



**FLOOD CONTROL DETENTION PLAN REVIEW CHECKLIST
November, 2008**

Office Use: Case No: _____
 Review Date: _____
 Reviewer: _____

Detention Plan Review Checklist

This Plan Review Checklist is designed as a tool to assist the design engineer and review engineer in submitting a complete set of plans for detention. This checklist is not intended to be a complete listing of all applicable requirements but is only a collection of the most commonly required items. It is the responsibility of the design engineer to obtain all applicable design standards and use good engineering judgment in preparing construction plans.

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SECTION 1 – DESIGN STANDARDS

The following is a listing of applicable design standards for typical residential subdivisions in Overland Park. Depending on project specific circumstances, other standards may apply:

1.1 Overland Park Municipal Code:

- Chapter 15.10 – Stormwater Management Program – Standards and Permitting
- Chapter 16.210 – Stormwater Treatment

1.2 Other City Standards and Policies:

- Design Criteria – Stormwater Conveyance Facilities – City of Overland Park
- Overland Park Standard Details
- Stormwater Management Studies (ES Policy #3-01)

1.3 Referenced Standards:

- KC Metro APWA Division V – Design Criteria Section 5600 – Storm Drainage Systems and Facilities (APWA 5600)
- MARC and KC Metro APWA Manual of Best Management Practices for Stormwater Quality, March 2008

SECTION 2 – SUBMITTALS

2.1 Initial Submittals

- _____ Two (2) plans submitted on 22" x 36" or 24" x 36" sheets
- _____ Final Stormwater Management Report (sealed) 2 sets (unless previously submitted with other plans)
- _____ Work in Special Flood Hazard Areas – Submit separate application/checklist for a Floodplain Development Permit

2.2 Final Submittals

- _____ Sealed by a Kansas Professional Engineer (At a minimum, original set. Additional sets may be copies.)
- _____ Five (5) full-sized sets for distribution

2.3 Fees paid prior to permitting:

_____ Easement/legal document recording fees – if applicable

SECTION 3 – CONSTRUCTION PLANS

3.1 Cover Sheet

_____ Project title agrees with plat name

_____ Signature Block. Approved By:

Administrator, Engineering Services Division / Date

_____ DET Case Number and related ESR/PRS case number

_____ Index of Sheets

_____ General Location Map

_____ Legal Description (i.e.-Lot#, Tract, or Plat ID)

_____ General Notes

_____ Benchmark Data and datum

_____ Developer/Owner (name/address/phone number)

_____ Utility Contacts and phone #'s

_____ Legend

3.2 Drainage Plan, Map, and Calculations

_____ Scale: 1"=100' or larger for onsite areas (smaller scale allowed for large offsite drainages)

_____ Existing/Proposed Contours shown

_____ All onsite/offsite drainage areas shown
✓ No significant drainage basin shifting allowed

- _____ Storm sewer system extended appropriately:
 - ✓ 2 acres maximum drainage area tributary to first uppermost inlets in system
 - ✓ Extended to undeveloped upstream property lines for future service
 - ✓ Public vs. Private storm sewer system clearly labeled
 - ✓ Public Storm sewer system minimizes length under pavement

- _____ Existing/proposed storm sewers shown

- _____ Storm sewer structures:
 - ✓ Structure Numbers labeled
 - ✓ Stationing shown
 - ✓ Adequate side clearance for pipes (see Inlet Box Sizing Chart)
 - ✓ 4 foot minimum length and width

- _____ Setback curb inlets not allowed adjacent to parking areas

- _____ Private Storm Sewer System Design:
 - ✓ Enclosed system - 10% design storm; Minimum 4% frequency design for cross road pipes and culverts at collectors and thoroughfares
 - ✓ 1% Storm overflow system provided
 - ✓ 7-inch maximum depth in parking lots and private drives (1% storm)
 - ✓ Cannot cause backwater onto adjacent property for 1% and lesser storm event
 - ✓ Must discharge to appropriate downstream drainage system – cannot shift, concentrate, or increase drainage area to adjoining property unless adequate storm sewer facilities are available
 - ✓ Must be constructed to public storm sewer standards

- _____ Drainage Table:
 - ✓ 10% design storm
 - ✓ 1% design storm overflow system (1 ft freeboard required to any building openings)
 - ✓ Tc based on 100-ft maximum overland flow length (Calcs req'd for Tc > 5 min)
 - ✓ Runoff Coefficient "C" conforms with APWA Section 5602.3
 - ✓ Undeveloped areas - Use City "Future Development Plan" land uses to determine future runoff conditions
 - ✓ Pipe System design storm Hydraulic Grade Line (HGL) at each inlet shown – HGL must remain 0.5 ft below bottom of throat opening for design storm.

3.3 Storm Sewer Profiles

- _____ Structures:
 - ✓ Inverts/top elevations indicated
 - ✓ 4-foot minimum length and width
 - ✓ 4-foot minimum structure depth (top to lowest invert out).
 - ✓ Top of pipe doesn't encroach into inlet throat

- ✓ If L+H or W+H >20 feet a structural design required
- ✓ Adequate vertical drop (0.2 ft min for straight through (<22 degrees) flows, 0.5' min for other conditions including multi-inflow pipes, size transitions etc)
- ✓ 8-foot maximum curb inlet width.

_____ Pipe profiles:

- ✓ Profile required for storm sewers with two or more pipe runs
- ✓ Line length, slope, inverts, and top elevations indicated
- ✓ For structures with two or more pipe connections – provide pipe orientation
- ✓ Existing/proposed ground line indicated
- ✓ Minimum cover – 18 inches (APWA 5606.6)
- ✓ Class III RCP or HDPE pipe (24" DIA and smaller only) required (CMP allowed)
- ✓ Cover exceeding 12-feet – Check if Class IV pipe is required for due to earth loads
- ✓ Maximum pipe run length 500 ft (APWA 5604.5)
- ✓ End sections draining into enclosed system include protection grate for 24-inch and larger pipes

_____ Outlets

- ✓ Grade for positive drainage shown
- ✓ Flowline indicated for end of pipe AND end section
- ✓ Outlet protection adequate (see Riprap Design Chart)
- ✓ Last pipe section at minimum slope possible to reduce outlet velocity (3 fps minimum velocity)
- ✓ Discharges to natural streams meets APWA 5605.6 requirements (location/skew etc)
- ✓ Discharges to lakes/ponds at normal pool elevation (no submerged/elevated outlets)

3.4 Detention Site Grading Plan

_____ Scale (1"=50' or larger) and North arrow

_____ Setback requirements:

- ✓ away from Buildings, Property Line, Embankment out of ROW, access path
- ✓ slopes conform with KCAPWA Section 5600 and O.P.M.C. Chapter 16.210

_____ Contour lines:

- ✓ Existing/Proposed shown with different line weights
- ✓ Minimum of 50 feet beyond property line - or as necessary to show drainage patterns

_____ Detention Basin Slopes:

- ✓ Maximum 3:1, if side slopes exceed 5:1 then safety measures shall be provided – including but not limited to fence on all sides.

- ✓ Minimum drainage slopes:
 - Grass areas, 2.5%
 - Asphalt area, 1%
 - Concrete areas, 0.5%
- ✓ Vertical retaining walls may be used if basin is fenced and a means of egress is provided for maintenance. Retaining walls subject to review by Planning and Building Safety Departments.

_____ Dam Embankment fill soil compaction specified.

3.5 Detention Basin Design

_____ Final Stormwater Study and construction plan correspond for:

- ✓ Drainage plans correspond
- ✓ Basin stage-storage on the plans match the final study.
- ✓ Orifice sizes match

_____ Offline detention is provided with no direct discharge into basin. For Water Quality Detention, see KCAPWA/MARC BMP Manual for recommended design.

_____ Primary Discharge is into an acceptable stormwater conveyance facility.

_____ Underground storage:

- ✓ Vented
- ✓ Adequate access for maintenance / cleaning of vault and orifice.
- ✓ Structurally Designed for H-20 loadings.

_____ Wet bottom basins:

- ✓ Minimum depth of 4 feet (10 feet for fish)
- ✓ Erosion control on banks at permanent pool elevation.
- ✓ Provisions for draining pool within 72 hours
- ✓ Private lake agreement required
 - Sediment Forebay sized per KCAPWA Figure 5608-1 and MARC BMP Manual for Wet Extended Detention provided.
 - Aeration provided

_____ Parking lot detention:

- ✓ Maximum depth of 7" in parking lots.
- ✓ Slotted drains fully encased in concrete.

_____ Required detention parameters provided on the plans:

- ✓ Total site area, ac
- ✓ Total area to basin, ac
- ✓ Off-site area to basin, ac
- ✓ 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
- ✓ Release rate, 5-year storm, cfs
- ✓ 5-year Design storm, duration & distribution
- ✓ 100-year Design storm, duration & distribution
- ✓ Orifice type and area, sf

_____ Stage-storage curve provided on the plans

_____ Stage-outflow curve provided on the plans

_____ Inflow and outflow hydrographs

_____ Orifice Design

- ✓ Orifice is correct size
- ✓ 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.
- ✓ Orifice is installed on the outlet pipe of the outlet structure.
- ✓ Outlet orifice not impaired by tailwater.
- ✓ No mechanical devices used.
- ✓ Orifice plate can fit through access opening for future removal/replacement.

_____ Primary Spillway Design is sized to route the 1% storm through the detention basin with one-foot of freeboard to the Auxiliary Spillway.

_____ Auxiliary Spillway Design

- ✓ Auxiliary spillway sized to pass the full 1% storm with one-foot freeboard between spillway WSE and top of berm.
- ✓ Erosion control provided on the auxiliary spillway when velocities exceed 5 fps.

3.6 Detail Sheet(s)

_____ Cross-section of Auxiliary Spillway including 1% storm design capacity, flowline elevation, 1% WSE, and top of berm elevation.

_____ Cross-section of dam including any compaction requirements

_____ Anti-seep collars

3.7 Miscellaneous Items / Other Permits

_____ Easement Submittal:

- ✓ Drainage easements (dedicated to the City of Overland Park):
 - Onsite storm sewer easements to cover those portions of the line not previously dedicated per plat.
 - Offsite storm sewer easements.
- ✓ Temporary construction easements:
 - Easements for offsite construction associated with the project. Provide copy of executed easement or written permission.
- ✓ Recording fees.

_____ Certification of basins required prior to obtaining Certificate of Occupancy.

_____ Final Plat Recorded.

_____ Maintenance Agreement recorded

_____ Other regulatory permits:

- ✓ KDHE Permit (if over 1 acre disturbed). Notify applicant of requirement and obtain copy of permit application.
- ✓ Kansas Department of Agriculture – Division of Water Resources (DWR) – Needed when working in the floodplain or in streams with greater than 240-acre drainage area. A State permit for the dam is required if the dam/impoundment exceeds the following:
 - If the Dam is 25 feet or higher (from toe to top of dam)
 - If the dam is between 6 and 25 feet high AND it impounds 50 acre-feet of water MEASURED AT THE TOP OF DAM
Additionally, a water rights permit is required if the dam impounds >15 acre feet of storage at the PERMANENT POOL
 - Notify applicant of requirement and obtain a copy of the permit application.
- ✓ Verify that COE Section 404 permit requirements have been satisfied (unless already completed with PC development plan approvals). Unless the site has no identifiable streams or drainageways, obtain one of the following:
 - Copy of valid COE Section 404 permit (verify that description and dates are valid).
 - Letter from applicant indicating that no Waters of the U.S. are impacted by proposed construction.
- ✓ Grading in FEMA floodplain – Approved Floodplain Development Permit required prior to issuance of permit. (See policy document – *FLOODPLAIN REGULATION* for more information).
- ✓ Copy of KDOT permit if in state right-of-way.