ENGINEERING DESIGN STANDARDS
for the
CHARTER TOWNSHIP OF OXFORD

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CHARTER TOWNSHIP OF OXFORD
COUNTY OF OAKLAND
STATE OF MICHIGAN

ORDINANCE NO. 106A

AN ORDINANCE ESTABLISHING ENGINEERING AND DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS FOR CERTAIN INFRASTRUCTURE IMPROVEMENTS IN THE CHARTER TOWNSHIP OF OXFORD INCLUDING BUT NOT LIMITED TO STREETS AND ROADWAYS, DRIVEWAYS AND APPROACHES, PARKING LOTS, STREET LIGHTS, PARKING LOT LIGHTING AND SIGNS, WATERLINES, SANITARY SEWER, SUBMERSIBLE SEWAGE PUMP STATIONS, STORM DRAINAGE, SOIL EROSION AND SEDIMENTATION CONTROL, TREE PLANTING STREET AND BUFFER / LANDSCAPE AREAS, TRAFFIC CONTROL / SAFETY STANDARDS, INSURANCE REQUIREMENTS, RIGHT-OF-WAY PERMIT REQUIREMENT AND INSPECTION, WATER SEWER APPROVAL AND CONSTRUCTION SEQUENCING, WATER SEWER TAP PERMIT INSTRUCTIONS, UTILITY INSPECTION SHEET, ADJUSTING / RECONSTRUCTING STRUCTURE COVERS, PAVEMENT REMOVAL AND RESTORATION, BITUMINOUS PAVING, CONCRETE PAVING, CONCRETE CURB AND GUTTER, CONCRETE DRIVES AND MISCELLANEOUS CONCRETE PAVEMENT, CONCRETE SIDEWALKS, CLEAN UP AND RESTORATION, TREES AND LANDSCAPING, CULVERTS, EDGE DRAINS, STORM SEWERS, SANITARY FORCE MAIN SPECIFICATIONS, WATER MAIN, WATER SERVICE LEADS, WELL ABANDONMENT TRAFFIC CONTROL, SITE GRADING, AND SOIL EROSION - SEDIMENTATION CONTROL.

The Charter Township of Oxford, Oakland County, Michigan, hereby ordains:

SECTION 1 – GENERAL

1.1 GENERAL

A. These engineering design standards are intended to provide a reasonable and proper basis for the design and construction of subdivision and other project site improvements, including sanitary sewer, water main, storm water management, and paving. Where standard codes are referenced within this ordinance to the extent so referenced, they are adopted by reference. The Standards are guidelines to assure high quality and system continuity yet deviation from the standards is at times encouraged to achieve a superior result. Deviation from the standards should be for valid reasons only and a request and justification shall be submitted to the Township Engineer for review and approval. The Township Engineer may permit the proposed deviation if the Township Engineer believes that the proposed deviation would result in an increase in construction safety, an increase in the safety of the final constructed improvement, a more effective operation of the final constructed improvement, minimization of potential negative impacts on one or more other parcels, and/or a more efficient operation of the review process set forth in this ordinance.

B. Extraordinary situations will arise that are not clearly defined by the standards or where the standards contained in this ordinance set forth by their own terms requirements that are general, which may be inappropriate when applied to a particular situation. When such circumstances occur, the decision of the Township Engineer shall govern, based on the Township Engineer's appraisal of the safety of the construction and/or operation of the proposed improvement, the effectiveness of the final constructed improvement, and/or the potential negative impacts on one or more other parcels. An applicant may appeal the decision of the Township Engineer to the Township Board. The appeal shall be in writing and shall be submitted by the applicant outlining the reasons why a specific requirement should be modified for a particular site or situation.

C. Where standard codes, acts, and details are referenced in this Ordinance to the extent so referenced, they are adopted by reference.

D. Proposed improvement plans are not solely for review and construction but are also used to keep records of utilities for maintenance and future construction.

E. The current Oakland County Drain Commissioner Standard Detail Sheets for Water Main, Sanitary Sewer, and Storm Sewer and any future updates are adopted by reference as part of this ordinance. The Charter Township of Oxford Pavement and Landscape Detail Sheets are adopted by resolution.

F. In the administration of this ordinance developers will generally be responsible for complying with the submission requirements except as otherwise intended. However, the proprietor for a project shall be responsible for any violation of this ordinance with respect to this project.

1.2 DEFINITIONS

The following is a list of words and phrases defined for proper use in interpretation of the Engineering Design Standards. Words and phrases not specifically defined shall rely on their definition in the Charter Township of Oxford's Zoning Ordinance, Land Division Control Ordinance, Condominium Regulations or its common or standard definition.

Contractor/Developer – The contractor and/or the developer is the person, partnership, corporation responsible for performing the work required by the Charter Township of Oxford in accordance with the Charter Township of Oxford's Engineering Design Standards.

Design Engineer – A professional engineer that is registered in the State of Michigan responsible for the design of the project and preparation of project drawings.

Design Standards – The applicable standards relevant to the planning, design and construction of infrastructure improvements within the township as adopted and contained in the Charter Township of Oxford's Engineering Design Standards.

Proprietor – A person, public corporation or authority, or a government agency that holds an ownership interest in land, whether recorded or not.

Project Drawings/Plans – Include site plans, plats, condominium site plans, project drawings, and plans. detailing the construction plans, requirements, and specifications applicable to the Charter Township of Oxford's Engineering Design Standards.

Township – The Charter Township of Oxford, Michigan.

Township Representative – The Charter Township of Oxford, Michigan, and its officers, employees and agents, including, but not limited to the Township Board, Township Planning Commission, Township Staff, Township Attorney, Township Engineer, Township Planner, etc.

Township Engineer – The Charter Township of Oxford's Engineer, or other township officer, employee or agent acting on behalf of the Charter Township of Oxford in the administration of the Township's Design Standards.

Township Planner – The Charter Township of Oxford's Planner, or other township officer, employee or agent acting on behalf of the Charter Township of Oxford in the administration of the Township's Zoning Ordinance.

1.3 INSURANCE

The proprietor shall cause its contractors to furnish to the Charter Township of Oxford evidence of public liability and property damage insurance coverage with a responsible insurance company which meets the approval of the Township in such amounts as will be adequate to protect the public, the Charter Township of Oxford, individual members of the Township Board, Township Employees, the Township's professional consultants in their individual and corporate capacities, and other persons reasonably exposed, and shall not be less than the limits set forth herein:

	TYPE OF INSURANCE	LIMITS
(a)	Workman's Compensation & Employers Liability	As required by laws of Michigan
(b)	General Liability	$ 1,000,000 per Occurrence $ 2,000,000 General Aggregate
(c)	Automotive Liability	$ 1,000,000 per Occurrence $ 1,000,000 Bodily Injury $ 1,000,000 Property Damage
(d)	Excess/Umbrella Liability	$ 5,000,000 per Occurrence
(e)	Owners & Contractors Protective Policy	$ 1,000,000 per Occurrence $ 2,000,000 General Aggregate

Policies shall be presented to the Charter Township of Oxford for examination as to their validity and any undesirable exclusion deemed improper by legal opinion rendered to the Township regarding same. The Township reserves the right to reduce/increase the policy amounts based on the character of the project. Underground construction, where applicable, shall be specified in the coverage. Certificates of coverage signed by the insurance carriers shall include a guarantee that 30 days written notice shall be given by the insurance carrier to the Charter Township of Oxford prior to cancellation of, or any change in, the respective policies. In the event that insurance is canceled, operations shall cease prior to the cancellation date and shall not resume until evidence is provided that the proper insurance is again in effect.

Additional named insured under (e) above shall include the Charter Township of Oxford, its Township Board and individual members thereof, the Township Engineer and members of its staff, Township employees and agents for the Township.

1.4 PERFORMANCE GUARANTEE/LETTER OF CREDIT

Either an irrevocable letter of credit in a form acceptable to the Township or cash deposit shall be furnished to the Township in an amount sufficient to complete the proposed project before any development is constructed, approved and accepted. The performance guarantee shall be equal to the cost to construct the approved site work, including water main, sanitary sewer, storm sewer, roadways, retaining walls, landscaping, etc as well as additional items that may be described in the Charter Township of Oxford Zoning Ordinance, Article 16.8.

1.5 MAINTENANCE GUARANTEE

A two (2) year Maintenance Guarantee shall be furnished to the Township before any development is approved and accepted. The term of the guarantee shall begin on the date of final acceptance of the work by the Township. The amount of the guarantee shall be equal to 100% of the construction cost for the site work, including water main, sanitary sewer, storm sewer, roadways, retaining walls, landscaping, etc.

1.6 PERMITS-JURSDICTION-NOTIFICATION

The proprietor shall obtain, or cause his contractor(s) to obtain all permits, post all required guarantees, and pay all required fees for each and all permitting agencies having jurisdiction over the land and rights-of-way involved in the project. Proper notification shall be given to each governmental agency and utility company prior to beginning of construction. A minimum 72-hour notice is required to the Charter Township of Oxford prior to commencement of any construction. The proprietor shall refer and adhere to Ordinance No. 108A Stormwater Drainage and Land Improvement Control for required permits.

1.7 CERTIFICATE OF COMPLETION

The record drawings furnished by the design Engineer shall contain a statement certifying that all surface grades, roads and structures are in conformance with the approved engineering plans. This statement shall be signed, sealed, and dated by the Design Engineer prior to acceptance of the improvements by the Township.

SECTION 2 – SUBMITTAL & APPROVAL PROCEDURES

2.1 GENERAL

All improvements to vacant land, expansions and/or modifications to existing developed parcels, and improvements or extensions to water main systems, sanitary sewers, storm water management systems, mass grading and paving require the review and approval of detailed engineering design plans prior to the issuance of permits and start of construction. This Ordinance is intended to address substantial site improvements and is not intended to regulate minor individual lot improvements such as the construction of decks, sheds, home landscaping, and similar related items so long as they do not significantly impact the property on which the improvements are to occur and/or the property of adjacent owners.

This standard establishes the basic submittal, review and permit processing procedures in the Township.

2.2 SUBMITTALS FOR REVIEW OF SITE PLANS AND PRELIMINARY PLATS

All applicable materials shall be submitted to the Township Planning Department for distribution. Article 12 – Site Plan Review of the Oxford Township Zoning Ordinance should be adhered to. Below is a brief synopsis of the items necessary for site plan submittal in relation to the submittal for engineering/construction plans.

A. The following items are common for all projects being submitted for site plan/preliminary plat review:

   1. Quantity of signed and sealed sets of site plans or preliminary plats, as noted in the Township Zoning Ordinance or Land Division Ordinance.

   2. Payment of site plan review fees.

B. Depending on the scope of work, the following engineering related items are to be incorporated in the plans as applicable to the project:

   1. Storm water calculations for volume, outlet restrictor size, percolation rates, etc. for detention, retention, and/or infiltration storm water management systems.

   2. Drainage district maps showing the various areas contributing to the points of inlet and total area drained (including off-site contributions).

   3. Other information/calculations pertinent to the project such as sanitary sewer systems & water distribution.

2.3 SUBMITTALS FOR ENGINEERING/CONSTRUCTION PLANS

All applicable materials shall be submitted to the Township Building Department for distribution. Section 3 – Plan Requirements of these Oxford Township Design

Standards provides more specific engineering plan requirements that should be adhered to.

A. The following items are common for all projects being submitted for engineering review:

1. A Trust and Agency account as noted in the Zoning Ordinance Section 16.7B shall be established by the Township for the project. An amount acceptable to the Township building department shall be deposited by the applicant into the account for purposes of paying for engineering reviews, construction observation, administration purposes, and other such project involvement for which the applicant will be required to pay for such services provided by the Township. Where a Trust and Agency account has previously been established pursuant to the Zoning Ordinance, that same account shall be utilized as the account set forth in this section.

2. A minimum of three (3) sets of signed and sealed Engineering Design Plans with applicable project specific details and necessary Township standards detail sheets.

3. A minimum of three (3) copies of the Sanitary Sewer Basis of Design (gravity or low pressure sewer).

4. Detailed storm sewer and/or open drain calculations, storm water calculations for volume, outlet restrictor size, sediment storage, percolation rates, etc. for detention, retention, and/or infiltration storm water management systems.

5. Drainage district maps showing the various areas contributing to the points of inlet and total area drained (including off-site contributions).

6. Soil boring logs and geotechnical report.

7. The developer shall review the Charter Township of Oxford's Wetlands and Watercourse Ordinance No. 80B which provides wetland regulations for the Township. The Township will verify all of the wetland delineations and has the authority to reject delineations if discrepancies exist.

8. Delineation of floodplain boundaries.

9. Potable water distribution system improvements.

10. Sanitary sewer systems & calculations.

11. Roadway systems indicating public/private roads and pavement cross sections.

12. Other information/calculations pertinent to the project.

2.4 TOWNSHIP ENGINEERING REVIEW PROCEDURE

A. Upon receipt of all required material from the applicant, the Building Department shall provide three (3) sets of the plans, a site development cost estimate, and any other applicable submitted materials, to the Township Engineer for review and/or approval.

B. Within thirty (30) days of receipt of the plans from the Township Building Department the Township Engineer shall review the plans and related material for conformity to the standards set forth herein and to the overall utility plans of the Township after which one (1) set of plans with the appropriate comments will be returned to the applicant or applicants agent, one (1) set shall be retained for Township Engineer's record, and one (1) set sent to the Township Building Department for Township record.

C. The applicant, after making any necessary revisions as required from previous reviews, shall resubmit three (3) sets of revised plans and related material to the Building Department for transmission to the Township Engineer for additional reviews and/or approval.

2.5 OTHER AGENCY REVIEWS

A. With the exception of public water main and sanitary sewer plans, the applicant or his designee shall be responsible for submitting plans to any public or private utility and any state or county agency that's existing or proposed facilities or rights-of-way may be affected by or has jurisdiction over the proposed construction. A list of private utility companies that provide services within the Township is available at the Township Building Department along with their contact information.

B. Refer to section 2.7D and 2.7E for public water and sanitary sewer review procedures.

C. Applicant is responsible to submit the changes requested by any state or county agency back to the Township for approval.

2.6 FINAL ENGINEERING/CONSTRUCTION APPROVALS

A. If the Township Engineer finds that the revised plans and related material conform to this ordinance, the plans will be stamped "Approved" with one (1) set being returned to the applicant, one (1) set shall be retained for Township Engineer's record, and one (1) set sent to the Township Building Department for Township record.

B. If minor corrections are still required, at the discretion of the Township Engineer the plans may be stamped “Approved As Noted”. Plans so stamped will be required to be revised prior to the Pre-Construction meeting.

C. Applicant must submit copies of the documentation from other agencies (as applicable to the project) to the Township Engineer indicating that the plans have received approval for work within, and/or modifications to, their facilities prior to the Township Engineer granting any engineering construction plan approval.

2.7 PERMITS/CONSTRUCTION

A. The applicant shall adhere to Ordinance No. 108A – Stormwater Drainage & Land Improvement Control for required permits and processes. Prior to the start of construction, the applicant must secure all necessary permits from other agencies as applicable to the project and provide copies of all required permits for the development as stated in Ordinance No. 108A at pre-construction meeting.

B. For quality purposes construction observation is required during construction. Construction observation will be required during the installation of water mains, storm sewer systems including detention/retention areas, sanitary sewers, paving, and any other site improvements that the Township requests to insure installation and materials are in accordance with Township specifications. Refer to specific utility sections for a more detailed description of the construction observation requirements. This service shall be performed by the Township Engineer or other governing agency.

C. The applicant and/or his designee is responsible for coordination and costs of construction observation services during the entire construction process through the Trust and Agency account. Should the account become deficient, the applicant shall be responsible to bring the account current. If the applicant does not act within two weeks the project shall be delayed, all approvals shall be suspended, and further work will no be permitted until accounts are brought current.

D. For projects where the water main will become part of the public system, the Township Engineer shall notify the applicant for additional copies of the plans, including current standard detail sheets and a completed Act 399 of 1976 permit application, signed and sealed by a Michigan Registered Professional Engineer for processing and eventual issuance of a Michigan Department of Environmental Quality construction permit for water main systems. No construction may commence on any portion of a public water system until this permit is issued.

E. For projects where the sanitary sewer will become part of the public system, the Township Engineer shall notify the applicant for additional copies of the plans, including current standard detail sheets and a completed Part 41of Act 451 of 1994 permit application, signed and sealed by a Michigan Registered Professional Engineer for processing and eventual issuance of a Michigan

Department of Environmental Quality construction permit for sanitary sewer systems. No construction may commence on the public sanitary sewer system until this permit is issued.

F. All other permits and payment of associated fees required to perform the work shall be the responsibility of the applicant and/or his designee. No construction may commence until permits, as applicable to the project, are secured from the appropriate agencies. Such permits include those identified in Ordinance 108A, but are not limited to, the following:

1. Road Commission for Oakland County permit for work within an existing or proposed county road right-of-way, including discharges from storm water management systems to county road drainage facilities.

2. Road Commission for Oakland County permit for approach work and/or utility work within an existing or proposed county road right-of-way.

3. Oakland County Drain Commissioner permit for storm water discharge and/or taps to county controlled drainage facilities.

4. Oakland County Drain Commissioner permit for connection(s) to existing public water mains

5. Oakland County Drain Commissioner permit for connection(s) to existing public sanitary sewers

6. Oakland County Drain Commissioner permit for soil erosion and sediment control.

7. A National Pollution Discharge Elimination System (NPDES) permit from the Michigan Department of Environmental Quality for storm water discharge for areas disturbed greater than five (5) acres.

8. Michigan Department of Environmental Quality permit for all work and/or storm water discharges to a regulated wetland or floodplain.

G. When all approvals have been obtained and prior to starting construction, the applicant will be notified of the time and place for a pre-construction meeting.

2.8 OTHER REQUIREMENTS

A. Temporary construction easements from adjacent property owners and/or permanent easements for off-site facilities shall be obtained by the applicant. Documents shall be in a form acceptable to the Township and the Township Attorney. Copies shall be submitted to the Township Engineer prior to construction plans being approved.

B. A Maintenance Guarantee shall be submitted for all constructed site development improvements. Refer to Section 1.5 of this Ordinance for information on the Maintenance Guarantee.

C. A cash deposit for record utility drawings in the amount of 1% of the estimated site utilities construction cost shall be deposited in the project Trust and Agency account prior to any record drawing review by the Township. Should the account become deficient, the applicant shall be responsible to bring the account current. If the applicant does not act within two weeks the project shall be delayed until accounts are current, all approvals shall be suspended, and further work will no be permitted until accounts are brought current.

D. Refer to Section 1.3 of this Ordinance for information regarding Insurance.

2.9 ACCEPTANCE OF IMPROVEMENTS

A. Final acceptance requirements for project improvements are outlined in each individual section of the standards.

B. Building permits or temporary Certificates of Occupancy will not be issued prior to final acceptance of the site utilities unless the necessary guarantees covering the cost of installing any remaining improvements and record drawing preparation is provided to the Township.

2.10 RECORD DRAWINGS

Record drawings for water main, sanitary sewer, and storm sewer systems, detention and retention basins, drainage ditches and swales, and pavement shall be submitted for review and approval prior to acceptance of the improvements by the Township.

Record drawing information shall be provided on the original approved construction drawings and shall contain, but not necessarily be limited to, the following items:

A. General Items

1. Funding shall be established as discussed in section 2.8C.

2. All record drawings shall contain a statement on the plans by an engineer or land surveyor, registered in the State of Michigan certifying that the record drawings conform to the approved construction drawings. The statement shall be signed, sealed, and dated by the engineer or land surveyor.

3. All record drawing elevations shall be based on the established Datum.

4. All record drawing information shall be clearly marked as such.

5. Record drawing locations shall be shown on the plans to an accuracy of one (1) foot horizontal and 0.1 foot vertical.

6. All location changes of 10 feet or more horizontally and 0.5 feet vertically shall be redrawn on the plan and the original location shall be crossed out (X-ed) on the plan.

B. Water mains

1. Location of all water mains with respect to property line, back of curb or edge of pavement.

2. Rim elevation of gate wells.

3. Fire hydrant bury line/arrow elevations.

4. Top of pipe elevation at gate wells.

5. A minimum of three witnessed dimensions to each bend, gate well, meter pit, pressure reducing valve, water main stub, etc.

6. A minimum of three witnessed dimensions to each connection to an existing water main or restrained joint, and at each connection point for transition from ductile iron pipe (D.I.P.) to high-density polyethylene (HDPE).

7. The distance between the hydrant and water main.

8. Accurately locate all utilities (storm, sanitary, water main etc.) where the recommended separation horizontally or vertically is less than that required ten (10) feet horizontal and 18” vertical.

9. The Liber and Page number for any easement obtained for water main as well as any existing easement involved in the project shall be noted.

10. Length and location, witnessed to three (3) points of all casing pipe at each end.

11. Materials installed:

    i. Size, length, type, class, joint and manufacturer of pipe.

    ii. Size, brand and manufacturer of valves and hydrants.

    iii. A total record drawing quantity list.

C. Sanitary and Storm Sewer

1. Location of all sewers with respect to property line, back of curb or edge of pavement.

2. Rim elevation of all structures.

3. Pipe invert elevations at all structures, end-sections or headwalls.

4. Percent grade of all pipe runs.

5. A minimum of three witnessed dimensions to each structure.

6. A minimum of three witnessed dimensions to all force main bends.

7. Length of pipe from center to center of manholes, and length of stubs out of manholes.

8. Length and location, witnessed to three (3) points of all casing pipe at each end.

9. Materials installed:

    i. Size, type, class, joint and manufacturer of pipe.

    ii. For pressure sewers, a diagram of all appurtenances in each valve structure shall be drawn with flow arrow.

    iii. A total record drawing quantity list.

10. The Liber and Page number for each easement obtained for the construction of sewer as well as any existing easement involved in the project shall be noted.

11. House lead locations:

    i. Information shall be obtained from inspection records and transferred to the plans.

    ii. Location of wye measured from downstream manhole.

    iii. Length of lead.

    iv. Length of any risers, if placed.

    v. Location of end of lead measured from downstream manhole.

D. Detention/Retention/Infiltration Basins

1. Width and length of top and bottom of basin.

2. Elevations at sufficient intervals to verify basin side slopes and capacity.

3. Location, width and elevations of basin overflow facility.

4. Invert elevation of inlet and outlet pipes.

5. Basin outlet restriction size.

6. Calculations of the basin volume between the high water elevation and the invert of the outlet pipe for a detention basin, and the bottom of the basin for a retention basin (based on as-built elevations).

E. Drainage Ditches and Swales

1. Location of centerline of all ditches and swales with respect to property lines.

2. Elevations of top and bottom of ditch and swales at lot corners.

3. Elevations at top and bottom of ditch and swales along all road frontages.

F. Paving

1. Elevations shall be shown at minimum 50 feet intervals for top of curb, gutter, and top of pavement including sidewalks and bike paths, also at high & low points, beginning, middle and end points of curves, and any other critical points.

2. Indication of changes in road widths, cross sections, or changes in radii.

G. Witnesses

1. Witnesses shall be from existing permanent structures excluding property lines that can be measured in the field.

H. Record Drawing Plans in Electronic Form

1. Upon final approval of the engineering plans, the developer's engineer shall provide the Township with an electronic copy (in GIS/State file format or in AutoCAD with two coordinates as specified by the Township Engineer) of the record drawing plans. This is required so that the record drawing improvements can be added to the Townships GIS database.

SECTION 3 – PLAN REQUIREMENTS

3.1 PLANS AND SPECIFICATIONS

The following establishes the minimum requirements for engineering plans for submittal to the Township.

Prior to starting any design, the design engineer is encouraged to make use of maps and information available at the Township and County offices. It shall be the responsibility of the design engineer to verify utility locations provided by the Township, Oakland County, or other agencies.

The plans and specifications shall be prepared by or under the supervision of a Civil Engineer registered in the State of Michigan and the plans shall have imprinted thereon the signature and original seal of that engineer.

Plans shall consist of a title sheet, ALTA plan or Certified Surveyor's Plan of existing features and easements, general improvement plan, demolition plan, utility plans and profiles, soil erosion and sediment control plan, project specific notes and details, and standard detail sheets. Sheet size shall be 24" x 36". A scale of 1" = 50' horizontal and 1" = 5' vertical for plan and profile sheets is preferred. Overall development/general plan and/or utility layout plan may be at 1" = 100'. Details specific to the project shall be drawn at scale.

3.2 TITLE SHEET

A title sheet, or the first sheet of a set of plans, shall show the following:

A. Project Title.

B. Name, address, and phone number of proprietor.

C. Name, address, and phone number of designing engineer.

D. The seal and signature of engineer responsible for the project.

E. Location map drawn to an appropriate graphic scale, generally not greater than 1" = 100' nor smaller than 1" = 2000', with North indicator, showing location of project area with respect to the surrounding area.

F. Reference bench marks, established at intervals not greater than 1,200 feet and on Township Datum North American Vertical Datum of 1988 (NAVD 88), convenient to the proposed construction. Each benchmark shall be noted with number, location, description and established elevation. A minimum of two bench marks shall be provided.

G. Legal description of the property including sidwell number and acreage.

H. Listing of submittal dates and revision submittal dates.

I. Sheet Index.

J. Quantity List of proposed Public Improvements.

K. A statement indicating that the design engineer has reviewed the Charter Township of Oxford Engineering Design Standards and other applicable ordinances and that the prepared work is in conformance with the standards and ordinances. All exceptions must be indicated.

L. The Developer shall be responsible for obtaining an NPDES permit when required and ensuring compliance with all applicable permit regulations, including but not limited to, inspection, restoration and record keeping requirements. Reports from the Certified Storm Water Operator shall be made available to the Township.

3.3 GENERAL PLAN

A general plan sheet shall provide the overall proposed development and should show the following:

A. North arrow.

B. Street names, street widths, subdivision names, lot numbers and dimensions, and permanent parcel numbers and dimensions for all unplatted parcels for the site and adjacent properties.

C. All proposed and existing utilities and easements.

D. Zoning classification of petitioner's parcel and all abutting parcels.

E. Total acreage and net acreage (minus right-of-way).

F. General notes applicable to tall drawings.

3.4 SOIL EROSION AND SEDIMENTATION CONTROL PLANS

If conducive, the proposed soil erosion and sedimentation control plans may be incorporated with Drainage Area plan sheet or other appropriate construction plans, keeping in mind that a separate review is necessary for an Oakland County soil erosion control permit.

As a minimum, soil erosion and sedimentation control plan sheets shall include:

A. North arrow.

B. Existing topography and proposed ground contours at 2 foot intervals extending 100 feet past the boundary of the site. All elevations shall be on the Township datum (NAVD 88). All existing ground elevations shall be shown to tenths of a foot.

C. Location, types and details of perimeter and on-site sediment and erosion control methods.

D. An erosion control and construction sequence schedule.

E. Location and details of mud mats.

F. Location, dimensions, surface material and thickness, method of containment, and restoration of construction staging and equipment and material storage areas.

G. Temporary onstruction sediment basins (when indicated on the plans or required due to site conditions):

1. Location of basin.

2. Calculations for the size of the basin and amount of sediment loading.

3. Method and/or location of conveying site runoff to the basin and erosion control measures along drainage route.

4. Location, cross-section, and details of access route to basin for periodic dredging and maintenance.

5. Maintenance schedule for removing accumulated sediment and indicating method and location of disposal of sediment basin soils.

6. Location and elevation of sodded emergency spillway.

7. Cross-section of basin side slopes, top of bank/basin bottom elevations, inlet/outlet elevations, and water surface elevation/depth of storage.

8. Plan or description for the removal of the temporary basin and restoration of the affected area once permanent control devices and stabilization are in place.

H. The following “Erosion Control Standard Notes” shall be placed on the soil erosion and sediment control plans:

1. All erosion and sedimentation control work shall conform to the current standards and specifications of the Oakland County Drain Commissioner and the Charter Township of Oxford.

2. Daily inspections shall be made by the Contractor for effectiveness of erosion and sedimentation control measures. Any necessary repairs shall be performed without delay.

3. Erosion and any sedimentation from work on this site shall be contained within the work area and not allowed to collect on any off-site areas, roadways, or in waterways. Waterways include both natural and man-made open ditches, streams, storm drains, lakes, ponds and wetlands.

4. The Contractor shall apply temporary erosion and sedimentation control measures as directed on these plans and where otherwise required by the work. The Contractor shall remove temporary measures as soon as permanent stabilization of slopes, ditches, and other stabilization improvements have been accomplished.

5. The Contractor shall preserve natural vegetation as much as possible. All on site and off site areas disturbed by construction shall be restored to equal or better than original existing conditions.

6. Protect all existing trees that are to remain, including their branches and roots, from damage due to this work unless specifically identified for removal. At the discretion of the Township the contractor may be required to place tree protection fencing or other protection devices to prevent unnecessary damage.

7. Stabilization of all disturbed areas shall be established using the appropriate vegetation within 5 days of completion of final grading.

8. The Contractor shall sweep the existing streets surrounding the project site as needed.

9. The Contractor shall be responsible for dust control created from the project and shall provide all equipment and material necessary to keep dust in check at all times. The Contractor shall respond immediately to any and all complaints.

3.5 GRADING PLANS

Scale of sheets shall be 1" = 50'. As a minimum, grading plan sheets shall include:

A. North arrow.

B. Existing topography and ground contours at 2 foot intervals extending 100 feet past the boundary of the site. All elevations shall be on the Township datum (NAVD 88). All existing ground elevations shall be shown to tenths of a foot.

C. Centerline of street stationing with centerline or top-of-curb elevations at 50-foot intervals, all radii, high points, low points, and other critical locations.

D. Existing and proposed ground elevations shall be provided at all lot corners along the boundaries of the development and 50 foot intervals along all site boundary lines.

E. Floodplain contour line, where applicable.

F. Wetland limits and any buffer as specified in the township Zoning Ordinance, and the name of the consultant that flagged the wetland limits.

G. Rim elevations of all existing and proposed structure elevations to one one-hundredth (.01) of a foot.

H. Proposed top of curb or shoulder elevation opposite each front lot corner to one one-hundredth (.01) of a foot.

I. Proposed ground elevation at each lot corner (front and rear), side lot elevations between houses and proposed building corners indicating walkouts, swales, and finished hydrant grades to tenths of a foot.

J. Provide sidewalk elevations at all lot corners to one hundredth of a foot. Slope across walk shall be ¼ inch per foot pitched towards the curb or drainage swale.

K. Provide elevations for pavement, sidewalks, parking islands and other locations as required by the Township Engineer.

L. When swales for lot drainage are called for on the plan, swale elevations at the high point adjacent to the house, the back of the house, and the front of the house shall be provided. General flow direction of swales shall be shown with arrows.

M. Drainage flow arrows shall be provided to indicate the direction of surface water drainage over the development.

N. In residential developments each grading plan sheet shall show or contain a note indicating the location of footing drain/sump pump discharge if one is to be provided.

O. Show any swales or ditches conveying emergency overflows or off-site pass thru drainage by arrows and a typical section of the swale or ditch with calculations as necessary.

3.6 PAVING PLANS

Paving plans involving proposed improvements to public or private roads shall incorporate the requirements set forth by the appropriate authority having jurisdiction, that being the Michigan Department of Transportation for any State Highway, the Road Commission for Oakland County for any county road or the Charter Township of Oxford for any local private road. The paving plan sheet shall include, at a minimum:

A. All elevations shall be on the Township datum (NAVD 88).

B. North arrow.

C. Street names, street and easement widths, subdivision names, lot numbers and frontage dimensions, for all unplatted parcels.

D. Location of existing and proposed utilities crossing or within proposed right-of-way.

E. Existing and proposed easements on the site.

F. Existing adjacent streets.

G. Cross-section of proposed pavement section providing the following minimum information:

1. Paving type, thickness and specification.

2. Base type, thickness and specification.

3. Pavement width, crown and cross-slope.

4. Curb section (where applicable).

5. Subgrade treatment.

H. All vertical curve data and radii of all horizontal curves.

I. Construction notes.

J. A tabulated list of quantities appearing on that sheet.

K. Sidewalks and approaches.

L. Proposed public street approaches with alignment and dimensions.

M. The profile portion of the sheet, when applicable, shall appear below the companion plan portion, generally projected vertically, and shall show at least the following:

1. Existing and proposed centerline of road profile.

2. Proposed top of curb profile.

3. Existing and proposed storm sewer and/or ditch profiles.

4. Roadway stationing.

3.7 PLAN AND PROFILE SHEETS (SANITARY, WATER MAIN, & STORM SYSTEMS)

The plan portion of sheet shall include, at minimum:

A. Scale of plan portion of sheet shall be 1" = 50'. Scale of profile portion of sheet 1" = 50' horizontal and 1" = 5' vertical.

B. All elevations shall be on the Township datum (NAVD 88).

C. Each plan and profile sheet shall include a tabulated list of quantities appearing on that sheet.

D. Structures shall be identified by numbers assigned consecutively and increasing in direction opposite to direction of flow in each sewer.

E. All existing or planned surface or underground improvements in streets or easements in which sewer construction is proposed, and in adjacent areas if pertinent to design and construction.

F. Street names, street and easement widths, subdivision names, lot numbers, lot dimensions, and parcel numbers and frontage dimensions for all unplatted parcels.

G. Location, length, size and direction of flow of each section of proposed sewer between manholes. Lengths for water mains should be provided between structures and fixtures such as bends, tees, etc.

H. Natural or man-made features such as drainage courses, county drains, lakes, wetlands and floodplains.

I. Locations of all manholes, air release valves (ARV), Intermediate flushing connections (IFC), branched flushing connections (BFC),terminal flushing connections (TFC), and other sewer appurtenances and special structures.

J. House leads, wye branches or tee inlets, to be constructed with the proposed sewer.

K. Limits of special backfill requirements.

L. A note stating that the Contractor shall adjust existing manhole covers, as required.

M. All proposed utilities need to be profiled with all inverts shown to the nearest on one hundredth (.01) of a foot.

N. The profile portion of sheet shall appear below companion plan portion, generally projected vertically, and shall show at least the following:

1. Size, length, slope, type and class of pipe, and bedding for each section of proposed sewer between structures.

2. Limits of special backfill requirements.

3. Profile, over centerline of proposed sewer, of existing and proposed finished ground and pavement surfaces.

4. Location of existing and proposed utilities crossing the line of the sewer or otherwise affecting sewer construction, with a note of caution.

5. Location of all proposed structures, with structure number, invert elevation/direction of all connecting pipes, top of casting elevation, and structure type. For water main gate valves, the top of pipe elevations in addition to the rim elevation. All water main size 12” and greater must be profiled.

6. Location of all house leads and wye branches to be constructed with the proposed sewer.

7. Height of any proposed risers.

8. Invert elevation at property line or easement line for house leads to be included with sewer construction.

9. A note stating that the Contractor shall verify the location and elevation of existing utilities prior to construction.

3.8 STORM WATER MANAGEMENT AND PRETREATMENT SYSTEMS

A. A drainage area plan indicating the area of runoff to a particular catch basin, inlet, swale is required as part of a development plan submittal.

B. Storm water management basins and/or pretreatment systems can be placed on the storm drainage plan and profile sheets or on a separate plan sheet.

C. Design calculations for detention/retention basin volumes required and provided, storm sewer systems calculations, basin outlet restriction, and a plan of the drainage area tributary to the basin shall accompany construction plans submitted for review.

D. For all open detention/retention basins, indicate the top-of-bank, high water and bottom of pond elevations, any permanent water elevation or water table per soil boring, and side slopes. Provide location, elevation and details of basin outlet restriction and emergency overflow spillway or manhole for detention basins.

E. For enclosed detention basins, provide high water and bottom of system elevations, any permanent water elevation or water table per soil boring, cross-section or profile of system; location, elevation and details of outlet restrictor, and method of providing for emergency overflows.

F. For infiltration (recharge) systems, provide soil boring logs and soils analysis, volume requirements, percolation rate, infiltration/exfiltration design calculations, cross-section or profile of system, and method for handling emergency overflows caused by rainfall in excess of the design storm event or failure of the infiltration/exfiltration medium. Soil boring for retention basins also to show ground water level, and soil types underlying the basin.

G. For open basin pretreatment systems, provide storage volume calculations, top of bank, high water and basin bottom elevations, side slopes, location of emergency overflow, and details of outlet control.

3.9 DETAIL SHEETS

A. The Sanitary Sewer, Water Main, Soil Erosion, Paving, Storm Sewer, and Landscape Standard Detail sheets as adopted by the Charter Township of Oxford shall be included with plan submittals as applicable and are considered a part of these design standards. A reproducible mylar copy of these details may be obtained from the Township Building Department.

B. Any additional detail sheets shall include complete details for all water or sewer appurtenances and structures to be included with the plans

C. Scales for special details shall be selected to clearly portray intended construction and component or equipment arrangement. Scales used shall be clearly identified.

3.10 PLOT PLANS

A. Prior to issuance of a building permit the permit holder shall submit a plot plan drawing to the Building Department for review and approval. All grades shown on the plot plan shall be in accordance with the approved subdivision grading plans. All plot plans shall be in accordance with an accurate boundary line survey and include the following information:

1. Elevations at each lot corner and grade change points.

2. Location of all the new construction on the site and distances from lot lines.

3. All proposed and existing utility structures.

4. Sidewalks and driveways.

5. All setback and easement locations.

6. Wetland boundaries, water surface and floodplain elevations.

B. Prior to backfill inspection as-built brick grade elevations must be submitted for review and approval by the Building Official.

C. Prior to issuance of a Certificate of Occupancy a Final Grade Certificate must be submitted and approved by the Building Official indicating that all lot grading has been done and accomplished in accordance with the approved plot plan (within an allowable tolerance of plus or minus 0.10 feet). A temporary Certificate of Occupancy may be issued by the Building Official upon the posting by the permit holder or his authorized agent, of a cash deposit in the sum of one thousand dollars ($1,000), to be released upon satisfactory completion of grading and the submission and approval of a grading certificate as hereinbefore provided.

SECTION 4 – WATER MAIN

4.1 GENERAL

This standard establishes the minimum requirements for the design of water main systems in the Township. All water main systems and its appurtenances shall be designed to the current standards of the Charter Township of Oxford, the Oakland County Drain Commissioner (OCDC), the Michigan Department of Environmental Quality (MDEQ), and any other agencies having jurisdiction over the water main. The design engineer shall undertake sufficient research to determine if the proposed water main has adequate pressure to handle the anticipated volumes. Such research will be provided to the Township with the submission of plans for review by the township engineer.

Prior to starting any water main design, the design engineer is encouraged to make use of maps and information available at the Township offices and at the Oakland County Drain Commissioner's office. It shall be the responsibility of the design engineer to verify utility locations provided by the Township and the OCDC.

4.2 DESIGN CONSIDERATIONS

A. GENERAL

1. Water mains shall be designed to provide adequate volumes for fire fighting purposes. Current International Organization for Standardization (ISO) Standards shall be used as a minimum guideline.

2. Water mains shall be looped whenever feasible in order to increase reliability. The Township shall review all water main layouts for adequate looping.

3. Water mains shall be extended to the property limits and valves left for future extensions when not looped. Dead end lines shall end with a hydrant followed by gate valve and well and a minimum 10 foot stub beyond the gate well. End hydrants can be relocated upon future extension, if feasible. Water main extensions shall be constructed across the property frontage unless the Oxford Township Water master plan conflicts.

4. All water mains shall be installed with a minimum cover of 5' 6" below proposed finish grade.

5. Water mains shall be designed using two-45 degree bends rather than 90 degree bends when possible.

6. A 5' 6" minimum horizontal clearance at all open drain crossings is required between the bottom of the drain and the top of the water main.

7. Where water main is constructed in pavement areas or within a one-on-one influence of pavement, compaction of backfill to 95% maximum density is required and shall be tested by an independent laboratory. All structures including, but not limited to, gate wells, hydrants, stop boxes must be outside any pavement.

8. All water main material shall be in accordance with the most current Oakland County Drain Commissioner Standard Water Main Detail Sheets which must be included with the plan set.

9. All water mains shall be designed for 150 P.S.I. working pressure.

10. Concrete thrust blocks or other approved restraint systems shall be provided at all bends, tees, hydrant shoes, at plugs and caps and at any crosses where necessary to prevent lateral movement of the pipe. Thrust blocks shall bear against undisturbed earth and shall have sufficient bearing area to develop the full resultant axial thrust of the pipe at test pressure.

11. All water mains 12” in diameter and larger must be profiled.

B. SERVICE LEADS

1. Service leads shall be type “K” copper or HDPE pipe with a minimum of 1” in diameter. Service leads shall be sized according to volume and pressure requirements of the development structure.

2. Service leads must be a separate/individual connection to the water main.

3. All leads for irrigation purposes must tap and branch from the existing domestic lead with a separate meter and back flow preventer. A tap to the fire service lead is not acceptable.

4. All services shall include a corporation valve at the main and a curb stop valve and box inside of right-of-way, or easement.

5. No house leads shall be made to a transmission main 16" in diameter or larger without approval from the Township, it’s Engineer, and any other agencies having authority over the water main.

6. All water service connections two inches (2) and smaller shall be made by the Oakland County Drain Commissioner.

7. All water taps greater than two inches (2) require a gate valve and well (i.e. no valve boxes).

8. A separate fire service tap is required for buildings with fire protection. Domestic service cannot come off the fire lane.

C. DESIGN FLOWS

The Design Engineer shall arrange a meeting with the Township Engineer and the Fire Chief to discuss specific fire protection needs. Design calculations shall be furnished upon request to the Engineer.

Minimum fire demands:

ZONING	FIRE DEMAND
Single family residential	Minimum of 1,200 gallons per minute
Multiple family & Institutional	Minimum of 2,000 gallons per minute
Commercial & Industrial	Minimum of 3,000 gallons per minute

D. MINIMUM SIZE

Minimum water main size is as follows unless design dictates otherwise:

ZONING	MINIMUM SIZE REQUIREMENTS
Single family residential	8" in diameter or larger
Multiple family & Institutional	12" in diameter or as indicated on the Township's water main Master Plan
Commercial & Industrial	*12" in diameter
Major Roads	12" in diameter or as indicated on the Township's water main Master Plan

*Except in a looped system of 1,500' or less where 8" diameter mains may be permitted.

E. LOCATION OF WATER MAINS

1. Water mains shall generally be located on opposite sides of streets from sanitary and storm sewers. Water mains shall be located a minimum of eight (8) feet inside the public right-of-way line or permanent easement, and shall have twenty (20) feet available for operations and maintenance.

2. Water mains shall be constructed on both sides of highways and other major thoroughfares in order to minimize the number of crossings under a major thoroughfare.

3. All water main, fire hydrants, valves, service valve boxes and other appurtenances not within a public right-of-way shall be located in a minimum 20-foot wide permanent easement, centered on the water main.

The easement shall extend ten (10) feet beyond a hydrant or valve. Such easement shall be dedicated to the Township, with restriction against use or occupation of easements by the property owners and/or by other utilities in any manner which would restrict water main maintenance or repair operations.

i. A written description and drawing of the easement shall be prepared by the Design Engineer and be presented to the the Oakland County Drain Commissioner's office, and the Township for examination before recording.

ii. Easements for possible extensions shall be provided to the property lines at locations designated by the Township and its Engineer.

4. Water mains shall preferably be constructed outside of paved parking areas, streets, drives, and rear-yards.

5. Within unplatted projects, water mains shall be installed parallel to the property lines or building lines.

6. The minimum separation from outside of water main to outside of any sewer shall be ten (10) feet horizontal and eighteen (18) inches vertical.

F. VALVES AND GATE WELLS

1. When connecting to an existing water main, a tapping sleeve, gate valve and well will be required unless connection to the existing water main can be made without interrupting service. Only mechanical joint tapping sleeves shall be used.

2. All gate valves 4 inches and greater shall be installed in an appropriate sized gate well, except hydrant shut-off valves.

3. Minimum valve locations:

i. Single Family residential: Valves shall be arranged so that no single water main failure will require more than 1,000 feet of water main, not more than 26 homes and not more than two hydrants to be out of service.

ii. All other Zoning Classifications: Valves shall be so arranged that no single water main failure will require more than 800 feet of water main or more than one hydrant to be out of service.

4. Valves shall be arranged such that any section of water main can be isolated by closing not more than four (4) valves.

5. Gate valves and wells are also required on both sides of a major thoroughfare when the water main crosses said thoroughfare. Valves shall generally be located at street intersections, and in a matter that the gate well structure will clear sidewalks, five (5) feet from the intersecting street right-of-way line.

6. Valves shall open as specified in the OCDC Water Main detail sheets.

G. HYDRANTS

1. Spacing of hydrants shall be considered as individual cases and the design engineer is encouraged to arrange a meeting with the Township Engineer and Fire Chief to review specific fire protection requirements. The Fire Chief shall have final approval for number and arrangement of hydrants. Typical minimum hydrant spacing is as follows:

ZONING	MINIMUM HYDRANT SPACING REQUIREMENTS
Single family residential	Within 250' of dwelling units
All Other Zoning Classifications	250' from any exterior portion of building "as the hose lies"

2. Generally hydrant location in single family residential areas shall be ten (10) feet inside the street right-of-way line and located at lot lines.

3. Hydrant nozzles shall face the road unless otherwise directed by the Fire Chief.

4. Hydrant leads shall be six (6) inch diameter minimum with a maximum length of 20 feet. Hydrant leads longer than 20 feet must be eight (8) inch diameter and have an eight (8) inch gate valve and well installed at the tee.

5. Hydrants shall be plumb and set to grade before final acceptance.

6. Hydrants shall be factory painted red in accordance with AWWA C502.

7. Hydrants types shall be in accordance with the Oakland County Drain Commissioner Standard Water Main Detail Sheets.

8. Hydrant's thread shall be National Standard Thread unless otherwise approved and specified by the local fire authority.

9. Hydrants installed as yard hydrants must be compatible with the rest of the system.

10. No fire suppression or domestic service leads are allowed to extend or be branched off from a 6" hydrant lead.

11. When near a street intersection, hydrants shall be located 15 feet from the intersecting street right-of way.

12. Hydrants shall be located at least 25 feet from any exterior wall of a masonry building and at least 50 feet from any exterior wall of frame or equivalent construction including brick and stone veneer.

13. Hydrants located in parking areas shall be protected with a six (6) inch concrete curb or standard guard posts.

14. All dead end water mains shall end with a hydrant blow-off, gate valve and minimum ten (10) feet of stub and cap for future extensions. A temporary blow-off in lieu of a hydrant will be considered based on hydrant spacing and future extension of the water main.

H. PRESSURE REDUCING VALVES

1. In systems where two or more pressure districts are to be interconnected, the plans shall include a pressure reducing valve near the point of connection to the higher pressure district to balance pressures across the new water system. The PRV shall conform to the Township's Standards for such facilities. The PRV design must be approved by OCDC and drawn on the plans.

2. Gate valves shall be installed both upstream and downstream of each pressure reducing valve to permit isolation of the pressure reducing valve for maintenance and repair.

3. A bypass line that is equivalent in pipe size to the water main and an additional bypass gate valve and well shall be provided.

4.3 FINAL ACCEPTANCE

A. Construction observation shall be required as described in *Section 2.7*. This includes construction of all water main structures, pipe installation, and testing.

B. Water mains shall be flushed and cleaned, and followed by chlorination and bacteria testing. Water main sterilization shall be in accordance with all local, state and federal regulations.

C. Water main connections to the existing system will not be allowed until written verification of the approved tests is received by the Township and its engineer.

D. A set of approved Record Drawings, an approved Bill of Sale, and a copy of any recorded easements that were required for construction, shall be submitted to the Township and Oakland County Drain Commissioner's office prior to final acceptance of the water main.

E. No new water taps will be allowed until final acceptance of the water main**.**

SECTION 5 – SANITARY SEWER

5.1 GENERAL

This standard establishes the minimum requirements for the design of sanitary sewer systems in the Township. All sanitary sewer systems and its appurtenances shall be designed to the current standards of the Charter Township of Oxford, the Oakland County Drain Commissioner (OCDC), the Michigan Department of Environmental Quality (MDEQ), Ten State Standards, and any other agencies and standards having jurisdiction over the sanitary sewer. The design engineer shall undertake sufficient research to determine if the proposed sanitary sewer and the existing outlet sewer have adequate capacity to handle the anticipated volumes. Such research will be provided to the Township with the submission of plans for review by the Township engineer.

Sanitary Sewers are also subject to the Charter Township of Oxford Water Ordinance and Sewage Ordinance.

Prior to starting any sanitary sewer design, the design engineer is encouraged to make use of maps and information available at the Township offices and at the Oakland County Drain Commissioner's office. It shall be the responsibility of the design engineer to verify utility locations provided by the Township and the Oakland County Drain Commissioner.

5.2 DESIGN CONSIDERATIONS

A. GENERAL

1. No connection receiving storm water, surface water, water softener backwash discharge, or ground water shall be made to sanitary sewers.

2. A minimum vertical clearance of 18 inches shall be provided at all crossings with other utilities. A minimum horizontal separation of 10 feet shall be provided between the outside of the sanitary sewer pipe and the outside of any water main or storm sewer pipe.

3. Sanitary sewers shall be located so as to provide unrestricted access for maintenance and inspection purposes. When located parallel to the roadway the sanitary sewer shall be constructed in the opposite side of the right of way as the water main when possible.

4. A grease interceptor will be required for all food service operations. No connections for domestic waste will be allowed to the interceptor.

5. The current Oakland County Drain Commissioners Sanitary Sewer Standard Detail sheets must be included with the plan set.

6. The proprietor must demonstrate that any wastewater resulting from grocery stores and car washes are similar in quality to domestic wastewater as stated in the Township Utility Ordinance.

7. Design shall incorporate the use of materials and sizes as specified in the Oakland County Drain Commissioners Sanitary Sewer Standard Details & Specifications..

B. LOCATION OF GRAVITY, FORCE MAIN AND LOW PRESSURE SANITARY SEWERS

1. Sanitary sewers for existing subdivisions and other establishments shall generally be located on opposite sides of streets from water mains, ten (10) feet inside the public right-of-way line. Locations less than ten (10) feet shall require a permanent easement parallel to the right-of-way necessary for future maintenance.

2. All sanitary sewers outside of the right-of-way shall be located within a minimum 20-foot wide easement, centered upon the sewer. Such easement shall be dedicated to the Township, with restrictions against use or occupation of easements, by the property owners and/or by other utilities, in any manner that would restrict sewer maintenance or repair operations.

   i. A written description and drawing of the easement shall be prepared by the Design Engineer and be presented to the Township for review by the Township Engineer for acceptance before recording.

   ii. Easements for possible extensions shall be provided to the property lines at locations designated by the Township Engineer.

   iii. Sewers and their appurtenances shall preferably be constructed outside of paved parking areas, streets, drives, sidewalks, and rear-yard areas.

   iv. Within unplatted projects, sewers shall be installed parallel to the property lines, or building lines, with clearance distances to accommodate the full width of the proposed easement or the distance necessary to accommodate a slope of one foot horizontal to one foot vertical from invert of sewer to ground surface, whichever is greater (20 foot minimum).

C. SEWER CAPACITY

1. Sanitary sewers shall be designed to serve all areas as set forth in Ordinance 107A. Sanitary sewers serving a tributary area beyond the

project limits shall extend to the boundary of the project site to provide for future extension, unless the adjacent property is part of another sewer district.

2. For design purposes, population shall be based on the current accepted MDEQ minimum persons per detached single-family home site. Population figures for all other dwelling units and buildings shall be based upon the current Charter Township of Oxford "Schedule of Unit Assignment Factors". The adopted unit factors shall be used to convert the different occupancy types to equivalent single-family units.

3. Submission for review shall include a tabulation of occupancy (usage) types and the conversion of these into terms of equivalent single-family units. The tributary area, in acres, may be used to calculate dwelling units based on density allowed in the Zoning Ordinance.

4. Sewage Quantities for Pipe Design

   For service areas with design populations greater than 500 but less than 28,400, sewer design capacity per household shall be based on the following formula:

$$Q = (100)\ \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$

   Q = Design capacity in gallons per household per day

   P = Design population expressed in thousands

   For service areas with design populations exceeding 28,400, sewer design capacity shall be 250 gallons per household per day.

D. PIPE SIZE & MATERIAL

1. SIZE

TYPE OF SEWER	MINIMUM PIPE SIZE
Gravity Sanitary Sewer	8” diameter
Low Pressure Sanitary Sewer	2” diameter

2. MATERIAL

   i. Gravity sewer pipe material shall be truss, reinforced concrete, HDPE, or SDR 23.5 PVC.

ii. Pressure sewer pipe material shall be HDPE or ductile iron pipe.

E. HYDRAULICS

1. The sewer constants for design calculations are as follows:

TYPE OF SEWER	Formula	Constants
Gravity Sanitary Sewer	Mannings Formula	n=0.013
Low Pressure Sanitary Sewer	Hazen-Williams	C=120
Force Main	Hazen-Williams	C=130

2. Minimum design velocity for gravity and low pressure sanitary sewers shall be two (2) feet per second, and maximum design velocity shall be ten (10) feet per second, with pipe flowing full. The slope of the sewer between the last two manholes at the upper end of any gravity lateral shall be increased above the minimum permissible pipe slope, wherever possible, to obtain a more rapid cleansing velocity.

3. Minimum allowable Pipe Slopes For Gravity Sewers (10 State Standards)

PIPE DIAMETER (INCHES)	MINIMUM SLOPE (FEET PER 100 FEET)
8	0.40
10	0.28
12	0.22
14	0.17
15	0.15
16	0.14
18	0.12
21	0.10
24	0.080
27	0.067
30	0.058
36	0.046

4. Allowances for Changes in Pipe Size in Gravity Sewers

   Maximum flow velocity for pipe flowing full shall be maintained by matching 0.80 of the diameter depth above invert for pipe size increases.

5. Allowances for Direction Change in Gravity Sewers

   Provide a drop of 0.10 feet in the downstream sewer invert for a direction change of 30 degrees or greater to compensate for velocity head loss of the incoming flow.

F. BASIS OF DESIGN-LOW PRESSURE SANITARY SEWER

1. A low pressure sanitary sewer system consists of individual grinder pump stations at each building site, connecting to a common pressurized sewer to convey domestic waste to an acceptable outlet.

2. Delineation shall be shown between the proposed pressure sewer system and any other sanitary sewer system within or in relation to the development.

3. Submissions for review shall include a tabulation of occupancy (usage) types and the conversion of these into terms of equivalent single-family units. The tributary area, in acres, may be used to calculate dwelling units based on density allowed in the Zoning Ordinance. The adopted "Schedule of Unit Assignment Factors" shall be used to convert the different occupancy types to equivalent single-family units.

4. Property owners will be required to use a Contractor approved by the Township to connect to the low pressure sewer, grinder pump installation, and the installation of the sewer lead.

5. Connections to the low pressure sewer shall be initiated through the Township Building Department.

6. Property owners shall be required to use the approved Township grinder pumps when connecting to the low pressure sewer.

G. DEPTH OF SEWERS

1. No sanitary sewer shall have less than five (5) feet of cover.

2. In general, gravity sanitary sewers shall have a minimum depth of ten (10) feet from top of curb (or centerline if uncurbed) to the invert of sewer. The sewer shall have sufficient depth to serve a standard depth basement by gravity.

H. SPECIAL BACKFILL REQUIREMENTS

1. Granular material meeting the requirements for MDOT Granular Material, Class II, shall be required for full depth backfill of trenches, above a horizontal line one (1) foot above the pipe, under existing or planned road surfaces, pavements, curbs, driveways, parking areas and sidewalks, and where the trench edge is within three feet of the edge of existing or planned pavements.

2. Backfill shall be compacted to a minimum of 90% maximum dry density from above the pipe to 18 inches below grade installed in 6 inch layers. Compaction shall be 95% of maximum dry density for top 18 inches of trench. The Compaction results will be determined by a Modified Proctor Test, ASTM Designation D-1557. Frozen material is prohibited. These requirements should be observed for areas that are within a one on one influence of roadway.

3. Building lead trenches shall have compacted granular backfill within the entire street right-of-way where sidewalks are required. Compacted granular backfill shall be provided between all utility crossings.

I. BUILDING LEADS

1. Unless otherwise approved, construction of building leads from a gravity sanitary sewer to the easement, right-of-way, and/or property line, for each fronting parcel in which the sewer is designed to serve, shall be included with the construction of the sanitary sewer.

2. Where construction of building leads to the property line is not required concurrently with gravity sanitary sewer construction, a wye branch with riser, and water-tight stopper or plug, shall be installed for every lot or building site which the sewer is designed to serve.

3. For service leads beyond the right-of-way, cleanouts shall be installed in accordance with the local plumbing codes and in no case greater than one-hundred (100) feet measured from the main line public sanitary sewer or at any bend 45 degrees or greater.

4. Minimum size for building leads shall be six (6) inches in diameter, SDR 23.5.

5. Minimum slope for building leads shall be 1/8 inches per foot (1.00%).

J. MANHOLES - GRAVITY SEWER

1. Location

   Manholes shall be constructed at every change in sewer grade, alignment, or pipe size, and at the end of each sewer line. Generally maximum distance between manholes shall be as follows:

DIAMETER OF SEWER	MAXIMUM MANHOLE SPACING
8" - 21"	400'
24" – 30"	450'
36" – 42"	500'

2. Monitoring manholes are required for all non-residential connections to the sanitary sewer system.

3. Drop Connections

   i. Internal drop connections are required at manholes where the outlet pipe is 18 inches or more below the inlet pipe. Inverts shall be matched at the flow line whenever possible if 18 inches or less.

   ii. Generally, drop connections are discouraged and will be considered only if other alternatives are not acceptable. External drop connections are not permitted.

K. AIR RELEASE VALVES (ARV), INTERMEDIATE FLUSHING CONNECTIONS (IFC), BRANCHED FLUSHING CONNECTIONS (BFC) AND TERMINAL FLUSHING CONNECTIONS (TFC) - LOW PRESSURE AND FORCEMAIN SEWER

1. Air Release Valves shall be located at all high points in low pressure and force main sewers.

2. Intermediate Flushing Connections in low pressure and force main sewers shall be located so as not to allow more than 1000 feet between structures. Intermediate flushing connections may also be required at significant low points.

3. Branched Flushing Connections shall be located at places where the low pressure sewer branches off.

4. Terminal Flushing Connections shall be located at the ends of the low pressure and force main sewer systems.

L. STUBS

Where future connections to a manhole are anticipated, stubs or blind drop connections, with watertight bulkheads, shall be provided. Stubs shall be 10 feet minimum in length. Deeper sewers should allow for one on one excavation for future connections (20' sewer – 20' stub).

5.3 FINAL ACCEPTANCE

A. Construction observation shall be required as described in *Section 2.7*. This includes construction of all sanitary structures, pipe installation, pumps, and testing.

B. All sewers shall be flushed and cleaned followed by air testing in accordance with all local, state and federal regulations. Videotaping of the sewer shall be conducted and reviewed to assure the sewer is acceptable.

C. A set of approved Record Drawings, an approved Bill of Sale, and a copy of any recorded easement that was required for construction, shall be submitted to the Township prior to final acceptance of the sanitary sewer.

SECTION 6 – STORM WATER MANAGEMENT

6.1 GENERAL

The management of increased storm water which results from the development of vacant land or expansions to existing facilities will be considered as a critical component of all development plans which are submitted to Oxford Township for approval. The intent of this standard is to provide guidelines for the sound management of storm water run-off and to provide sufficient flexibility for design professionals to develop innovative solutions that protect the resources of Oxford Township while meeting the objectives of water quality preservation and flood control.

All storm sewer systems and its appurtenances shall be designed to the current standards of the Charter Township of Oxford, the Oakland County Drain Commissioner, the Road Commission for Oakland County, the Michigan Department of Transportation, and other agencies having jurisdiction over the storm sewer. Additionally, the standards set forth in Township Ordinances 80B and 108A shall be adhered to.

The use of natural drainage features, shallow swales and landscape areas shall be incorporated into the drainage planning for a site whenever possible. The objective is to achieve a functional and aesthetically pleasing development that minimizes the use of extensive enclosed storm drains and large obtrusive storm water detention or retention basins while providing for the proper management of storm water runoff.

Development plans must present a unified design that, as a minimum, provides the following protections:

A. The design must show that the development will not cause any impact to downstream properties or upstream properties. Both the rate of storm water discharge, and the volume of storm water discharge must be considered.

B. The development plan shall be fitted to the topography and soil to create the least erosion potential and to effectively accommodate the increased runoff caused by changed soil and surface conditions during and after development.

C. The design must demonstrate the use of “Best Management Practices” for minimizing erosion and controlling sedimentation and other pollutants through all phases of construction.

D. The design must demonstrate that proposed buildings or other permanent structures on and adjacent to, a proposed development are and will remain safe from flooding.

6.2 SOIL EROSION AND SEDIMENTATION CONTROL

Under the Natural Resources & Environmental Protection Act (Act 451), Part 91 of 1994, the developer shall submit an erosion control plan to the Oakland County Drain Commissioner - Soil Erosion Control Division. The Soil Erosion and Sedimentation

Control Permit must be issued by the OCDC prior to any earth moving operations. The methods used for soil erosion control must be in accordance with the current Oakland County Erosion Control Manual and specifications.

An approved National Pollution Discharge Elimination System (NPDES) permit where applicable, will be required prior to the commencement of any earth moving operations.

To provide effective erosion and sedimentation control, practical combinations of the following technical principles shall be applied to the erosion control aspects of the plan:

A. Under Natural Resources & Environmental Protection Act 451, Part 91 of 1994, the developer shall submit an erosion control plan to the Oakland County Drain Commissioner for permit issuance. An approved soil erosion permit from Oakland County Drain Commissioner, as well as the National Pollution Discharge Elimination System (NPDES) permit where applicable, shall be required prior to the commencement of any earthmoving operations.

B. The permittee shall be responsible for maintaining temporary erosion control devices during all phases of construction.

C. The smallest practical area of land shall be exposed at one time during development.

D. When land is exposed during development, the exposure shall be kept to the shortest possible period of time.

E. Temporary vegetation and/or mulching shall be used to protect critical areas exposed during development.

F. Temporary sedimentation basins (debris basins or silt traps) shall be installed and maintained to remove sediment from runoff waters from land undergoing development.

G. Mud mats shall be installed at construction access points to provide a buffer area where vehicles can deposit mud and sediment prior to leaving the site, to control erosion from surface runoff, and to help control dust.

    1. Sediment basins for construction purposes shall be separated from permanent storm water detention or retention basins.

    2. Basins shall be designed in accordance with the current Oakland County Drain Commissioner's standards for sedimentation basin design.

    3. Construction runoff shall be directed to the basin in a controlled manner through mass grading techniques, diversion berms/swales, enclosed storm sewers or any combination thereof that would limit runoff velocities and provide for the least potential for erosion of the site.

H. Areas set aside on the site for equipment storage, laydown, fuel, lubricants, chemical compounds and material stockpiles shall be contained in such a manner as to prevent any leakage or spillage from contaminating the surrounding soils and groundwater, and from entering any storm water management system or existing surface waters.

I. Filters shall be provided at catch basins and culvert inlet points to prevent the accumulation of sedimentation into storm sewers for both new and existing systems.

J. Adequate dust control shall be maintained at all times. Surface streets adjacent to the site must be cleaned of any deposits on a daily basis.

K. On larger projects or when phasing is involved, the developer may be required to provide alternate construction drives to the site to avoid damage to newly constructed streets. All construction drives shall be approved by the township.

L. Permanent vegetation and storm water structures shall be installed as soon as practical in the development.

M. Whenever feasible, natural vegetation shall be retained and protected.

N. Riprap shall be required at all storm sewer outlet points and prior to entering pipe entrances to detention or retention basins. The minimum width of the riprap shall be a minimum two times the outside diameter of the pipe. The riprap shall extend from the bottom of the basin around to the top of the pipe. Two types of materials to be used may include:

    1. Eight (8) inch diameter to 15 inch diameter fragmented limestone or other suitable rock underlain with geotextile fabric. Cobblestone, broken concrete or grouted rip rap is not preferred. Larger diameter outlets may require larger riprap as velocity and flow condition dictate.

    2. Gabions installed per the manufacturer's specifications.

O. A bar screen is required for all pipe outlets and inlets eight (8) inch diameter and larger.

6.3 STORM WATER MANAGEMENT BASINS AND PRETREATMENT SYSTEMS

On-site storm water detention or retention is necessary for all developments in the Township (including private roads) whenever runoff is increased. Waiver of this requirement may be considered by the Planning Commission upon submittal of a request for waiver, and report stating the reasons why detention or retention should not be necessary. Such report shall include maps, charts, and calculations prepared by a

Professional Engineer registered in the State of Michigan. The report and the request shall be subject to review and recommendation by the Township Engineer.

Generally speaking, detention basins temporarily store storm runoff for a period of time in which the runoff is released through a positive outlet, at a controlled rate. Retention basins do not have a positive outlet, so that the stored runoff will percolate into the existing soils.

Infiltration (recharge) systems that store and release run-off through permeable soils to the groundwater may be allowed under specific circumstances and with the review and approval of the Township Engineer.

In cases where the requirements for detention/retention basins have been waived, storm water pretreatment (in the form of permanent debris and sedimentation control systems) will be required.

A. Detention Basins

1. Detention basins may only be used when the design shows that there is an adequate positive outlet for the storm water, and where the increased volume of storm water will not damage downstream property owners. Construction drawings must include sufficient off-site information to demonstrate the existence of an adequate outlet.

2. Water originating from off-site is not required to be detained in the on-site detention basin. Storm water originating from off-site should be diverted around the detention basin whenever practical, and where the diversion will not increase the erosion of soils.

3. Detention basins shall be designed so that the resulting storm water discharge from the developed site does not exceed the agricultural rate of discharge from the site. The Township has defined an agricultural rate of storm water run-off as 0.20 cubic feet per second per acre; or the capacity of the existing storm drainage facilities downstream of the detention basin outlet, whichever is less.

4. The volume of detention provided must be equal to or in excess of that calculated by the Oakland County Drain Commissioner's "Simplified Detention Basin Design Procedure" for a 100-year frequency storm. The volume of sediment storage is in addition to the volume required for detention.

5. The maximum water level shall be controlled by gravity outlets. The use of pumps for dewatering is not allowed.

6. Detention basin volumes shall not include volumes below the invert of outlet pipe(s). An additional one (1) foot of volume below the outlet pipe invert is required to be incorporated into the design for sediment storage.

7. Detention basins shall be provided with an overflow spillway or storm sewer structure set at the high water levels capable of passing a 100-year frequency storm. The overflow spillway shall be located so not to cause potential damage to adjacent properties. To protect the surface from eroding overflow spillways shall be constructed with natural materials such as mesh or other approved materials. The edges of the surface shall have headers of the same or similar materials to prevent undercutting by the storm water overflow.

8. A minimum of one (1) foot of freeboard around the entire basin shall be provided above the design high water elevation.

9. All open detention basins having side slopes steeper than one (1) foot vertical on four (4) feet horizontal shall be fenced, except where their design is an integral part of the landscape, and where the Township determines that depth and location are not hazardous. Fences shall be four (4) feet high ornamental, vinyl coated chain link or approved equal fencing. Gates shall be 12 feet wide with double opening. The maximum side slopes of the basins shall be one (1) foot vertical on four (4) feet horizontal, with a four (4) foot minimum shoulder inside the fence. Refer to Section 6.3A.17. for wet pond slope requirements.

10. Detention basins specifically designed for a location within yard setback areas shall be approved as to their concept and location by the planning commission.

11. The bottom of detention basins shall have a minimum slope of one percent (1.0 %) to the outlet for dewatering purposes unless designed as a wet basin.

12. Detention basins are prohibited within a floodplain, defined as the area of land adjoining a river, stream, watercourse, lake or other body of water which will be inundated by a 100-year frequency flood event and where evidence exists that such flood has occurred, or would have occurred in the past given the land configuration.

13. Storm water detention in paved parking lots is strictly prohibited.

14. Underground Detention will be considered on a case-by-case basis with the following conditions:

    i. Provisions must be made in the design for the collection and removal of sediment and debris accumulated in the system. All applicable health and safety requirements shall also be incorporated in the design of systems that require access by inspection or maintenance personnel.

    ii. Detailed shop drawings are required for underground detention systems, including pertinent engineering calculations and soils information.

15. Detention in wetland areas will be considered with the following conditions:

    i. If in a regulated wetland, an MDEQ permit is required.

    ii. A permanent pretreatment system for the removal of sediment is required prior to outletting to the wetland.

    iii. Calculations indicating what the water elevation will rise to during the design storm event will be required. The design must show that properties adjacent to the wetland area will not be negatively impacted by the increase in storm water runoff. Consideration must be given to future developments in the immediate area that could also use the wetland for storm water management purposes.

16. The entire detention basin must be seeded or sodded.

17. Detention basins designed as a wet pond:

    i. Shall have lowest overflow outlet elevation a minimum of eight (8) feet above the pond bottom.

    ii. Side slopes higher than four feet below outlet shall be no steeper than one (1) foot vertical to four (4) feet horizontal.

    iii. Side slopes lower than four feet below the outlet shall be no steeper than one (1) foot vertical to three (3) feet horizontal.

    iv. All slopes above water surface shall be topsoiled seeded, and repeated as necessary until permanent vegetation is established or as requested..

B. Retention Basins

1. If a gravity outlet cannot be provided, then the storm water holding facility shall be designed as a retention basin with a volume equal to or in excess of the volume of storm water run-off from two consecutive 100-year frequency storms including the volume of sediment storage. The storm water storage volume shall be calculated by:

   Volume = 16,500 x 2 x total tributary acres x weighted run-off coefficient.

2. Off-site tributary areas: Retention basins must be sized for storm water that originates off-site and which cannot be bypassed around the proposed retention basin to a site where the storm water originally flowed to. In such cases, the retention basin must be sized using the following design parameters:

   Tributary acres: On-site area plus the off-site area

   Run-off coefficient: Weighted C factor of the entire tributary area that considers the existing off-site conditions, and the proposed on-site improvements.

3. One foot of freeboard shall be provided around the entire basin above the design high water elevation.

4. All open retention basins having side slopes steeper than one (1) foot vertical on four (4) feet horizontal shall be fenced, except where their design is an integral part of the landscape, and where the Township determines that depth and location are not hazardous. Fences shall be six (6) feet high ornamental, plastic coated chain link or approved equal fencing. Gates shall be 12 feet wide with double opening. The maximum side slopes of the basins shall be one (1) foot vertical on four (4) feet horizontal, with a four (4) foot minimum shoulder inside the fence.

5. Retention basins are prohibited within a floodplain.

6. Retention of storm water in parking lots is strictly prohibited.

7. The retention basin volume shall not include volumes below existing groundwater table or permanent water elevation. The retention basin design must demonstrate that the soils are capable of providing necessary infiltration. A soils report shall be submitted.

C. Infiltration (Recharge) Systems

1. An infiltration system will be considered if the design engineer can demonstrate that all of the following conditions exist:

   i. An adequate positive outlet is not available or it is not possible to construct an off-site drainage system to convey basin discharge to the nearest outlet, and the installation of a retention basin is not feasible or practical.

   ii. The natural underlying soils are well-drained (hydrologic groups A or B) and the ground is suitable for percolation.

   iii. The underlying soils and ground water table have the ability to move water away from the site for the area and volume being drained.

   iv. Permanent pretreatment system upstream of inlet point to prevent any material from potentially clogging the infiltration medium (both surface and subsurface).

   v. An overflow for a 100 year storm must be provided.

   vi. Infiltration system can be easily accessed for maintenance and replacement if necessary. The use of perforated storm pipe under pavements is discouraged.

   vii. There must be a method for determining a failure in the infiltration system. The system cannot be designed such that a failure in the infiltration system results in short circuit to the emergency overflow without on-site ponding.

2. The following information shall be supplied and/or incorporated in the design of infiltration systems:

   i. Soil boring logs/sieve analysis/geotechnical report indicating type and properties of both surface and subsurface soils, suitability of surface soils for infiltration, capability of subsurface soils to conduct seepage to the underlying groundwater table, and flow from the system under mounding conditions at the maximum infiltration rate. Conditions greater than 6 inches/hour percolation rate will not be allowed.

   ii. Computed percolation rate and infiltration/exfiltration calculations.

   iii. Drainage area map, including any off-site contributing areas and emergency overflow route in the event of system failure.

iv. Construction methods to prevent compacting the surface soils which may reduce the infiltration capacity of the soils.

D. Permanent Pretreatment Systems

1. Permanent pretreatment systems shall be sized for a “first flush” depth of 0.5 inches of runoff from the entire drainage basin area of the project. Permanent systems are required when discharging to an existing lake, stream, waterway or wetland.

2. Pretreatment can be in the form of open basins or engineered treatment systems.

i. Open basins shall be designed with minimum side slopes of one (1) vertical to four (4) horizontal, one (1) foot of freeboard above design storm water elevation, emergency sodded overflow, and outlet control devices.

ii. Design calculations, plans and shop drawings for pre-fabricated engineered treatment systems shall be certified by a Professional Engineer licensed in the State of Michigan.

iii. Horizontal velocities through the system shall be minimized to prevent turbid flows and allow particles to settle in the pretreatment system.

3. Permanent pretreatment facilities will not be allowed within a floodplain.

E. Maintenance of Storm Water Management Basins and Pretreatment Facilities Commercial, Industrial and Office Sites: The proprietor shall maintain the storm water management basins and permanent pretreatment facilities in proper working order at all times.

6.4 GRADING AND SURFACE DRAINAGE

For all new subdivisions, site plans, private roads, and other development proposals within the Township, a grading plan shall be submitted for review and approval.

This standard establishes the minimum requirements for the design of grading and surface drainage in the Township.

A. Design Considerations

1. The grading plan shall be designed to insure that if a failure occurs in any storm drainage system, storm waters will drain to an approved outlet thru overland swales without flooding buildings or adjacent properties.

2. Positive drainage of all yard areas is required for all residential developments. In special cases involving extreme vertical relief and wooded areas, isolated undrained potholes will be considered. These undrained areas must be provided with an easement for surface drainage and retention which will encompass the storm water storage level for two 100 year frequency storms plus one (1) foot of freeboard.

3. Generally, residential lot drainage shall be split at the building; drainage from the front of the building shall drain to the road and drainage from the rear of the building shall drain to the rear lot line. Rear to front surface drainage shall be avoided and will only be permitted under extreme topographic conditions. If rear to front drainage is permitted, only the drainage from the rear of the specific lot is allowed.

4. Rear to front lot drainage shall have protective drainage swales around the building. The high point of the swale shall generally be located a minimum distance of 20 feet off the rear of the building and one (1) foot below the building brick ledge grade.

5. Side yard swales shall be a minimum of 0.5 feet below the building brick ledge grade of the building and located a minimum of ten (10) feet away from the building.

6. Rear-yards shall be drained with swales and shallow ditches unless topographic features prevent surface drainage.

7. Meet existing ground at the exterior property boundaries. Construct an intercepting swale to prevent drainage onto adjacent property or lots.

8. All building footing drains and sump pumps shall discharge into enclosed storm systems outside of the road right-of-way if available. When footing drains or sump pumps are discharged onto the ground surface, the point of discharge shall generally be directed away from side lot lines and road right-of-way and not intensify stormwater to adjacent property.

9. In residential development with poor draining soils or high groundwater table, an enclosed drainage system for footing drains/sump pumps discharge is required. (See Underdrain/Sump Pump Collection Systems).

B. SLOPE REQUIREMENTS

1. Protective perimeter slope: A minimum slope of 5 percent (5%) is required for areas within 10 feet of building perimeter.

2. Minimum ground slope for any portion of the site shall be two percent (2%).

3. Drainage swales along side and rear property lines, and the protective swale around buildings shall have a two percent (2%) slope. Rear yard swales shorter than 300 feet may have a minimum slope of one percent (1.0%).

4. Maximum ground slope for any graded portion of the site shall be one foot (1) vertical to four (4) horizontal. Refer to the Zoning Ordinance Section 7.4C for berm requirements.

6.5 STORM SEWERS AND OPEN DRAINS

The following details and specifications shall be required for developments utilizing storm sewers and/or open drains to convey runoff from the site. All such storm drainage systems must outlet to either a detention basin, retention basin, infiltration system, or pretreatment facility as outlined in Section 6.3 of this Ordinance prior to discharging to any natural or man-made water course, wetland, drain or other body of water.

This section of the design standards establishes the minimum requirements for the design of storm drainage systems in the Township. In general, the design engineer shall follow the storm drainage standards set forth from the OCDC.

A. STORM SEWER CAPACITY

1. Sufficient capacity shall be provided in the storm sewer system to allow existing runoff from upstream drainage to "pass through" the proposed storm sewer system.

   i. When a storm sewer is designed to provide capacity for upstream areas, the hydraulic gradient shall remain in the pipe. For storm sewer designed to take on-site drainage only, the hydraulic gradient must be no higher than one (1) foot below storm structure rim elevations.

   ii. When the hydraulic gradient is above the top of the sewer pipe the design elevation of the hydraulic gradient shall be indicated on the profile at each manhole.

   iii. If the heights of the hydraulic gradient exceed two (2) feet above the top of pipe, rubber gaskets at pipe joints shall be used.

B. HYDRAULICS AND HYDROLOGY

1. Storm drainage systems shall be designed for a minimum of a ten-year storm. To determine the storm water runoff, the rational method shall be used (Q=CIA). Where:

   Q = peak rate of runoff in cubic feet per second
   A = area in acres
   C = runoff coefficient for drainage area
   I = average rainfall intensity in inches per hour for a given time of concentration

2. The formula for rainfall intensity (I) shall be determined by using the formula I = 175/(T+25), where T is the time of concentration in minutes. For residential areas, the initial T shall usually be 20 minutes; for commercial and office areas, the initial T shall be 15 minutes or less.

3. Run-off coefficients shall be determined for each individual drainage area. Drainage area coefficient determination shall generally be based on the following:

	SURFACE	C
BY TYPE	Agricultural/Grass	0.15
	Impermeable	0.85
	Basins and wetland	1.00
BY USE	Residential	0.35
	Multiple Housing	0.55
	Commercial/Industrial	0.75

   The above run-off coefficients are minimum. Actual site design may require an increase in run-off coefficient. A weighted run-off coefficient can be used (provide calculations). Coefficients proposed for a project are subject to review and approval by the Township Engineer.

4. An overland flood route for a 100 year storm frequency shall be provided and shown on the plans. A minimum freeboard of one foot shall be provided from any building's exterior finished grade (brick ledge) to the 100 year flood elevation.

5. In Manning's formula, n = 0.013, shall typically be used for hydraulic calculations.

6. Minimum design velocity shall be 2.5 feet per second and maximum design velocity shall be 10 feet per second, with the pipe flowing full.

7. Allowable pipe slopes:

PIPE DIAMETER (IN)	MINIMUM SLOPE (FT/100 FT)
12	0.32
15	0.24
18	0.18
21	0.14
24	0.12
27	0.10
30	0.09
36	0.08
42	0.06
48	0.05
54	0.04
60	0.04

8. For changes in pipe size, the maximum flow velocity for full pipe flow shall be maintained by continuity of the 0.80 diameter depth above invert.

9. A drop of 0.10 feet in the downstream sewer invert shall be provided for direction changes of 30 degrees or greater to compensate for velocity head loss of the incoming flow.

10. All road catch basin and inlet leads shall be laid on a minimum slope of 1%.

11. Wherever differences in manhole pipe invert elevations exceed two (2) feet, a two (2) foot sump shall be provided to prevent channel erosion.

C. SEWER PIPE

1. The minimum pipe size for storm sewers, catch basin leads and inlet leads shall be 12 inches in diameter.

2. Rear yard under drain system with no inlets: 8” perforated plastic pipe.

3. All storm sewer shall have a minimum of four (4) feet of cover.

4. Storm sewers shall generally be located on the opposite sides of streets from water mains. Storm sewers shall be located ten feet from the right-of-way line in the public right-of-way.

5. A minimum ten feet horizontal separation from outside of pipes is required between storm sewer and water mains.

6. Granular material meeting the requirements for MDOT Granular Material, Class II, compacted to 95% maximum density, shall be required for full depth backfill of trenches under existing or proposed road surfaces, pavements, curbs, driveways, parking areas, and sidewalks, and where the storm sewer is within a one-on-one influence of the edge of existing or proposed pavements. Compaction testing shall be performed by an independent laboratory.

7. Storm sewer leads shall have compacted granular backfill within the entire street right-of-way beneath all existing and proposed pavement, and between all utility crossings.

D. MANHOLES

1. Manholes shall be located at:

   i. Points where the sewer changes direction

   ii. Points where the size of the sewer changes

   iii. Points where the slope of the sewer changes

   iv. The junction of sewer lines

   v. Street intersections or other points where catch basins or inlets are to be connected

   vi. The end of the sewer line

2. Maximum distance between manholes shall be as follows:

DIAMETER OF SEWER	MAXIMUM MANHOLE SPACING
8” – 15”	350’
18” – 30”	400’
36” – 48”	500’
54” – 60”	550’
66” – 72”	650’
78” & Larger	1000’

E. CATCH BASINS, INLETS, AND END-SECTIONS

1. Size

   i. All inlet/rear-yard catch basins are to be four (4) feet in diameter.

2. Catch Basins shall be located:

   i. At the radius returns of street intersections. A maximum distance of 150 feet is allowed when drainage is required to go around a corner between a high point and a corner catch basin.

   ii. At maximum intervals of 400 feet along a continuous slope.

   iii. At all low points in streets, swales and ditches, where applicable.

   iv. At a location to provide a maximum of 800 feet of drainage from two directions.

3. Standard rear yard basins shall be provided at all low points in easements. All catch basins shall be located within four (4) feet of lot corners. A minimum of twelve (12) foot side yard easements to the street shall be included at all rear yard basins.

4. All catch basins and inlets located at low points in poor draining soils shall have a minimum of two ten (10)-foot runs of six (6) inches perforated pipe with pea gravel bedding and backfill. Other trench collecting underdrains may be required, as required by the Township Engineer.

5. Catch basin leads may tap directly into sewers 48 inches in diameter and larger.

6. End-sections or headwalls shall be placed at all culverts and pipe inlets or outlets.

7. A prefabricated bar screen shall be used on all storm sewer openings 18 inches in diameter and larger. The bar screens shall be constructed according to an approved separate enlarged detail in the drawings and shall be designed to be sturdy, permanent easily maintained, non-clogging and shall have clear openings of no more than six (6) inches.

F. UNDERDRAIN/SUMP PUMP SYSTEMS

1. Where the proposed ground surface slope is less than two percent (2%), supplementary drainage shall be provided by an underdrainage system.

2. Place underdrain at a minimum grade of 0.50%.

3. Trench for underdrain shall have adequate depth to provide gravity flow of sump pump discharge lines to underdrain, and shall have a minimum depth of three (3) feet from the property line.

4. Install four (4) foot diameter inlets at 400 foot maximum intervals along the underdrain and located three (3) feet from side lot lines.

5. Install a two (2) inch P.V.C. capped tee at each lot for the sump pump with overflow device.

6. Show the underdrain system with sump pump on the storm sewer plan, with a dimension to the nearest lot line for each sump pump tee.

7. The sump pump collector system may be combined with the underdrain system, as noted above.

8. Minimum pipe material shall be eight (8) inch PVC constructed with a minimum of 3.0 feet of cover and 0.50%.

9. Eight (8) inch lines must not be used for the collection of surface runoff and therefore structures on these size lines must have solid covers.

G. OPEN DRAIN REQUIREMENTS

1. Open drains shall have slope protection (rip-rap) at bends with radius of 500 feet or less and other points as designated by the Township Engineer.

2. The drain bottom and slopes, to the hydraulic gradient line, shall be sodded. The remainder of the drain shall be seeded. The Township will not approve the work until all turf is established.

3. Specific drain cross-section and velocity control measures will be approved by the Township Engineer on an individual basis.

6.6 EASEMENTS

A. All easements shall be for access for maintenance and/or inspection of storm water management facilities.

B. Easements for storm sewers and open ditches shall be as specified in Township Ordinance 108A. The easement must be large enough to accommodate a slope of 1 horizontal to 1 vertical from the sewer invert to the edge of easement, but shall have a minimum width of twelve (12) feet, centered upon the sewer or ditch.

C. An easement shall be provided for the pretreatment system to allow access for maintenance and/or inspection.

D. When drainage is required to flow across an adjacent lot, a 12-foot wide storm water easement, centered on the drain, must be provided. This easement shall be dedicated to the Homeowners Association with restriction against use or occupation of easements by the property owners and/or by other utilities in any manner that would restrict storm system maintenance or repair operations.

E. A written description and drawing of the easement (s) in a clear manner shall be prepared by the Designing Engineer and be presented to the Township. The Township Engineer shall review the easement documents for compliance with all Township Standards and Ordinances and provide approval or disapproval.

F. Easements for possible extensions shall be provided to the property lines at locations designated by the Township Engineer.

G. The horizontal alignment of sewers that are not proposed to generally follow street, drive, or parking area pavements, shall parallel property lines or building lines.

6.7 MAINTANANCE

A. A maintenance agreement per Township Ordinance 108A, to provide the means and assurance that maintenance of stormwater management facilities, is required for all projects.

B. In no instance shall any property owner, block, redirect, impede, or alter any existing or proposed storm water runoff.

6.8 FINAL ACCEPTANCE

A. All sewer systems shall be subject to a Final Inspection prior to acceptance of the system by the Township Engineer.

B. A set of approved Record Drawings and a copy of all recorded easements that were required for and following construction are required for final acceptance of the storm sewer.

SECTION 7 – PAVEMENTS & WALKWAYS

7.1 GENERAL

This standard establishes the minimum requirements for pavement and pedestrian walkways installed within the Township to provide public health, safety, and general welfare of the Charter Township of Oxford. The most current Charter Township of Oxford Zoning Ordinance shall be adhered, in particular Article 8, Access, Circulation, Parking, and Loading and Article 11, Private Roads, and Ordinance No. 117, the Sidewalk and Safety Path Ordinance. All pavements that are within an additional jurisdiction shall meet the requirements established by said governing agency, such as, but not limited to the Road Commission for Oakland County (RCOC), the Michigan Department of Transportation (MDOT), and Federal regulations for ADA requirements.

7.2 PRIVATE ROADS

The design of private roads shall conform to the Charter Township of Oxford Zoning Ordinance, Article 11, Private Road Ordinance and the following standards:

A. Design Requirements:

1. Soil borings are required to be taken near the beginning and terminus of the proposed private road and at intervals not to exceed 500 feet in between.

2. A soils report prepared by a qualified soils consultant shall be provided along with the private road plans.

3. The applicant shall remove all unsuitable soil including muck, peat and marl, as well as brush, trees, tree stumps, and similar materials from the full width of the roadway, including the shoulders and ditches.

4. The maximum grade allowed on any surface type is six percent (6.0%).

5. The minimum longitudinal grade on any roadway, except parking areas, shall be:

   i. Six-tenths of a percent (0.6%) for concrete pavement.

   ii. One percent (1.0%) for hot mix asphalt pavement.

6. Road grades in excess of six percent (6.0%) shall be approved by the Township Planning Commission upon the recommendation of the township's consultants. At the intersection of two roadways, however, the maximum grade shall be three percent (3.0%) for a distance of one hundred (100) feet from the point of intersection.

7. The intersection radii in residential developments shall be a minimum 25 feet.

8. The intersection radii in industrial developments shall be minimum 35 feet. Radii for commercial developments will be evaluated on a case-to-case basis.

9. The minimum length of vertical curves shall be 100 feet for grade changes greater than two percent (2.0%).

10. The minimum radius in horizontal alignment is 250 feet. When reverse curves are used provide a minimum 100 feet tangent.

11. All dead-end roads shall terminate in a cul-de-sac turn-around with a minimum radius of 60 feet. This requirement may be waived or modified by the Planning Commission in the case of private roads having a boulevard cross section and/or more than one (1) travel lane in each direction, and where it can be demonstrated to the satisfaction of the Township Engineer and Fire Chief that safe and efficient circulation will be maintained.

12. Sight distances on horizontal and vertical curves and at intersections shall be a minimum of 260 feet measured at a point 10 feet from the edge of the traveled way at a height of 42 inches to an object height of 42 inches. R.C.O.C. specifications shall be applied.

13. Road and sidewalk cross sections, materials, and dimensioning shall meet the minimum requirements of the most current Charter Township of Oxford Pavement Detail Sheet.

14. Approaches to any sites from roads under the jurisdiction of the RCOC or the MDOT shall be designed according to their criteria. Approval of these improvements by the above agencies must be obtained and furnished to the Township Engineer prior to Township approval of the paving plans. Passing lanes and acceleration/deceleration lanes are required by the Township on connections to all paved roads under RCOC or MDOT standards.

7.3 PUBLIC STREETS

All streets within public right-of-way shall be designed according to the criteria and specifications of the RCOC or MDOT

7.4 PARKING LOTS

The design of parking lots shall conform to the Charter Township of Oxford Zoning Ordinance *Article 8, Access, Circulation, Parking, & Loading* and the following standards:

A. Design Requirements:

1. Soil borings are required to be taken at intermittent intervals of the proposed private parking lot and not to exceed 100 feet in between.

2. A soils report prepared by a qualified soils consultant shall be provided along with the paving plans.

3. The applicant shall remove all unsuitable soil including muck, peat and marl, as well as brush, trees, tree stumps, and similar materials from the full width of the parking lot, including the curbs and approaches.

B. Parking Lot Classifications

1. Class A – Light duty driveways and small parking lots with less than forty stalls. This cross section is not suitable for heavy refuse truck pick-up or delivery services. In areas where this service is used, the Class B cross section should be used for routing to and from the service area.

2. Class B – Parking lots containing more than 40 stalls, light to medium truck traffic, typical for commercial lots.

3. Class C – Industrial lots, heavy truck uses, some commercial lots, bus routes.

4. Class D – Parking areas where extremely heavy truck traffic is encountered should be designed on a per case basis by a qualified professional engineer.

C. Parking Lot Design Requirements

1. In parking areas the minimum grade allowed on any surface is one percent (1.0%).

2. Parking lots shall be of the size, configuration, stripping, and space size as required by the Oxford Township Zoning Ordinance, Article 8.

3. Parking lot pavement cross sections, materials, and dimensioning shall meet the minimum requirements of the most current Charter Township of Oxford Pavement Detail Sheet.

4. Curbing is required around all parking lot perimeters and internal parking lot islands per the Zoning Ordinance Section 8.7.D.

5. HMA curbs will NOT be permitted.

7.5 APPROACHES

All drives and approaches within public right-of-way shall be designed according to the criteria and specifications of the RCOC or MDOT. The design of drives and approaches shall conform to the Charter Township of Oxford Zoning Ordinance *Article 8, Access, Circulation, Parking, & Loading* and the following standards:

A. Approach Design Requirements

1. Approach cross sections, materials, and dimensioning shall meet the minimum requirements of the most current Charter Township of Oxford Pavement Detail Sheet.

2. Approaches shall have adequate flares to provide a safe turning radius.

3. Heavily traveled industrial drives shall be designed by a qualified professional engineer.

4. For residential approaches constructed on an existing curbed street, the curb and gutter shall be entirely removed or cut horizontally.

5. When an MDOT Type "M" approach is constructed on an existing curbed street, the curb and gutter must be entirely removed. The extent of the removal shall extend to the nearest joint past the spring line of the new curb.

6. Commercial and industrial approaches shall meet MDOT standards.

7.6 SIDEWALKS AND SAFETY PATHWAYS

This standard establishes the minimum requirements for pathways, sidewalks and sidewalk repair in the Township. Sidewalks and/or safety pathways shall be required as set forth in Township Ordinances 67A, 103, and 117. As used in this section, the terms sidewalk and safety path shall be used according to the "subclassifications" set forth in Township Ordinance 117.

A. Sidewalk Design Requirements

1. Where sidewalks/safety paths are proposed, they shall be indicated on the site plan as set forth in Township Ordinance 67A.

2. Sidewalk shall be five (5) feet wide and generally located one (1) foot inside the existing or proposed right-of-way line of public streets. A width of eight feet is required in areas with above average pedestrian traffic and along major streets.

3. Sidewalk transverse slopes shall meet the requirements of the Oxford Township Pavement Standard Detail Sheet. Longitudinal grades shall not exceed one inch per foot.

4. ADA barrier free access ramps are required at all crossings.

5. Sidewalk alignment shall match adjoining or existing sidewalk where possible. The alignment shall integrate the natural features, yet maintain safety.

6. Sidewalk cross sections, materials, and dimensioning shall meet the minimum requirements of the most current Charter Township of Oxford Pavement Detail Sheet.

B. Safety Pathway Design Requirements

1. The inclusion of a safety path may be required as part of proposed development. The developer shall review Township Ordinance 117 which regulates the development, construction, maintenance, and signage of safety paths.

C. Repair Requirements

1. Sidewalk flags shall be replaced when one or more of the following conditions exist: stubber, crack, drainage problem, holes, scaling, slope, reverse pitch, and thin walk.

2. Replacement shall correct the problem and installation requirement shall be per design requirements.

D. Performance Guarantee

1. A performance guarantee for safety paths and sidewalks shall be as set forth in Township Ordinance 117.

7.7 INSPECTION AND FINAL ACCEPTANCE

A. The contractor shall notify the township engineer 48 hours before the conclusion of each step in the pavement construction. Inspections will be made at a minimum:

1. Prior to the installation of the subbase

2. After the installation of the subbase

3. After final grading and drainage is complete of the subbase

4. During pavement installation.

B. Testing will be required on materials used and installed for quality assurance as noted in the specifications.

C. The applicant shall provide weigh slips which certify the quantity and class of material used for subbase and aggregate used for the road and shoulder surfaces.

D. All public road systems shall be subject to a Final Inspection and approval by the Road Commission for Oakland County prior to acceptance of the system by the Township or issuance of any certificate of occupancy.

E. A set of approved record drawings, together with copies of all material certifications, density testing reports, concrete cylinder test reports and any recorded easement shall be submitted to the Township prior to final acceptance.

SECTION 8 – RESTORATION & LANDSCAPING

8.1 GENERAL

Article 7 – Landscaping, Screening, Fences, & Walls in the Charter Township of Oxford Zoning Ordinance provides minimum standards for the design and use of landscaping, greenbelts, and screening, and for the protection and enhancement of the Township's environment. The Restoration & Landscaping Standards elaborate on the Ordinance providing minimum safety and design criteria for restoration and landscaping to assure resident wellbeing and longevity of the installed landscaping and restoration. These landscape provisions are intended to apply to landscaping as required by Ordinance 67A.

8.2 PLANTING

A. Design Requirements

1. Tree quantities, placement, and type shall meet the Oxford Township Zoning Ordinance requirements and shall be approved by the Township Planning Commission.

2. The Oxford Township Zoning Ordinance shall govern any deviations from the landscape plans.

B. Installation

1. All plant material shall be installed in a sound workman like manner in accordance with ANLA guidelines and shall conform to the American Standard for Nursery Stock ANSIZ60.1 and be:

   i. Nursery grown under climatic and in soil conditions similar to those in the locality of the project.

   ii. State Department of Agricultural inspected and approved.

   iii. No. 1 grade with straight, unscared trunks, & well developed uniform crowns on trees.

   iv. The minimum acceptable sizes of plants measured before pruning with branches in normal position shall conform to measurements specified.

2. Tree stakes, guy wires, and tree wrap if necessary are to be removed by the developer after two (2) year guarantee period.

3. All landscaping costs shall be included as a part of the Performance Guarantee for the project.

4. All plant material shall be subject to inspection and approval by the Township Planner.

5. All plant tags shall remain until inspection and approval.

6. All landscape areas shall have proper drainage that prevents excess water from standing on lawn areas or around trees and shrubs.

8.3 LAWN RESTORATION

Disturbed areas shall be restored to original or better condition and per Zoning Ordinance 7.5(C)(7). In addition, slope conditions will also determine the method of restoration.

8.4 COMPLETION & MAINTENANCE

A. Upon completion and installation of the landscaping, the developer shall request final landscape inspection from the Township.

B. A certificate of occupancy will be issued only after completion of the landscape plan or the developer provides a cash deposit, letter of credit, or certified check to ensure installation of required landscaping.

C. Planting materials shall be maintained in a healthy growing condition, neat and orderly in appearance for a period of two (2) year following acceptance by Township. Developer shall replace without cost to the Township, any dead or unacceptable plants as determined by the Township Planner at any time during the guarantee period.

D. If any plant material dies or becomes diseased, it shall be replaced within thirty (30) days of written notice from the Township or within an approved extended time period.

E. All required irrigation systems must be maintained in working order and operated to ensure growth of the lawn and landscape areas.

F. Overspray from irrigation on walkways and roadways shall not occur.

8.5 WALLS

Article 7 – Landscaping, Screening, Fences, & Walls of the Charter Township of Oxford Zoning Ordinance should be met.

1. Walls a total height of four (4) feet or higher shall require a seal of a registered engineer.

2. Boulder walls shall have a maximum three feet vertical to one foot horizontal side slopes.

3. Drawings shall show cross sections, heights, foundations, drainage, and proposed materials.

4. It shall be the full responsibility of the design engineer to ensure that the retaining wall system selected for a given location is appropriate and assure stability.

5. At the discretion of the Township or Township Engineer soil bores and a geotechnical report with a detailed slope stability analysis may be requested for proposed retaining walls.

6. Proper drainage shall be implemented in the retaining wall system.

7. Living walls i.e. walls consisting of plant material, shall be reviewed on a site specific basis.

SECTION 9 – EXECUTION

9.1 SEVERABILITY

The various parts, sections and clauses of this Ordinance are hereby declared to be severable. If any part, sentence, paragraph, section or clause is adjudged unconstitutional or invalid by any court of competent jurisdiction, the remainder of the Ordinance shall remain in full force and effect.

9.2 PENALTIES AND ENFORCEMENT

Violation of the provisions of this Ordinance shall constitute a municipal civil infraction. A person found responsible for a violation of this Ordinance shall be subject to a civil fine to be determined by the Michigan District Court with jurisdiction of this Township. The person responsible shall also be subject to costs, including all expenses, direct and indirect, to which the Township has been put to enforce this Ordinance in the amount of not less than $9 nor more than $500. In the event a person responsible has been issued a civil fine and costs as set out above, and in the event the person fails to pay the civil fine and costs in a timely manner as set forth under court order, the Township may obtain a lien against the land , building(s) and/or structure(s) involved in the violation and such lien may be enforced and discharged subject to the procedures and limitations cited at MCL 600.8731. The penalties set forth in this Section are otherwise controlled by the requirements of Public Acts 12 and 13 of 1994. The Township may further pursue injunctive remedies permitted at law to enforce this Ordinance.

9.3 REPEAL OF CONFLICTING ORDINANCE

A. Repeal of conflicting ordinance - This Ordinance shall repeal all inconsistent provisions in prior Ordinances, including Ordinance No. 106, except that it shall not repeal or supercede any provision of Ordinance No. 67A, 103, 104A, 105B, 107A, 108A, 116, or 117, or any amendment to any of those ordinances.

B. Savings - Section 9.3(A)(1) notwithstanding, all permits and/or authorizations issued pursuant to Ordinance No. 106 and all proceedings, actions, and other activities undertaken by the Township pursuant to Ordinance 106, shall remain in full force and effect.

9.4 EFFECTIVE DATE

This Ordinance shall take effect 30 days after publication in The Oxford Leader.

MOVED BY: Treasurer Ferrari SECONDED BY: Trustee Kniffen

AYES: Ferrari, Dunn, Sanderson, Behnke, Fitchena, Bellairs, Kniffen

NAYS: None

ABSENT: None

William Dunn, Supervisor
Charter Township of Oxford

Clara J. Sanderson, CMC, Clerk
Charter Township of Oxford

STATE OF MICHIGAN)
)SS
COUNTY OF OAKLAND)

I, Clara J. Sanderson, CMC, duly elected Clerk of the Charter Township of Oxford, do hereby certify that the foregoing is a complete and true copy of Ordinance No. 106A adopted by the Charter Township of Oxford at a meeting of the Board of Trustees held on December 12, 2007.

Clara J. Sanderson, CMC, Clerk

PUBLISHED: December 19, 2007

EFFECTIVE: January 18, 2008