

ENGINEERING DEVELOPMENT PLAN REVIEW CHECKLIST

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Project Name: Click or tap here to enter text.
Submittal Number: <input type="checkbox"/> 1 st <input type="checkbox"/> 2 nd <input type="checkbox"/> 3 rd <input type="checkbox"/> 4 th or More
Review Date: Click or tap here to enter text.
Plan Number (City Assigned): Click or tap here to enter text.
PLAN REQUIREMENTS
REQUIREMENTS FOR <u>ALL</u> CIVIL PLAN SHEETS
<input type="checkbox"/> Plans must be a minimum of 90% complete or they will be returned as incomplete without review
<input type="checkbox"/> Title block with engineering firm information, registration number, engineer's seal, sheet title and page numbers clearly shown
<input type="checkbox"/> Plans are clear and easy to read (typical scales are 1"=20' or 1"=40' for plans) (1"=5' Vertical for profiles)
<input type="checkbox"/> A minimum of two benchmarks are required on all pertinent sheets. Establishment of a City GPS monument may be required
<input type="checkbox"/> North arrow and scale clearly shown on each plan sheet
<input type="checkbox"/> Legend (relevant to each sheet) showing all special symbols, line types and hatch use
<input type="checkbox"/> Street names labeled on all existing, proposed and future streets
<input type="checkbox"/> Lot & block numbers and/or ownership info shown for all lots
<input type="checkbox"/> Caution notes shown when working next to any existing utilities (public and franchise)
<input type="checkbox"/> Include City provided plan number in the margin of the bottom right hand corner (Provided by City after initial review)
<input type="checkbox"/> All work shall be performed using State Plane Coordinate System 1983 Projections, using the North American 1983 (NAD83) Datum (referenced ellipsoid GRS80) North Central Texas FIPS 4202 (Feet)
<input type="checkbox"/> All submittals shall be electronic
RECOMMENDED ORDER OF SHEETS
<input type="checkbox"/> Cover Sheet (Show location map of project, index to drawings, name, address and contact of Developer/owner and Engineer, engineering firm's license number and project name)
<input type="checkbox"/> City General Notes (check City website for latest revision)
<input type="checkbox"/> Plat
<input type="checkbox"/> Approved Site Plan (commercial projects)
<input type="checkbox"/> Dimension Control Plan (commercial projects)
<input type="checkbox"/> Demolition Plan
<input type="checkbox"/> Traffic Control Plan
<input type="checkbox"/> Grading Plan
<input type="checkbox"/> Erosion Control Plan
<input type="checkbox"/> Paving Plans
<input type="checkbox"/> Drainage Area Map
<input type="checkbox"/> Drainage Calculations

<input type="checkbox"/> Storm Drain Plans
<input type="checkbox"/> Water Plans
<input type="checkbox"/> Sewer Basin Map
<input type="checkbox"/> Sewer Plans
<input type="checkbox"/> Street Light, Signage and Striping Plan
<input type="checkbox"/> Photometrics
<input type="checkbox"/> Screening and Buffering Plans
<input type="checkbox"/> Tree Survey and Preservation Plan
<input type="checkbox"/> Landscaping and Irrigation Plan
<input type="checkbox"/> Construction Details
POSSIBLE PERMITS, REPORTS, AND FEES (IF NECESSARY)
<input type="checkbox"/> Plan Review Fee with plan submittal
<input type="checkbox"/> Earthwork Permit
<input type="checkbox"/> Floodplain Development Permit
<input type="checkbox"/> City of Celina Building Permit
<input type="checkbox"/> TCEQ – Small Construction Activity (1ac to 5ac) – Construction Site Notice (CSN)
<input type="checkbox"/> TCEQ – Large Construction Activity (5ac or greater) – Notice of Intent (NOI)
<input type="checkbox"/> SWPPP – Must have a copy available on site at all times
<input type="checkbox"/> Flood Study – (3 rd Party Review) – (Billed to Developer)
<input type="checkbox"/> FEMA – CLOMR/LOMR
<input type="checkbox"/> 404 Permit
<input type="checkbox"/> Water and Sewer System Modeling – 3 rd Party Analysis – (Billed to Developer)
<input type="checkbox"/> TxDOT Permits (Through the City)
<input type="checkbox"/> Permits from other Municipalities or County
<input type="checkbox"/> Traffic Impact Study
<input type="checkbox"/> Downstream drainage impact assessment (reference figure 3.1 of the City’s Engineering Design Standard)
<input type="checkbox"/> Written permission from adjacent owner required if grading/earthwork encroaches adjacent property
<input type="checkbox"/> Easements by special instrument/amended plat in case utilities will not be within easements
<input type="checkbox"/> BNSF Permits
<input type="checkbox"/> Electric transmission lines and petroleum/gas pipelines
<input type="checkbox"/> Escrow Fees – Paid prior to final plat recording (water, sewer, street, etc.)
<input type="checkbox"/> Developer Participation Agreement – Submit prior final plat for City approval
<input type="checkbox"/> Impact Fees – Due at time of building permit issuance
<input type="checkbox"/> Pro-Rata Agreement – Submit after project acceptance (water and sewer extended across a separately owned tract)
<input type="checkbox"/> Three percent (3%) City Engineering Inspection Fee shall be paid prior to or at the pre-construction meeting
<input type="checkbox"/> Street lighting installation cost payments made to ONCOR, GCEC or CoServ
<input type="checkbox"/> 2-Year (100%) Maintenance Bond (City)
<input type="checkbox"/> Contractor and Engineer of Record to attend pre-construction meeting

- Engineer of Record will attend the final walk-through to ensure the design intent is met, generate punch list and issue Request of Acceptance Letter.
- Letter of Acceptance will not be issued until vegetation is established as per the SWPPP
- Provide signed As-Built plans in PDF, and digital data in GIS compatible format projected to State Plane NAD 1983 North Central Texas FIPS 4202 (Feet)

PLATS

- Boundary tied to an abstract corner
- Two monuments set with 3D coordinates based on the City of Celina Monument System
- Appropriate right-of-way dedicated, including flares, corner clips, and hike-and-bike trails
- Onsite easements are shown on the plat and tied down
- Seven and half foot (7.5') utility easements on both sides of the street ROW
- Offsite easements required for acceptance are shown on the plat with space for recording information
- Drainage, Detention and Floodway Easement provided, if necessary, including dedication language on the signature page
- Finished Floor Elevations are shown on the plat for lots adjacent to floodplains or other major drainage facilities are a minimum of 2' above the adjacent 100-year WSEL
- No portion of any residential lot shall be located within the limits of the 100-year floodplain
- No homes shall front on collector streets
- No dumpster enclosures within easements
- Site Plan Data (as needed):
 - Floor area
 - Parking ratio
 - Required parking
 - Onsite parking provided
 - Onsite handicapped parking provided
 - Trailer parking
 - Total available parking
 - Total impervious area
 - Connection to public streets
 - Water & sewer connections
 - Exhibits for median openings on TxDOT roadways
 - Onsite detention calculation
 - Sidewalk and/or trails

DIMENSION CONTROL PLAN (COMMERCIAL PROJECTS)

- Dimensions for all buildings, pavement and hardscape areas (i.e. parking areas, driveways, fire lanes, turn lanes, sidewalks, radii, throat depths, etc.) measured to the nearest 0.0'
- Control points to structures (i.e. inlets, etc.) based on dimension from property corner or known feature (not from an arbitrary point parallel to property line)
- Verification of public ROW widths. Dimension each property corner adjacent to public ROW to a perpendicular point opposite side ROW line (do not label "variable width" only)
- Dimension along ROW to nearest cross-street and/or driveway measured from throat to throat
- Dimensions for easements

GRADING

- Existing and proposed contours at 1' intervals are shown

<input type="checkbox"/> Proposed contours tie back in to existing contours minimum of 50' to adjacent properties
<input type="checkbox"/> Show all existing and proposed storm drain in the project area
<input type="checkbox"/> At a minimum, show driveway locations adjacent to inlets and at the intersections
<input type="checkbox"/> Date and name of firm who prepared geotechnical report with corresponding note stating: "Work shall be in accordance with the Geotechnical Report by _____, dated _____."
<input type="checkbox"/> Provide a letter of permission for offsite grading if necessary
<input type="checkbox"/> Slopes shall not be steeper than 4:1 (25%) without a slope stability analysis prepared by a geotechnical engineer.
<input type="checkbox"/> Positive drainage shall be provided away from all structures
<input type="checkbox"/> Drainage clarified by flow arrows, high points, sags, ridges, and valley gutters
<input type="checkbox"/> Spot shots shown to ensure proper drainage and adequate routing where applicable
<input type="checkbox"/> Clearly label drainage swales and provide typical cross-sections and flow data for all swales and open channels
<input type="checkbox"/> Show typical lot grading types
<input type="checkbox"/> Lot-to-lot drainage is not allowed in residential developments
<input type="checkbox"/> Retaining Walls: <ul style="list-style-type: none"> ○ Retaining walls must be shown on the grading plan. Specific structural detail for walls over three (4') vertical feet sealed by a registered professional engineer must be provided ○ Retaining wall must clearly show and label top/bottom elevations of wall at key locations such as ends and bends and taper down to 6" at ends. ○ Retaining walls including footings must be on private property and may not be located within easements, ROW, floodplains or any other City maintained property ○ Provide a typical cross-section view showing proposed ground slopes on each side of the retaining wall
<input type="checkbox"/> Guardrail required when slopes exceeding 3:1, walls, or other obstructions are within 30' of roadways or driveways
<input type="checkbox"/> Show FEMA base flood elevations (BFEs) and/or BFEs
<input type="checkbox"/> Finished Floor Elevations (on plat) are a minimum of 2' above the adjacent 100-year WSEL
<input type="checkbox"/> Show Erosion Hazard Setbacks and 100-year Floodplain and Floodway limits. Note the source of the 100-year Floodplain limits
EROSION CONTROL PLAN
<input type="checkbox"/> NOI / CSN and SWPPP must be provided to the City and erosion control devices must be installed before earth disturbing activities can begin
<input type="checkbox"/> Erosion control standard details provided and add note referencing the sheet location of the details
<input type="checkbox"/> The grading plan shall be used as the erosion control base
<input type="checkbox"/> Existing and/or proposed contours clearly shown/labeled
<input type="checkbox"/> Existing and proposed storm drain lines and inlets shown
<input type="checkbox"/> Show flow arrows
<input type="checkbox"/> Estimate and provide the total disturbance area in acres
<input type="checkbox"/> Delineate the limits of construction
<input type="checkbox"/> Phasing of BMP's with construction activities listed/described on erosion control plan

<input type="checkbox"/> Add note: "Contractor shall police site regularly and keep site free of trash and construction debris. Contractor is required to repair and/or replace damaged erosion control devices."														
<input type="checkbox"/> BMP maintenance schedule listing BMP, maintenance frequency and responsible party on erosion control details														
<input type="checkbox"/> Provide a legend of proposed erosion control devices														
<input type="checkbox"/> If a disturbed area of 10 acres or greater is flowing to one location a sedimentation basin must be provided														
<input type="checkbox"/> Stockpile area and batch plant areas shown and labeled														
<input type="checkbox"/> Areas to be sodded or seeded shown and specified with permanent perennial vegetation														
<input type="checkbox"/> Areas of permanent erosion control (other than vegetation) clearly shown														
PAVING														
<input type="checkbox"/> Roadways shall be designed in accordance with the City of Celina Thoroughfare Standards														
<input type="checkbox"/> Centerline stationing at a minimum of every 100', PC's, PT's and curve data labeled														
<input type="checkbox"/> Minimum grade 0.6%, maximum grade 6.0%														
<input type="checkbox"/> All paving shall be a minimum of 4,000 PSI at 28 days														
<input type="checkbox"/> Minimum horizontal centerline radius as per Section 4.02C of the City's design standard:														
<table border="1"> <thead> <tr> <th>Design Speed (Mph)</th> <th>Min. Centerline Radius (Ft.)</th> </tr> </thead> <tbody> <tr> <td>25</td> <td>250</td> </tr> <tr> <td>30</td> <td>350</td> </tr> <tr> <td>35</td> <td>525</td> </tr> <tr> <td>40</td> <td>775</td> </tr> <tr> <td>45</td> <td>1100</td> </tr> <tr> <td>50</td> <td>1400</td> </tr> </tbody> </table>	Design Speed (Mph)	Min. Centerline Radius (Ft.)	25	250	30	350	35	525	40	775	45	1100	50	1400
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25	250													
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<input type="checkbox"/> Show and label horizontal curves and/or provide a curve table with radius, Δ (central angle), tangent distance and length														
<input type="checkbox"/> Guardrail required when slopes exceeding 3:1, walls, or other obstructions are within 30' of roadways or driveways														
<input type="checkbox"/> Typical section is provided for each roadway type to be constructed														
<input type="checkbox"/> Drainage clarified by flow arrows at crests, sags, ridges, intersections and valley gutters														
<input type="checkbox"/> Storm inlets identified with paving stations and top of curb and flow line elevations at center of inlet provided														
<input type="checkbox"/> Street intersections shall intersect at 90° angle but for residential collectors and/or local street intersections up to a 5° tolerance is allowable.														
<input type="checkbox"/> Show and label all easement types and widths														
<input type="checkbox"/> Show existing and proposed utilities														
<input type="checkbox"/> At a minimum, show driveway locations adjacent to inlets														
<input type="checkbox"/> Include City of Celina standard paving details														
<input type="checkbox"/> Profile Views: <ul style="list-style-type: none"> ○ Existing ground line for left and right ROW shown ○ Proposed top of curb line shown for all public streets, proposed invert line shown for all alleys ○ Show right and left top of curbs at intersections where split grade occurs ○ Top of curb/pavement elevations labeled at every 50 foot stations 														

- Grade differentials greater than 1.2% require vertical curves
- Vertical curve stationing and elevations including PVC, PVI PVT, crest/sag station/elevation, curve length, algebraic grade difference and “K” values shown at a minimum
- Minimum acceptable crest and sag curves given speed and difference in grade of road as per Section 4.02 B (7):

Crest Curve											
Design Speed, V (MPH)	K	Length of Vertical Curve (L=KA)									
		A=1.6	A=2	A=3	A=4	A=5	A=6	A=7	A=8	A=9	A=10
25	12	50	50	50	50	60	80	90	100	110	120
30	19	50	50	60	80	100	120	140	160	180	190
35	29	50	60	90	120	150	180	210	240	270	290
40	44	70	90	140	180	220	270	310	360	400	440
45	61	100	130	190	250	310	370	430	490	550	610
50	84	140	170	260	340	420	510	590	680	760	840

Sag Curve											
Design Speed, V (MPH)	K	Length of Vertical Curve (L=KA)									
		A=1.6	A=2	A=3	A=4	A=5	A=6	A=7	A=8	A=9	A=10
25	26	50	60	80	110	130	160	190	210	240	260
30	37	60	80	120	150	190	230	260	300	340	370

35	49	80	100	150	200	250	300	350	400	450	490
40	60	110	140	200	260	320	390	450	520	580	640
45	79	130	160	240	320	400	480	560	640	720	790
50	96	160	200	290	390	480	580	680	770	870	960

Multiple of Algebraic Difference						
	20	25	30	40	50	60
Crest Vertical Curve	10	15	28	50	80	150
Sag Vertical Curve	15	20	35	50	70	100

- Hatch fill areas and add note “Compacted fill to 95% STD Proctor Density”

- Residential Streets: Reference Sheet No. ST-1 of the City’s standard details.
 - 27’ (back of curb to back of curb) paving, 60’ ROW, or 37’ (back of curb to back of curb) including two 5’ bike lanes (Residential Collector); or
 - 29’ (back of curb to back of curb) paving, 50’ ROW,
 - As per table 4.1 of the City’s standard details no street ROW shall be less than 50’ and no street pavement shall be less than 29’ (back of curb to back of curb).
 - Min. 7” pavement thickness with 6” lime stabilized subgrade
 - Paving width shall be 29’ minimum if alleys are not provided
 - Intersections shall have a curb radius of 20’ unless with a major or minor thoroughfare
 - Intersections shall have a maximum slope of 2% in all directions within the curb returns
 - Parkways shall have a minimum slope of ¼” per foot
 - Maximum Length of Dead End Street - The maximum length of a cul-de-sac or dead end street with a permanent turn-a-round shall be 600 feet measured from the centerline of the intersection to the center point of the cul-de-sac or T-shaped (hammer head) turnaround.
 - Temporary Turnarounds shall be provided at ends of streets more than 150 feet long that will be extended in the future. No buildings shall be constructed in these sections without approval of the Director or Engineering.

<ul style="list-style-type: none"> ○ Residential Cul-de-sac turnarounds shall have a circular driving surface that has a minimum radius of forty feet (40') and a street right-of-way that has a minimum radius of fifty feet (50').
<ul style="list-style-type: none"> □ Commercial Collectors: <ul style="list-style-type: none"> ○ 27' (back of curb to back of curb) paving, 60' ROW (or) 37' (back of curb to back of curb) including two 5' bike lanes (Residential Collector); ○ 8" pavement thickness with 6" lime stabilized subgrade ○ Intersections shall have a curb radius of 30' ○ Intersections shall have a maximum slope of 2% in all directions within the curb returns ○ Parkways shall have a minimum slope of ¼" per foot. ○ Maximum Length of Dead End Street - The maximum length of a cul-de-sac or dead end street with a permanent turn-a-round shall be 600 feet measured from the centerline of the intersection to the center point of the cul-de-sac or T-shaped (hammer head) turnaround. ○ Temporary Turnarounds shall be provided at ends of streets more than 150 feet long that will be extended in the future. No buildings shall be constructed in these sections without approval of the Director or Engineering. ○ Commercial Cul-de-sac turnarounds shall have a circular driving surface that has a minimum radius of fifty feet (50') and a street right-of-way that has a minimum radius of sixty feet (60'). ○ Hammer head turnarounds shall have a minimum pavement width of 60 feet and a minimum depth of 20 feet.
<ul style="list-style-type: none"> □ Thoroughfares: <ul style="list-style-type: none"> ○ 120' ROW for major thoroughfares, 100' ROW for minor thoroughfares (140'/110' at thoroughfare intersections) ○ 11' wide through lanes, 11' wide single right / left-turn lanes, 10' wide left-turn lanes (if two lanes are provided) ○ Cross-slope of 1/4" or 3/8" per foot ○ 9" pavement thickness with 8" lime stabilized subgrade ○ Intersections shall have a minimum curb radius of 30' ○ Intersections between thoroughfares shall have a max grade of 2% for a min distance of 200' from the intersection ○ Intersections between thoroughfares shall have a max grade of 2% within the curb returns of any street intersection ○ All other intersecting roadways shall have a max grade of 2% for a min distance of 100' from the intersection ○ Parkways shall have a minimum slope of ¼" per foot
<ul style="list-style-type: none"> □ Frontage Roads: <ul style="list-style-type: none"> ○ Consider as a major thoroughfare (6LD) for design purposes ○ No driveway shall be located between 50' in advance of and 400' beyond the curb gore of an exit ramp
<ul style="list-style-type: none"> □ No driveways shall be located between 200' in advance of and 50' beyond the curb gore of an entrance ramp
<ul style="list-style-type: none"> □ Alleys: <ul style="list-style-type: none"> ○ 12' paving, 18' ROW, 5" invert ○ 8" – 5" – 8" pavement section ○ 15' radius at alley-street intersections

<ul style="list-style-type: none"> ○ Alleys across streets shall align within 15' or else a minimum 75' offset is required ○ Alleys sloping to the ROW shall rise 0.33' from the street gutter to the invert at the ROW line ○ Alleys sloping away from the ROW shall rise 0.75' from the street gutter to the invert at the ROW line ○ Parkways in alleys shall have a slope of 1" per foot
<p><input type="checkbox"/> Non-residential Driveways:</p> <ul style="list-style-type: none"> ○ Driveways shall intersect the street at a 90° angle ○ Driveways shall not be located in right-turn lane or decel lane transitions ○ Driveways at median openings shall be centered within the median opening ○ Driveway elevations at the ROW line shall be a minimum of 6" above the street gutter ○ Cross-access is required between adjacent commercial, retail, and office properties ○ Fire lanes cannot exceed 10% in grade change, with cross slope not exceeding 5% ○ Standard commercial driveways are generally a minimum 30' and a maximum of 36' (40' at a gas station) wide (ref. section 4.03D of the City's design standards) ○ The last upstream driveway at an intersection shall be located a minimum of 75' from the ROW line ○ The first downstream driveway at an intersection shall be located between 100' and 170' from the ROW line
<p><input type="checkbox"/> Left-turn lanes are required on major and minor thoroughfares at median openings: (ref. section 4.03 B)</p> <ul style="list-style-type: none"> ○ Major or minor (on major): 200' transition, 150' (inside left-turn lane) & 250' (outside left-turn) minimum storage (to median nose) ○ Major or minor (on minor): 100' transition, 150' minimum storage (to median nose) ○ Collector streets / non-residential driveways: 100' transition, 150' minimum storage (to median nose) ○ Residential streets: 100' transition, 100' minimum storage (to median nose)
<p><input type="checkbox"/> Right-turn lanes are required on major and minor thoroughfares at intersections with other streets: (ref. section 4.03 B)</p> <ul style="list-style-type: none"> ○ Major or minor (on major): 150' transition, 225' storage (to curb return) ○ Major or minor (on minor): 150' transition, 175' storage (to curb return) ○ Collector streets: 110' transition, 150' storage (to curb return) ○ Residential streets: 110' transition, 100' storage (to curb return) ○ Right-turn lanes require 10' additional ROW
<p><input type="checkbox"/> Decel lanes are required on major and minor thoroughfares at all non-residential driveways: (ref. section 4.03 D)</p> <ul style="list-style-type: none"> ○ On major: 110' transition, 110' storage (to curb return) ○ On minor: 110' transition, 90' storage (to curb return) ○ Not required at first driveway downstream of intersection (minimum 100', maximum 170') ○ If located in a right-turn transition, then extend with 50' of additional storage before driveway ○ Decel lanes require a 10' street easement outside the ROW
<p><input type="checkbox"/> Median Openings: (ref. section 4.03 B)</p> <ul style="list-style-type: none"> ○ Median openings are required for all street intersections ○ Median openings may be provided for non-residential driveways if spacing requirements are met

<ul style="list-style-type: none"> ○ All non-residential lots on a thoroughfare shall have direct or indirect access to at least one median opening ○ Median openings shall be 60' wide unless other concerns specifically dictate otherwise ○ The minimum distance to the first mid-block median opening varies from 350' to 600', measured nose to nose, depending on the thoroughfare type and the type of mid-block opening ○ Median noses shall be laid down with stamped concrete (ref. City construction std. details)
<ul style="list-style-type: none"> □ Parking – Concrete <ul style="list-style-type: none"> ○ Permanent – 4,000 PSI, 5" pavement thickness with 6" lime stabilized subgrade, #3 bars @ 18" OCEW ○ Temporary – 3,600 PSI, 4" pavement thickness with 6" lime stabilized subgrade
<ul style="list-style-type: none"> □ Fire Lanes (Commercial): <ul style="list-style-type: none"> ○ Fire lanes shall be indicated on the plat as an easement. Where fire lanes are provided and a plat is not required, the limits of the fire lane shall be shown on a site plan. ○ Fire lane and access easements shall be provided to serve all buildings through parking areas, to service entrances of buildings, loading areas and trash collection areas, and other areas deemed necessary to be available to fire and emergency vehicles. The Fire Chief is authorized to designate additional requirements for fire lanes where the same is reasonably necessary to provide access for fire and rescue personnel. ○ When fire apparatus access roads are required to be installed, such protection shall be installed and made serviceable prior to vertical construction, and shall remain serviceable during construction.
<ul style="list-style-type: none"> □ Fire Access Road Locations: <ul style="list-style-type: none"> ○ Fire lanes must be provided to allow unobstructed fire department access such that all portions of the exterior of the building shall be within 150-feet (as the hose lays) of a fire lane and/or other approved fire apparatus access roadway ○ Two means of fire apparatus access must be provided for the following: <ul style="list-style-type: none"> ▪ Buildings or facilities exceeding 30-feet in height ▪ Buildings of facilities having a gross building area of more than 62,000 SF (<i>Exception: Projects having a gross building area of up to 124,000 SF that have a single approved fire apparatus access road when all buildings are equipped throughout with approved automatic sprinkler systems.</i>) ▪ Multiple-family residential projects having more than 100 dwelling units (<i>Exception: Projects having up to 200 dwelling units may have a single approved fire apparatus access road when buildings, including nonresidential occupancies, are equipped throughout with approved automatic sprinkler systems.</i>) ▪ Multiple-family residential projects having more than 200 dwelling units ▪ One- or two-family dwelling developments where the number of units exceeds 30 (<i>Exception: May have a single approved fire apparatus access road if all dwelling units are equipped with an approved automatic sprinkler system as per Section 903.3.1.1, 903.3.1.2 or 903.3.1.3 of the IFC.</i>) ○ Where two access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the lot or area to be served, measured in a straight line between accesses ○ Buildings or portions of building or facilities three or more stories or 30-feet or more in height above the lowest level of fire department vehicle access shall be provided with a

fire lane a minimum of 15-feet to a maximum of 30-feet from the building and shall be positioned parallel to one entire side of the building.

Fire Lane Specifications:

- Widths will be measured face of curb to face of curb (FC-FC)
- Minimum width of 24-feet
- A turning radius of 20-feet for buildings less than 30-feet in height
- A turning radius of 30-feet for building 30-feet or above in height and/or 3 or more stories in height
- Minimum clear vertical height clearance of 14-feet
- Fire lanes are not allowed to go under or through an area covered with an awning, canopy, carport, porte-cochere, sky bridge, parking structure, covered structure, etc.
- Fire lanes cannot exceed 10% in grade change, with cross slope not exceeding 5%
- Fire lanes shall be constructed of concrete surface. The design shall be based on the geotechnical investigation of the site, but shall meet the stated minimums, as follows: the fire lane shall be constructed with 6 inch thick, 4,000 psi concrete with No. 4 bars spaced 18 inches on centers both ways and with sub-grade to a density not less than 95 percent standard density

Fire Lane Turnarounds:

- An approved hammerhead, cul-de-sac or dead-end hammerhead turnaround must be provided for all dead end fire access roads in excess of 150-feet in length. Unless specifically approved by the Fire Department, parking or other obstruction within the required turnaround is prohibited.
- All approved turnarounds shall be marked and platted as fire lanes
- Commercial Cul-de-sac turnarounds shall have a circular driving surface that has a minimum radius of fifty feet (50') and a street right-of-way that has a minimum radius of sixty feet (60').
- Hammerhead – 60 foot minimum legs along the “T,” as measured from centerline of the fire lane. Corner radius shall be per the fire lane width required.
- Dead-End Hammerhead – 60 foot minimum intersection leg, as measured from centerline of the fire lane. Corner radius shall be per the fire lane width required.

Traffic Calming Devices

- Speed bumps or other similar obstacles that have the effect of slowing or impeding the response of the fire apparatus shall be approved by the Fire Department prior to installation.
- Markings: Refer to the Celina Fire Department guidelines
- Access Gates: Refer to the Celina Fire Department guidelines

Sidewalks and Ramps:

- Minimum of 5' wide and a minimum thickness of 4" with a minimum of 4000 PSI
- Show and dimension all sidewalks and barrier free ramps and label if proposed or to be built by the builder or developer
- Barrier free ramps shall be constructed at all intersections and shall connect all sides of the intersection
- Sidewalks not located within the ROW shall have a dedicated sidewalk easement extending 2' beyond the sidewalk
- Sidewalks shall be constructed to connect cul-de-sacs to adjacent through streets
- Consult with the Parks Department to insure the requirements of their hike & bike master plan are considered

<ul style="list-style-type: none"> ○ Any pedestrian crossing of a street or driveway shall have a maximum cross-slope of 2% ○ All buildings must be connected to the public sidewalk by an accessible onsite sidewalk
<input type="checkbox"/> Visibility Triangles (ref. section 4.07 B): <ul style="list-style-type: none"> ○ 40' x 40' ROW corner clips at all intersections with major and minor thoroughfares, collectors or residential streets that potentially will be signalized. ○ 25' x 25' ROW corner clips at all major thoroughfares, minor thoroughfares and collector-residential streets that will remain un-signalized intersections ○ 10' x 10' ROW corner clips at all residential-residential street intersections ○ 15' (along street) x 5' (along alley) ROW corner clips at alley-street intersections ○ Visibility, Access, and Maintenance Easements (VAMs) are required where roadway geometrics result in a sight-line triangle that extends outside the ROW
<input type="checkbox"/> Conduit (ref. section 4.10 and 7.03): <ul style="list-style-type: none"> ○ Two 4" conduit rings with Type A pullboxes shall be installed around all intersections that may be signalized ○ One 2" schedule 40 PVC conduit with Type A pullboxes shall be installed across median openings for future street lighting ○ Two 4" white PVC conduits shall be installed across median openings for future irrigation
DRAINAGE AREA MAPS
<input type="checkbox"/> Existing contours clearly shown for entire drainage basin, both onsite and offsite
<input type="checkbox"/> Drainage areas and sub areas delineated and labeled
<input type="checkbox"/> Flow arrows for surface drainage shown
<input type="checkbox"/> Existing and proposed storm drain lines shown
<input type="checkbox"/> Inlet designation labels shown
<input type="checkbox"/> Detention pond shown and labeled
<input type="checkbox"/> Drainage easements shown and labeled
<input type="checkbox"/> Zoning indicated for all offsite areas and/or land use assumptions specified
<input type="checkbox"/> Rational Method Peak Runoff Rate Computation table shown ($Q = CIA$) for Areas less than 200 acres and unit hydrograph method peak runoff table shown for areas greater than 200 acres
<input type="checkbox"/> Time of concentration and weighted runoff coefficients calculations shown as needed
<input type="checkbox"/> List the total site impervious area (ft ² of all paving, roof areas, etc.) – <i>Commercial Projects Only</i>
<input type="checkbox"/> Show erosion hazard setbacks and 100-year floodplain and floodway
<input type="checkbox"/> Runoff calculations are completed using City of Celina requirements as per the City's design standards (ref. Table 3.1). <ul style="list-style-type: none"> ○ $C = 0.30$ undeveloped; 0.35 parks; 0.55 single family residential; 0.70 two family, patio homes, town homes and schools; 0.80 multi-family or churches; 0.90 non-residential uses, hospital and streets. ○ Minimum Inlet Times (T_c) = 20 min for undeveloped and parks; 15 min for single family residential or schools; 10 min for two family, patio homes, town homes, multi-family, non-residential uses, churches, hospitals and streets. ○ $I_{100} = 20 \text{ min} = 6.89 \text{ in/hr}$; 15 min = 7.69 in/hr; 10 min = 8.74 in/hr (ref. section 3.02 D) ○ As per Section 3.04 of the City's design standards, street capacities shall be hydraulically designed using Manning's equation $Q = \left(\frac{1.486}{n} \right) A (R^{2/3}) (S^{1/2})$

q	Gutter flow (cfs)
n	Manning's roughness coefficient, (0.0175 for concrete street)
A	Cross section flow area (ft ²)
R	Hydraulic radius of the conduit in feet, which is the area of the flow divided by the wetted perimeter ($R=A/P$)
P	Wetted perimeter (ft.)
S	Slope of the hydraulic gradient (ft/ft)

- Provide table showing street/alley and inlet capacities and inlet capacities.
- During a 100 year storm event, the gutter depth on all thoroughfares are required by the City not to exceed six inches (6") or top of curb, whichever is less.

- During a 100-year storm event, the City requires a minimum of nine feet (9') of pavement in each direction for all thoroughfares.

STORM DRAIN

- Enclosed storm sewer systems:
- Existing drainage system sizes and locations correspond with City of Celina GIS/As-Built
 - Drainage systems are extended to serve adjacent properties and sized accordingly
 - Show and label all existing and proposed utilities
 - Label inlet type, size, paving station, top of curb elevation and flowline elevation at a minimum
 - Label type and size of existing/proposed structures (i.e. headwalls, manholes/junction boxes)
 - Label type, size and dimensions of all permanent outfall erosion protection
 - Show paving flow arrows at crests, sags, ridges, intersections and valley gutters
 - Show centerline stationing for pipe with PC and PT stations and curve data
 - Label centerline stations for lateral connections, manholes/junction box locations, pipe size changes headwalls and future stub out connections
 - Laterals shall intersect the storm drain at 60°
 - 100-YR gutter flows and bypass shown at each inlet along public streets and fire lanes
 - Show erosion hazard setbacks and 100-year floodplain and floodway
 - Note source of floodplain/floodway delineation
 - Provide applicable construction details for all drainage structures
 - Valley gutters shall not cross major or minor thoroughfares or collectors
 - Storm sewer lines shall generally be located under paving 7' from the outside back of curb
 - Drainage improvements located under fire lanes or public improvements shall be RCP
 - Storm sewer easements shall be a minimum of 15' wide (or 1.5 x depth if greater than 10')

- Profile Information:
- Existing and proposed ground line at centerline of pipe shown and labeled correctly
 - Hydraulic grade lines shall be calculated for all storm drain lines
 - Hydraulic grade lines shall be a minimum of 1' below the top of an inlet
 - Show all hydraulic data including pipe flow, pipe capacity, hydraulic slope, velocity, velocity head and partial flow data if under partial flow conditions (velocity and flow depth)
 - Velocity for storm drains shall not exceed 20 fps or less than 2.5 fps
 - Velocity for inlet lateral shall not exceed 30 fps
 - The minimum allowable pipe size is eighteen inches (18"). Pipe sizes shall not be decreased in the downstream direction

- Minimum slope for storm drain pipes

Pipe Diameter (in)	Slope (ft/100 ft)	Pipe Diameter (in)	Slope (ft/100 ft)
18	.180	51	.045
21	.150	54	.041
24	.120	60	.036
27	.110	66	.032
30	.090	72	.028
33	.080	78	.025
36	.070	84	.023
39	.062	90	.021
42	.056	96	.019
45	.052	102	.018
48	.048	108	.016

- Storm drain shall be embedded in accordance to Standard detail sheet SD-1
- Profile all laterals 30 feet in length and greater and profile any lateral crossing a utility line
- Label station and flowline elevations at a minimum of 100' intervals and for all manholes, structures, utility crossings, laterals, curves, size changes, etc.
- Indicate length, type/class, slope and size of all storm drain lines
- Show all utility crossings and parallel sewer lines shown in profile
- 100-YR WSEL shown at outfalls for ponds, creeks and channels
- End to end connections of different pipe sizes shall match crown elevations

Inlets:

- Recessed curb inlet shall be installed on all major thoroughfares and on residential thoroughfares standard curb inlets shall be installed.
- Inlets shall be placed to prevent the 100-year storm from exceeding the street capacity
- Inlets shall generally be placed upstream of intersections to limit the flow of water through the intersection
- Inlets shall generally be placed upstream of right-angle turns and street intersections to limit the flow around the turn
- Inlets shall not be located directly on a storm sewer line (used as a junction box)
- Inlets shall not be located in "eye brows" on residential streets
- Drop inlet depth shall not exceed 5'
- Inlet info shall be shown on both the storm sewer plan and on the paving plan
- Inlet sizes used for public improvements shall only be standard sizes
- Velocity for inlet lateral shall not exceed 30 fps
- Sag inlets shall have a minimum 10' opening and a minimum 21" lateral
- Sag inlets shall have a paved emergency overflow within 0.9' above the street gutter at the inlet
- Sag inlets on major or minor thoroughfares shall have an overflow inlet within 0.3' V or 30' H, whichever is greater
- Sag inlets cannot be located less than 300' apart
- Emergency overflow flumes shall be 4' wide with a 4" invert and located 1' off the property line in a 10' easement
- Combination grate inlets shall be placed in alleys to prevent the 100-year storm from exceed the alley capacity
- Drop inlets shall be located to collect water from unpaved areas
- No grate inlets are permitted in fire lanes or paved parking lots

- | |
|---|
| <input type="checkbox"/> Storm sewer manholes: <ul style="list-style-type: none"> ○ Storm sewer manholes shall be provided where two or more lines connect to the main at the same point ○ Storm sewer manholes shall be provided where bends exceed 45° ○ Storm sewer manholes shall be Type A for 18" to 30" and Type B for lines exceeding 30" ○ Access shall be provided at intervals not to exceed 500' for lines less than 48" and 1000' for lines 48" or greater |
| <input type="checkbox"/> Outfalls: <ul style="list-style-type: none"> ○ Outfalls shall generally be aligned with the receiving channel ○ Outfall velocities greater than 8 fps generally require erosion protection, riprap/grouted riprap is not allowed ○ Outfall flow lines shall be a minimum of 2' above the flow line of the receiving channel unless lining is present ○ Submerged outfalls require a dry manhole be constructed upstream for access ○ Final 10' of storm sewer shall be laid at a maximum 1% grade |
| <input type="checkbox"/> Culverts: <ul style="list-style-type: none"> ○ Freeboard above the 100-year WSE shall be a minimum of 2' ○ Culverts shall be designed to follow the natural stream channel ○ Velocity for culverts shall not exceed 15 fps ○ Generally, no more than 4 multiple box culverts shall be used for a stream crossing |
| <input type="checkbox"/> Bridges: <ul style="list-style-type: none"> ○ Clear the lowest member of the bridge by 2 feet above the 100-YR water surface ○ Show geotechnical soil boring information on plans ○ Show bridge sections upstream and downstream ○ Provide hydraulic calculations on all sections ○ Provide structural details and calculation with dead load deflection diagram ○ Provide vertical and horizontal alignment ○ Show soil erosion protection measures and concrete rip-rap |
| <input type="checkbox"/> Open drainage systems: <ul style="list-style-type: none"> ○ Preservation of creeks and tributaries in their natural condition is preferred, assuming undesirable brush is removed and slopes are stabilized or setbacks are provided |
| <input type="checkbox"/> Channel and swale design: <ul style="list-style-type: none"> ○ Cross-sections and hydraulic data shall be provided for channels ○ Roughness coefficients and maximum velocities for open channels are shown in Table 3.6 of the City's design standards. ○ Minimum slope for open channels is 0.3% ○ Trapezoidal channels are preferred over triangular channels. Bottom width shall generally be twice the depth ○ Freeboard above the 100-year WSE shall be a minimum of 1' ○ Flumes and pilot channels are not permitted in open channels ○ Retaining walls within channels shall be constructed of reinforced concrete with factor of safety of 2 against overturning and 1.5 against sliding. ○ Drainage Easement for channel shall be top of bank plus a minimum 10' for access on each side |
| <input type="checkbox"/> Drainage and Floodway Easement (ref 3.11 K of the City's design standards): <ul style="list-style-type: none"> ○ Provided around all major natural and excavated drainage channels |

<ul style="list-style-type: none"> ○ Easement includes 1' of freeboard above the 100-year WSE and then 10' access on each side ○ For slopes exceeding 3:1, then 15' of access shall be provided adjacent to the slope ○ The Erosion Hazard Setback shall be included within the Easement ○ Finished Floor Elevations (on plat) are a minimum of 2' above the adjacent 100-year WSE ○ No portion of any residential lot shall be located within the limits of the 100-year floodplain ○ Drainage and Floodway Easement must be dedicated by plat and include dedication language
<input type="checkbox"/> Erosion Hazard Setback: <ul style="list-style-type: none"> ○ Included in the drainage easement to protect public and private property ○ Generally, a 4:1 slope is projected back from the toe of the bank to intersect the finished grade, from this intersection add fifteen feet (15') away from the bank. This shall be the limit of the erosion hazard setback. ○ No residential lot or street ROW shall be located within the setback ○ Entire setback shall be contained within the Drainage and Floodway Easement
<input type="checkbox"/> Detention: <ul style="list-style-type: none"> ○ Storm water detention must be provided for sites that exceed single-family runoff (C= 0.55) ○ Detention design should consider the 2-, 5, 25 - and 100-YR storm events ○ If offsite flows enter the detention pond, a maintenance agreement is required ○ Provide a maintenance plan and responsible parties. ○ Minimum freeboard of 1' required (2' if impounded by a raised embankment) ○ Where earth embankment is proposed for impoundment, furnish a typical embankment section and specifications for fill, and include profile for the structural outflow and geotechnical report ○ Provide structural details and calculations for any item not a standard detail?? ○ Provide a detention basin volume calculations and elevation versus storage curve ○ Provide hydraulic calculations for outflow structures and elevation versus discharge curve ○ Provide routings or modified rational determination of storage requirements, demonstrating that critical duration is used (permitted for areas of 600 acres or less) ○ Fencing may be required around detention area ○ Underground detention shall have manhole access for silt removal ○ Underground detention shall be RCP if located under a fire lane ○ Basins with permanent storage ("wet ponds") must have a method for dewatering and silt removal ○ Drainage and Detention Easement must be dedicated by plat and include dedication language
WATER
<input type="checkbox"/> Existing water line sizes and locations correspond with City of Celina GIS/As-Builts.
<input type="checkbox"/> Proposed water line sizes and locations correspond with City of Celina Master Plan (water model)
<input type="checkbox"/> Development is served by two points of connection
<input type="checkbox"/> Water lines are extended to serve adjacent properties and sized accordingly
<input type="checkbox"/> Show and label all existing and proposed utilities
<input type="checkbox"/> Label size, type and pressure class for all proposed water mains
<input type="checkbox"/> Show location for all water services and meters

<input type="checkbox"/> Show and label all easements
<input type="checkbox"/> Dimension location of all mains, services, meters and spacing from other utilities
<input type="checkbox"/> Show and label all fire hydrants, valves, fittings, FDC locations and back-flow prevention
<input type="checkbox"/> Embedment shall be as per sheet W-1 of the City standard details
<input type="checkbox"/> Water lines other than laterals/service lines shall not be less than 8" diameter
<input type="checkbox"/> Indicate type and size of encasement where needed (bores, utility crossings, etc.)
<input type="checkbox"/> Provide minimum clearances of 9' in all directions when paralleling or crossing a wastewater line, separation distances shall be measured from the outside surface of each of the lines
<input type="checkbox"/> If minimum separation distance cannot be met for parallel water and wastewater lines, the wastewater lines must either have a minimum pressure rating of 150 psi or be concrete encased. The water main shall be placed above the wastewater main with minimum separation distances of 4' horizontally and 2' vertically
<input type="checkbox"/> Where a new potable waterline crosses above a wastewater main or lateral, center the segment of the waterline pipe over and perpendicular to the wastewater main or lateral such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the centerline of the wastewater main or lateral
<input type="checkbox"/> If minimum separation distance cannot be met for crossing water and wastewater lines, when the existing wastewater main or lateral is disturbed or shows signs of leaking, the wastewater main or lateral shall be replaced for at least 9 feet in both directions (18 feet total) with at least 150 psi pressure-rated pipe embedded in cement stabilized sand for the total length of one pipe segment plus 12 inches beyond the joint on each end.
<input type="checkbox"/> Provide minimum clearances of 18" in all directions when paralleling or crossing a storm sewer, if the minimum clearance cannot be met then the water main shall be encased in 6" of concrete
<input type="checkbox"/> Water lines shall cross existing roadways by means of a bore
<input type="checkbox"/> Connections to existing water lines shall be done with cut in tees and valves
<input type="checkbox"/> Water lines crossing any thoroughfare (current or future) shall be steel encased
<input type="checkbox"/> Two 45° bends are generally preferred over one 90° bend
<input type="checkbox"/> Profile View: <ul style="list-style-type: none"> ○ Profiles provided for water lines 12" diameter or greater ○ Existing and proposed ground line at centerline of pipe shown and labeled correctly ○ Label station and flowline elevations at a minimum of 100' intervals and for all fittings, laterals, utility crossings, valves, curves, bends, etc. ○ Lines less than 12" within developed areas shall have a minimum cover of 4' ○ Lines between 12" and 20" within developed areas shall have a minimum cover of 5' ○ Lines greater than 20" shall have a minimum cover of 6' if it is within a developed area otherwise seven feet (7') cover shall be required. ○ All waterlines 20" and less within undeveloped areas shall have a minimum cover of 6' ○ Indicate length, type/class, slope, size, embedment type and size of encasement as needed of all lines ○ Show all utility crossings and parallel sewer/storm lines shown in profile ○ Dead end water mains are not allowed unless approved in writing by the City
<input type="checkbox"/> Water pipe sizing for water demands less than 80,000 gallons per day
<input type="checkbox"/> Single and Multi-family water service line sizing: <ul style="list-style-type: none"> ○ Service lines to the properties shall be a minimum of 1" and shall be installed at the edge of the lot lines

<ul style="list-style-type: none"> ○ Water lines serving residential development will be a minimum of 8" diameter ○ Water lines greater than 600' or serving more than one fire hydrant shall 12" ○ Water lines under 500' or serving one fire hydrant with less than seven lots may be 6" diameter <ul style="list-style-type: none"> ▪ Dead end lines, when allowed, shall include a 2" blow-off valve in a meter can at the end of the line ○ Provide 12" water lines to adequately supply the single-family residential development, locating them generally along collector streets
<input type="checkbox"/> Commercial water service line sizing: <ul style="list-style-type: none"> ○ Water lines over 1,000' in length or supplying more than two fire devices shall be 12" diameter ○ Water lines serving fire hydrants in parking lots (not adjacent to buildings) may be 8" but must be looped
<input type="checkbox"/> For average daily water demands greater than 80,000 gallons per day the following information shall be submitted: <ul style="list-style-type: none"> ○ Zoning ○ Area in acres ○ Type of Development ○ Number of units and/or building square footage ○ Exhibit with connection locations and proposed water main schematic ○ Projected Average Daily Water Demands
<input type="checkbox"/> Water line materials: <ul style="list-style-type: none"> ○ Less than 12": C900 DR14 PVC ○ 12": C900 DR18 PVC ○ Greater than 12": C905 DR18 PVC ○ Greater than 20": may be Ductile Iron with a minimum pressure class of 150 psi
<input type="checkbox"/> Valve location and spacing: <ul style="list-style-type: none"> ○ No more than 3 valves (4 at crosses) shall be necessary to shut down each line segment ○ No more than 1 fire hydrant shall be shut off with any line segment ○ Spacing shall not exceed 600' in residential districts and 500' in other districts for 12" and smaller, lines greater than 12" may have spacing of up to 1000' and at every intersection
<input type="checkbox"/> Water meter Vaults: <ul style="list-style-type: none"> ○ Unit shall be of monolithic construction at floor and first stage of wall with sectional riser to required depth ○ Reinforcement: grade 60 reinforced. Steel bar conforming to ASTM 1615 on required centers or equal. ○ Hatchway: 3' x 5' galvanized steel double leaf spring assisted hatchway- with slam lock (traffic rated if within paving). ○ For a water service requiring a vault, a minimum six inches (6") water line shall be required off the water main with a minimum six inches (6") gate valve prior to reducing in size. ○ No high rising valve stems in vaults ○ All blockings shall be concrete
<input type="checkbox"/> Air release and vacuum release combination valves: <ul style="list-style-type: none"> ○ Combination valves shall be installed on water mains larger than twelve inches (12"). Vent pipes shall discharge air above grade and above 100-year floodplain elevation if applicable.

- The Engineer shall be responsible for locating and sizing air release valves in accordance with AWWA Manual M51: Air-Release, Air/Vacuum & Combination Air Valve.
- Air valves are not required on water distribution mains smaller than twelve inches (12") where fire hydrants and service connections provide a means for venting trapped air.
- Air valve manholes shall not be located in parking spaces.
- Install combination valves in high points along feeder mains, transmission mains or major mains. The size and type are as follows:

Water Line Size	Size of Relief Valve	Type of Relief Valve
16-inch and smaller	1-inch	Combination
18-inch to 36-inch	2-inch	Combination
42-inch and above	3-inch	Combination

- Water easements:
 - 15' minimum for water lines 12" or less (or 1.5 x depth if greater than 10 feet)
 - 20' minimum for water mains 16" and larger, subjected to approval by the City
 - 10' x 10' minimum for fire hydrants and automatic flushing valves if outside the ROW
 - 5' x 5' minimum for water meters (10' x 10' for meters greater than 3")

- Fire hydrants (ref. Section 2.1.9 of the City's design standards):
 - Fire hydrants shall be located at all street and fire lane intersections and within 150' main entrances
 - Fire hydrants shall be installed at a minimum of 10' from the curb return for all streets and fire lanes
 - Fire hydrants shall be installed at a minimum of 3' from the back of curb on all streets and fire lanes and shall be centered on a 6" thick 30' x 30' concrete pad.
 - Fire hydrant leads exceeding 100' shall be looped with a minimum 8" line
 - Fire hydrants shall not be located in sidewalk.
 - Fire hydrants shall be located outside the radius of the fire lane and at least 35' from all buildings
 - Fire hydrant valves shall be positioned to one side of the fire hydrant pumper nozzle
 - All fire hydrants shall be furnished with a Knox Storz Guard fitting with locking caps
 - Fire hydrant spacing shall not exceed 500' for residential, 400' for apartments, and 300' for non-residential
 - Fire service line shall be 8" stub-out with valve and shall be provided for all buildings exceeding 5000 SF
 - Fire Department Connection shall be no more than 100' from a fire hydrant

- Automatic Flushing Valves:
 - Shall be placed on dead ends (if approved) of water mains
 - The automatic flushing device system shall be installed parallel to the curb line
 - Unit shall not be installed front of a residential lot.
 - Automatic flushing valve shall have a two-inch (2") brass FIP inlet leading vertically into a two-inch (2") automatic solenoid valve.
 - Automatic solenoid valve shall have an internal, self-cleaning debris screen and have a 220 psi rating. Each unit shall be furnished with a stand-alone controller.
 - Valve controller will not require a second hand-held device for programming. Controller must have a minimum of nine (9) possible flushing cycles per day

- Back Flow Prevention required at the following locations:
 - Commercial property water service lines
 - Dedicated irrigation lines

<ul style="list-style-type: none"> ○ Private fire service main supplying fire sprinkler systems ○ Multi-family residential water service
WASTEWATER
<input type="checkbox"/> Existing wastewater sizes and locations correspond with City of Celina GIS/As-Builts
<input type="checkbox"/> Proposed wastewater sizes and locations correspond with City of Celina Master Plan/ wastewater modelling
<input type="checkbox"/> Wastewater lines are extended to serve adjacent properties and sized accordingly
<input type="checkbox"/> Reference sheet WW-1 of the City' embedment for the embedment of wastewater lines
<input type="checkbox"/> Show and label all existing and proposed utilities
<input type="checkbox"/> Label size and type for all proposed sewer lines
<input type="checkbox"/> Add arrow for direction of sewer flow
<input type="checkbox"/> Show centerline stationing for wastewater lines
<input type="checkbox"/> Show and label all easements
<input type="checkbox"/> Dimension location of all mains from other utilities
<input type="checkbox"/> Stub outs labeled with size, slope, length and flowline elevations (if not profiled)
<input type="checkbox"/> Show and label all manholes with rim elevations as well as cleanouts
<input type="checkbox"/> Indicate type and size of encasement where needed (bores, utility crossings, etc.)
<input type="checkbox"/> Wastewater lines other than laterals/service lines shall not be less than 8" diameter
<input type="checkbox"/> Wastewater lines crossing any thoroughfare (current or future) shall be steel encased
<input type="checkbox"/> Wastewater lines, when curved, shall have a minimum radius of 200'. (R = 300 x D, R = min. radius, D = pipe diameter in ft) Lines 12" and above require straight sections utilizing manholes for direction changes
<input type="checkbox"/> Wastewater lines up to 15" in diameter shall be constructed of green SDR 35 or SDR 26 for lines deeper than 15-feet. Lines greater than 15" in diameter shall have a minimum stiffness for 46 psi or 115 psi and be manufactured in accordance with ASTM F679 (solid wall)
<input type="checkbox"/> Wastewater force mains shall be constructed of white SDR 25 (up to 12") or DR 25 (larger than 12")
<input type="checkbox"/> Sewer lines shall have a minimum and maximum velocity of 2.0 ft/s and 10 ft/s respectively with an n-value of 0.013 (see table 2.3 of the City's design standards for min and max slopes)
<input type="checkbox"/> Wastewater services: <ul style="list-style-type: none"> ○ Services for single family homes shall be 4" diameter and located at the center of the lot ○ Services shall have a minimum slope of 2% ○ Services for multi-family, retail, and commercial shall be minimum 6" diameter ○ Services for industrial shall be minimum 8" diameter ○ Wastewater laterals shall not be attached to mains deeper than 12'. ○ Each building shall have only 1 lateral with a clean-out on the owner's side except duplexes which shall have 2 laterals independently attached to the main
<input type="checkbox"/> Profile View: <ul style="list-style-type: none"> ○ Profiles provided for sewer lines 8" diameter or greater ○ Existing and proposed ground line at centerline of pipe shown and labeled ○ Label station and flowline elevation information for all manholes, crossings and laterals ○ Label station and flowline elevations at a minimum of 100' intervals and for all manholes, size changes, laterals, utility crossings, curves, tees, valves, etc.

- Wastewater lines shall have a minimum cover of 4' but not less than necessary to serve the drainage area
- Manhole inflow and outflow elevations to be designed with a minimum of 0.1 foot drop
- Indicate the type and diameter for all manholes
- Indicate length, type/class, slope, size, embedment and size of encasement as needed of all lines
- Provide minimum clearances of 9' in all directions when paralleling or crossing a water line, separation distances shall be measured from the outside surface of each of the lines
- If minimum separation distance cannot be met for parallel water and wastewater lines, the wastewater lines must either have a minimum pressure rating of 150 psi or be concrete encased. The water main shall be placed above the wastewater main with minimum separation distances of 4' horizontally and 2' vertically
- If minimum separation distance cannot be met for crossing water and wastewater lines, the wastewater lines must either have a minimum pressure rating of 150 psi or be concrete encased a minimum of 10' on each side. The water main shall be placed above the wastewater main with minimum separation distance of 2'
- Provide minimum clearances of 18" in all directions when paralleling or crossing a storm sewer, if the minimum clearance cannot be met then the wastewater main shall be encased in 6" of concrete
- Show all utility crossings and parallel storm lines shown in profile

- Minimum and maximum pipe slopes shall be as follows:

Size of Pipe (in)	Minimum Slope (%)	Maximum Slope (%)
6	0.50	12.35
8	0.33	8.40
10	0.25	6.23
12	0.20	4.88
15	0.15	3.62
18	0.11	2.83
21	0.09	2.30
24	0.08	1.93
27	0.06	1.65
30	0.055	1.43
33	0.05	1.26
36	0.045	1.12
39	0.04	1.01
>39	*	*

* For lines larger than 39 inches in diameter, the slope shall be determined by Manning's formula to maintain a minimum velocity greater than 2.0 feet per second when flowing full and a maximum velocity less than 10 feet per second when flowing full.

- Manhole locations:

- Manholes shall be located at all locations where more than two wastewater lines connect and be provided at changes in grade, direction and pipe size
- Maximum manhole spacing shall be 500' as follows:
- Manholes shall be located on curved mains shall be constructed at the PC, PT, and a maximum spacing of 300' along the curve.

<ul style="list-style-type: none"> ○ Manholes shall be located on both ends of lines constructed by any method other than open trench ○ Manholes shall be required where services 6" or greater connect to the main ○ Manholes shall not be located in the gutter, especially in the "eye brow" of a residential street
<p><input type="checkbox"/> Manhole sizes:</p> <ul style="list-style-type: none"> ○ Manholes shall be 5' diameter minimum for depths exceeding 15' ○ Manholes shall be 4' diameter minimum for lines less than 15" ○ Manholes shall be 5' diameter for lines from 15" to 27" ○ Manholes shall be 6' diameter for lines greater than 27" ○ Manholes shall be concentric type conforming to ASTM C478 and C76 ○ Concrete for precast manholes shall be a minimum of 4000 psi sulfate resistant with conshield admixture
<p><input type="checkbox"/> Manhole types:</p> <ul style="list-style-type: none"> ○ Drop manholes shall be constructed where the inflow and outflow elevations differ by more than 2' ○ Sealed manholes shall be constructed when located in a floodplain or other drainage way ○ Sealed manholes shall be constructed such that every third manhole is vented 2' above the 100-year WSE/ 10' above the adjacent grade line whichever is higher
<p><input type="checkbox"/> Lift stations:</p> <ul style="list-style-type: none"> ○ Show the proposed lift station location and force main routing ○ Show the location and size of the existing collection system at the tie-in point ○ Provide backup generator for emergency power ○ Paved access road to the site, with pad for equipment ○ Lift station shall not be located 100' from a residential lot ○ Lift station shall be protected from the 100-year flood and shall be accessible during 100-year flood (elevation shall be a min. 2' above the fully developed 100-year flood plain and FEMA 100-year flood plain. ○ Connect the lift station to the City's SCADA system and include minimum emergency provisions in accordance to TCEQ chapter 217.63 ○ Site fencing set back shall be 20' from the easement line to allow for a landscape and drainage buffer ○ Piping inside the lift station shall be PVC. All fittings shall be stainless steel. ○ Submit design calculations and pipe selection
<p><input type="checkbox"/> Wet well:</p> <ul style="list-style-type: none"> ○ Orientation shall consider the routing of incoming sewer and force main for ease of maintenance, to minimize effluent turbulence and allow a 5 ton vehicle to pull in forwards or backwards directly to the wet well. ○ Wet wells shall be cast in place/precast water and gas tight concrete walls with water tight joints meeting ASTM C478-90 ○ Concrete shall be minimum 4000 psi with conshield biocide admixture ○ Wet wells shall have a min. of 10% sloped bottoms to the pump intakes and a smooth finish to avoid excess sludge deposits ○ Well volume shall be calculated by the formula, $V = (Q_p * t) / 4$; V-volume required (gal.), t-min. time of 1 pumping cycle (mins.), Q_p- pump capacity (gpm) ○ Wet wells shall have a 4" minimum diameter air vent with outlet located 1' above the top of the well

<ul style="list-style-type: none"> ○ Wet well and valve vaults shall be separated by at least 1' and have separate entrances ○ The floor drain line from the valve vault connecting to the wet well must prevent gas and liquid from entering the valve vault
<ul style="list-style-type: none"> □ Pumps and motors: <ul style="list-style-type: none"> ○ Station shall contain a minimum of 2 pumps and capable of handling peak flows with 1 pump out of service ○ Pumps shall be non-clog, submersible type capable of passing a 2.5" diameter sphere or greater equipped with automatic flush valve ○ Provide system head curves, pump curves and head calculations ○ Minimum acceptable efficiency of pump at operating point shall be 60% ○ Minimum required horsepower for the motor must be capable of handling the entire range as shown in the pump curve
<ul style="list-style-type: none"> □ Valves: <ul style="list-style-type: none"> ○ Each pump shall have a check valve and an isolation valve downstream of the pump ○ A suitable combination air release valve shall be installed along the force main where the force main would be prone to trapped air
<ul style="list-style-type: none"> □ Force main: <ul style="list-style-type: none"> ○ Size force main to meet the pump capacity with a minimum size of 4" diameter ○ Minimum recommended velocity is 3 fps and velocity shall not be less than 2.5 fps when only the smallest pump is in operation ○ Force main must terminate at a manhole with the top of the pipe matching the water level in the manhole at design flow ○ Install plug valves at every 1000' of force main
<ul style="list-style-type: none"> □ Sewer easements: <ul style="list-style-type: none"> ○ Wastewater easements shall be a minimum of 15' wide for mains with depth up to 10' (or 1.5 x depth if greater than 10') ○ 20' for mains with depths between 10' and 20' ○ 30' easement for mains with depths greater than 20'.
STREET LIGHTS AND SIGNAGE PLAN
<ul style="list-style-type: none"> • All street light poles and luminaries shall conform to City of Celina approved specs.
<ul style="list-style-type: none"> □ Show all stop signs and traffic related signage locations
<ul style="list-style-type: none"> □ Verification of fire hydrant placement relative to street lights and stop signs (3' clear area)
<ul style="list-style-type: none"> □ If symbols are used in plan, provide legend for clarification
<ul style="list-style-type: none"> □ Provide photometric plan (commercial only)
<ul style="list-style-type: none"> □ Residential streets: <ul style="list-style-type: none"> ○ Street lights shall have a maximum spacing of 600' and a minimum spacing of 150'. ○ Street lights shall be located at all street intersections, bends and at mid-block locations if the block length is greater than 600' ○ Street lights shall be located adjacent to stop signs at intersections (but only one per intersection). ○ Cul-de-sacs over 225' in length, measured from centerline of cross street to center point of cul-de-sac, shall have a street light installed at the street intersection and at the beginning of the bulb <ul style="list-style-type: none"> ▪ Street lights shall be located between the sidewalk and the ROW or 1' within the ROW if sidewalk is outside the ROW.

<ul style="list-style-type: none"> ○ Street lights shall be 14' in height when located on/at Collectors or Thoroughfares and 12' when located on residential streets. ○ Poles are to be minimum 4" diameter, fluted with anchor base ○ Consideration shall be made for consistent internal spacing from block to block. ○ Provide a typical street light location detail that meets these requirements.
<input type="checkbox"/> Commercial collectors: <ul style="list-style-type: none"> ○ Street lighting shall be placed in the parkway between the curb and the sidewalk, with spacing not to exceed one 180' and no closer than one hundred fifty feet 150'. ○ Street lighting shall use Full Cutoff, Type 2 Luminaires. ○ Poles are to be round tapered with a maximum height of thirty feet (30') ○ Street lights shall be located at all street intersections and bends.
<input type="checkbox"/> Thoroughfares: <ul style="list-style-type: none"> ○ Street lighting shall be placed in the medians, with spacing not to exceed one hundred eighty feet (180') and no closer than one hundred fifty feet (150') depending on median breaks and intersections. ○ Unless a photometric analysis suggests the use of a different type of luminaire, street lighting shall use Full Cutoff, Type 3 Luminaires on 6LD thoroughfares and Full Cutoff, Type 2 Luminaires on 4LD thoroughfares ○ Poles are to be a max of 30' with type A ground boxes with concrete aprons ○ Street lighting foundations shall be 30" x 96" ○ Street light placement shall be supported by a photometric plan showing the effect of the lighting on the roadway.
TREE SURVEY AND PRESERVATION PLAN
<input type="checkbox"/> Show location of all existing or proposed structures, or building pads as shown on the grading plan and all improvements properly dimensioned and referenced to property lines
<input type="checkbox"/> Show building setback requirements
<input type="checkbox"/> Show existing and proposed site elevations, contours (min. 5-foot intervals) and limits of construction
<input type="checkbox"/> If symbols used in plan, provide legend for clarification
<input type="checkbox"/> Show location of existing or proposed utilities and easements
<input type="checkbox"/> Show location of all protected trees and trees to be removed from the site and the location of all replacement trees
<input type="checkbox"/> Provide columnar table listing of all protected trees by species, location key shown on the plat, diameter breast height (DBH is 4.5' above natural ground level), physical condition of tree, and an indication of whether or not the applicant is proposing to remove that tree. Each column with numeric values shall be totaled.
<input type="checkbox"/> Protected Trees: Only tree species listed on the city's approved plant list which have a diameter of six inches (6") DBH and larger or any individual tree, regardless of species, that has a DBH of thirty (30) inches or greater. The diameter of a multi-trunk tree shall be determined by adding the total diameter of the largest trunk at DBH to one-half the diameter of each additional trunk.
<input type="checkbox"/> Tree Replacement and Planting Requirements: <ul style="list-style-type: none"> ○ If it is necessary to remove protected or feature tree(s), the applicant as condition of approval will be required to replace the tree(s) being removed with trees selected from the list of approved trees on the city's approved plant list. Replacement trees must be a minimum of three (3) caliper inches measured 6" above the root ball when planted. The following replacement rules apply.

- A protected tree(s) measuring six inches (6") through twenty-nine inches (29") DBH will be replaced with caliper inches equal to half the total caliper inches of the tree(s) removed.
- Protected tree(s) measuring thirty inches (30") DBH and larger, if approved for removal, will be replaced with caliper inches equal to the total caliper inches as the tree(s) removed.
- Include note on sheet that states, "The replacement tree must be maintained in a healthy growing condition for a minimum of 2 years after planting.
- A replacement tree shall not be planted within an area such that the mature root zone will interfere with underground public utility lines, and/or where the mature canopy of the tree will interfere with overhead utility lines.
- No tree shall be planted within five (5) feet of a fire hydrant, water or sewer line.
- All replacement trees shall be situated as to not interfere with any visibility, access and maintenance easements.
- Tree replacement credits may be granted to reduce the number of replacement inches required. The following guidelines apply:
 - Preservation credits: Each protected tree saved, that is six (6) inches DBH or greater will earn a credit towards the new trees required as part of a development application. The maximum credit under this provision is 50% of the total required caliper inches on the same tract (lot) of land.
 - Purchase of credits: Tree replacement credits not exceeding 50% of the total replacement inches can also be purchased. Payments of \$100.00 per caliper inch may be paid to the city tree fund. Funds will be used for planting of trees, in locations such as, but not limited to, parks, open space, roadway medians, and along street rights-of-way and other areas within the corporate limits of the city.