

STORMWATER REVIEW CHECKLIST

Development Name: _____	Date: _____
Location: _____	Reviewed By: _____

CONCEPT REVIEW MEETING

The following information must be provided at a minimum:

		<u>Provided/ Satisfactory</u>	<u>Comments</u>
1.	Location map (include sections and watershed or drainage district boundaries).	<input type="checkbox"/>	_____
2.	Acreage of the total site and acreage of disturbed area, including proposed percent impervious.	<input type="checkbox"/>	_____
3.	Description proposed development and location of proposed activities impacting stormwater and drainage both on and off the site.	<input type="checkbox"/>	_____
4.	Conceptual layout of proposed stormwater management system, if known.	<input type="checkbox"/>	_____

PRELIMINARY PLAT OR SITE PLAN DRAWINGS

The following information shall be included on all preliminary plats or site plans submitted for approval. Sheets shall be no larger than 24" x 36" at a scale no smaller than 1" = 100' and prepared by a professional engineer or surveyor licensed in the State of Michigan.

		<u>Provided/ Satisfactory</u>	<u>Comments</u>
General			
1.	Development name/subdivision number.	<input type="checkbox"/>	_____
2.	Name, address, and telephone number of Developer.	<input type="checkbox"/>	_____
3.	Name, address, telephone number, email, signature, and seal of the Design Engineer (and/or surveyor).	<input type="checkbox"/>	_____
4.	Description of location (section and fractional portion thereof; town and range; township, city or village; county; state).	<input type="checkbox"/>	_____
5.	Location map.	<input type="checkbox"/>	_____
6.	North arrow, scale and legend.	<input type="checkbox"/>	_____

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Site Layout

- 7. Number of acres to be developed. _____
- 8. Development boundary with legal property description tied to government corners. _____
- 9. Identification of all adjoining parcels (for subdivisions show address, lot number, subdivision name, liber, and page numbers; for metes and bounds parcels show address and permanent parcel number). _____
- 10. Lot layout with dimensions and lot numbers. _____
- 11. Building setback lines. _____
- 12. Roadway layout (e.g. streets, alleys, non-motorized pathways). _____

Easements

- 13. Utility easements with dimensions, type of utility, and recording liber and page. _____
- 14. Existing drainage easements with name of grantee, dimensions, and recording liber and page. _____
- 15. Proposed drainage easements with name of grantee and dimensions. _____

Soils

- 16. Soil type(s) from County Soil Survey. _____
- 17. Soil borings indicating ground elevation and water table elevations. _____
- 18. Areas of known contamination. _____

Existing and Proposed Site Features

- 19. Existing and proposed contours (no greater than 2' interval inside the plat; no greater than 10' interval outside the plat). _____
- 20. Existing and proposed buildings (label those under construction with address). _____
- 21. Existing and proposed roads with name, right-of-way width, and ownership (public or private). _____
- 22. Location and description of any other onsite and adjacent offsite utilities or features that may be relevant to the site plan (e.g. railroads, high tension power lines, underground transmission lines, sanitary sewers, water mains, septic fields, wells, cemeteries and parks). _____

STORMWATER REVIEW CHECKLIST

Drainage

- | | | | |
|-----|---|--------------------------|--|
| 23. | Existing watercourses and waterbodies on or adjacent to the development. | <input type="checkbox"/> | |
| 24. | County, municipal, MDOT and private drains (permission required to connect). | <input type="checkbox"/> | |
| 25. | Limits and elevation of 100-year floodplain. | <input type="checkbox"/> | |
| 26. | Wetland boundaries with determination date and company. | <input type="checkbox"/> | |
| 27. | Riparian buffers, natural flow pathways, and other sensitive areas. | <input type="checkbox"/> | |
| 28. | Existing ditches, culverts, storm sewer, drainage structures and stormwater BMPs (with labeling as to type, size, rim and invert elevations). | <input type="checkbox"/> | |
| 29. | Proposed drainage system (clearly identify all open and enclose portions). | <input type="checkbox"/> | |
| 30. | Preliminary layout of proposed stormwater BMPs. | <input type="checkbox"/> | |
| 31. | Ownership of proposed drainage system. | <input type="checkbox"/> | |
| 32. | Stormwater runoff discharge location(s) from the site, including roof water. | <input type="checkbox"/> | |

CONSTRUCTION DRAWINGS

The following additional information shall be included on all construction drawings submitted for approval. Sheets shall be no larger than 24" x 36" at a scale no smaller than 1" = 50' and sealed by a professional engineer licensed in the State of Michigan. A final set of approved drawings, updated with date in revision block, must be received before written approval will be granted.

- | | | <u>Provided/
Satisfactory</u> | <u>Comments</u> |
|----|--|-----------------------------------|-----------------|
| 1. | Benchmark locations and elevations. | <input type="checkbox"/> | |
| 2. | Plans, profiles, cross-sections, and details of all roads, storm sewers, footing drain laterals, open channel drains and other stormwater BMPs. | <input type="checkbox"/> | |
| 3. | Details of storm sewer and culverts: numbering of manholes/catchbasins; invert and casting elevations; pipe length, diameter, material, slope, class or gauge, joints; special backfill and bedding; inlet/outlet protection; profile of the hydraulic grade line. | <input type="checkbox"/> | |
| 4. | Details of outlet control structures including a scaled detail with dimensions, elevations and hydraulic information matching calculations. | <input type="checkbox"/> | |

STORMWATER REVIEW CHECKLIST

		<u>Provided/ Satisfactory</u>	<u>Comments</u>
5.	Lot grading plan (detail, statement, or drainage arrows).	<input type="checkbox"/>	_____
6.	Minimum opening and basement elevation for each lot.	<input type="checkbox"/>	_____
7.	A soil erosion and sedimentation control plan with minimum measures and proposed staging.	<input type="checkbox"/>	_____
8.	Protected sensitive areas, minimal disturbance areas and other “non-structural” BMPs.	<input type="checkbox"/>	_____
9.	Location of all proposed drain fields. (Drain fields shall comply with isolation distance requirements.)	<input type="checkbox"/>	_____
10.	Contaminated soil and groundwater procedures (if required).	<input type="checkbox"/>	_____
11.	Recorded liber and page of easements obtained for the site development.	<input type="checkbox"/>	_____

MAINTENANCE ASSURANCE

The Design Engineer shall incorporate considerations for access, operation and maintenance into the design of all stormwater BMPs to ensure the stormwater management system can be readily maintained. Specific minimum requirements are included on individual BMP design criteria sheets. The following information must be shown on the construction drawings, and clearly identified on Exhibit B of the maintenance plan (if one is required):

		<u>Provided/ Satisfactory</u>	<u>Comments</u>
1.	Identified access routes for trucks and maintenance equipment, including fences and gates.	<input type="checkbox"/>	_____
2.	Proper siting, sizing and design of BMPs for accessibility (e.g. outlet control structure access during flood event, steps, turning room, cleanouts, etc.).	<input type="checkbox"/>	_____
3.	Design of BMP elements to minimize amount of maintenance required (e.g. filters on small orifices, design of trash racks to facilitate debris removal, etc.).	<input type="checkbox"/>	_____
4.	Design details to illustrate maintenance features (e.g. removable grates or rails, locks, access platforms, etc.).	<input type="checkbox"/>	_____
5.	Identified areas for staging and temporary spoil disposal.	<input type="checkbox"/>	_____

STORMWATER REVIEW CHECKLIST

DESIGN CALCULATIONS

Completed by a professional engineer licensed in the State of Michigan.

Submit initial design calculations with preliminary submittal (if any). A full set of design calculations shall be submitted with construction drawings. A final set of approved calculations, updated with date, must be received before written approval will be granted.

		<u>Provided/ Satisfactory</u>	<u>Comments</u>
1.	LGROW Design Spreadsheet (PDF and XLSX), or completed Stormwater Worksheet.	<input type="checkbox"/>	_____
2.	A drainage map that clearly shows topography, subcatchment boundaries, acreages and flow paths of tributary areas to each point of discharge from the development, including tributary areas originating outside of the development. Also identify tributary areas to inlets, culverts, and other storm water BMPs.	<input type="checkbox"/>	_____
3.	Calculations of peak discharge for a range of storms up to and including the 100-year storm for any natural water courses and/or county drains passing through the proposed development, including area of upstream watershed.	<input type="checkbox"/>	_____
4.	Normal, design and 100-year water elevations, including overland flow routes shown on the drainage map.	<input type="checkbox"/>	_____
5.	Documentation and/or calculations required to demonstrate an adequate outlet, including the dimensions/sizes and locations of upstream and downstream drainage routes and infrastructure.	<input type="checkbox"/>	_____
6.	Calculations of stormwater rates and volumes for each point of discharge or treatment train for pre-development and post-development conditions for the design storms.	<input type="checkbox"/>	_____
7.	BMP design calculations.	<input type="checkbox"/>	_____
8.	Groundwater mounding calculations (when required).	<input type="checkbox"/>	_____
9.	Design summary report, including at a minimum: description of stormwater management plan for the site, identified contributing areas with land cover types, soils and runoff coefficients, times-of-concentration, runoff volumes, peak discharges, design high water levels, sewer hydraulic grade line, required storage volumes, and volumes provided.	<input type="checkbox"/>	_____

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CONSTRUCTION RECORD DRAWINGS

Sealed by a professional engineer licensed in the State of Michigan.

A final set of drawings, updated and marked “issued for construction record” with date in revision block, must be received before release of any security on deposit.

	<u>Provided/ Satisfactory</u>	<u>Comments</u>
1. Horizontal location of all drainage structures and footing drain connection points relative to a coordinate point or lot corner. Alternately, locations may be shown by road stationing with offsets.	<input type="checkbox"/>	
2. Final grading and volume of all detention/retention facilities and integrated BMPs with verification that they meet or exceed approved storage and infiltration capacities.	<input type="checkbox"/>	
3. Pipe inverts, length and slope, manhole and catch basin rims, top of berm, and spillway elevations.	<input type="checkbox"/>	
4. Details of inlet structures (including opening areas and elevations.)	<input type="checkbox"/>	

GIS DIGITAL SUBMISSION REQUIREMENTS

Required for final plats and construction record drawings.

1. All files must be submitted in Drawing Exchange Format (DXF).
2. All submitted files must be zipped to ensure they arrive intact.
3. Email or compact disc are acceptable ways to receive files.

Technical Requirements:

1. All lines must be snapped closed (no dangles, overstrikes, or understrikes).
2. Layers must have a reasonable label of what can be found on each layer.
3. The following separate layers must be included:
 - a. Lot Numbers.
 - b. Lot Lines.
 - c. Lot Dimensions.
 - d. Right-of-Way Dimensions.
 - e. Right-of-Way Names.
 - f. Subdivision Boundaries.
 - g. Water/Storm/Hydrants/Sewer Lines/Culverts.
 - h. Easements.
 - i. Easement Dimensions.
 - j. Contours.
 - k. Any other features of value in determining overall drainage requirements.
4. Lot and right-of-way dimension layers must have nothing more than leaderlines.
5. Hatching must be on one layer with no other items.
6. Layout design and any tables must be in one layer.