



Bixby Engineering Design Checklist

This checklist has been prepared by the Engineering Department to minimize the number of Plan reviews by providing a list of information that must be provided for all submittals. The intent of this list is not to provide an exhaustive list of generally accepted practices, elements, or formats used for Construction Drawing production. The items included in the checklist identify and clarify key, recurring Plan elements; that if addressed from the outset; will reduce repetitive comments.

Review will not begin until the minimum Plan requirements listed below have been provided. To resolve questionable design issues prior to Construction Plan submittal, intermediate review meetings addressing specific issues are encouraged.

A completed copy of this checklist must be submitted with completed Construction Plans. Incomplete Plans and checklists will be returned to the Engineer without review.

Project: _____	Submittal #: _____
Owner: _____	
Engineer: _____	Signature: _____
Address: _____ _____	Date: _____
Phone: _____	Fax: _____

A. General Drawing Requirements

- ___ Five (5) sets of half-size Plans for Initial Submittal.
- ___ Six (6) sets of half-size & One (1) set of full size Plans for Final Submittal.
- ___ Cover sheet includes a vicinity map showing at least full mile section with proposed project area and adjacent properties and developments.
- ___ Plat drawing should be included in each Plan set.



Bixby Engineering Design Checklist

- ___ North arrow and scale bars provided on all sheets.
- ___ Maximum Drawing Scales: 1" = 100' on Plan Sheets. 1" = 50' Horizontal and 1" = 5' Vertical on Plan & Profile Sheets.
- ___ Min. Lettering height = 0.12".
- ___ Title block on each sheet includes the project title, owner's and engineer's name, drawing description, page number, and date.
- ___ All improvements may be located at the project site from dimensions shown on the drawings based on established physical objects. No improvements shall need to be scaled off of the drawings to be located at the project site, or need for the designer to physically locate the improvement at the project site.
- ___ Vertical control is based on USGS datum (NAVD '88) and bench marks are shown on each plan view drawing. Horizontal control points are based on the State Plane Coordinate System (NAD 83 Feet Ok North) used by the City of Bixby. Control points are shown and labeled.
- ___ All easements and right-of-way required for improvement Construction have been identified, dedicated and shown on the Plans. Appropriate Book and Page listed for each instrument.
- ___ Call OKIE symbol included on Cover and Plan sheets.
- ___ Legend provided on all Plan sheets.
- ___ Benchmarks located and labeled on each Plan set.
- ___ Soil Borings shown on each Plan set.
- ___ 100-year floodplain boundaries and Wetland boundaries are shown on all Plan sheets.
- ___ All existing and proposed obstructions, above and below ground, are included in drawings.
- ___ Existing and proposed utilities shown in Plan drawings.
- ___ Existing contours are always shown with dashed, light line. Proposed contours are shown as continuous, heavy line.



Bixby Engineering Design Checklist

B. Streets and Sidewalks

- ___ Soils Report with paving design recommendation submitted.
- ___ Typical street sections and paving details provided, dimensioned and labeled.
- ___ Maximum cross slope used = 3/8" per foot.
- ___ For Residential asphalt streets, base course is specified as Type A and surface course is specified as Type C.
- ___ ODOT Standards to be used are listed on Cover sheet.
- ___ Geometric design and sight triangles provided in accordance with Engineering Criteria Manual.
- ___ Complete geometric layout and curve data for horizontal layout provided.
- ___ Finish contours shown in Plan drawings.
- ___ Intersection details for each intersection are included in drawings. Spot elevations, exact horizontal location, and flow arrows are provided.
- ___ Wheelchair ramp locations labeled and ramp design specified.
- ___ Vertical curve data included for each curve: Tangent Grades, Curve Length, VPC Sta., VPI Sta., VPT Sta., High Point (crest), Low Point (Sag) , K, and Design Speed.
- ___ Fill areas shown, hatched, and labeled on Profiles.
- ___ Profiles show existing and proposed grades for roadway centerline and proposed grade for right-of-way lines on each side of roadway.
- ___ Storm water drainage inlet locations are labeled and stationed.

C. Storm Water Drainage

- ___ Storm Water Detention and Drainage Report meeting requirements of Section D submitted. Report contains detailed hydrologic and hydraulic calculations for storm water drainage system including storm sewers, culverts, bridges, erosion control measures (i.e. riprap), and an evaluation of downstream tailwater conditions that affect system hydraulic performance.



Bixby Engineering Design Checklist

- ___ Floodplain development issues, where applicable, have been addressed. Floodplain areas have been placed within Reserve Areas. Compensatory storage calculations including cut/fill summary with supporting cross section information has been prepared and submitted. Required CLOMRs have been prepared and submitted to FEMA.
- ___ 404 Permit and Wetland issues, where applicable, have been pursued and addressed with the U.S. Army Corps of Engineers.
- ___ Detention facility and outlet structure construction details provided including geometric layout data and low flow concrete trickle channels.
- ___ Grading Plan showing existing and finish grade contours is included in the Plan set.
- ___ Finished Contours and Finished Floor elevations for each lot shown on Plan drawings. Spot elevations are used as required to show grading in and around individual building sites.
- ___ Overland drainage across more than two lots has been prevented by the use of storm water drainage structures or overland drainage easements containing vegetated swales or channels.
- ___ Storm water drainage maps for on-site and off-site drainage along with inlet & structure design and hydrology/hydraulic summary are included in drawings.
- ___ Off-site discharge or receipt of runoff addressed with adequate easements, drainage structures, and permanent erosion control measures.
- ___ Legend showing inlet and structure design designations provided.
- ___ Each structure labeled with unique identifier used in Drainage calculations, on Plan drawings and on Profiles.
- ___ Structures with Stations and Grate/Rim/Invert elevations shown on the profiles.
- ___ Max time of concentration to any inlet = 10 minutes for Residential and 5 minutes for Industrial/Commercial areas.
- ___ Pipe label, size, material, and length of run included on Plans and on Profiles. Culvert end treatments are also specified where applicable.
- ___ Cadi-Lok type wrap has been specified for RCP storm sewer joints in sandy soils.
- ___ Pipe grades, capacity, design flows, and flow velocities are labeled on Profiles (including culverts and tailwater conditions).



Bixby Engineering Design Checklist

- ___ Existing and proposed grades shown on Profiles. Existing and proposed grades for culverts shall be extended a minimum of 50' upstream and downstream of the end of the pipe.
- ___ Street crossings shown and labeled on Profiles.
- ___ EGL and HGL grades are shown on Profiles (including culverts and tailwater conditions).
- ___ Typical sections for drainage swales and channels are provided. Design information including flow rate and velocity included with details.
- ___ Storm Water Pollution Plan in accordance with ODEQ regulations has been prepared and submitted.
- ___ Erosion Control Plan addressing temporary construction measures and long term permanent measures has been prepared and submitted.
- ___ Calculations for riprap sizing and/or other erosion control measures is included in Detention and Drainage Report.
- ___ Filter fabric provided for all riprap installations.

D. Sanitary Sewer

- ___ Sewer located 12.5' from property line within 17.5' perimeter easement.
- ___ Sewer located 7' from property line within 11' easement.
- ___ Offset dimensions of sewer line from property labeled on Plans.
- ___ Sewer adjacent to street right-of-way is placed on the side of the street opposite water line location.
- ___ Sewers terminating in manhole project a minimum of 15' into property served.
- ___ Manholes provided at all at the end of each line, at all changes in grades, size, or alignment; at all intersections; and at distances not greater than 400 feet for sewers 15 inches or less, and 500 feet for sewers 18 to 30 inches.
- ___ Manhole spacing at 500' in streets or parking areas pre-approved by City.
- ___ Manholes located outside of paved areas.



Bixby Engineering Design Checklist

- ___ Manhole access should be provided within 20' of the back of curb(i.e. outside possible fenced areas) at street crossing for sanitary sewer lines installed through back and side yards.
- ___ Angle between inflow and outflow lines is greater than or equal to 90 degrees.
- ___ Each manhole labeled with unique identifier used on Plan drawings and on Profiles.
- ___ Minimum manhole depth = 4'.
- ___ Manhole diameters approved for pipe sizes.
- ___ Manholes with Stations and Rim/Invert elevations shown on the profiles.
- ___ Rim elevations elevated minimum 1' above 100-year flood level or bolt-down covers specified.
- ___ Drop manholes shown when the difference in manhole inverts is 2' or more.
- ___ Pipe label, size, material, and length of run included on Plans and on Profiles.
- ___ Flow direction arrows included on Plan Sheets.
- ___ Existing and proposed grades shown on Profiles.
- ___ Fill areas shown, hatched, and labeled on Profiles.
- ___ Street crossings shown and labeled on Profiles.
- ___ Pipe materials and grades included on Profiles.
- ___ Conduits/bores shown on Profiles.
- ___ Utility crossings (including water and storm sewer) and clearances shown and labeled on Profiles.
- ___ 10' horizontal and 2' vertical clearance provided between sanitary sewer lines and water mains.
- ___ At crossings of sanitary and storm sewer lines, the water line is to be installed over the sanitary and storm sewer lines except where otherwise pre-approved by the City Engineer. In areas of limited cover, conduit is used and/or construction of sanitary sewer lines with AWWA C900 pipe to keep the water line installation above that of the sanitary and storm sewer.
- ___ Sufficient slope provided to maintain minimum velocity of 2 ft/sec.



Bixby Engineering Design Checklist

- ___ Main at sufficient depth and capacity to serve all upstream properties.
- ___ 3' minimum cover provided at creek or channel crossings. Either encased conduit with PVC line or encased DIP is shown for creek and channel crossings.
- ___ Service tees included on Profiles with station, size, and direction. Design depth based on service line stubout 1.5' below surface, 2% min. grade, and 1.5' drop into sewer.
- ___ Finished Contours and Finished Floor elevations for each lot shown on Plan drawings.
- ___ Finished Floor elevations for each service tee shall be labeled and shown on Profiles.
- ___ Pressure sewer system pre-approved by City.
- ___ Lift Stations and Force Mains designed and detailed in accordance with ODEQ regulations and City requirements for Lift Station layout and equipment.

E. Waterworks

- ___ Mains located and dimensioned at 8' from property line.
- ___ On all Plan sheets, structures that have (or will have) a finished floor elevation of 700 or less are specially designated to require installation of a pressure reducing valve.
- ___ Fire Hydrants spacing at 600' max for Residential areas and 300' max for Industrial and Commercial areas.
- ___ Plan sheet showing coverage radii for all hydrants provided in drawing set.
- ___ 4.5' bury Fire Hydrants labeled on Profiles.
- ___ Pipe label, size, material, and length of run included on Plans and on Profiles.
- ___ All fire hydrants, valves, and fittings use easily identifiable symbols and are labeled & stationed on Plan drawings and on Profiles. All hydrants, valves, and fittings mechanically restrained.
- ___ All valves located outside paved areas.



Bixby Engineering Design Checklist

- ___ Connections to asbestos cement pipe are detailed and specified according to City requirements.
- ___ Water service connections, including long services shown and labeled. Long services cross roadways from property corner to property corner.
- ___ Minimum 3' cover shown and labeled on Profiles.
- ___ Existing and proposed grades shown on Profiles.
- ___ Fill areas shown, hatched, and labeled on Profiles.
- ___ Street crossings shown and labeled on Profiles.
- ___ Conduits/bores shown on Profiles.
- ___ Utility crossings (including sanitary and storm sewers) and clearances shown and labeled on Profiles.
- ___ 10' horizontal and 2' vertical clearance provided between sanitary sewer lines and water mains.
- ___ Stream and channel crossings comply with ODEQ regulations in OAC 252:626-19-2(9)(B).

F. Other Required Submittals

- ___ Traffic Control and Street Sign Plan prepared and submitted.
- ___ Street Lighting Plan prepared in conjunction with the appropriate power company prepared and submitted.