CITY OF COLUMBIA - COMMUNITY DEVELOPMENT
BUILDING AND SITE DEVELOPMENT DIV.
SITE/CIVIL PLAN REVIEW CHECKLIST

Site Plan Name: _____
Address: _____
Site Legal Description: _____
Project #: _____ Date Reviewed: _____ Review Engineer: _____

Y | N | N/A (Not Applicable)

---------- Prior to Review ----------

_____ Land Disturbance permit application & $200 fee when disturbance is 1 acre or more.
_____ MDNR Land Disturbance permit (if applicable), with MDNR permit number on cover sheet.
_____ Commercial Permit and Plan Review Application if 1st submittal or Response to Comments form if subsequent submittal.
_____ All Plans signed and sealed by a Professional Engineer licensed in the state of Missouri.

---------- Preliminary Items----------

_____ Review Development Agreement, verify that items mentioned in Development Agreement are included in plans (if applicable).
_____ Review preliminary plat and final plat.
_____ Review conceptual stormwater management plan (if applicable).
_____ If Planned Development (PD) zoning, review ordinances for any stipulations attached to the project.

---------- Plan Requirements ----------

Cover Sheet

_____ Developer/Owner's name, mailing address and telephone number.
_____ Survey Benchmark tied to City datum.
_____ Legal description of lot/property.
_____ Note that adjoining property owners must be notified in writing 30 days prior to construction.
_____ Vicinity Map not less than 1" = 1 mile. Must have sufficient landmarks to locate the site.
_____ Table showing impervious area of the site (pre and post development).
_____ Index of sheets.
_____ Project Title.
_____ Utility company contact information and One Call phone number.
_____ Zoning district of property.
_____ Legend of line types and symbols.
_____ If property is not located within the regulated floodplain, the following note should be provided:
This tract is not located within a Flood Hazard Zone as defined in City Ord. 29-2.3(d)(4), per the Boone County FIRM Panel #_____, dated 4/19/17.
_____ If the property does not contain a stream buffer provide the following statement:
This tract is not regulated by the City of Columbia Stream Buffer ordinance as determined by the USGS map for this area, and Article X of Chapter 12A of the City of Columbia Code of Ordinances.
_____ Provide a General note which reads as follows:
In order to terminate a state operating permit the Missouri Department of Natural Resources (MDNR) requires that the permittee submit a completed Form H (included with the approved permit) to the MDNR. A permit is eligible for termination when either perennial vegetation, pavement, buildings, or structures using permanent materials cover all areas that have been disturbed. Vegetative cover shall be at least 70% of fully established plant density over 100% of the disturbed area. A copy of Form H should be submitted to the City at which time the City will remove the project from its inspection schedule.
_____ Provide a General note which reads as follows:
Land disturbance sites shall be inspected on a regular schedule and within a reasonable time period (not to exceed 48 hours) following heavy rains. Regularly scheduled inspections shall be at a minimum of once per week. Any deficiencies shall be noted in a weekly report of the inspection and corrected with seven calendar days of the report. Contractors are required to submit to City inspection staff copies of their inspection reports required by the Stormwater Pollution Prevention Plan (SWPPP) on a monthly basis if requested.

Title blocks

_____ Project Name; Address (or site location if no address has yet been assigned); Sheet numbers; Date (and any subsequent revision dates); Plan type (i.e. Land Disturbance, Site Plan).

General

_____ North arrow and scale on each sheet of plans.
_____ Profile stationing generally to read left to right.
_____ Dimensions of lot boundary including bearings and angles.
_____ Does site meet current definition of "lot"? Site must be on a legal lot before issuance of any permits or licenses, per Ordinance 29-5.2(b)(1).
_____ All existing and proposed easements on or adjacent to the development must be shown. Limit lines, easement types & widths required, along w/ legal reference (book & page) for all existing easements.
_____ All existing utility locations with labels.
_____ Utilities to be relocated, with proposed locations and labels.
_____ Tracer wire test stations for new sanitary sewer connections.
_____ No items of work "by others" on plans with the exception of retaining walls.
_____ Retaining walls with a height of 4 feet or greater (measured from bottom-of-footing to top-of-wall), or that support a surcharge, require a submittal of detailed plans and calculations, sealed by a Missouri Professional Engineer, demonstrating compliance with IBC 1807.2. (This can be a deferred submittal.) Retaining walls under 4 feet in height do not require this submittal but must still be designed to comply with IBC 1807.2.
_____ Guards are required for drops of 30" or greater and must be called out on site plans. If no detail is shown, then all the requirements of I.B.C. 1015 must be listed. These include but are not limited to location required, strength/attachment requirements, height, opening limitations.
_____ For any retaining walls, the engineer who designs the wall shall provide a statement of whether a global stability analysis is required.
_____ Show limits of regulated floodplain (if applicable).
_____ Show limits of Stream Buffer (if applicable).
_____ Proposed easements: descriptions with exhibits to be submitted for checking by City Surveyor.

Right of way

_____ Existing & proposed street names, right-of-way lines & widths ("Variable" width unacceptable).
_____ Right of Use required for retaining walls, signs, etc. proposed in City right of way.

---------- **Site and Dimension Plans** ----------

_____ Scale: 1"=50' or larger.
_____ Building to be dimensioned from the property line.
_____ All Building setback lines on the site.
_____ All paved areas dimensioned.
_____ All curb types/ locations indicated.
_____ Curb return radii dimensioned.
_____ Intra-site location map or match lines where plans stretch across multiple sheets.
_____ Pavement Marking Plan (Temporary and Permanent).
_____ Drive entrances to public streets.
    _____ Width labeled.
    _____ Concrete driveway in conformance with City standards.
    _____ No curb radii shown.
    _____ Sufficient spot elevation callouts to determine that the drive entrance meets ADA/ City specifications.
_____ Standard Details.
    _____ Adequate notes provided indicating each City standard detail number needed on the project and a general note indicating that the contractor is required to have a copy of the City's latest edition of the Street and Storm Sewer Specifications and Standards on site at all times during construction.

-OR-

    _____ All applicable City standard details provided in the approved set of site plans. Details must include the City's title block indicating the revision date and detail number.

---------- **Grading Plan** ----------

_____ Scale (1"=50' or larger) and north arrow.
_____ Existing/Proposed elevation contours at no more than 2 foot interval.
_____ Grading Limits.
_____ Ground Slopes - Maximum ground slope is 3H:1V, unless a long-term slope stability analysis performed by a qualified professional engineer licensed in the state of Missouri indicates an acceptable factor of safety. Fill slopes set back at least 12 in. from any property line.
_____ Spot elevation callouts, high points, and low points as needed.
_____ Low finished floor elevation for each proposed structure.
_____ Ensure adverse impact will not occur on adjacent sites, and no grading (or other work) on adjacent properties without written permission.
_____ Demonstrate compliance with Ordinance12A-71, regulating soil stockpiles. At a minimum list the ordinance requirements and their applicability to this site. A designated location for the stockpile would be preferred.

-------- **Stormwater Management Plan, Drainage Map, and Calculations (Ord. 12A-85 – 12A-95)**--------

_____ Drainage area maps, including all onsite areas and all offsite areas that drain to the site. Scale 1"=100' or larger for onsite areas (smaller scale allowed for large offsite drainages).
_____ Storm drainage system extended appropriately.
- _____ Public vs. Private storm sewer system clearly labeled.
- _____ Public storm sewer system minimizes length under pavement. Pipes should be perpendicular or parallel to street alignment unless otherwise unavoidable.

_____ Existing/Proposed storm sewers.
_____ Storm sewer structures.
- _____ Structure numbers labeled.
- _____ Inverts/top elevations indicated.
- _____ Adequate side clearance for pipes provided.
- _____ Minimum length and width provided.
- _____ Minimum structure depth provided.

_____ Direction of flow on roofs and downspouts.
_____ Drainage Calculations:
- _____ 10% design storm required.
- _____ 1% Storm overflow system provided – per Section 4.7 of the Stormwater Management and Quality (SMWQ) Manual. Cannot cause backwater onto adjacent property for 1% and lesser storm event.
- _____ Must discharge to appropriate downstream drainage system – can't shift, concentrate or increase flow unless adequate storm facilities are available.
- _____ Information provided must be equivalent to Figures 7.3.1 – 7.3.3 of the SMWQ Manual.
- _____ "K" and "C" values match table 2.2.1.1 and 2.2.1.2 of SMWQ Manual.
- _____ Time of Concentration (T_c) based on 100' max overland flow length (Calculations required for T_c > 5 min.)
- _____ Manning's "n" (RCP=.013, HDPE = 0.011, CMP=0.024 typically).

_____ Storm Profiles:
- _____ Profile required for storms pipes with two or more pipe runs.
- _____ Existing/proposed ground line.
- _____ Stationing / Elevation (inverts and top) / Structure numbers.
- _____ Pipe length, diameter, slope and type.
- _____ Pipe orientation for structures with two or more pipes. Max 90^o angle change.
- _____ Structure size and type. No discharging a larger pipe into a smaller one.
- _____ Top of pipe doesn't encroach into inlet throat.
- _____ Adequate vertical drop through the manhole (0.2').

_____ Minimum cover of 12 inches on top of the pipe.
_____ Maximum pipe run of 500 feet between access points.
_____ Minimum pipe slope of 0.4% / Velocity in system between 2 and 15 fps. No appreciable decrease in velocity at inlets, bends, etc.
_____ Design storm Hydraulic Grade Line (HGL) at each structure, for Public system. HGL to be 0.5' below any openings to the ground or street at all locations. (Even if designed for open channel flow, need to demonstrate energy losses haven't pushed it into pressure flow.)
_____ No bends in pipes smaller than 33 inches.
_____ Pipe crown elevations entering a structure above/at crown of existing pipe.

_____ Box Culverts:
_____ Built to MoDOT specifications.
_____ Calculations with headwater and tailwater depths.

_____ Pipes:
_____ Appropriate embedment (per std. details 540.01 or 540.02 for Public system).
_____ Cover not less than manufacturer recommendation or 1', whichever is greater.
_____ Minimum pipe size in public system = 12", 15" under pavement.
_____ Toe walls and Flared end sections.

_____ Outlets:
_____ Grade for positive drainage at outlet.
_____ Flowline indicated for end of pipe and end section.
_____ Adequate outlet protection (per std. detail 530.03 for Public system).

_____ Engineered Channels:
_____ 1% storm completely contained, w/ freeboard of 1' below FFE of structures.
_____ Velocity: max 6 fps (flow depth > 6"); 15 fps or limit of lining (depth < 6").
_____ Lining material – permissible shear stress within limits of Table 5.2.7.1. of SMWQ Manual
_____ Lining height: design storm profile +0.5'. Sideslopes 2.5:1 max or 3:1 max (turf).
_____ Height, width, sideslopes, min. grade, 100-yr WSE shown.

_____ Storm drainage easements to be at least 16 feet wide and centered on pipe. . Document must meet all recording requirements for conveyances as determined by the City's Law Dept.

_____ Tributary areas in non -R-1, R-2 or planned district equivalents must not allow 3,000 square feet of impervious area to drain across sidewalks (or 9,000 square feet of sodded area).

_____ For re-development sites over an acre that have post-development stormwater flows greater than pre-development flows, include a note stating that analysis was performed which indicates that the increase in impervious area resulting from this project will not have any adverse effects on adjoining or neighboring property.

_____ If re-development, follow flowchart, Fig. 6.8.1 of Stormwater Management and Water Quality (SMWQ) Manual.
_____ If re-development, is site upstream of critical area? If yes, contact Stormwater Utility for detention requirements. For small sites, see Guidance dated 5/6/14.

_____ Scaled maps showing pre- and post-development CN areas, and Drainage area maps showing all onsite and offsite areas that drain to each stormwater management BMP. Scale 1"=100' or larger.

Detention -- *Detention Checklist included later in this document.*

Water Quality - Ch. 6.8 of SMWQ Manual: *Individual BMP Checklists included later in this document.*
_____ Pre and Post development CN Calculations.
_____ Level of Service Calculations. Permanent BMP's adequate to meet required LOS.
_____ Cross section provided for any BMP's utilized.
_____ Water Quality volume (WQv) calculated using Sec 2.3 of the SMWQ Manual. For conveyance BMPs, calculate Peak Discharge.

Permanent Access & Buffers for Stormwater Management Facility - Ch. 6.2 SMWQ:

_____ The water surface of the design storage pool minimum 20' from structures, or greater if bldg. foundations or if slope stability is a consideration.

_____ Min. 2' separation between the maximum ponding elevation and the lowest floor of applicable surrounding structures.

_____ Min. 15' wide access strip for maintenance, with access from a street or parking area. Access needed for structures, inlet pipes, outlet pipes, spillways, etc.

_____ Right-of-use agreement needed where a public street crosses top of a permanent dam.

_____ Stormwater Management/BMP Covenant, with inspection schedule and forms. Please send original, executed and notarized document. Document must meet all recording requirements for conveyances as determined by the City's Law Dept.

---------- Erosion and Sediment Control Plan (ordinance 12A-66 – 12A-71)----------

_____ Stormwater Pollution Prevention Plan (SWPPP) is required if disturbed area > 1 acre.

_____ Project Narrative (Ord 12A-68) – Required for all projects needing Land Disturbance Permit.

- _____ Project description, explanation of existing significant problems.
- _____ Factors affecting runoff - existing & post-development.
- _____ Total disturbed area (in acres or sq. feet).
- _____ Limits of Disturbance shown.
- _____ Calc of peak runoff from 10-year freq., 24-hr. duration storm.
- _____ Explanation of selection of BMPs.
- _____ Minimum of 2 rows of silt fence at the toe of all slopes adjacent to a stream.

_____ Initial BMP Installation Plan – temporary erosion control measures (Ord. 12A-70).

- _____ Perimeter control BMPs (sediment fence, etc.)
- _____ Ditch checks – straw bales not effective.
- _____ Protection of inlets.
- _____ Protection of adjacent properties.
- _____ Stabilized Construction entrance.
- _____ Stabilized parking/delivery/staging area.
- _____ Diversion of offsite water around disturbance when feasible.
- _____ Sediment basins (when required).
- _____ Concrete wash out area.
- _____ Other BMP's.

_____ Staged BMP Plan - Provide a separate or staged plan or notes that clearly indicate required erosion control BMPs for each stage of construction, e.g. grading, paving, building const., final stabilization.

_____ Silt Basins–required for common, disturbed drainage areas over 10 ac. (per City's DNR Operating permit.)

- _____ Design information and calculations provided.
- _____ Permanent Emergency Spillway with adequate protection.
- _____ All inflow pipe flowlines above cleanout level.
- _____ Riser pipe size/perforations indicated (when applicable).
- _____ Anti-floatation device size indicated (when applicable).
- _____ Baffles provided when necessary.
- _____ Plan shows ultimate removal of basin with notes regarding basin removal & clean out.

---------- New Public Street or Sidewalk Plans ----------

_____ Street plans meet all City requirements.

_____ Required Sidewalks shown. See Ord. 24-35 and 29-5.1(d).

_____ All Sidewalks & sidewalk ramps per City standards & specifications, with elevation callouts to demonstrate ADA compliance at ramps, across drive approaches, etc.

_____ General note provided which reads as follows:

Contractor is responsible for notifying the BSD Right-of-Way Technician (874-7474), immediately prior to closure of street, during construction for inspections and again when work is complete and street is reopened:

_____ Grading in the public street ROW - Finished grade of ¼ to ¾ inch per foot towards the public street.

_____ Pavement cuts and patches per city standards.

_____ Advisory: Prior to performing any work in City right-of-way or easement, the contractor must obtain a City Right of Way permit, which will include any required Temporary Traffic Control Plans and Pedestrian Traffic Control Plans. (ROW Permit application to be submitted by the contractor when construction schedule and other specifics are known.) All traffic control must meet MUTCD requirements. In addition, a Right-of-Way Closure Permit will be required for all street and/or sidewalk closures per Ordinance 24-41 through 46.

---------- Other Permits (if applicable)----------

_____ MoDOT right-of-way permit required for all work in MoDOT jurisdiction.

_____ Floodplain Development permit required if regulated floodplain encroaches the site (even if outside limits of disturbance). In addition, an Elevation Certificate will be required for any proposed buildings before a Certificate of Occupancy is issued, which includes a post-construction survey.

_____ Work near water ways: provide Corps of Engineers 404 permit or proof that no permit is needed. If 404 is needed, also need US Fish & Wildlife & MDNR Endangered Species clearance.

_____ City of Columbia Right-of-Use for signs, retaining walls, etc. in City ROW.

----------Stormwater Management BMPs – Water Quality----------

Rain Gardens

_____ Maximum contributing area of 1 acre.
_____ Maximum ponding in depressional area of 3 days.
_____ Placement of rain gardens is to be 10 feet away from building foundations.
_____ Soils test to be provided (percolation test).

Bioretention

_____ Pretreatment.
_____ Ponding Area.
_____ Organic Mulch Layer.
_____ Planting Soil Bed - < 10% clay. With sufficient permeability.
_____ Sand Bed.
_____ Plants- detailed planting plan for the specific shape of each basin showing number, species and size of each planting.
_____ Water Level Control Structure.
_____ Side Slopes to be 3:1 or flatter and 25% of perimeter to be 5:1 or flatter.
_____ WQ_v to be filtered through the planting soil in 1-3 days.
_____ Tributary area less than 4 acres.
_____ 1 cleanout per run and every 50 feet or less.
_____ Overflow that safely passes up to and including the 100 year storm event.
_____ Planting depth at least 2.5 feet deep.
_____ Ponding area at least 6 inches deep.
_____ K value to be between 1 and 2.

Pervious Pavement Systems

_____ Water Quality storm infiltrates into soil.
_____ Contributing area to pervious pavement to be less than a 3:1 ratio.
_____ 12 hour drain time used.

Extended Wet Detention

_____ Sediment forebay holding at least 10% of WQ_v and 4-6 feet deep, formed by acceptable barrier.
_____ Permanent pool depths between 4-12 feet.
_____ WQ_v above the permanent pool.
_____ WQ_v to discharge over a period of 40 hours.
_____ Flow path to have a minimum length of three times the facility width, as measured across the center of the facility in the smallest dimension at the permanent pool elevation.
_____ Erosion protection provided at facility's outfall.

Extended Dry Detention Basin

_____ Placed outside of stream corridors and stream buffer zones.
_____ Sized to treat the WQv and discharge over a period of 40 hours.

_____ Sediment forebay that captures 10% of the WQ_v and is 4-6 feet deep.
_____ Basin depth between 2-5 feet for the WQ_v.
_____ Side Slopes to be 3:1 or flatter and 25% of perimeter to be 5:1 or flatter.
_____ 1 foot of freeboard when detaining the WQ_v.
_____ Erosion protection to be provided at facility's outfall.

Turf Swale

_____ Side slopes to be no steeper than 3:1.
_____ Longitudinal slope at least 1%.
_____ Velocity for 2 year storm must not exceed 4 fps or erosive velocity for turf.
_____ Drainage area of 5 acres of less.
_____ Surface storage of WQ_v maximum depth of 18 inches.

----------Stormwater Management BMPs – Detention—(Ch 6.4 - 6.7 of SMWQ Manual)----------

The default detention requirement is Flood Prevention Detention, which is assumed. If Channel Protection detention is selected, need to show applicability and meet requirements of Ch. 6.1.

_____ Detention calculations with inflow / outflow hydrographs of all drainage areas for the 1, 2, 10 and 100 year design storms.
_____ The maximum release rate shall be controlled by limiting the post-development storm water release rates to the predevelopment rates for the 1, 2, 10 and 100 year, 24 hour design storms.
_____ Pre development CN = 78 max.
_____ Ensure proper Time of Concentration (Tc) is used.
_____ Redevelopment projects: If detention reduction is applicable, adjust CN appropriately.
_____ Rate of inflow to the storage facility and all hydrologic considerations must include all tributary areas to the detention basin under existing conditions and fully developed conditions.
_____ Stage-Storage curve.
_____ Stage-outflow curve.
_____ Required detention parameters provided in calculations or on plans:
    _____ Total site area, acres.
    _____ Total area to basin, acres.
    _____ Off-site area to basin, acres.
    _____ Percent impervious of total site, Pre-developed, %.
    _____ Percent impervious of total site, Post-developed, %.
    _____ Percent impervious of area to basin, Post-developed, %.
    _____ Percent impervious of off-site area to basin, Post-developed, %.
    _____ Storage volume at overflow, cf.
    _____ Water elevation at 100-year storm, cfs.
    _____ Orifice type and area, sf.
_____ All designs shall include an emergency or overflow spillway which would pass excess flows greater than those of the 25 year design storms and overflows caused by clogging of the principal outlets. The emergency spillway shall be designed to safely pass the flow resulting from a 100-year frequency, 24-hour duration storm event.
_____ Erosion control on the emergency or overflow spillway.
_____ Cross section of emergency or overflow spillway including 100year storm design capacity, flowline elevation, 100 year design storm WSE, and top of berm elevation
_____ Primary discharge is into an acceptable stormwater conveyance facility.
_____ Proper side slopes per SMWQ Manual.
_____ No detention structures shall be located within a designated 100-year flood plain.
_____ No detention storage facility will be permitted within public street right-of-way without specific written approval from the Director of Public Works.
_____ Orifice Design
    _____ Orifice plate is stainless steel, aluminum, or ASTM A-123 galvanized with stainless steel fasteners, and sealant.
    _____ Accessible trash rack on orifices smaller than 8" diameter.

_____ Outlet orifice not impaired by tailwater.
_____ Orifice plate can fit though access opening for future removal/replacement.

_____ Underground Storage:
- _____ Facility is Vented.
- _____ Adequate access for maintenance/ cleaning of vault and orifice.
- _____ Bearing capacity of subgrade specified.
- _____ All design dimensions, including depths of stone above and below chambers specified.
- _____ Available storage volume calculated.

_____ Cross section of dam including any compaction requirements.

_____ Anti-seep collars – wet pond only.