer for review and approval. The resultant pavement section thickness shall be based on the geotechnical report if the report indicates a structural section stronger than the minimum is required.
- (d) **Pavement Thickness.** The criteria defining the thickness of the structural sections for asphalt concrete pavement for streets are as follows:
 - (1) Asphalt concrete structural sections for arterial streets shall be a minimum of five (5) inches of pavement over six (6) inches of Type 2 Class B aggregate gravel base;
 - (2) Asphalt concrete structural sections for collector streets shall be a minimum of

four (4) inches of pavement over six (6) inches of Type 2 Class B aggregate gravel base;

- (3) Asphalt concrete structural sections for local streets shall be a minimum of three (3) inches of pavement over six (6) inches of Type 2 Class B aggregate gravel base;
- (4) Asphalt concrete structural sections for proposed bus routes shall be a minimum of five (5) inches of full width pavement over six (6) inches of Type 2 Class B aggregate gravel base; and
- (5) The minimum pavement structural section for private streets shall be required as follows, to the satisfaction of the County Engineer:
 - (i) Collector-classified roadway pavement structural section shall have four (4) inches of asphalt over six (6) inches of granular base; and
 - (ii) Local classified roadway pavement structural section shall have three (3) inches of asphalt over six (6) inches of granular base.
- (e) Construction Haul Route. All on-site streets, both public and private, which are to be utilized by construction vehicles during development, shall be paved in accordance with the standards contained in Section 110.436.20(l).
- (f) Seal. A seal for private and public streets shall be placed within twenty (20) days after the asphalt concrete pavement has been constructed unless the temperature is below fifty (50) degrees Fahrenheit or when weather conditions, in the opinion of the County Engineer, would prevent proper construction. The type of seal used shall be determined by the County Engineer.

Section 110.436.65 Temporary Patches. Temporary patches shall be provided in accordance with the provisions of this section.

- (a) Thickness. Temporary patches shall be a minimum of two (2) inches thick and compacted in accordance with procedures acceptable to the County Engineer.
- (b) Elevation. Temporary patches shall not deviate more than three-fourths (3/4) inch above the existing pavement grade when measured from the bottom of a straight edge laid two (2) feet beyond the patch on both sides of the existing pavement. In no case shall the elevation of the patch be lower than the existing adjacent pavement elevation.
- (c) Loose Material. All loose material shall be removed from the temporary patch site immediately after completion of the patch.

Section 110.436.70 Retaining Walls. All retaining walls shall be constructed in accordance with the provisions of this section.

- (a) Design Calculations. Unless using standard County details, all retaining walls constructed within the public right-of-way and those which are to be maintained by the County shall have a complete set of design calculations submitted with the improvement plans for review. All calculations shall be signed and sealed by a Nevada Registered Civil Engineer.

- (b) Private Retaining Walls. Any retaining walls associated with private streets and constructed on private property shall be reviewed by the Building and Safety Division and shall be subject to the Uniform Building Code (UBC) design criteria and the provisions of this section.
- (c) Anti-Graffiti Treatment. An anti-graffiti treatment shall be applied to all masonry or concrete retaining walls.

Section 110.436.75 Street Signs. Street signs shall conform to the provisions of this section.

- (a) Conformance. Signs and pavement markings shall conform with the most recent edition of the Manual on Uniform Traffic Control Devices (MUTCD), published by the Federal Highway Administration.
- (b) Intersections. Street signs designed to County standards shall be installed at all intersections.
- (c) Public Streets and Bikeways. Signs and pavement markings shall be installed on all public streets and bikeways, as required by the County Engineer.
- (d) Posted Speeds. Posted speeds on County streets shall be in accordance with the following subsections, unless designated otherwise by the County Engineer:
 - (1) Twenty-five (25) miles per hour (mph) on local and collector streets;
 - (2) Thirty-five (35) mph on minor arterial streets; and
 - (3) Forty-five (45) mph on major arterial streets.
- (e) Sign Layout. Proposed sign layouts shall be submitted with plans showing other public improvements (e.g. street improvement plans).
- (f) Private Streets. Street signs for private streets shall conform to the following requirements:
 - (1) Regulatory signs shall be installed at the juncture of all public streets with a private street, as approved by the County Engineer. Said sign shall state: "Private Street Not Maintained By County". All regulatory signs shall meet the Manual of Uniform Traffic Control Device standards and be approved by the County Engineer.
 - (2) Private streets may be required by the County Engineer or Fire Marshal to be posted "No Parking" on one (1) or both sides, with the provision and maintenance of such signs being the responsibility of the homeowners or other association.

Section 110.436.80 Hazard Locations. High hazard locations along streets shall be mitigated by the use of protective devices approved by the County Engineer. Street right-of-way and width widening shall be provided where necessary for the installation of such protective devices.

Section 110.436.85 Bus Turnouts. Bus turnouts shall be provided when required by the County Engineer. The design of required bus turnouts shall be in accordance with Regional Transportation Commission (RTC) Standards.

Section 110.436.90 Dead-End Streets. All dead-end streets shall be provided with a cul-de-sac in accordance with Section 110.436.120, Cul-de-sacs and Knuckles.

Section 110.436.95 Emergency Access Roads. Emergency access roads shall be designed in accordance with the provisions of this section.

- (a) **Placement and Structural Design.** Unless otherwise approved by the Fire Marshal, emergency access roads shall comply with the following standards:
 - (1) Emergency access roads shall be placed within a minimum thirty (30) foot wide easement; and
 - (2) The roadways shall be a minimum width of twenty (20) feet and structurally designed to support a tandem axle loading of twenty five (25) tons, with a minimum outside turning radius of forty (40) feet.
- (b) **Grades.** Grades for emergency access roads shall not exceed the maximum for street grades, unless otherwise approved by the County Engineer.
- (c) **Access.** Access to such roadways shall be controlled by an "Emergency Access Control Gate," and shall be posted with a sign stating "For Emergency Vehicles Only." Alternatives may be approved by the County Engineer.
- (d) **Surfacing for Temporary Emergency Access Roads.** Temporary emergency access roads shall be surfaced with a minimum of six (6) inches of Type 2 Class B Aggregate Base and sealed with a minimum of eight one-hundredths (0.08) gallon per square yard of asphalt or other alternative approved by the County Engineer, and shall be provided with adequate roadside drainage consistent with County standards, including Article 420, Storm Drainage.
- (e) **Surfacing for Permanent Emergency Access Roads.** Permanent emergency access roads shall be paved with a minimum of two and one-half (2.5) inches of asphalt concrete pavement on an engineered gravel base and shall be provided with adequate roadside drainage consistent with County standards, including Article 420, Storm Drainage.

Section 110.436.100 Improved Maintenance Access. Vehicular access for maintenance of County-owned sanitary sewers and storm drainage facilities, and their related appurtenances, shall be designed in general accordance with the provisions of this section.

- (a) **Minimum Width.** Access ways/roads shall be constructed to a minimum width of twelve (12) feet.
- (b) **Structural Design.** Access ways shall be constructed to support a tandem axle loading of ten (10) tons.
- (c) **Roadside Drainage.** Access ways shall be constructed to provide adequate roadside drainage consistent with County standards, including Article 420, Storm Drainage.
- (d) **Grades.** Improved maintenance access ways shall be constructed with grades not exceeding twelve (12) percent, unless approved by the County Engineer.
- (e) **Surfacing for Temporary Maintenance Access Roads.** Temporary emergency access roads shall be surfaced with a minimum of four (4) inches of Type 2 Class B Aggregate

Base or other equivalent as approved by the County Engineer.

- (f) Surfacing for Permanent Maintenance Access Roads. Permanent maintenance access roads shall be a four (4) inch minimum thickness Type 2 Class B compacted gravel base on a compacted subgrade and shall be provided with adequate roadside drainage consistent with County standards, including Article 420, Storm Drainage.
- (g) Snowplows. Snowplow maintenance turnarounds shall be located, and constructed to either permanent or temporary cul-de-sac standards, as determined by the County Engineer.

Section 110.436.105 Private Access. Private access roads serving not more than four (4) lots shall be designed in accordance with the following provisions.

- (a) Minimum Easement Width. Private access easements serving not more than four (4) residential units shall be a minimum of twenty (20) feet in width.
- (b) Improvement. Private access shall be improved to the satisfaction of the County Engineer.
- (c) Drainage. The access roadway shall be provided with adequate roadway drainage consistent with County standards, including Article 420, Storm Drainage.

Section 110.436.110 Private Streets. Private streets for newly created subdivisions shall be designed in accordance with the provisions set forth in this section.

- (a) Street Section. The minimum pavement surface width for a private local street is twenty two (22) feet and twenty four (24) feet for a collector designated street. Concrete curb and gutter will be required for a lot size of less than 0.5 acre. The minimum required rights of way for these street sections shall be 36 and 38 feet respectively.
- (b) Street Signs. Street signs for private streets shall conform to the provisions of Section 110.436.80, Street Signs.
- (c) Traffic Carrying Capability. Lane widths of private streets shall be capable of safely carrying the projected traffic. This may need to be evidenced by a traffic report prepared by a Nevada Registered Civil Engineer, experienced in traffic engineering, to the satisfaction of the County Engineer.
- (d) Design and Construction. All private streets shall be geometrically designed and constructed to the applicable ITE and AASHTO criteria (e.g., curve radii, maximum slopes, setbacks) to the satisfaction of the County Engineer.
- (e) Right-of-Way. All street widths shall be sufficient to accommodate the projected traffic, attendant drainage, pedestrian demand, utilities, emergency vehicles, delivery and collection vehicles, and any bicycle lanes if planned by the developer, to the satisfaction of the County Engineer. The minimum right-of-way access widths shall be in accordance with Section 110.436.25, Street Sections and this Section.
- (f) Pavement Structural Section. The minimum pavement structural section shall be as provided for in Section 110.436.60, Paving.
- (g) CC&Rs. The conditions, covenants, and restrictions (CC&Rs) shall prominently note to

the satisfaction of the County Engineer that Washoe County will not assume responsibility for maintenance of the development's private street system or drainage system, or accept the streets for dedication to Washoe County unless the streets meet those Washoe County standards in effect at the time of offer for dedication.

- (h) Security Gates. Private streets that are designed with security gates shall have adequate on-site stacking space. The specific type and size of the stacking areas must be approved by and constructed to the satisfaction of the County Engineer.
- (i) Regulatory Signs. Signs must be posted in accordance with the provisions of Article 110.436.80, Street Signs.
- (j) 100-Year Flood. Private streets that are designed to permit passage of a portion of the 100-year flood over the roadway will be allowed, to the satisfaction of the County Engineer, if the following conditions are met:
 - (1) An alternate roadway access which is not susceptible to overtopping by the 100-year flood exists and is available for use;
 - (2) The overtopped roadway is designed to not be washed out by the 100-year flood; and
 - (3) Public safety will not be compromised.
- (k) Storm Drainage. Private streets for lot sizes of 0.5 acres or greater may be designed to use open drainage systems; all designs must be based on the requirements of Article 420, Storm Drainage.
- (l) Final Map Notes. The applicable notes on the final map shall be modified to reflect the granting of the request for private streets to the satisfaction of the County Engineer. The map shall prominently note the private streets and drainages.
- (m) Turnarounds. Turnarounds shall be provided as needed.

Section 110.436.115 Driveways. Design and construction for driveways, approaches, and curb cuts shall be in accordance with County standards and the provisions of this section.

- (a) Provision of Driveways. Where car storage or access for motor vehicles is desired in business, commercial, or industrial districts, provisions shall be made for a driveway.
- (b) Commercial Driveways. Spacing from center to center shall be a minimum of two hundred thirty five (235) feet on major arterials, one hundred fifty (150) feet on minor arterials, and fifty (50) feet on commercial collectors.
- (c) Driveway Approaches. All driveway approaches shall enter properties via a standard curb cut.
- (d) Unused Driveways. Unused driveways shall be replaced with new curb, gutter, and sidewalks.

Section 110.436.120 Cul-de-sacs and Knuckles. Cul-de-sacs and knuckles shall be designed in accordance with the provisions of this section.

- (a) Minimum Grades. Minimum grades around cul-de-sacs and knuckle-type intersections shall be one-half of one (0.5) percent.
- (b) Street Crowns. The normal street crown may be increased to a maximum of four (4) percent from the centerline to the lip of the gutter.
- (c) Knuckle Turnouts. Without prior approval by the County Engineer, knuckle turnouts shall not be allowed on through streets or local streets serving more than twenty (20) lots.
- (d) Cul-de-sac Length. Cul-de-sacs shall not exceed fifteen hundred (1,500) feet in length as measured from the end of the cul-de-sac bulb to the intersecting street curb line. A maximum average daily traffic (ADT) of 300 is allowed.
- (e) Cul-de-sac Bulb Radius. The minimum turnaround radius of the cul-de-sac bulb shall be forty eight (48) feet measured from the radius point to the face of the curb.
- (f) Cul-de-sac Bulb Right-of-Way. Minimum right-of-way for the cul-de-sac bulb shall be forty eight (48) feet measured from the radius point to the right-of-way line.
- (g) Temporary Cul-de-sacs. Temporary cul-de-sacs shall comply with the provisions of this subsection:
 - (1) When located within the development, temporary cul-de-sacs shall be constructed with the structural section used for the associated street, unless otherwise approved by the County Engineer. Asphalt curbing shall be used;
 - (2) Temporary cul-de-sacs shall be provided with adequate drainage consistent with County standards, including Article 420, Storm Drainage; and
 - (3) All temporary cul-de-sacs shall have a minimum radius of forty eight (48) feet.

Section 110.436.125 Partial Width Streets. Partial width streets shall not be permitted whenever the street is used for access to a development. Where permitted, partial width streets shall comply with the provisions of this section.

- (a) Property Boundaries. The location of partial width streets adjacent to property boundaries shall comply with Section 110.436.20(e) General Requirements.
- (b) Street Improvement Plans. Partial Width streets shall be clearly designated on street improvement plans as required by the provisions of Sections 110.436.140, Street Improvement Plans: General Requirements, 110.436.145, Street Improvement Plans: Contents, and 110.436.150, Street Improvement Plans: Plan and Profile Sheets as being only a portion of a street and not a street of full width.
- (c) Existing Partial Width Streets. Where a dedicated and recorded partial width street exists adjacent to proposed development, the other portion shall be dedicated with the proposed development to make the street complete.
- (d) Minimum Improvements. Partial width streets which are permitted along the boundary of a development shall be improved at least to half width, but in no instance shall the paved travel way be less than twenty-four (24) feet in width (with no on-street parking). Curb, gutter and sidewalk adjacent to the development, and a minimum two (2) foot shoulder opposite the development shall be provided. The final width of improvements shall be

determined by the County Engineer.

- (e) Grading and Drainage. Provisions for cut and/or fill slopes along the shoulder and any necessary sanitary sewer, storm drain, or utility extensions shall be provided and constructed to County standards.
- (f) Future Saw Cut. A two (2) inch by six (6) inch redwood header shall be placed along the open pavement edge, or a one (1) foot additional width shall be added to the pavement for a future saw cut.

Section 110.436.130 Street Extensions. Street extensions shall comply with the provisions of this section.

- (a) Development Boundary. Streets constructed to full width improvements shall be extended to the development boundary for extension to future development, when required by the County Engineer.
- (b) Temporary Cul-de-Sac. Streets extending to the development boundary, which are proposed for future extension, shall be provided with temporary cul-de-sacs, when required by the County Engineer,
- (c) Future Development. The future removal of temporary cul-de-sacs and their replacement to full width County standard street improvements shall be provided with the extension of the street by future development.

Section 110.436.135 Pedestrian and Bicycle Ways. Pedestrian and bicycle ways shall be designed in accordance with the provisions of this section.

- (a) Sidewalk Widths. In no instance shall sidewalks be less than four (4) feet in width. In commercial areas, sidewalks shall not be less than five (5) feet in width.
- (b) Bikeway Design. The design of bikeways shall conform to AASHTO "Guide for Development of New Bicycle Facilities", latest edition, unless otherwise specified by the County Code, Standard Specifications and Details for Public Works Construction, the Regional Transportation Commission guidelines, or this section.
- (c) Structural Section. The structural section of public and private bicycle and pedestrian paths shall conform to the following provisions.
 - (1) The structural section shall be based on a soils report recommendation; and
 - (2) The minimum structural section shall be two and one-half (2-1/2) inches of Type II or Type III asphalt concrete pavement compacted to ninety-five (95) percent minimum density over an engineered subgrade. Drainage shall be consistent with County Standards, including Article 420, Storm Drainage. The pavement shall be sealed in accordance with Washoe County Standards.
- (d) Obstructions. No obstruction (i.e., power poles, street lights, signal poles and controls, water meter boxes, pull boxes, mail boxes, etc.) shall be located within sidewalk areas or pedestrian ways, except as allowed by the County Engineer. Any necessary additional right-of-way that may be required for locating such obstructions at the back of sidewalks shall be dedicated or easements provided for, if needed (e.g. for mailboxes).

- (e) Cut and Fill Slopes. Cut and fill slopes shall be set back a minimum of one (1) foot from the back of the sidewalk. If no sidewalk exists, the setback shall be a minimum of five (5) feet from the back of the curb.

Section 110.436.140 Street Improvement Plans: General Requirements. All street improvement plans submitted to the County shall conform to the requirements of this section.

- (a) Plan Size. Plans shall be on standard twenty-four (24) inch by thirty-six (36) inch sheets.
- (b) Plan Information. Each sheet of the plans shall include the north arrow, scale and a title block including the following:
- (1) The name of the project, owners, and type of design shown on the plan;
 - (2) The name and seal of the Nevada Registered Professional Civil Engineer;
 - (3) The date, sheet number, and total number of sheets; and
 - (4) Any information necessary to clarify the design.
- (c) Existing Conditions and Improvements. The plans shall clearly indicate in plan and profile, the distinction between existing conditions and proposed improvements, and shall designate identified improvements as public or private.
- (d) Existing Paving. When showing existing pavement or concrete in relation to new work, suitable shading or delineation shall be made to highlight the proposed new work.
- (e) Adjacent Property. The plans shall show adjacent property owners.
- (f) Certification. All designs shall be certified by a Nevada Registered Professional Civil Engineer. Upon concurrence by the County with the plans, this engineer shall provide the County Engineer with reproducible sepia-mylar copies of the plans and at least one (1) set of prints of the plans, wet stamped and signed.

Section 110.436.145 Street Improvement Plans: Contents. The contents of the street improvement plan sheets shall include all items required by the County Engineer and the provisions of this section.

- (a) Title Sheet. Improvement plans shall include a title sheet which shows the entire project or assessment district and includes, at a minimum, the following:
- (1) Index;
 - (2) Legend;
 - (3) Vicinity map with any city limits shown thereon;
 - (4) Owner;
 - (5) Engineer;
 - (6) All pertinent notes.
- (b) Utility Index. Improvement plans shall include a utility index which consists of a single

sheet of the subdivision or development showing the following:

- (1) The general location of sanitary sewer and storm drain systems;
 - (2) All manholes and structures identified and numbered; and
 - (3) All improvements indicated as either public or private as appropriate, including all rear lot drainage ways and piping to off site systems and drainage ways where required.
- (c) Easements. The following right-of-way and easement lines shall be properly dimensioned and noted on the plans:
- (1) Right-of-way lines on both sides of all streets;
 - (2) Boundaries of lots fronting on both sides of all streets;
 - (3) Drainage and utility easements;
 - (4) Section lines and corners;
 - (5) Land grant lines; and
 - (6) Temporary construction easements, both existing and proposed.
- (d) Topography and Improvements. All pertinent topographic features and improvements shall be shown including:
- (1) Street lines;
 - (2) Curbs, sidewalks, and shoulders;
 - (3) Location and size of sanitary sewers, storm drains, and drainage ditches;
 - (4) Location and sizes of utilities, including water, gas, electrical, telephone lines, utility poles, fire hydrants; and
 - (5) Structures, houses, trees and other flora, and all other features of the area which may affect the design.
- (e) Proposed Improvements. Where proposed improvements meet existing infrastructure facilities, the plan shall show all of the following for a minimum distance of three hundred (300) feet from any boundary of the development:
- (1) Pertinent existing elevations;
 - (2) Gutter grades;
 - (3) Centerline of pavement;
 - (4) Sewer and storm drain inverts;
 - (5) Driveway locations; and

- (6) Traffic signal equipment, detection loops, etc.
- (f) Stationing and Orientation. The stationing on plan and profile shall be from south to north and west to east insofar as practical and shall include:
 - (1) All street centerlines;
 - (2) Beginning of curves;
 - (3) Points of compound curves;
 - (4) End of curves; and
 - (5) Limits of work.
- (g) Curve Data. Curve data shall include:
 - (1) Centerline radius;
 - (2) Length of curve; and
 - (3) Delta or central angle and tangent distances.
- (h) Vertical Curves. Vertical curves shall include:
 - (1) The length of the curve;
 - (2) BVC (Beginning of Vertical Curve) and EVC (End of Vertical Curve) station and elevation; and
 - (3) K-value used (rate of vertical curvature).
- (i) Benchmarks. Benchmarks shall be clearly indicated on the plans as to location, description, elevation, and datum.
- (j) Typical Section. A typical section(s) for each type of street within the area to be improved shall be a part of the plans and shall include the following:
 - (1) Structural features (delineated);
 - (2) Width of right-of-way;
 - (3) Improvement dimensions and details on both sides of all streets; and
 - (4) Boring logs from the soils report are to be included in the construction plans.
- (k) Cross Sections. Cross sections shall be included in the plans, when directed by the County Engineer. Normally this would occur in limited areas with unusual topographic features or when special conditions occur that would affect the work.
- (l) Grading and Drainage. Plans shall include existing and proposed drainage conditions according to the following requirements:

- (1) Existing contours every five (5) feet as fine continuous or dashed lines and proposed contours every five (5) feet as solid lines;
 - (2) All cut and fill slopes;
 - (3) Retaining walls;
 - (4) Street grades in percent;
 - (5) Peak flows, for the 10-year and 100-year storms, entering and leaving the development and disposition of same;
 - (6) The 100-year flood line;
 - (7) Spot elevations on streets, top of curbs, retaining walls, lots, and surface drainage improvements;
 - (8) Drainage arrows showing individual lot drainage; and
 - (9) Soil requirements printed thereon.
- (m) Plan and Profile Sheets. Plan and profile sheets shall be prepared in accordance with the requirements set forth in Section 110.436.150, Street Improvement Plans: Plan and Profile Sheets.
- (n) Details. All County Standard Details being used in the project shall be shown. Any additional details shall be shown as necessary for clarification of the improvements. Any necessary general notes shall be provided, including the following note: "All construction shall conform to County standards."
- (o) Permit. A Revocable Permit shall be obtained from the Nevada Department of Transportation for any facilities encroaching upon a state right-of-way or for any drainage disposal on the right-of-way. (Allow a minimum of 30 days for obtaining a permit.)
- (p) Drawings of Record. Drawings of record noting all of the changes in the improvements constructed from the design plan shall be provided. The drawings of record shall be submitted on a reproducible sepia-mylar reproduced from the original drawings that have been stamped and sealed thereon by a Nevada Registered Civil Engineer verifying the drawings of record conditions. The distance from the nearest sanitary sewer manhole to each "Y" or "T" intersection, and to the terminus of each service at the property line shall be shown.
- (q) Private Streets. The County will not assume maintenance responsibility for access and drainage facilities and their associated structures located outside the limits of dedicated street rights-of-way or public easements, or which are not constructed to county standards for public facilities. Private facilities for access and drainage located on private street, lots, or parcels are to be owned and maintained by the property owners.

Section 110.436.150 Street Improvement Plans: Plan and Profile Sheets. Plan and profile sheets shall conform to the requirements set forth in this section.

- (a) Scale. Minimum vertical scale shall be 1" = 10' and minimum horizontal scale shall be 1" = 40'.

(b) Streets and Access Roads. All information for streets and access roads shall be located on the plan and profile sheets in accordance to the provisions of this subsection.

- (1) Name of street(s);
- (2) Plan sections shall show the following information:
 - (i) Monuments;
 - (ii) Right-of-way widths;
 - (iii) Improvements;
 - (iv) Traffic control devices;
 - (v) Intersecting street(s);
 - (vi) Centerline stationing;
 - (vii) Horizontal curve data and stationing;
 - (viii) Benchmark locations and elevations; and
 - (ix) Existing facilities.
- (3) Profile sections shall show the following information:
 - (i) Existing and proposed grades along centerline, including tangency slopes;
 - (ii) Vertical curve elevations and data;
 - (iii) Station and elevation of intersecting street(s); and
 - (iv) Existing facilities.

(c) Storm Drains. If located within a public street section, all information for storm drains on the street plan and profile sheets shall be shown in accordance with the provisions of this subsection.

- (1) Plan sections showing storm drainage facilities shall include the following information:
 - (i) Location of pipe in relation to street centerline and/or easements and property lines;
 - (ii) Type and location of manholes and catch basins, showing the station and number and rim elevations of each;
 - (iii) Size, class, and type of pipes;
 - (iv) Type, location, and 10-year storm flow of inlet and outlet structures;

- (v) Location and type of maintenance access roads to manholes or structures, where required;
 - (vi) Typical channel section, where required;
 - (vii) Bench mark locations and elevations; and
 - (viii) Existing utilities.
- (2) Profile sections showing storm drainage facilities shall include the following information:
- (i) Existing and finished surface grades and pipe profile showing type, size, slope, Q^{10} (Volume of runoff from 10-year storm event), velocity at Q^{10} , and the hydraulic grade line if the pipe is under pressure;
 - (ii) For channels, the depth of flow for the 10-year and 100-year storms;
 - (iii) Manhole station, number, rim elevation, and invert elevation of all pipes entering or exiting and distance between manholes; and
 - (iv) Existing utilities with pertinent elevations.
- (d) Sanitary Sewers. If located within a public street section, all information for sanitary sewers shall be shown on the street plan and profile sheets in accordance with the provisions of this subsection.
- (1) Plan sections showing sanitary sewers shall include the following information:
- (i) Location of pipe in relation to street center line and/or easements and property lines;
 - (ii) Type and location of manholes, showing the station and number and rim elevation of each;
 - (iii) Size, class, and type of pipe;
 - (iv) Service lateral locations with reference to station and property lines;
 - (v) Location and type of maintenance access roads, where required;
 - (vi) Bench mark locations and elevations; and
 - (vii) Existing utilities.
- (2) Profile sections showing sanitary sewers shall include the following information:
- (i) Existing and finished surface grades;
 - (ii) Pipe profile showing type and class, size, slope, and velocity at peak flow;
 - (iii) Manhole station, number, rim elevation, and invert elevation of all pipes

entering or exiting;

- (iv) Distance between manholes; and
- (v) Existing utilities with pertinent elevations.

Article 604

DESIGN REQUIREMENTS

Sections:

110.604.00	Purpose
110.604.05	Applicability
110.604.10	Streets
110.604.15	Setbacks
110.604.20	Intersections
110.604.25	Pedestrian Circulation and Access
110.604.30	Utilities
110.604.35	Street Lighting
110.604.40	Energy Conservation
110.604.45	Existing Vegetation
110.604.50	Snow Storage
110.604.55	Subdivisions Adjacent to Public Land
110.604.60	Open Space and Recreational Trails

Section 110.604.00 Purpose. The purpose of this article, Article 604, Design Requirements, is to set forth subdivision design requirements.

Section 110.604.05 Applicability. The design requirements within this article shall apply to all tentative subdivision maps, parcel maps and division into large parcels.

Section 110.604.10 Streets. Streets within the subdivision shall be designed in conformance with Article 436, Street Design Standards.

Section 110.604.15 Setbacks. Setback requirements shall be in conformance with this section.

- (a) **Front Yard Setback Requirements.** A lot shall have a front yard setback as stated in Article 406, Building Placement Standards.
- (b) **Minimum Building Setback Requirements.** No building in any regulatory zone shall be constructed or altered closer than fifty (50) feet to the centerline of any major arterial, or forty (40) feet to the centerline of any minor arterial, or thirty (30) feet to the centerline of any through street.

Section 110.604.20 Intersections. Intersections within the subdivision shall be designed in conformance with Article 436, Street Design Standards.

Section 110.604.25 Pedestrian Circulation and Access. In all subdivisions, a plan for pedestrian circulation and access in conformance with the appropriate area plan of the Washoe County Comprehensive Plan shall be prepared and implemented to the satisfaction of the County Engineer.

Section 110.604.30 Utilities. All public utilities shall be placed underground, except in the case where underground placement of utilities is shown to not be feasible, in which case the County Engineer may approve exceptions to this requirement.

Section 110.604.35 Street Lighting. Street lights are required for major street intersections or hazardous street intersections. Major street intersections are those intersections having at least one intersecting street with a minimum designed vehicular speed limit of forty-five (45) miles per hour. Hazardous intersections are those intersections determined to be hazardous by the traffic-control committee because of detrimental physical characteristics. All street lighting shall be luminaires in accordance with local utility standards, and as determined appropriate by the County Engineer to be required. Light poles shall be either wooden or metal, or other material, as required by the County Engineer.

Section 110.604.40 Energy Conservation.

- (a) **Design.** The design of a subdivision for which a tentative map is required shall provide, to the extent feasible, for future passive or natural heating or cooling opportunities in the subdivision.
 - (1) Examples of passive or natural heating opportunities in subdivision design include design of lot size and configuration to permit orientation of a structure in an east-west alignment for southern exposure.
 - (2) Examples of passive or natural cooling opportunities in subdivision design include design of lot size and configuration to permit orientation of a structure to take advantage of shade or prevailing breezes.
- (b) **Considerations.** In providing for future passive or natural heating or cooling opportunities in the design of a subdivision, consideration shall be given to local climate, contour, configuration of the parcel to be divided and other design and improvement requirements. This provision shall not result in reducing allowable densities, or the percentage of a lot which may be occupied by a building or structure under applicable plans in force at the time the tentative map is filed.
- (c) **Exceptions.** The requirements of this section do not apply to condominium projects which consist of the subdivision of airspace in an existing building when no new structures are added.
- (d) **Definitions.** For the purposes of this section, "feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors.

Section 110.604.45 Existing Vegetation. The subdivision shall be designed to preserve the greatest practicable amount of existing vegetation, including trees with a trunk caliper of eight (8) inches or greater. Native or ornamental trees required to be preserved, as shown on the tentative map, shall not be damaged. Trees and other vegetation damaged, destroyed, or removed without prior authorization of the Director of Development Review shall be replaced by the subdivider. The size and species of the replacement vegetation shall be in accordance with the provisions of Article 412, Landscaping.

Section 110.604.50 Snow Storage. Site plans, parcel maps, and tentative maps shall provide snow storage areas appropriate for the elevation and historic snowfall amounts.

Section 110.604.55 Subdivisions Adjacent to Public Land. When shown to be in the public's best interest, any site plan, parcel map, and tentative subdivision map adjacent to publicly owned land shall provide access easements of an appropriate width to the public land. Said easements shall be offered for dedication to an appropriate public agency.

Section 110.604.60 Open Space and Recreational Trails. All site plans, parcel maps and tentative subdivision maps shall provide open space and recreational trails pursuant to the following:

- (a) **Open Space.** New site plans, parcel maps, and tentative subdivision maps shall include open space or greenbelts indicated in the appropriate area plan of the Washoe County Comprehensive Plan. Such open space shall be integrated with any approved open space or greenbelts in adjacent developments. Said open space or greenbelts shall be offered for dedication to the appropriate public agency.
- (b) **Recreational Trails.** New site plans, parcel maps, and tentative subdivision maps shall include easements of an appropriate width for recreational trails as shown in the appropriate area plan of the Washoe County Comprehensive Plan. Such easements shall be integrated with any approved recreational trails in adjacent developments. Said easements shall be offered for dedication to the appropriate public agency.

ARTICLE 902 DEFINITIONS

Sections:

110.902.00	Purpose
110.902.05	Applicability
110.902.10	Rules of Interpretation
110.902.15	General Definitions

Section 110.902.15 is proposed to be amended to include an additional definition.

Section 110.902.15 General Definitions.

Driveway, Residential. A private paved or unpaved area used for ingress or egress of vehicles, and allowing access extending from a property line to a building or other structure or facility on the subject parcel.

