

## CHAPTER V - IMPROVEMENT PLANS

### SECTION 1. - General Plan Requirements:

1. All plans and designs shall conform to City Standards, be signed and sealed by a Nevada Licensed Civil Engineer, or as appropriate, and conform to the following outline of procedures. Any significant changes to the approved plans prior to or during construction shall require approval by the City Engineer prior to installation. All plans shall incorporate the following note: In the event of a conflict between these drawings and Reno Municipal Code, code shall prevail.
2. Upon acceptance of the plans by the City, the engineer shall provide the Community Development Department three sets of prints of the plans, wet stamped and signed.
3. All plans submitted shall at a minimum meet the following requirements:
  - a. Standard size for plan sheets and mylars shall be 24" x 36" sheets.
  - b. Each sheet of the plans shall have a north arrow and indicate scales used.
  - c. Each sheet shall carry a title block which shall be located along the right-hand margin (24" side) and which shall contain the following information:
    - (1) The name of the project.
    - (2) Name of owners and developer.
    - (3) An indication of the type of design shown on the plan.
    - (4) The name, date and seal of the Nevada Licensed Civil Engineer, or as appropriate.
    - (5) The date plans were drawn.
    - (6) A sheet number and total number of sheets shall be indicated, and shall be located in the lower right-hand corner of the 36" side of the sheet.
    - (7) Any additional information necessary to clarify the design.
4. The plans shall clearly indicate in plan and profile, the distinction between existing conditions and proposed improvements, and shall designate

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improvements as public or private. The plans shall show adjacent property owners and parcel numbers.

5. Right-of-way lines on both sides of all streets, the boundaries of lots fronting on both sides of all streets, drainage easements, storm water quality management easements, utility easements, public use easements, landscape easements, section lines and corners, land grant lines, and temporary construction easements both existing and proposed shall be shown on the plans. All right-of-way and easement lines shall be properly dimensioned and noted.
6. All pertinent existing and proposed topographic features shall be shown, such as street lines, curbs, sidewalks, shoulders, location and size of sanitary sewers, storm drains, water, gas, electrical, telephone lines and other underground facilities. Also show structures, houses, trees and other flora, drainage ditches, utility poles, fire hydrants, and all other features of the area which may affect the design.

Where proposed improvements meet existing infrastructure facilities, the plan shall show all pertinent existing elevations, gutter grades, centerline of pavement, sewer and storm drain inverts, driveway locations, traffic signal equipment, detection loops, etc. for a minimum distance of 100 feet from any boundary of the subdivision or development. Contact City Signal Shop for location of detection loops.

When showing existing pavement or concrete in relation to new work, suitable shading and delineation shall be made of the new work.

7. The stationing and orientation on plan and profile shall be from south to north and west to east insofar as practical. All street centerlines, beginning of curves, points of compound curves, end of curves, and limits of work shall be stationing on the plans. Curve data shall include: centerline radius, length of curve, delta or central angle and tangent distance. Vertical curves shall include the length of the curve, BVC and EVC stations and elevation and the K-value used (rate of vertical curvature).
8. Vertical control bench marks shall be clearly indicated on the plans as to location, description, elevation and datum. The datum shall be that of the National Geodetic Survey, North American Vertical Datum of 1988 (NAVD '88), or its successor. The Reno Vertical Control System (RVCS) is based upon the above datum. Consult the latest edition of the RVCS directory, or contact the Survey Section of the City of Reno Engineering

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Division for location and elevation of the nearest official bench mark. Bench marks shall be clearly shown on the title sheet and all grading and plan and profile sheets.

9. Horizontal Control - All land division maps, reversionary and amended maps, records of survey for boundary line adjustments, commercial and industrial development, and waiver of parcel map, require positioning and orientation to a common horizontal datum jointly adopted by the July 14, 1998 Interlocal Agreement between Washoe County, and the cities of Reno and Sparks. The purpose for this requirement is to promote a common, multi-jurisdictional county-wide parcel database in support of a Geographic Information System (GIS). The Interlocal Agreement contains digital base map standards for submittals.

An approved listing of geodetic control monuments may be obtained from the office of the Washoe County Surveyor. A minimum of two (2) of these control points must be tied-in and utilized to position and orient all mapping to a common basis at ground level. This is to be the basis of bearings expressed on all maps submitted for approval.

Datum for the horizontal control is the North American Datum of 1983 (NAD '83) as identified on Record of Survey No. 2775, filed in the office of the Washoe County Recorder on September 21, 1994, as Document No. 1834848. The combined mapping factor in Reno for West Zone (Nev. 2703), Nevada State Plane Coordinate conversion from Grid to Ground is 1.000197939; Ground to Grid is 0.999802100. Surveyors are advised that these values result in coordinates on a localized, mean ground surface network that has been devised for uniform GIS mapping and related digital submittal purposes only. Survey level control and other geodetic work must adhere to procedures that will result in true, official State Plane Coordinate values. Mapping required to be digitally submitted and oriented to the localized regional control system must also contain sufficient information to maintain and carry forward a historical lineage to the legal cadastral fabric.

10. A typical section(s) for each type of street within the area to be improved, delineating the structural features, width of right-of-way, improvement dimensions, landscape, pedestrian way, bike path, easement areas and details on both sides of all streets. Reference soils report and include information on design subgrade resilience modulus, subgrade corrections, with each section, and compaction requirements for each type and lift of

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material shall be shown. Street name and stationing shall be identified for each section.

11. All plans submitted to the City of Reno shall be clean, uncluttered and legible, with all information clearly indicated and readable. The City of Reno reserves the right to reject any set of plans, and establishes the following minimum standards:
  - a. Minimum text size shall be 0.1 inch height.
  - b. Shall allow for reproduction and/or scanning without loss of integrity.
  - c. Shaded areas shall not occlude underlying information.
  - d. Any print, mylar, sepia-mylar or other document which is determined by the City to be illegible shall be replaced at no cost or expense to the City.

**SECTION 2 - Plans Required, Order of Binding and Specific Requirements:**

1. A typical set of plans for construction of public works shall include all of the listed plans unless waived by the City Engineer. Order of binding shall be as follows:
  - a. Title sheet.
  - b. Key Sheet
  - c. Record map sheet.
  - d. Utility index.
  - e. Grading and drainage.
  - f. Plan and profile sheets.
  - g. Detail sheets.
  - h. Cross sections (if required).
  - i. Traffic signs and pavement markings.
  - j. Traffic signal.
  - k. Landscaping.
  - l. Boring logs.
  - m. Site drainage (from drainage report).
  - n. Storm water quality management plan

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2. The title sheet shall show the entire project, or assessment district, to include but not limited to, index, legend, vicinity map with the City limits shown thereon, street names, section lines, grant lines and corners, bench marks, basis of bearing and datum, pertinent notes, project owner, developer, engineer of record, testing company, design engineer, signature, wet-stamp and date by design engineer. RMC Section 18.14.202(b) requires the title sheet to contain the statement, “These plans, sheets 1 through \_\_, have been prepared in accordance with the approved tentative map, city council conditions of approval, and the Reno Municipal Code.”
3. Record maps include, but are not limited to, the associated final map, parcel map, map of dedication, existing FEMA information, record of survey or easement and shall be included as part of the approved construction plans.
4. The utility index shall be contained on a single sheet of the subdivision or development showing the general location of sanitary sewer and storm drain systems, identifying and numbering all manholes and structures and indicating improvements as either public or private as appropriate. This shall include all rear lot drainageways and piping to off-site systems and drainageways. All other existing aboveground and underground facilities, including proposed services for water, gas, electric, telephone, cable television, fire hydrants, street lights, valves, major junction boxes and manholes, fiber optic cables, etc., shall be schematically shown. Structure numbering shall match that in the sanitary sewer or storm drainage reports.
5. Grading and drainage plans shall depict existing contours as fine continuous or dashed lines and proposed contours as solid lines. Elevations of contours labeled as appropriate; existing and proposed FEMA information; all cut and fill slopes labeled 2:1, 3:1, etc.; retaining walls labeled with top and bottom elevations, maximum height, and a front elevation drawing, if required, all clearly identified as requiring a separate building permit and special inspection; mainline and intersecting street grades in percent; peak flows, for the 5- and 100-year storms, entering and leaving the subdivision or development and disposition of same; the 100-year flood line; spot elevations on streets, top of curbs, retaining walls, and lots; surface drainage improvements; drainage arrows showing individual lot drainage; soil report requirements printed thereon; and storm drain system with lines, catch basins and 5- and 100-year flows, all concrete swales, including overflow swales, cross sections identifying base flood elevations for predevelopment conditions in flood hazard zone “A”, information showing before and after conditions for C.L.O.M.R., L.O.M.R., and critical flood zones, and any other pertinent and offsite

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drainage features. Any catch basin bypass or 100 year breakout flows shall be clearly identified on the drainage report, plan, and profile sheets.

6. Plan and profile sheets shall have minimum scales of 1" = 10' vertical and 1" = 40' horizontal:
  - a. Streets and access roads:
    - (1) Name of street and stationing on plan view and in title block of street.
    - (2) For all plan view sheets, show:
      - a. Monuments.
      - b. Right-of-way widths.
      - c. Improvements.
      - d. Traffic control devices.
      - e. Intersecting streets and names.
      - f. Centerline stationing.
      - g. Horizontal curve data and stationing.
      - h. Indicate bench mark location and elevation.
      - i. Show existing facilities and match lines.
      - j. Show location of any borings, test pits, monitoring wells, etc.
      - k. Street Lighting.
    - (3) Profiles shall be along centerline, shall include cross streets, spur lines, additional crossings, etc., and shall show:
      - a. Existing and proposed grades, including tangency slopes.
      - b. Vertical curve elevations and data.
      - c. Station and elevation of intersecting streets.
      - d. Show existing facilities.
      - e. Show groundwater elevation from soils report where available.
  - b. Storm Drains:

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Where storm drains are located within a public street section, they shall show on the street plan and profile sheets; where exterior to a street section, storm drains shall show on separate plan and profile sheets, indicating the appropriate easements and easement widths.

- (1) Plan sections for all storm drains shall show at a minimum the following:
  - a. Location of pipe in relation to street centerline and/or easements, property lines, etc.
  - b. Type and location of manholes and catch basins showing the station, number and rim elevations of each.
  - c. Size, class and type of pipe including catch basin leads
  - d. Type, location, Q capacity,  $Q_5$ ,  $Q_{100}$  of storm flows of inlet and outlet structures, catch basins and catch basin leads, bypass, and overflows.
  - e. Location and type of maintenance access roads to manholes or structures, where required.
  - f. Typical channel section, where required.
  - g. Indicate bench mark location and elevation.
  - h. Show existing utilities; extent, location and size of riprap or energy dissipater at discharge points.
  - i. Show match lines clearly.
  - j. Type of water quality treatment feature and connection to storm drain system
  
- (2) Profile sections for all storm drain shall show, at a minimum, the following:
  - a. Existing and finished surface grades and pipe profile showing type, size, slope, Q capacity,  $Q_5$  and  $Q_{100}$ , the velocity flowing full and the hydraulic grade line if  $Q_{100} > Q_{cap}$ , and labeling of clearances.
  - b. For channels, also show the depth of flow for the 5- and 100-year storms, Q capacity, freeboard, maximum slope, minimum slope, maximum and minimum velocities.
  - c. Manhole station, number, rim elevation and the invert elevation of all pipes entering or exiting and distance between manholes.
  - d. Show existing utilities with pertinent elevations, including labeling of clearances.

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- e. Show match lines clearly.
- f. Identify all piping as being public or private.

c. Sanitary Sewers:

Where sanitary sewers are located within a public street section, they shall show on the street plan and profile sheets; where exterior to a street section, sanitary sewers shall show on separate plan and profile sheets, indicating the appropriate easements and easement widths.

(1) Plan sections for all sanitary sewers shall show at a minimum the following:

- a. Location of pipe in relation to street centerline and/or easements, property lines, etc.
- b. Type and location of manholes showing the station and number and rim elevations of each.
- c. Size, class and type of pipe.
- d. Service lateral locations with reference to station and property lines (where lateral locations are not shown on utility plans).
- e. Location and type of maintenance access roads, where required.
- f. Indicate bench mark location and elevation.
- g. Show existing utilities, including labeling of clearances.
- h. Show match lines clearly.

(2) Profile sections for all sanitary sewers shall show, at a minimum, the following:

- a. Existing and finished surface grades.
- b. Pipe profile showing type and class, size, slope, and velocity for half-full flow.
- c. Manhole type, station, number, rim elevation and invert elevation of all pipes entering or exiting.
- d. Distance between manholes.
- e. Show existing utilities with pertinent elevations, including labeling of clearances.
- f. Show match lines clearly.



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- g. Identify all piping as being public or private.
- 7. Display on the plans all City Standard Details being used in the project. Show any additional details as necessary for clarification of the improvements. Provide any necessary notes, such as:

"All construction shall conform to City standards."
- 8. Cross sections shall be included in the plans. Normally this would occur in limited areas with unusual topographic features or when special conditions occur that would affect the work. Any change in standard centerline crown design shall be depicted on cross sections to demonstrate run-out. The street cross sections are to identify the type of asphalt mix design required (i.e. 50 or 75 blow mix, Type II or Type III mix, the R value, etc.) and the geotechnical report shall be referenced on the cross section, including any relevant notes. Additional cross sections may be required, if directed by the City Engineer.
- 9. Traffic signs and pavement markings (both existing and proposed) to be removed, remain in place, relocated, or installed shall be shown. Include appropriate notes, MUTCD designations, and standard detail references. Use a separate sheet for extensive or complex traffic device work; separate plan sheets are not required for minor work. These plans shall also show curb markings and parking meter poles, when appropriate.
- 10. Plan sheets for the modification of existing traffic signals shall show both existing and proposed improvements. Plans shall show underground utilities, traffic lane configuration, channelization, property lines, curbs, and such other existing or proposed physical features as may be likely to affect the signal installation. Reference NDOT standard plans and specifications, or appropriate City of Reno equipment standards, construction standards, or standard specifications.
- 11. Landscape.
- 12. Miscellaneous.
- 13. Boring logs.
- 14. Site drainage map shall be included from the drainage report, including a reproducible sepia-mylar.

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SECTION 3 - Digital Submission of Selected Items from Improvement Plans:

1. Land division maps that entail recordation and require associated improvement drawings with final map approval, must be accompanied by digital submission of selected street and utility improvements. Specific improvements required are those outlined in the Improvement Layering Scheme jointly adopted by the three local jurisdictions in accordance with the July 14, 1998 Interlocal Agreement.
2. Selected improvement submittals must be in DWG format and are to be submitted with the approved sepia-mylars at the 10-day final map submittal. Appropriate format of the selected improvement submittals is required prior to recordation of the official plat.
3. Digital submission of hydrology report and supporting calculations may be requested by the City Engineer.

SECTION 4 - Drawings of Record:

1. Upon completion of the project, and at time of acceptance by the City for maintenance, drawings of record noting all of the changes in the improvements constructed from the design plan shall be submitted on Compact Disc, in TIFF format, which resolution 300 dpi or greater, reproduced from the original drawings that have been wet-stamped and sealed thereon by a Nevada Licensed Civil Engineer, or as appropriate, verifying the drawings of record conditions. All drawings of record shall be legible upon reproduction as determined by the City Engineer. Approved vault drawings may be annotated by the Engineer of Record to become the record prints. Drawings submitted must conform to the requirements of NRS 625 and NAC 625.
2. Improvements constructed in substantial conformance with submitted improvement drawings will not require additional digital improvement submittals. Improvements not constructed in substantial conformance with initial submittals will require that drawings of record be digitally resubmitted in the appropriate format prior to release of financial assurances associated with the development.
3. Digital submission of the drawings of record shall include the following layers:
  - a. Streets
  - b. Underground utilities

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- c. Sewer and storm drainage
- d. Easements