

EXHIBIT E

TOWNSHIP SUBDIVISION ROADWAY DESIGN STANDARDS

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Purpose

To establish an integrated and safe roadway system, with reasonable geometric standards, and of sufficient strength, to provide adequate public service, as well as to contribute to an attractive, stable and wholesome environment.

Engineering Specifications

All roads shall be constructed in accordance with the minimum geometrics and specifications established by AASHTO (American Association of State Highway Transportation Officials), "A Policy on Geometric Design of Highways and Streets".

In addition to the AASHTO guide the following procedures will be followed:

1. A construction permit shall be filed by the developer or owner with the County Environmental Services Department prior to any work being done.
2. A grading plan shall be submitted to the County Environmental Services Department. All said roads may be inspected by the County Highway Department as the work progresses.
3. A performance bond from the developer shall be posted with the County Environmental Services Department. The amount of the bond shall be \$100/linear foot of road. The bond shall run for a period of two years from the time the road is completed and approved by the Town Board, with a copy to be given to the Town Board before the final plat is signed. The Town Board shall not approve or accept a road until houses are totally constructed on a minimum of fifty (50) percent of the lots or buildable properties covered by the performance bond.
4. Upon completion of the work the roadway shall be reviewed by the Town Board with the assistance of the County Highway Department. The Town Board may, at its discretion, perform limited maintenance without incurring any obligation for future acceptance of a road.

Geometric Design Standards

The design standards of all roads shall be considered in their relation to existing and planned roads, to reasonable circulation of traffic, to topographical conditions, to runoff of storm waters and to the proposed land uses of the area to be served.

Where new roads will be an extension of an existing road their projections shall be at the same or greater width, but in no instance less than the minimum required width. Where adjoining areas are not subdivided or other development of land has not occurred, the arrangement of roads and streets in new subdivisions and other development of land shall make provision for the proper projection of roads and streets. When a new subdivision or other development of land adjoins unsubdivided land susceptible to being subdivided or other development of land may occur, then the new roads and streets shall be carried to the boundaries of such unsubdivided or undeveloped land.

Provisions for through traffic must also be considered for projected land use of adjoining areas. An acceptable average daily traffic volume should be calculated and designed for accordingly. The location of crosswalks, walkways, and trails should also be studied and implemented in the planning of any new subdivision.

All roadways shall be designed for a minimum of 30 miles per hour or the design speed determined by the township. Maximum centerline grade will be 8 percent.

Stopping sight distance will be the minimum sight distance allowed.

A road alignment may be required by the Town Board and/or the County Environmental Services Department so that their use by through traffic will be discouraged.

Road and street jogs with centerline offsets of less than 150 feet shall be avoided.

In so far as practical, roads and streets shall intersect at right angles and no intersection shall be at an angle of less than 70 degrees. All roads and streets that do not intersect at right angles shall be reviewed by the Dodge County Highway Engineer to insure sufficient sight distance and traffic safety.

Each cul-de-sac shall be provided at the closed end with a turn-around having a minimum outside roadway diameter of 90 feet and minimum road and street property line diameter of 120 feet.

Each road or street shall have a shoulder width of at least three feet but not more than ten feet.

Inslopes shall be a minimum of 1:4 slopes, all slopes shall be free of obstacles to a distance 16 feet from the traveled portion of roadway.

Finished subgrade widths shall be a minimum of 36 feet.

Finished surfaced width shall be a minimum of twenty-four feet plus 3 feet aggregate shoulder on each side.

Shoulder radius at road intersections shall be rounded at a radius of not less than 40 feet.

Grading

All excavation and embankment as well as surfacing shall be finished in reasonable close conformity with the dimensions shown on the typical section and shall be compacted by the "Quality Compaction Method" as provided in "Minnesota Department of Transportation, Standard Specifications for Highway Construction" latest current edition, Specification Number 2105.3.

The upper one foot of topsoil shall be removed from the traveled portion of the roadway and be placed on inslopes and backslopes. In general, when granular materials or select soils are uncovered they shall be placed in the uppermost part of the traveled portion of the roadway.

Sodding and/or seeding shall be provided for on newly developed roadways.

Drainage

Drainage facilities shall be designed for a 25 year storm under a registered engineer's supervision and approved by the engineer. The facilities shall be designed to consider the drainage basin or watershed as a whole and shall accommodate not only runoff from the subdivision or other development, but also, where applicable, the system shall be designed to accommodate the runoff from those areas adjacent to and upstream from the subdivision or other development, as well as its effects on lands downstream.

All drainage systems shall be designed (a) to permit the unimpeded flow of natural water courses, (b) to ensure adequate drainage of all low points.

Culverts and bridge widths shall be at least the width of the roadway and shoulder plus a driver reaction of two feet on both sides. All culverts shall be new.

This information shall be included in the grading plan.

Base and Surfacing

Upon completion of the grading a minimum of 8 inches of compacted Class 2 aggregate shall be placed on the roadway. If the surface is to be paved immediately Class 5 aggregate may be used for the base.

Design strength or surfacing is dictated by the degree and type of traffic, therefore, each project must be considered individually. Each project if surfaced shall meet a minimum standard of a 7-ton design as determined by the County Highway Department. Surfacing should be delayed for one

year after grading or until all homes are completed within the subdivision and are approved by the Township Board.

All materials incorporated into the base and surfacing shall comply with "Minnesota Department of Transportation, Standard Specification of Highway Construction" latest current edition, Specification No. 3138 and 3139.

Preliminary and Final Plats, and Grading Plan

Show exact alignment, gradients, dimensions and other features such as storm drainage, widths of roads or streets, widths of surfacing, etc.. Maximum centerline grade allowed shall be 8 percent.

Show the fundamental design procedure used for culvert and bridge waterway openings. Basically (1) the determination of the design discharge and (2) the determination of the geometric proportions of the drainage structure to accommodate the design discharge.

Provide a typical cross section of roadway showing width of right-of-way, width of roadway, width of surfacing, type and depth of surfacing etc.. If stage construction is to be used develop plans of sufficient geometrics capable of future structural strength.

State road gradients and radii of curves and show drainage computations. All elevation data shall be mean sea level.

Plat all streets, railway right-of-way, utility easements, etc. Sewers, watermains, culverts or other underground facilities. Topography such as lakes, water courses, streams, marsh areas and contours shall be at a reasonable vertical interval.

Approved:

Township - Chairman

Date