CITY OF SOUTHFIELD
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

ENGINEERING DESIGN STANDARDS

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INTRODUCTION

The following design standards are intended to provide a basis upon which all commercial, industrial and multiple sites within the City of Southfield are to be designed. The requirements outlined herein reflect the requirements of the Engineering Division of the Department of Public Services and conform to current engineering practices in the Metropolitan Detroit area. The review of the submitted plans will be done by the City Engineer, indicated herein, or his designee. By no means are these standards intended as a substitute for sound professional engineering judgment. It is suggested that the applicant obtain a copy of the City of Southfield Zoning Ordinance to supplement these standards.

CONTENTS

I. GENERAL REQUIREMENTS AND PROCEDURES

A. GENERAL SUBMITTAL PROCEDURES:

1. Prior to the issuance of a building permit, the plans must first receive an approval from the Engineering and Planning Divisions.

2. A minimum of FOUR (4) complete sets of civil site construction plans will be required, depending on the various agencies influenced by the proposed development. It is recommended that the applicant meet with the Engineering Division prior to submittal of any plans. The plans will be received at the Engineering Division Office, 26000 Evergreen Road, Southfield, MI 48076. All plans must be sealed by an Engineer or Land Surveyor registered to practice in the State of Michigan.

3. The Engineering Division will forward the plans to all departments within the City that may have jurisdiction over a certain phase or area of the site. The review comments of these other departments will then be incorporated in the Engineering review. The intent of this distribution is to restrict the review to one agency (the City), thereby eliminating any discrepancies in requirements between two or more departments.

4. Upon completion of the review, the Engineering Division will return one set of plans or provide a detailed review letter to the engineer or surveyor with revisions and/or corrections noted on the plans. Direction will be given at that time as to how many plans must be resubmitted.

6. Upon Engineering approval, the City Engineer will issue a Preliminary Engineering Approval Letter to the engineer or surveyor of record for the project, detailing the number of sets of plans and fees necessary for permit routing to other governmental agencies for water and sewer permits. It shall be the responsibility of the developer to apply for and receive all permits related to work within Road Commission for Oakland County or MDOT rights-of-way.

7. Once all permits have been received by the City, the City Engineer will issue a Final Engineering Letter detailing any additional permits, fees, bonds, and insurance policies that the City must also receive prior to scheduling a preconstruction meeting NO PARTIAL APPROVALS WILL BE GRANTED.

8. Once all permits, fees, bonds and insurance policies have been received and approved by the Engineering Division, a preconstruction meeting will be scheduled.

9. For all residential projects, building permits will not be issued until all utilities and streets have been inspected, dedicated and accepted by the City of Southfield.

10. For all commercial projects, no certificates of occupancy shall be issued prior to the dedication of all utilities and streets to the City of Southfield.

B. FEES, BONDS AND INSURANCE:

1. Review Fee:

This fee must be paid with plan submittal. This fee is non-refundable and approval cannot be given without its receipt.

You will be charged two percent (2%), or a minimum two hundred fifty dollars ($250), of the construction cost for all water main, sanitary sewer, paving, grading, drainage improvements and soil erosion measures, where applicable; regardless of whether private or public.

The minimum fee provides for the plan review and two site inspections. If additional inspections are required, a fee of seventy-five dollars ($75) per inspection will be charged.

This fee will be based on either the signed contract for the work or an approved sealed engineer's or land surveyor's itemized estimate for the work.

2. Inspection and Administrative Fees:

This is a cash amount to be deposited in an escrow (trust) account to cover the costs of City Engineering inspection, administration of the escrow account, and testing. The deposit is based on the construction cost of all water main, sanitary sewers, storm sewers and paving that require Engineering inspection. The construction cost shall be defined as either the signed contract for the work, or an approved sealed engineer's or surveyor's itemized estimate for the work.

Cost of Construction	Deposit to Cover Inspection Fees
$0 - $5,000	$1,000.00

$5,000.01 - $50,000.00	20% but not less than $1,000.00
$50,000.01 - $100,000.00	18% but not less than $10,000.00
$100,000.01 - Plus	15% but not less than $18,000.00

Inspection fees will be billed at an hourly rate of seventy five dollars per hour ($75/hr) regular time and one hundred twelve dollars and fifty cents per hour ($112.50/hr) overtime. This is based on an eight (8) hour day and includes a one (1) hour paid lunch period.

A minimum of four (4) hours will be charged if the inspector keeps a scheduled inspection appointment and the Contractor does not work. All costs incurred for consulting services and testing requirements will be billed against this account.

If this account is depleted during the course of construction, additional deposits will be necessary, as required by the Engineering Division.

Upon final approval of the site, the balance remaining in the trust account will be refunded.

3. Utility Dedication Surety:

A cash surety deposit or Letter of Credit shall be posted with the Engineering Division. Release of escrow shall be made after public improvements of the project have been installed properly and the site has been properly graded in accordance with the approved plans and city standards, and have been accepted by the City Council. The escrow shall be established in accordance with the schedule below:

Cost of Construction	Surety Amounts
$0 - $10,000.00	$1,000.00
$10,000.01 - $50,000.00	10% but not less than $3,000.00
$50,000.01 - $100,000.00	10%
$ 100,000.01 - Plus	$10,000.00

4. Soil Erosion Fee:

A fee for a Soil Erosion and Sedimentation Control Permit is included as part of the engineering review fee.

5. Performance Guarantee:

At the time of the issuance of a permit and before conducting any pre-construction meetings, the owner shall deposit a performance guarantee in the amount of one hundred percent (100%) of the estimated construction cost of the required improvements and it shall be in the form of cash, certified check, or irrevocable bank letter of credit. It is the intent of the performance guarantee to ensure that a permitted improvement, once undertaken, is completed or is, at the owner's option, terminated in a manner which leaves the City's existing utility system undamaged or restored and intact.

6. Insurance:

At the time of issuance of a permit for residential and commercial projects and project improvements under the ultimate jurisdiction of the Department of Public Services of the City, the contractor shall procure and maintain, during the life of any contract or agreement for such construction, insurance meeting the requirements of the general supplementary conditions as adopted by resolution of the City Council. The insurance policy shall also include the City of Southfield and its engineering consultants as additional insureds, if applicable.

C. GENERAL PLAN REQUIREMENTS:

1. All plans, easements, legal descriptions and design computations, maps and sketches shall be prepared by a registered engineer or registered land surveyor. All such documents shall bear the seal and signature of the person who prepared them.

2. Plans submitted shall be on twenty-four inch by thirty-six inch (24” x 36”) white prints having blue or black lines, and shall be neatly and accurately prepared. Engineering judgment should be exercised in the design, layout and presentation of proposed improvements. Acceptable scales shall be:

1”=20’; 1”=30’; 1”=40’; 1”=50’, according to the size of the site.

3. For projects or subdivisions having more than one (1) sheet of plans, a cover sheet displaying a general plan having a scale of one inch equals one hundred feet (1”=100’) shall be provided showing the overall project or subdivision and indicating the location of all improvements shown in the detailed plans. Superimposed on this general plan shall be one-foot (1’) contours of the area, including the area at least one hundred feet (100’) outside of the subdivision or project site. Street names, street and easement width, lot lines, lot dimensions and lot

numbers shall be shown in all plans. Where possible, the utilities shall be located in accordance with the City standards, as established by the Director of the Department of Public Works. Water main easements shall have a minimum width of twelve feet (12') while storm and sanitary sewers shall be centered within an easement twenty feet (20') wide. Sewers in easements shall be kept at least two feet (2') away from side or rear lot lines

4. All plans submitted for review must contain a cover sheet that includes but is not limited to: the name of the project; a location map of where the project is located; a sheet index; the name, telephone number and address of the developer; the engineer of record and the office of the City Engineer; and the name, address and telephone number of property owner.

5. City standard detail sheets for water main shall be included. The City uses WRC detail sheets for sanitary sewers, storm sewers and soil erosion.

6. The standard notes, as adopted by the City of Southfield, shall be placed on the plans.

7. A legal description of the property must be included on the cover sheet.

8. The requirements of Chapter 19, which relates to the site grading and drainage, and of Chapter 49, Soil Erosion and Sedimentation Control of this Code, may be combined on the plans with the requirements of this Chapter.

9. Easements shall be shown on the plans.

10. Note on the plans any other permits from other governmental agencies.

11. Note on the plans the testing required for acceptance of the improvements.

12. Prior to starting any improvement design, the applicant may make use of maps and information available at the Engineering Division. It shall be the responsibility of the applicant to verify utility locations provided by the City.

13. All types of sewers shall be shown in plan and profile. Profiles of sewers shall indicate the size, class of pipe, invert and slope of the sewer and type of bedding, and shall indicate the existing ground along the route of the sewer and the proposed, or existing, top of the curb or edge of pavement grade. The locations of required compacted porous backfill shall be indicated on the profile, together with other existing, or proposed, utilities.

14. All profiles shall have a vertical scale of one inch equals five feet (1" = 5') where applicable. The profile shall be shown below the plan view, where possible, with as close an alignment as possible.

15. All plans within the set shall have a title block containing: the name of the project, the name of the developer, a revision block and table of contents, etc.

16. Elevations shall be on the NAVD 88 datum. Benchmarks for the work shall be indicated on all of the pertinent plans.

17. Finished grades of structures and hydrants shall be indicated on the plan and profile for all structures.

18. Water main fittings. The plan shall indicate only such fittings, such as bends and reducers, which are not obviously otherwise identified. Indicate the locations, by proper dimensions, of such fittings.

19. Curve data for all streets and properly line curves shall be indicated.

20. The top of curb elevation shall be indicated on the plan or profile for proposed paving project.

21. A positive (white) Photostat of the plat for subdivisions, accurately reduced to a scale of one inch (1") equals two hundred feet (200'), shall be furnished to the City for the purpose of obtaining addresses for lots in subdivisions.

22. A copy of the computed plat for subdivisions shall be submitted with the engineering plans.

23. All setbacks and building separations must be indicated in accordance with the Zoning Ordinance requirements.

24. Loading spaces must be indicated in accordance with the Zoning Ordinance.

25. If a wall or berm is required as part of the project, it must be shown on the plan with a detail indicating the cross section.

26. If above-ground tanks are proposed, their use, capacity and location must be indicated.

27. Required plantings, in accordance with the Zoning Ordinance, must be shown on the plan. A copy of the proposed landscaping plan must be included in the set of engineering construction site plans and,

conversely, a copy of the proposed grading plan should be a part of the landscaping submittal.

D. FIELD REQUIREMENTS:

1. The City of Southfield, or its agent, will provide inspection on all public utilities and improvements proposed within the project. Wherever possible, inspection will be full-time on water mains, sanitary sewers, storm sewers and paving. Part-time inspection may be provided at the discretion of the Engineering Division for sidewalks, approaches, taps to public utilities, on-site paving and private storm sewers.

2. A minimum of forty-eight (48) hours notice is required to ensure the presence of a City Inspector, or his agent, when work commences.

3. Prior to starting any construction, the Contractor must obtain all required permits.

4. All public improvements must be field-staked under the supervision of the Engineer or Land Surveyor that prepared the plans. Staking must be in accordance with the approved plans.

5. All construction must conform to the current MIOSHA safety standards.

6. At the time of final inspection for all public improvements, the owner, or his contractor, shall provide all necessary labor and equipment to allow the City to inspect the system.

7. Generally, one inspector will be assigned to a particular project and will be responsible for that project until its completion. The contractor and the inspector may make arrangements for day-to-day inspection. Any interruption or moratorium on the flow of work may result in a re-assignment of that inspector to another project and require the normal forty-eight (48) hour notice before work is resumed.

8. At the completion of the project, a certification from the developer's engineering consultant will be required, indicating that all public infrastructure work has been completed in accordance with the approved plans.

E. PERMIT REQUIREMENTS:

1. Site Plan.

The approved site plan constitutes a permit from the Planning Department. The Engineering Division will issue a permit for the construction of the site improvements. Note, however, that other Divisions of the City and other agencies may require additional permits.

The other agencies, such as, the Michigan Department of Transportation (MDOT), the Oakland County Water Resources Commissioner (WRC) and the Road Commission for Oakland County (RCOC), requiring permits will generally be listed on the approved plan.

2. Soil Erosion and Sedimentation Control Permit:

This permit is required prior to final construction plan approval. Applications are available at the City Engineering Division offices. A bond may be required in accordance with City Code, Chapter 49, Article VI.

3. Michigan Department of Environmental Quality Water Main:

All water main requires a water supply permit from the Michigan Department of Environmental Quality (MDEQ). Submit an Act 399 permit application [http://www.michigan.gov/deq/0,1607,7-135-3313_3675_3691-72232--,00.html] to the Engineering Division upon request. The City of Southfield's WSSN number is 06160. The City will directly request approval from the MDEQ during the course of engineering plan approval.

4. Michigan Department of Environmental Quality Sanitary Sewer:

All sanitary sewers require a permit from the Michigan Department of Environmental Quality (MDEQ). Submit a Part 41 permit application [http://www.michigan.gov/deq/0,1607,7-135-3313_44117---,00.html] to the Engineering Division upon request. The City will submit the request for approval from the MDEQ during the course of engineering plan approval.

5. Oakland County Water Resources Commissioner:

All taps to sanitary sewers require permits from the Oakland County Water Resources Commissioner (WRC).

6. Road Commission for Oakland County:

All work in roads under the jurisdiction of the Road Commission for Oakland County (RCOC) requires a permit from the Road Commission for Oakland County.

7. Other Permits:

Other agencies that may require a permit will be designated in the tentative approval letter. These permits are generally the contractor's responsibility and will be required prior to construction:

Michigan Department of Transportation
Michigan Department of Environmental Quality
Oakland County Water Resources Commissioner

II. SURVEY

A. GENERAL:

1. A complete topographical survey is required for all sites. Existing off-site elevations must be given at a minimum of fifty feet (50') and one-hundred feet (100') abutting the entire perimeter of the site. Grades shall be indicated at all property corners and along all property lines. On-site, intermittent elevations or defined contours are required to establish the existing site drainage.

2. All existing conditions shall be indicated. Locations and elevations must be given on the following:

   - Existing drainage courses;
   - Upstream and downstream culverts;
   - All utilities, including sanitary, water main, gas, telephone, electrical, etc. Inverts and castings and finish grades are required where applicable;
   - Sidewalks;
   - Finished grades of all adjacent buildings;
   - All easements.

3. A NAVD 88 Benchmark (B.M.) is required and a site B.M. for construction purposes must be identified on the plan.

4. Road topography shall extend across the entire site with grades shown on both sides of the street for:

   - Property line;
   - Ditch center line;
   - Top of bank;
   - Edge of shoulder;
   - Edge of pavement or top of curb;
   - Street crown or center line.

5. Property lines must be indicated by distances and bearings where applicable and property corners must be identified as either *found* or *set*.

6. Existing rights-of-way of adjacent roads must be indicated.

III. SOIL EROSION AND SEDIMENTATION CONTROL

A. SITES REQUIRING PERMITS:

All sites having a construction area of one (1) or more acre; or within five hundred feet (500') of a drainage course; or within five hundred feet (500') of a storm drain inlet requires a Soil Erosion Permit.

B. INTENT OF PERMIT:

The intent of this requirement is to ensure that no silt or sediment enters the public streams or water courses. This is accomplished through means of siltation basins, filters, diversions, etc.

C. PLAN REQUIRED:

A separate soil erosion and sedimentation control plan is required for all sites that require a permit. Itemized on this plan shall be step-by-step requirements for controlling siltation. No work (including site clearing) will be allowed until approved siltation control measures are in effect.

Accelerated erosion and sedimentation must be prevented during all phases of construction, including:

- Initial site clearing;
- Utility construction;
- Building construction;
- Site paving;
- Final site approval.

D. INSPECTION:

Inspections will be made periodically throughout construction on the maintenance and effectiveness of soil sedimentation control methods.

The costs of these inspections are charged against the inspection escrow account. If inspection reveals that the controls are not being implemented, a Stop Work Order on all site construction may be issued.

NOTE: THE SILTATION CONTROL REQUIREMENTS MAY CONTROL THE PROGRESS AND SCHEDULING OF ALL CONSTRUCTION ON THE SITE.

IV. WATER MAIN

A. NOTES:

1. When applicable, the City of Southfield detail sheets must be included with the plans.

2. A quantity list itemizing all proposed public water main construction must appear on the plan.

B. SIZES AND DISTRIBUTION:

1. The minimum size water main in the City of Southfield shall be eight inches (8"). Six-inch (6") mains may be used only for single fire hydrant leads having a maximum length of forty feet (40'). No service leads are allowed from a six inch (6") main. Maximum dead end mains are as follows:

   - 400 ft. for eight inch (8") Mains;
   - 1,000 ft. for twelve inch (12") Mains.

   Reducers are not allowed to meet the dead end requirements.

2. Twelve-inch (12") water main may be considered as minimum for internal transmission on industrial and multiple sites.

3. Looping of mains will be required, wherever possible. All mains must end with a hydrant or blow-off.

4. The extension of water main will generally be required across the entire frontage of the site.

5. All water main installations must be in accordance with the City's water Master Plan.

C. VALVES:

Gate valve spacing will generally be regulated by providing the following provisions.

In the event of a breakage:

- No more than thirty (30) single or multiple family units will lose service;
- No more than one (1) hydrant will be out of service;
- No more than four (4) valves shall have to be closed to isolate the

break, and where possible, three valves should isolate the break;
- On-line valve spacing shall be a maximum of one thousand feet (1,000').

D. AUTOMATIC FIRE SPRINKLER SERVICE CONNECTIONS:

The City will allow installation of an un-metered fire service connection provided adequate provision is made to prevent the use of water from such fire service for purposes other than fire extinguishing. In no case should hydrants be placed downstream of any check valve used for automatic sprinkler protection. Where hydrants are necessary, separate mains shall be installed for fire sprinkler service and hydrant protection. Sprinkler systems are not a substitute for standard requirements for hydrants and the fire suppression system supply line shall have its own isolation valve so that the water supply to the structure can be turned off while still keeping the fire suppression system in service.

E. HYDRANTS:

1. Single family residential spacing shall be a maximum of six hundred feet (600').

2. Commercial, industrial and multiple spacing shall generally be a maximum of five hundred feet (500') on line, but may vary to meet the following requirements:

   All points on the exterior of a building shall be no closer than fifty feet (50'), nor further than two hundred-and-fifty feet (250') from a hydrant. Distances shall be measured along the shortest feasible exterior route (never through buildings) for laying hose.

3. Any hydrant located in a parking lot shall be protected by a minimum of six inch (6") curb or bollards. In all cases, the visibility of the hydrant must be considered. No parking will be allowed within ten feet (10') of the hydrant.

4. A hydrant is required to be located within one hundred feet (100') from the fire department connection on a building. Additional hydrants may be required depending on the specific use.

F. MATERIALS:

All materials shall be in conformance with the City of Southfield current standards and specifications.

G. CONSTRUCTION:

No building permits for wood frame construction will be issued above the foundation for any development prior to the active service of the required mains and hydrants and adequate access for fire fighting equipment. No occupancy shall be allowed in any instance without the required mains, hydrants and sprinklers being officially dedicated to the City of Southfield.

H. EASEMENTS:

All public water mains must be located in an easement or public right-of-way. Standard easement forms are available at the City Engineering Division. The minimum easement shall be twelve feet (12'). The dedication of the easement will be required prior to use of the system.

V. SANITARY SEWER

A. GENERAL:

1. Public sanitary sewers are required when two or more connections are made to the same sewer. In most instances, including multiple unit developments, the sewers may have to be public, even though the project has one owner.

2. The extension of the sanitary sewers will generally be required across the entire frontage of the site, and to provide for upstream discharge.

3. All construction shall conform to the current WRC sanitary sewer standards and specifications.

B. NOTES:

1. Where required, WRC sanitary sewer detail sheets shall be included with plans.

2. A quantity summary, itemizing all proposed public sanitary sewer construction, must appear on the plans.

C. SEWERAGE:

Downspouts, weep tile, footing drains, or any conduit that carries storm or ground water shall not be allowed to discharge into the sanitary system.

D. GRADE:

1. The following table represents the minimum and maximum grade for public sanitary sewers. Maximum velocity may not exceed ten feet per second (10' fps).

Size	Standard Grade	Minimum Grade
10"	0.60%	0.30%
12"	0.40%	0.22%
15"	0.24%	0.15%
18"	0.18%	0.12%
21"	0.14%	0.10%

2. All upstream dead-end sewers shall have a minimum last run grade of one percent (1.0%).

E. MANHOLES:

1. Sanitary Sewer Manholes shall be spaced as follows:

Size	Standard Run	Maximum Sewer Run
10”	300 Ft.	330 Ft.
12”	400 Ft.	450 Ft.
15”	500 Ft.	500 Ft.
18”	600 Ft.	600 Ft.
21”	600 Ft.	600 Ft.

2. A manhole will be required at all changes in alignment, size or grade.

F. LOCATION:

1. Sanitary sewers shall be located so as to provide unrestricted access for maintenance and inspection. A minimum alignment separation of ten feet (10’) must be maintained between the sewer and all water mains. The water main and sanitary sewer shall be located on opposite sides of the street, wherever possible.

2. All public sewers must be located in a public right-of-way or an easement. Standard Easement forms are available at the City Engineering Division. The easement size will vary individually as required for maintenance and access. The minimum sanitary sewer easement shall be twenty feet (20’). The dedication of the easement will be required prior to use of the system.

G. LEADS:

1. Service leads shall be a minimum of six inches (6”) in diameter with a minimum slope of one percent (1.0%).

2. Private sanitary sewer leads of excessive length, although not a public sewer may require inspection and testing. Each site will be considered individually by the Engineering Division.

3. Service leads shall not be made into a manhole without written permission from the City Engineer.

4. The maximum depth of a sewer lead is ten feet (10') at the property line.

H. PROFILE:

The following information shall be indicated on the sanitary sewer profile:

- Length of run between manholes;
- Type and class of pipe between manholes;
- Size and grade of pipe between manholes;
- Top of casting and invert of all manholes;
- Existing and proposed ground elevation along the run of sewer;
- Progressive numbering system;
- All utility crossings;
- Special backfill areas;
- Provisions for infiltration testing.

I. DROP CONNECTIONS:

External drop connections are required where the invert of the outlet pipe is eighteen inches (18") or more below the invert of the inlet pipe. Internal drop connections will generally not be allowed.

J. SEPTIC TANK:

If sanitary sewer is not available, a copy of a valid septic system permit from the Oakland County Health Division must be submitted prior to approval.

VI. STORM SEWER

A. GENERAL:

1. All storm sewers must conform to the project's grading plan.

2. All construction must conform to Southfield's City Code and WRC standards.

3. Where required, the WRC storm drain detail sheets shall be included with plans.

4. Underground drainage facilities will generally be required. All run-off on-site must be accommodated and discharged in a controlled manner. The minimum on site pipe size is eight inches (8"). All public systems shall have a minimum pipe size of twelve inches (12"). A minimum pipe size of twelve inches (12") shall also be required for all storm sewer from the tap to the public system to the first structure upstream.

5. Sump pump discharge must be directed into the storm sewer via an enclosed system. A minimum of four inch (4") pipe shall be utilized and will also be allowed to discharge unrestricted.

B. STRUCTURE:

1. Catch basins at the upstream end of the system shall be a minimum of twenty-four inches (24") in diameter. Catch basins with an inlet pipe shall have a minimum diameter of thirty-six inches (36"). All manholes and public catch basins shall be a minimum of forty-eight inches (48") in diameter.

2. The first structure upstream from a public system within the confines of the private development shall be forty-eight inches (48") in diameter and have a twenty-four inch (24") sump.

3. Manholes shall be located at:

    a) All changes in alignment;
    b) Points where the sewer changes size;
    c) Points where the grade changes;
    d) Junction of sewer lines.

C. STORM SEWER DESIGN:

1. Storm sewers shall be designed using the Manning Equation for pipes flowing full. Runoff shall be determined using the Rational Method with

an intensity formula of I = 175/T+25. The initial time of concentration shall generally be twenty (20) minutes and T+25 minutes maximum.

2. Storm sewer design computations must be submitted for review by the City Engineer. The velocity shall be a minimum of two and one-half feet per second (2.5 fps) and shall not exceed ten feet per second (10 fps).

3. The hydraulic gradient must be maintained within the pipe, wherever possible.

4. Runoff coefficients shall be determined for each individual drainage area and calculations for each drainage area must be submitted as part of the design computations.

5. A storm drainage district map must be provided showing all drainage districts within the development. The district limits must be overlaid on a proposed grading plan for the site. Color coding is encouraged.

6. All upstream drainage must be accommodated on-site. Allowances for upstream area must be based on ultimate improvements and runoff. Discharge must not be diverted onto abutting properties.

7. The outlet must be in accordance with the project's grading plan and the existing natural drainage courses in the area.

D. PLAN AND PROFILE:

1. All public storm sewers must be shown in profile. For developments larger than one acre, the private sewer must also be shown in profile.

2. The following must be shown in profile:

- Length of run between manholes and catch basins;
- Type and class of pipe between manholes and catch basins;
- Size and grade of sewer between manholes;
- Top of casting elevations;
- Inverts of all pipes at manholes;
- Proposed and existing ground elevations along the run of sewer;
- Progressive numbering system on all manholes and catch basins;
- All utility crossings;
- Special backfill areas;
- Type of joint.

E. TAPS:

Connections must be made at manholes. Blind taps are generally not allowed.

F. DETENTION:

1. All sites within the City of Southfield shall be required to provide detention of storm water runoff for the one hundred (100) year design storm, treating and storing for the first flush and bank-full flood. Design shall be per the current Oakland County Water Resources Commissioner Engineering Design Standards for storm water facilities.

2. All open detention basins must be fenced if the side slopes exceed one (1) vertical to six (6) horizontal. This may be waived by the Engineering Division when the design is an integral part of the landscaping and the location and depth does not present a potential hazard. The earthen side slope shall be one (1) vertical to three (3) minimum horizontal. Fences shall be a minimum of six feet (6') high chain link with a locking access gate, eight feet (8') wide.

3. Minimum grade on the bottom of the detention basin shall be one and two-tenths percent (1.2%) when sodded.

4. All detention systems are required to be maintained as part of the site Maintenance Agreement on file with the approved Site Plan.

G. PUBLIC STORM SEWER:

1. All public storm sewers must be located in a public right-of-way or an easement. Standard easement forms are available at the Engineering Division. The easement size will vary as required for maintenance and access. The minimum storm sewer easement shall be twenty feet (20'). The dedication of the easement will be required prior to use of the system.

2. Any storm sewer that accepts runoff from abutting property or public right-of-way must be placed in a minimum twenty foot (20') storm sewer easement.

3. All public storm sewer shall be a minimum of twelve inch (12") diameter Cl. IV concrete pipe with premium gasketed joints.

VII. PAVING AND GRADING

A. GENERAL:

1. All public paving shall conform to the current standards and specifications of the City of Southfield.

2. Where required, the City of Southfield pavement details shall appear on the plans.

B. ON SITE:

1. A cross section of all on-site paving is required on the plans.

   Minimum requirements are as follows:

   a) Commercial and Multiple:

      Three inch (3") asphalt on six inch (6") gravel base; six inch (6") concrete.

   b) Industrial:

      Four inch (4") asphalt on eight inch (8") gravel base; eight inch (8") concrete.

   These minimum requirements are based on adequate sub-grade, sub-grade drainage and average live loads. Each site will be examined individually and additional pavement thickness and/or increased base requirements may be necessary.

2. Minimum surface grade for asphalt paving shall be one percent (1.0%). Minimum surface grade for concrete paving shall be four-tenths percent (0.4%).

C. CITY PUBLIC RIGHT-OF-WAY:

1. A cross section of all off-site paving is required. Minimum requirements are dependent on the type of existing pavement as follows:

   - Concrete major thoroughfare and collector roads require nine inches (9") of PC concrete on sand sub-base;

   - Asphalt major thoroughfare and collector roads require eight inches (8") of asphalt;

- Concrete local roads generally require seven inches (7") of PC concrete sand sub-base;

- Asphalt local roads generally require three inches (3") of asphalt on an eight inch (8") gravel base;

- Requirements for existing gravel roads will be considered on an individual basis by the City Engineering Division.

2. Six inch (6") concrete curb and gutter is required on all approaches.

3. Passing lanes, acceleration lanes and tapers, and deceleration lanes and tapers will be required in accordance with the current Road Commission for Oakland County specifications and guidelines. If curb is required on the passing acceleration, or deceleration lanes, it shall be six inch (6") concrete curb and gutter.

4. The dedication of the following right-of-way along the frontage of the site to the ultimate requirement for future improvement is requested:

   - 120 feet - major thoroughfare;
   - 86 feet - collector road;
   - 60 feet - local road.

5. All shoulders shall be eight inches (8") of 22A Gravel, eight feet (8') wide on thoroughfares and four feet (4') wide on local roads.

6. Sufficient proposed grades must be given to determine proposed grading of all right-of-way improvements.

D. <u>DRAINAGE IN RIGHT-OF-WAY:</u>

1. Enclosures of drainage ditches across the frontage of the site will generally not be permitted. The City Engineering Division may, however, require the enclosure if adequate controls on pavements and shoulders cannot be maintained and the health, safety and welfare of the general public is endangered.

2. Side slopes on open ditch drainage shall be three (3) minimum horizontal to one (1) vertical. The ditch bottom shall be two feet (2') wide.

E. <u>SIDEWALKS AND NON-MOTORIZED PATH:</u>

1. Sidewalks are required along all rights-of-way. They shall be located in the right-of-way, one foot from the right-of-way line.

2. The walk shall be five feet (5'), constructed of four inches (4") of PC concrete on four inches (4") of 21AA base. The walk must be continued through driveway sections where the thickness becomes six inches (6") and on major thoroughfares and collector road at corners. Curbs must be tapered to meet the walk. Cross slopes on the sidewalk must have a maximum of two percent (2%) cross slope toward the street, and continue to maintain a two percent (2%) across driveways. Non-motorized paths must be eight feet (8') wide, constructed of two inch (2") bituminous surface on four inches (4") of 21AA base.

3. Proposed grades must be indicated along the property line and on the walk, driveways, and intermittent locations along the length of the walk, at no less than intervals of fifty feet (50').

4. Any structures, hydrants, poles, etc. that are existing along the alignment of the walk, must be adjusted or relocated at the expense and coordination of the developer. All sidewalk construction shall be in accordance with the Americans with Disabilities Act (ADA) of 1990 in accordance with MDOT's current R-28 series details.

5. All sidewalk ramps at intersections and boulevard driveways are required to have Detectable Warning Strips. Detectable Warnings shall be cast-in-place or adhesive in "brick red". Imprinting of concrete will not be permitted.

F. <u>SITE GRADING:</u>

1. Sufficient proposed grades must be indicated on the plan to ensure that:

   - Drainage is adequately discharged off-site with proper retention;
   - No upstream drainage is restricted;
   - Paving is in accordance with standards outlined herein;
   - The site, in general, drains without standing water.

2. Elevations representing the brick ledge, finished grade, and the first floor grade must be indicated.

3. Proposed grading shall meet abutting property line elevations. Differentials in grade must incorporate a minimum four (4) horizontal to one (1) vertical slope to the abutting property line.

4. Retaining walls are discouraged. Any wall separating a differential grade of more than twelve inches (12") shall be considered a retaining structure and will require a structural engineering design and review.

5. The finish grade adjacent to the structure must be a minimum of eighteen inches (18”) above the side yard swale elevation.

VIII. REQUIREMENTS FOR CITY ACCEPTANCE OF UTILITIES

GENERAL

The City of Southfield shall take over water supply, sewage disposal systems and streets existing in developments which have been constructed under a Michigan Department of Health permit issued to the City of Southfield. Before taking over the above mentioned infrastructure, and before Building Permits are issued, or taps are made to the system, the following must be submitted to the Department of Public Works:

1. A Quit Claim Deed or Bill-of-Sale from the developer for the materials used in these improvements.

2. A letter from the engineer who designed the improvements stating the final construction cost of these improvements and also indicating that this construction has been completed in accordance with the approved plans.

3. Two (2) sets of As-Built drawings on paper and one (1) electronically submitted PDF.

4. Sworn statement from the contractor indicating that all labor and materials have been paid in full.

5. Maintenance and Guarantee Bond in favor of the City of Southfield in the amount of 100% of the final construction cost of the improvement. This bond is to be on the City's form and shall run for two (2) years from the date of acceptance by the City Council.

6. Dedicate to the City all necessary easements and rights-of-way.

CITY OF SOUTHFIELD STANDARD NOTES

1. Notify the City of Southfield Engineering Division (248) 796-4810 a minimum of forty-eight (48) hours prior to the start of construction.

2. All construction must conform to the current standards and specifications adopted by the City of Southfield.

3. Utilities must be located underground.

4. Call MISS DIG (1-800-482-7171 / 811) a minimum of seventy-two (72) hours prior to the start of construction.

5. All soil erosion and silt must be controlled and contained on-site.

6. All excavation under or within three feet (3') of public pavement, existing or proposed shall be backfilled and compacted with sand (Class II MDOT).

7. The contractor is responsible for all damage to existing utilities.

8. Prior to the issuance of an occupancy permit, engineering site inspection is required.