VILLAGE OF DEXTER
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# ENGINEERING CHECKLIST FOR FINAL SITE PLANS

## General Requirements

- ☐ Submittal on 24" x 36" white paper having blue or black lines with a minimum horizontal scale of 1 inch = 50 feet and vertical of 1 inch = 5 feet. Other acceptable scales are 1 inch - 20 feet, 1 inch = 30 feet and 1 inch = 40 feet.
- ☐ General plan at 1 inch = 100 feet or 1 inch = 200 feet when size of site prohibits a single plan sheet. Show street names, units, utilities, pavement, site dimensions, phase lines, lot lines and lot numbers.
- ☐ Location map showing section number and major thoroughfares.
- ☐ Legal description of property, including lot number or sidwell number, parcel dimensions and adjoining rights-of-way.
- ☐ Village of Dexter standard notes, including water, sewer, storm and landscaping.
- ☐ Plans must be signed and sealed by a professional engineer registered in the State of Michigan. All correspondence concerning the design of the site will be directed to the engineer whose seal appears on the plan.
- ☐ Name, address and phone number of engineer/architect, owner and the applicant, if different from the owner. Owner's signed consent for application if the applicant is not the owner.
- ☐ Title block for each sheet with a summary of each particular sheet.
- ☐ Zoning classification of the property, location of required yards, total ground floor area and lot coverage (percent) and floor area ratio. For residential units, the plan will note the dwelling unit density, lot area per dwelling unit, and a complete schedule of the number, size and type of dwelling units.
- ☐ Owner, use and zoning classification of adjacent properties, location and outline of buildings, drives, parking lots and other improvements on adjacent properties.
- ☐ Location and exterior dimensions of proposed buildings and structures, within the location referenced to property lines or a common base point. Distances between buildings, height in feet and stories, first floor, finished grade and brick ledge elevations.
- ☐ Location and dimensions of proposed parking lots, numbers of spaces in each lot, zoning requirements for parking, dimensions of spaces and aisles.
- ☐ Locations of proposed trash container enclosures, size, typical elevation, and vertical section of enclosures showing materials and dimensions.
- ☐ Location and type of proposed screens and fences, including height, typical elevation and vertical section showing materials and dimensions.
- ☐ Location, type, size, area and height of proposed signs.

- [ ] Location, type, direction and intensity of outside lighting.
- [ ] Location and size of proposed improvements of open spaces and recreation areas, and maintenance provisions for such areas.
- [ ] Landscape plan showing location, size of plant materials, and standard notes.
- [ ] Walls or berms, as required by zoning, must be shown in cross-section. Walls separating a grade differential of more than 18 inches are considered retaining walls and require a structural engineering design and review. Design engineer must supply calculations with engineering plan submittal.
- [ ] The storm sewer, sanitary sewer and water main will be shown on the same plan view.
- [ ] Plan and description of measures to control soil erosion and sedimentation during grading and construction operations until a permanent ground cover is established.
- [ ] A traffic study must be provided to the Village Engineer for review. Exceptions will be only allowed with written permission from the Village Engineer.

**Topographical Survey**

- [ ] Show USGS Benchmark, (minimum of two). All elevations must be on USGS Datum.
- [ ] Property lines showed by bearing and distance.
- [ ] Existing natural conditions, including trees, wooded areas, streams, marshes, ponds, and other wetlands. Clear indication of all natural features to remain and to be removed. All trees 8 inches in diameter or larger will be accurately located on the final site plan and labeled as to be either preserved or removed. Replacement requirements should be noted.
- [ ] Existing offsite elevations at a minimum of 50 feet and 100 feet around the property.
- [ ] Elevations at property corners and along property lines and sufficient onsite elevations or contours to establish site drainage.
- [ ] Existing improvements shown. Any buildings, structures and other improvements, including drives, ditches, culverts, bridges, utilities (invert and casting elevations), sidewalks, utility poles and towers, easements, pipelines and finish grade of adjacent buildings. Clear indication of all improvements to remain and to be removed.
- [ ] Show existing adjacent roads with both existing right-of-way and future right-of-way per the Master Plan. Grades must be shown at ditch centerline, top of bank, edge of shoulder, edge of pavement or top of curb and pavement centerline. Grades must be shown on both sides of road.

**Water Main**

- [ ] Standard notes and details included, (final submittal).
- [ ] A quantity list and basis of design must be shown on the plan.
- [ ] Minimum size water main is 8 inches. Maximum dead-end main lengths are 40 feet for a 6-inch fire hydrant lead, 450 feet for an 8-inch main, 1000 feet for a 12- inch main. All mains must end with a gate valve then a hydrant or blow-off.

- [ ] Show water service and size. No private services allowed from a 6-inch hydrant lead or mains over 16 inches in diameter.
- [ ] Where water main is next to the right-of-way, a water main easement must be extended across the front or to a property line as directed by the Village Engineer.
- [ ] Profiles are required on all water mains. Include the following information:
  - [ ] Length, size, type, and class of pipe.
  - [ ] Top of casting elevation on gate wells.
  - [ ] Special backfill areas, i.e., sand.
  - [ ] Utility crossings.
  - [ ] Existing and proposed ground elevations.
- [ ] Minimum 10-foot horizontal separation between the water main and sanitary or storm sewer.
- [ ] Minimum 18-inch clearance between water main and storm or sanitary sewer. Top of water main and sewer invert indicated.
- [ ] Pipe size, length and type shown in plan view. Ductile iron water main shall be standard wall thickness class 54.
- [ ] Tapping sleeve and valve used to connect to existing mains unless connection can be made without interrupting service on the main.
- [ ] Minimum 12-foot-wide easement must be shown on the plans.
- [ ] Valve spacing: In case of a breakage, three valves to isolate break, four maximum, no more than two hydrants out of service; no more than 30 single family units or 30 multiple units out of service. For major commercial and industrial developments, building service must be maintained from a looped system with valves and wells on either side of the building service.
- [ ] Hydrant spacing: see Hydrant Coverage.
- [ ] No parking within 10 feet of a hydrant.
- [ ] Fire Department will comment on hydrant locations.
- [ ] Plan must conform to Fire Department Guidelines.

**Sanitary Sewer**

- [ ] Standard notes and details included.
- [ ] Quantity list and basis of design data must be shown on plan.
- [ ] Where sanitary sewer is next to the right-of-way, a sanitary sewer easement must be extended across the front or to a property line as directed by Village Engineer.
- [ ] Minimum 20-foot easement. Check for increase due to depth of sewer. Easement must be shown.

☐ External drop connection required when there is an 18-inch vertical difference between inverts on outlet and inlet pipes.

☐ Internal drop connections must be approved by DPW or governing agency. They are not allowed under current policy.

☐ Show building lead size, location and invert elevation at building and finish grade of building. Check conflict in elevation with other utilities. Minimum 4- inch diameter at a 2 percent slope or a 6-inch diameter at a 1 percent slope.

☐ All sewers and services over 8 inches in diameter and larger must be shown in profile.

☐ Sewer size, grade and manhole spacing table:

| Size | Standard Grade Percent | Minimum Grade Percent | Maximum Grade Percent | Standard Run Feet | Maximum Run Feet |
|---|---|---|---|---|---|
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☐ The following must be shown in plan view:

- ☐ Length between structures.
- ☐ Type, class and size of pipe.
- ☐ Slope of sewer.
- ☐ Top of casting elevation.
- ☐ Easement where required.
- ☐ Progressive numbering system.
- ☐ Invert elevations if sewer is not also shown in profile.

- [ ] Profiles must be shown for sewers and services over 8 inches in diameter and larger with the following information:
  - [ ] Length, type, class, size and slope of pipe between manholes.
  - [ ] Top of casting and sewer invert elevations at all manholes.
  - [ ] Existing and proposed ground elevations.
  - [ ] All utility crossings. Show porous backfill to 12 inches above the higher utility.
  - [ ] Special backfill areas, i.e., sand.
  - [ ] Provisions for infiltration testing.
  - [ ] Progressive numbering system.
  - [ ] Adjacent existing or proposed utilities plotted where parallel.

**Storm Sewer**

- [ ] Standard notes and details included.
- [ ] Design calculations submitted on the Village form with hydraulic grade line computed. Attempt to keep the hydraulic grade line within pipe.
- [ ] Design: Q = CIA, rational method.
- [ ] 100-year storm, I = 175/(T+25) with initial T = 20 minutes, maximum.
  - [ ] Composite runoff coefficient, C, based on the sum of the percentages of each drainage district covered by impervious and pervious areas multiplied by the respective coefficients listed below, C:
    - [ ] Single family residential: 0.35
    - [ ] Multiple Family: 0.55
    - [ ] Commercial and Residential: 0.70
    - [ ] Agricultural: 0.20
  - [ ] Velocity; Minimum = 2.5 feet per second: Maximum = 10 feet per second.
  - [ ] Manning equation for pipes flowing full.
  - [ ] Storm district drainage map provided. Included as part of plans for sites greater than one acre.
  - [ ] Upstream drainage accommodated.
  - [ ] Discharge not diverted on adjoining properties.
  - [ ] Detention as required by outlet capacity.

- [ ] The following must be shown in plan view:
  - [ ] Length between structures.
  - [ ] Type, class and size of pipe.
  - [ ] Slope of sewer.
  - [ ] Top of casting elevation.
  - [ ] Easement where required.
  - [ ] Progressive numbering system on structures.
  - [ ] Invert elevations for sewers not also shown in profile.
- [ ] Private storm sewers for developments larger than one acre and all public storm sewers must be shown in profile.
- [ ] The following must be shown in profile:
  - [ ] Length, type, class, size and slope of pipe between manholes.
  - [ ] Top of casting and sewer invert elevations at all manholes.
  - [ ] Existing and proposed ground elevations.
  - [ ] All utility crossings.
  - [ ] Special backfill areas, i.e., sand.
  - [ ] Progressive numbering system.
- [ ] Connections at storm structures:
  - [ ] Roof drains must be connected at a structure.
  - [ ] Sump pump discharge connected via a 4-inch minimum pipe.
- [ ] Private sewer requirements:
  - [ ] Profile for sites larger than one acre.
  - [ ] 12-inch minimum pipe size.
  - [ ] Catch basins/inlets at upstream end will be a minimum of 24 inches in diameter.
  - [ ] Catch basins with an inlet pipe will be a minimum of 48 inches in diameter.
  - [ ] First structure upstream of the public system will be a minimum of 48 inches in diameter with a 24-inch sump.
  - [ ] Minimum cover of 3 feet based on low head structures; check details.

- [ ] Public sewer requirements:
  - [ ] Must be shown in profile.
  - [ ] 12-inch minimum pipe size.
  - [ ] 48-inch minimum diameter for manholes and catch basins.
  - [ ] 24-inch minimum diameter for inlets.
  - [ ] Minimum cover of 2 feet, 7 inches based on low head structure, check details.
  - [ ] Located in public right-of-way or 12-foot minimum easement.
  - [ ] Public sewers are any sewers that accept runoff from abutting property or public right-of-way.

**Detention Basin**

- [ ] Must be designed per current Village requirements.
- [ ] Acceptable means are: underground infiltration and storage, oversized storm pipes, and separate basin.
- [ ] Allowable discharge to be determined by one of the following:
  - [ ] Discharge approved by agency having jurisdiction over outlet, i.e., county drain office or county road sewer, (approval must be submitted).
  - [ ] S.C.S. Technical Release No. 55 "Urban Hydrology for Small Water Sheds," (calculations must be provided). Allowable discharge could not exceed existing discharge determined.
  - [ ] Allowable flows designed into the outlet, (previous calculations must be submitted).
- [ ] Separate detention basin requirements:
  - [ ] Fenced if side slopes exceed one on five, (may be waived if Planning Commission feels location and depth do not present a hazard and/or design is integral part of landscaping).
  - [ ] Fences must be a minimum 6 feet high and chain link with an 8-foot access gate.
  - [ ] Side slope one on three maximum.
  - [ ] Must drain entirely unless basin is part of overall landscaping plan.
  - [ ] Bottom must be sodded or paved.
  - [ ] Minimum bottom slope of one (1) percent.
  - [ ] Paved swales at 0.5 percent.
  - [ ] Minimum 12-inch freeboard provided above 100-year-high water level.
  - [ ] Non-erodible overflow capable of handling a 100-year storm.
  - [ ] Maintenance agreement with Village must be executed.

## Site Grading

- ☐ Sufficient proposed grades indicated to ensure that:
  - ☐ Drainage is adequately discharged offsite with proper detention.
  - ☐ No upstream drainage is restricted.
  - ☐ Paving slopes are adequate.
  - ☐ In general, the site drains without standing water.
- ☐ Elevation representing the brick ledge, finished grade and the first floor grade must be indicated.
- ☐ Proposed grading will meet abutting property line elevations. Differentials in grade must incorporate a one on four maximum slope to the abutting property line.
- ☐ Any wall separating a differential grade of more than 18 inches will be considered a retaining structure and requires a structural engineering design and review. Design engineer must supply design calculations.
- ☐ Easement from adjacent property owner will be required for any grading necessary on offsite property at time of engineering plan submittal.

## Paving and Right-of-Way Improvements

- ☐ Standard paving details as necessary.
- ☐ Onsite paving requirements:
  - ☐ Pavement cross-section must be shown; minimums are:
    - ☐ Residential: 4 inches of asphalt on 8 inches of gravel base or 6 inches of concrete on 4 inches of sand base.
    - ☐ Mixed use: 5.5 inches of asphalt on 10 inches of gravel base or 8 inches of concrete on 4 inches of sand base.
  - ☐ Minimum slope: Asphalt: 1 percent. Concrete: 0.5 percent.
  - ☐ Maximum Slope: Asphalt: 6 percent. Concrete: 6 percent.
  - ☐ Minimum drive widths and parking lot dimensions per standard details, (see Appendix).
  - ☐ All private roadways and parking lots must have concrete curb and gutter.
- ☐ Public right-of-way, (Village).
  - ☐ Sufficient proposed grades to show drainage patterns, (50-foot maximum spacing).
  - ☐ Pavement cross-sections must be shown, minimums are:
    - ☐ Concrete mixed use: 8 inches of concrete on 4 inches of sand subbase.
    - ☐ Asphalt mixed-use road: 5.5 inches of asphalt on 10 inches of gravel base.

- [ ] Concrete residential road 6 inches of concrete on 4 inches of sand subbase.
- [ ] Asphalt residential road 3 inches of asphalt on 8 inches of gravel base.

- [ ] All public roads must have curb and gutter unless otherwise approved by the Village.
- [ ] Passing lane, acceleration lane and taper, deceleration lane and taper as required by the DPW, (see standard details).
- [ ] Shoulder requirements (uncurbed roads): Local road: 5 inches - 22A gravel 5 feet wide.

- [ ] Dedication of right-of-way along frontage to the ultimate right-of-way shown.
  - [ ] Major road: 120 feet.
  - [ ] Collector road: 86 feet.
  - [ ] Local road: 60 feet.
- [ ] Drainage ditches:
  - [ ] Adequate culvert capacity.
  - [ ] Enclosure of ditch generally not permitted, (other than for driveways).
  - [ ] Side slopes: One on three maximum.
  - [ ] 2-foot-wide ditch bottom.
- [ ] Sidewalks required along the frontage of all roads:
  - [ ] Located 1 foot from ultimate right-of-way line.
  - [ ] 5 feet wide, 4 inches thick with 8-inch thickness at driveways for mixed use roads and 6 inches of thickness at driveways for local roads.
  - [ ] Proposed grades at property corners, driveways and intermittent locations between.
  - [ ] Handicapped ramps noted.
  - [ ] All structures, hydrants, poles, etc., noted and moved or adjusted as necessary.