

APPENDIX A – PERMANENT STORMWATER DESIGN CHECKLIST

PERMANENT STORMWATER DESIGN CHECKLIST	
<ul style="list-style-type: none"> ➤ For New Subdivisions and Commercial/Industrial/Multi-Family Building Sites ➤ Each site will be reviewed only for site specific items 	
Site Address, City Project/Building Permit No.: _____	
Prepared By: _____	Date: _____
Reviewed By: _____	Date: _____

Proposed drainage plan and calculations shall be prepared in accordance with the current City Standards for Volume, Rate, and Water Quality Control as outlined in the City's Land Subdivision Code 11-6-7 DRAINAGE IMPROVEMENTS found at: www.sartellmn.com

GENERAL		
	Yes <input type="checkbox"/>	No <input type="checkbox"/>
1. Proposed drainage plan and hydraulic calculations are dated and signed by a licensed professional.	<input type="checkbox"/>	<input type="checkbox"/>
2. Owner, engineer, and architect name, address, phone and email listed.	<input type="checkbox"/>	<input type="checkbox"/>
3. Plan is to scale. North arrow shown.	<input type="checkbox"/>	<input type="checkbox"/>
4. Size of the project shown:		
• Existing impervious and pervious surface areas of the site.	<input type="checkbox"/>	<input type="checkbox"/>
• Ultimate (when site fully developed) impervious and pervious surface of the site.	<input type="checkbox"/>	<input type="checkbox"/>
• Development schedule: show phasing and calendar year each phase is planned for construction.	<input type="checkbox"/>	<input type="checkbox"/>
5. Plan is drawn in 2-foot contours. Existing contours are dashed and proposed are solid. All contours are labeled and legible. Where applicable, extend existing 2-foot contour lines a minimum 100 feet beyond the site boundary or more to accurately depict the drainage patterns. Elevation tied to NGVD 29 (City benchmark).	<input type="checkbox"/>	<input type="checkbox"/>
6. Existing vegetation: Describe and identify the location of existing vegetation.	<input type="checkbox"/>	<input type="checkbox"/>
7. Areas not to be disturbed clearly defined.	<input type="checkbox"/>	<input type="checkbox"/>
8. On-site soil characteristics; Boundaries of different soil types are described. Groundwater elevations are shown.	<input type="checkbox"/>	<input type="checkbox"/>
9. Existing drainage: Show pre-developed drainage areas, land use and the direction of flow for each area and travel path used to determine the Time of Concentration.	<input type="checkbox"/>	<input type="checkbox"/>
10. Final drainage: Show post-developed drainage areas, land use and the direction of flow for each area and travel path used to determine the Time of Concentration.	<input type="checkbox"/>	<input type="checkbox"/>
11. Identify off-site catchment areas draining to the site. Provide 2-foot contours. Show land use and the direction of flow for each area and travel path used to determine the Time of Concentration.	<input type="checkbox"/>	<input type="checkbox"/>

12. Existing public and private utilities shown.	<input type="checkbox"/>	<input type="checkbox"/>
13. All receiving waters, including wetland, identified.	<input type="checkbox"/>	<input type="checkbox"/>
14. Property limits shown. Streets are labeled. Lot and block information shown if platted. Street address shown if unplatted.	<input type="checkbox"/>	<input type="checkbox"/>
15. A long-term inspection and maintenance plan for all permanent stormwater treatment practices is required to be submitted with the SWPPP following the City's examples.	<input type="checkbox"/>	<input type="checkbox"/>
Comments:		

EROSION/SEDIMENT CONTROL		
	Yes <input type="checkbox"/>	No <input type="checkbox"/>
1. SWPPP notes provided on the plan	<input type="checkbox"/>	<input type="checkbox"/>
2. Temporary stabilization measures provided	<input type="checkbox"/>	<input type="checkbox"/>
3. Erosion control blankets provided on all slopes greater than 3:1	<input type="checkbox"/>	<input type="checkbox"/>
4. Perimeter Control i.e., Silt Fence, Filter Log, etc.	<input type="checkbox"/>	<input type="checkbox"/>
5. Phasing for sites that are ≥ 1 acre	<input type="checkbox"/>	<input type="checkbox"/>
6. CB Inlet Protection	<input type="checkbox"/>	<input type="checkbox"/>
7. Dewatering	<input type="checkbox"/>	<input type="checkbox"/>
8. Sediment control	<input type="checkbox"/>	<input type="checkbox"/>
9. Waste control	<input type="checkbox"/>	<input type="checkbox"/>
10. Concrete washout	<input type="checkbox"/>	<input type="checkbox"/>
11. Rock entrance	<input type="checkbox"/>	<input type="checkbox"/>
12. Street sweeping schedule	<input type="checkbox"/>	<input type="checkbox"/>
13. Permanent restoration plan	<input type="checkbox"/>	<input type="checkbox"/>
14. SWPPP includes an erosion and sediment control inspection schedule and person responsible for maintenance	<input type="checkbox"/>	<input type="checkbox"/>
Comments:		

DRAINAGE SWALES, EASEMENTS, BUILDING LOTS		
	Yes <input type="checkbox"/>	No <input type="checkbox"/>
1. Existing and proposed drainage easements shown and labeled on the plan.	<input type="checkbox"/>	<input type="checkbox"/>
2. All existing and proposed lot corner elevations shown to the nearest tenth of a foot.	<input type="checkbox"/>	<input type="checkbox"/>
3. Control/spot elevations for drainage ways provided.	<input type="checkbox"/>	<input type="checkbox"/>
4. 100-year flow contained in easement.	<input type="checkbox"/>	<input type="checkbox"/>
5. Minimum slope of side lot drainage swales is 2%, direction arrow shown.	<input type="checkbox"/>	<input type="checkbox"/>
6. Minimum back lot drainage swale slope is 1%, direction arrow shown.	<input type="checkbox"/>	<input type="checkbox"/>
7. Building pads, type of house to be built, garage floor elevation, lowest floor elevation and lowest opening elevation are shown.	<input type="checkbox"/>	<input type="checkbox"/>
8. Driveway slope, from garage to the gutter is shown.	<input type="checkbox"/>	<input type="checkbox"/>

9. Lowest opening elevation: min. 2 feet above 100-year HWL, and min. 1 foot above emergency overflow elevation.	<input type="checkbox"/>	<input type="checkbox"/>
Comments:		

STORM DRAIN SYSTEM, INLETS, AND OVERFLOWS		
	Yes <input type="checkbox"/>	No <input type="checkbox"/>
1. Storm drain system design: Rainfall frequency shall be determined by City Engineer.	<input type="checkbox"/>	<input type="checkbox"/>
2. Pipe size, length, grade and material shown.	<input type="checkbox"/>	<input type="checkbox"/>
3. Top of castings and all inverts of catch basins and manholes shown. Label storm drain structures.	<input type="checkbox"/>	<input type="checkbox"/>
4. All apron elevations (inlets and outlets) shown.	<input type="checkbox"/>	<input type="checkbox"/>
5. 450-foot max. manhole spacing.	<input type="checkbox"/>	<input type="checkbox"/>
6. Flow direction change ≤ 90 degrees at junctions is desirable.	<input type="checkbox"/>	<input type="checkbox"/>
7. Apron inlets to storm sewer system include trash guards. Trash guards are optional on true culverts.	<input type="checkbox"/>	<input type="checkbox"/>
8. Discharge direction of flow generally 45 degrees or less to the flow direction of receiving ditch or stream.	<input type="checkbox"/>	<input type="checkbox"/>
9. Discharges to rear property lines shall generally be piped to at least the rear property line.	<input type="checkbox"/>	<input type="checkbox"/>
10. Overflow design to be considered for events greater than storm sewer system design event.	<input type="checkbox"/>	<input type="checkbox"/>
Comments:		

PERMANENT POOLS		
	Yes <input type="checkbox"/>	No <input type="checkbox"/>
1. Entire drainage/service area shown (in the report).	<input type="checkbox"/>	<input type="checkbox"/>
2. Grading plan with pond cross section. All apron elevations (inlet and outlet shown).	<input type="checkbox"/>	<input type="checkbox"/>
3. Hydraulic calculations for ponding provided. 100-year high water level shown. and normal water level shown.	<input type="checkbox"/>	<input type="checkbox"/>
4. Where possible, provide a forebay at the inlet; locate inlet and outlet at opposite ends of pond; and provide length to width ratio 3:1.	<input type="checkbox"/>	<input type="checkbox"/>
5. Multi-cell design where practical.	<input type="checkbox"/>	<input type="checkbox"/>
6. 10:1 bench is provided for first 1 foot of depth below normal water elevation.	<input type="checkbox"/>	<input type="checkbox"/>
7. Buffer zones, pond slopes, pond depth as per City of St. Cloud Engineering Department Standard Plate "Vegetated Buffer Area for Wet Ponds".	<input type="checkbox"/>	<input type="checkbox"/>
8. The permanent pool must reach a minimum of 3 feet, stay below 10 feet, and be configured to minimize scour and re-suspension of solids. Vegetation and slope stabilization methods are subject to City's approval.	<input type="checkbox"/>	<input type="checkbox"/>
9. Outlet is designed to prevent short-circuiting and discharge of floating debris.	<input type="checkbox"/>	<input type="checkbox"/>
10. Permanent pool volume 1,800 cf per acre drained (minimum).	<input type="checkbox"/>	<input type="checkbox"/>

11. Outlet sized to discharge water quality volume at no more than 5.66 cfs/acre of pond surface area.	<input type="checkbox"/>	<input type="checkbox"/>
12. Energy dissipation on outlet piping.	<input type="checkbox"/>	<input type="checkbox"/>
13. Emergency overflow spillway is provided to accommodate storms greater than the 100-year event. High point elevation and direction of overflow are marked on plans. Top of berm is 1 foot above emergency overflow spillway.	<input type="checkbox"/>	<input type="checkbox"/>
14. Emergency overflow spillway is located to protect adjacent property and large fill sections.	<input type="checkbox"/>	<input type="checkbox"/>
15. Minimum 10-foot width at top of berm.	<input type="checkbox"/>	<input type="checkbox"/>
16. 12-foot wide access and turn-around area for maintenance vehicles is shown on a slope $\leq 15\%$, cross slope $\leq 6\%$.	<input type="checkbox"/>	<input type="checkbox"/>
17. Pond access is included in a min. 15-foot wide portion of the pond outlet. If access is in an easement across private property, a 12-foot wide access road is provided.	<input type="checkbox"/>	<input type="checkbox"/>
18. Ponds shall not be located in a wetland unless mitigated for.	<input type="checkbox"/>	<input type="checkbox"/>
19. Minimum horizontal distance between a water supply well and the ordinary high water level of a pond is 35 feet	<input type="checkbox"/>	<input type="checkbox"/>
20. As part of the drawing set submittal, provide in table form the following information:		
• Elevation of normal water level (NWL).	<input type="checkbox"/>	<input type="checkbox"/>
• Elevation of 100-year high water level (HWL), with respective discharge rate.	<input type="checkbox"/>	<input type="checkbox"/>
• Elevation of water quality water level, with respective discharge rate, and pond water surface in sq. ft.	<input type="checkbox"/>	<input type="checkbox"/>
• Sediment storage volume (for sediment accumulation during construction and 20 years thereafter).	<input type="checkbox"/>	<input type="checkbox"/>
Comments:		

INFILTRATION/FILTRATION		
	Yes \checkmark	No \checkmark
1. Refer to the Minnesota Stormwater Manual. for specific infiltration/filtration practices.	<input type="checkbox"/>	<input type="checkbox"/>
2. Infiltration systems shall meet volume control standards as set by the City. Filtration systems shall achieve approximately 80% removal of total suspended solids.	<input type="checkbox"/>	<input type="checkbox"/>
3. Infiltration or filtration systems should not be excavated to final grade until the contributing drainage area has been constructed and fully stabilized.	<input type="checkbox"/>	<input type="checkbox"/>
4. During construction of infiltration or filtration systems, rigorous erosion prevention and sediment controls (e.g. diversion berms) should be used to keep sediment and runoff completely away from the infiltration or filtration area. The area must be staked off and marked so that heavy construction equipment will not compact the soil in the proposed infiltration or filtration area.	<input type="checkbox"/>	<input type="checkbox"/>

5. A pretreatment device such as a vegetated filter strip, small sedimentation basin, or water quality inlet (e.g. grit chamber) is required before the stormwater discharges into the infiltration or filtration system. The Minnesota Stormwater Manual and Minimal Impact Design Standards (MIDS) shall be used when sizing and designing pre-treatment.	<input type="checkbox"/>	<input type="checkbox"/>
6. Pre-treatment sumps shall have a minimum 3 foot sump depth.	<input type="checkbox"/>	<input type="checkbox"/>
7. Area to be infiltrated or filtrated shall be delineated on plans.	<input type="checkbox"/>	<input type="checkbox"/>
8. Calculations or computer model results that demonstrate the design adequacy of the infiltration or filtration system must be included as part of the SWPPP.	<input type="checkbox"/>	<input type="checkbox"/>
9. The water quality volume shall discharge through the soil surface or filter media in 48 hours or less. Additional flows that cannot be infiltrated or filtered in 48 hours should be routed to bypass the system through a stabilized discharge point. A way to visually verify that the system is functioning as designed must be provided.	<input type="checkbox"/>	<input type="checkbox"/>
10. Appropriate on-site testing is required and must be consistent with the recommendations in the Minnesota Stormwater Manual. Testing shall be conducted to verify soil types, infiltration capacity characteristics, and to ensure a minimum of 3 feet of separation from the seasonally saturated soils (or from bedrock) and the bottom of the proposed infiltration system.	<input type="checkbox"/>	<input type="checkbox"/>
11. Adequate maintenance access must be provided (typically 12 ft. wide)	<input type="checkbox"/>	<input type="checkbox"/>
12. Provide scaled drawing of infiltration or filtration BMP, with typical detail and typical cross section. Outline area which runoff is directed to the BMP. As part of the drawing set submittal, provide in table form the following information:		
• For Infiltration BMP:		
a) Runoff volume directed to infiltration BMP in cu. ft.	<input type="checkbox"/>	<input type="checkbox"/>
b) Storage volume of infiltration BMP in cu. ft.	<input type="checkbox"/>	<input type="checkbox"/>
c) Time of infiltration in hours (must be <input type="checkbox"/> 48 hours).	<input type="checkbox"/>	<input type="checkbox"/>
d) Separation in feet between the ground water table and the bottom of BMP (must be min. 3 feet).	<input type="checkbox"/>	<input type="checkbox"/>
• For Filtration BMP:		
a) Runoff volume directed to filtration BMP in cu. ft.	<input type="checkbox"/>	<input type="checkbox"/>
b) Percent of TSS reduction level.	<input type="checkbox"/>	<input type="checkbox"/>
c) Time of filtration in hours (must be <input type="checkbox"/> 48 hours).	<input type="checkbox"/>	<input type="checkbox"/>
Comments:		

INFILTRATION PROHIBITIONS AND RESTRICTIONS		
	Yes <input type="checkbox"/>	No <input type="checkbox"/>
1. Infiltration is prohibited when the infiltration BMP will receive discharges from, or be constructed in areas:		
• Where industrial facilities are not authorized to infiltrate industrial stormwater under an NPDES/SDS Industrial Stormwater Permit issued by the MPCA;	<input type="checkbox"/>	<input type="checkbox"/>
• Where vehicle fueling and maintenance occur;	<input type="checkbox"/>	<input type="checkbox"/>

<ul style="list-style-type: none"> With less than three (3) feet of separation distance from the bottom of the infiltration system to the elevation of the seasonally saturated soils or the top of bedrock; 	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> Where high levels of contaminants in soil or groundwater will be mobilized by the infiltrating stormwater; 	<input type="checkbox"/>	<input type="checkbox"/>
2. Infiltration is restricted unless higher engineering review provides sufficient information that the treatment system can function properly and prevent adverse impacts to groundwater when the infiltration system will be constructed in areas:		
<ul style="list-style-type: none"> With predominately Hydrologic Soil Group D (clay) soils; 	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> Within 1,000 feet up-gradient, or 100 feet down-gradient of active karst features; 	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> Within a Drinking Water Supply Management Area (DWSMA) as defined in Minn. R. 4720.5100, subp. 13.; 	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> Where soil infiltration rates are more than 8.3 inches per hour. 	<input type="checkbox"/>	<input type="checkbox"/>
Comments:		

ALTERNATIVE VOLUME REDUCTION AND TREATMENT PRACTICES		
	Yes ✓	No ✓
1. Must follow requirements and recommendations in the MN Stormwater Manual.	<input type="checkbox"/>	<input type="checkbox"/>
2. Full calculations and plans included (narrative in drainage report).	<input type="checkbox"/>	<input type="checkbox"/>
Comments:		

BETTER SITE DESIGN/LOW IMPACT DEVELOPMENT		
	Yes ✓	No ✓
1. Green Infrastructure techniques and practices (including, but not limited to, infiltration, evapotranspiration, reuse/harvesting, conservation design, urban forestry, green roofs), shall be given preference as design options consistent with zoning, subdivision and PUD requirements.	<input type="checkbox"/>	<input type="checkbox"/>
2. Additional low impact development design features shall be considered and indicated on the plans such as preserving natural areas, site reforestation, stream and shoreline buffers, soil compost amendments, disconnecting of surface impervious cover, and stormwater landscaping.	<input type="checkbox"/>	<input type="checkbox"/>
Comments:		