CITY OF ROCHESTER HILLS

ENGINEERING DESIGN STANDARDS

CHAPTER 6

Roads

A. Plans & Specifications – Submittal Procedure

1. The plans and specifications shall be prepared in accordance with Chapter 1, *General Requirements and Submittals*.

2. Paving designs, including soil borings (minimum of five feet (5') deep) may be required with particular paving submittals.

B. Requirements for New Public Roadways

1. Paving width and thickness shall conform to the following requirements for public roadways:

   a. Concrete roads shall be eight inches (8") 3,500 psi concrete over four inches (4") 21AA aggregate base course materials (crushed limestone or crushed concrete). Alternate recycled asphalt product (RAP) base course materials may be considered upon approval of the City Engineer. Alternate RAP materials must meet equivalent structural strength of 21AA aggregate (crushed limestone or concrete).

      Extend four inches (4") of base course material to one foot (1') beyond edge drain. All industrial subs shall be constructed with concrete to meet all weather conditions.

   b. Asphalt roads shall be nine inches (9") deep strength asphalt over six inches (6") of 21AA aggregate base course materials (crushed limestone or crushed concrete). Alternate recycled asphalt product (RAP) base course materials may be considered upon approval of the City Engineer. Alternate RAP materials must meet equivalent structural strength of 21AA aggregate (crushed limestone or concrete). The nine inches (9") shall consist of two inches (2") of HMA 5E3 (wearing), two and-one half inches (2-1/2") HMA 4E3 (leveling), four and one-half inches (4-1/2") HMA 3E3 (base course). Extend six inches (6") base course material to one foot (1') beyond edge drain. Asphalt binder shall be PG 64-22.

   c. Asphalt road sections for projects that follow the special assessment district (SAD) paving program will be in accordance with the design standards for that policy. Furthermore, reconstruction of City local roads may be rebuilt with a section less than the requirements identified in items a. or b. above if approved by the City Engineer.

2. Other alternative paving and drainage designs may be submitted to the Department of Public Services for consideration, following review and recommendation by the City's Engineer, in limited areas where such alternative paving and drainage designs would be more consistent with the character and construction of existing paving and drainage facilities in the area. Such alternative paving and drainage facilities shall only be

acceptable in those instances where the City finds that the proposed design will provide an acceptable level of serviceability, ease of maintenance, and facility life, consistent with public paving and drainage facilities in similar areas, elsewhere in the City.

3. The minimum radius of cul-de-sacs is as follows:

   a. With island, the minimum outside radius of a cul-de-sac from back-of-curb (b/c) shall be fifty-seven feet (57'). The inside radius shall be thirty feet (30') (b/c). All right-of-way radii shall be seventy-three feet (73') minimum.

   b. Without island, the minimum outside radius of a cul-de-sac (b/c) shall be forty-seven feet (47'). All right-of-way shall be sixty-three feet (63') minimum.

4. Pavement widths for residential streets shall be twenty-seven feet (27') (b/c to b/c). Pavement widths for streets in an industrial subdivision shall be thirty-six feet (36') (b/c to b/c). Streets that are developed as part of a flex business overlay district per zoning ordinance section 138.8.302 – Street Design will be given consideration to deviate from the above road width standards as agreed upon by the Department of Public Services Engineering Division and Planning and Economic Development department.

5. A boulevard section may be allowed in an enlarged right-of-way. Pavement widths shall be at least twenty-four feet (24') (b/c to b/c) for all boulevard streets within residential subdivisions. The minimum island width shall be sixteen feet (16'). Within industrial subdivisions the pavement sections should be increased to twenty-seven feet (27') (b/c to b/c). The nose of the median shall be offset at least eight feet (8') from the edge of pavement of the intersecting street.

6. The minimum longitudinal pavement slope shall be one percent (1%), and a maximum of six percent (6%) for major roads, and eight percent (8%) for local roads. A grade in excess of the standard will not be allowed. Vertical curves are necessary when a change in grade of one percent (1%) or more occurs. The minimum length of vertical curve shall be one hundred feet (100'). Cross slope shall be at two and one-half percent (2.5%).

   The pavement profile view must include:

   a. Elevations at top of curb, or at centerline if not curbed.
   b. Existing ground elevations at the center of the right-of-way, and at other locations as required for review.
   c. Station and elevations of all high points, low points, grade-breaks, curb returns intersecting property lines, and necessary information at vertical curves.
   d. Top of curb (or centerline) elevations at each station. Grade in vertical curves must be indicated at twenty-five foot (25') intervals.
   e. The station and top of casting grade of all pavement catch basins and inlets.

7. The pavement radius at all intersections of all roads shall be a minimum twenty-five feet (25'). Allow for a minimum of one-half foot (0.5') drop in elevation around the curb return for twenty-five foot (25') radius. For larger radii, a proportionately greater amount of fall must be provided.

8. The Michigan Department of Transportation and/or Road Commission for Oakland County design requirements shall be met for intersecting roads under their jurisdictions. Passing

lanes, center left-turn lanes, acceleration, and deceleration lanes shall conform to the requirements as outlined under *Chapter 8, Widening Lanes*.

9. All horizontal curves shall be consecutively numbered and indicated in the plan view. Curve data shall be given for the respective curve on the same sheet as it occurs.

10. Finish grade of all structures shall be indicated in the plan view.

11. All pavement in residential areas shall have thirty-inch (30") mountable concrete curb and gutter with a three-inch (3") curb height. All island curbs and street intersections shall have MDOT B-2 modified curbing with a five and one-half inch (5.5") curb height. In either case, the face of gutter depth shall be nine inches (9") thick. Curb height through driveway locations shall be reduced to one-inch or less.

12. City major roads shall have B-2 modified curbing. A five-foot (5') transition area is required where the curb changes from MDOT B-2 modified to four-inch (4") mountable curb and gutter. Curb height through driveway locations shall be reduced to one-inch or less.

13. A detail of all intersections and cul-de-sacs must be provided. The detail shall show jointing and detailed grades. Maximum scale of the detail shall be one inch equals thirty feet (1" = 30'). On intersections where jointing is shown on the pavement Standard Detail sheet and where grades are completely determined by additional notes on the plans, separate details need not be shown.

14. At the end of a street that may be extended in the future, indicate a one-foot (1') end header, barricade and signs (end of roadway object marker ("OM4-3") and a "Road Ends" sign ("W-14-2-a").

15. Edge drains shall be placed one foot (1') offset from the back of curb and placed with three and a half feet (3.5') of cover (from top of curb) for the full length of all curb. Edge drains in open ditched sections where the ditch slope is less than one percent (1%) will require a solid wall perforated in a fabric/sock pipe under the ditch. Edge drain, six inches (6") in diameter, perforated or slotted, shall be constructed in the back of curb line for the full length of curb, backfilled with either 2NS sand or pea stone. Perforated pipe shall be Smooth-Wall PVC Plastic Edge Drain with 3/16 inch to 3/8-inch perforations. Slotted pipe shall be A-2000 (Contech or equivalent approved by the City Engineer) sewer pipe, with slotted perforations. The pipe shall be installed with the protective geotextile sock wrap. Roadway rehabilitation or reconstruction projects may consider the use of flexible piping for common sump pump collection lines.

16. Temporary access roads shall be sixteen feet (16') wide minimum. Construction plans shall identify a method to prevent site development vehicles and equipment from tracking mud and/or dirt onto roadways.

17. Streetlights – The City may require street lighting at street intersections or other locations to serve purposes of safety and/or security. When required, the intensity and type of illumination, location and types of poles, bases, etc. shall be coordinated with the existing and future street lighting within that area and conform to the latest version of the American Association of State Highway and Transportation Officials (AASHTO) Roadway Lighting Design Guide.

18. The owner/developer shall provide and properly maintain until accepted by the City all traffic and pavement markings, which the City may determine necessary, for the proper operation of the roadway/driveway/curb cut. Only those traffic signs and pavement markings specified by the City (or jurisdictional authority) may be used within the road right-of-way. All signs and pavement markings shall conform to the current Michigan Manual of Uniform Traffic Control Devices (MMUTCD).

19. All plans are to clearly identify public or private dedication.

20. Private roads are to be designed to City Public Road Standards.

21. Shared driveways can be proposed to the Planning and Economic Development Department and the Department of Public Services. The applicant must demonstrate that the incorporation of any shared driveways provides a measurable benefit and better aligns with the development intent and surrounding environmental characteristics. Ingress/egress agreements for the shared operation, maintenance and future replacement are required.