ARTICLE XXVII
BETSIE VALLEY TRAIL OVERLAY DISTRICT

Sec. 27.1 INTENT AND PURPOSE

Add a Betsie Valley Trail Corridor Overlay District in which a Special Land Use Permit requiring Site Plan Review by the Planning Commission will be required where any structure that is closer than 39 feet on the interior portion of a curve from the center line of the 10-foot Trail Easement or Trail requiring a Site Plan Review process by the Planning Commission. This applies to all portions of the Betsie Valley Trail Corridor located within Crystal Lake Township identified as that part of the former Ann Arbor Railroad Right-of-Way identified as per the MDOT Right-of-Way maps contained in the Planning Department.

To provide for and protect the public health, safety, and welfare of adjacent landowners, citizens, visitors and users and non users of the Betsie Valley Trail by ensuring that "Reasonable Trail Design Standards" are applied to proposals for either new construction or additions to existing structures located adjacent and contiguous to the Trail along the entire Betsie Valley Trail Corridor including but not limited to the segment hereafter known as the Crystal Lake Segment.

There are four situations which this Article is intended to address where the placement of a structure may cause a safety hazard: 1)the Corridor outside the Crystal Lake Segment, (2)the Corridor with a reduction in width of easements along the Crystal Lake Segment under the terms of the Settlement Agreement, (3)those areas with historical encroachment on the Trail, and (4)instances where the Trail or Future Rail/Utility Easements have been moved with approval by the MDNR/MDOT.

Sec. 27.2 DEFINITIONS

A. Structure - any obstruction defined as a structure in Article II of the Crystal Lake Township Zoning Ordinance.

B. Settlement Agreement or Agreement - refers to the 19th Circuit Court Case, Bigelow, et al. vs. MDOT, et al. and the resulting Consent Agreement.

C. Betsie Valley Trail Corridor - That portion of the former Ann Arbor Railroad Right-of-Way from Thompsonville to Frankfort/Elberta via Benzonia and Beulah formerly owned by the MDOT and sold to the MDNR for use as a Trail Corridor as identified on the Right-of-Way Maps. Only those portions of this Corridor are affected which are under Township Zoning jurisdiction.

D. Crystal Lake Segment - That portion of the Betsie Valley Trail Corridor located along the South Shore of Crystal Lake from Spring Street in Beulah to the Mollineaux Road subject to the Settlement Agreement which was reduced to two easements - one, 10 feet with an 8-foot Trail and the other, a 30-foot future rail/utility easement. Either easement may be relocated in or out of the original right-of-way subject to approval of the property owner, adjacent property owners, and the MDNR and/or MDOT.

E. Reasonable Trail Design Guidelines - as referred to in Section 4.1.1 of the Settlement Agreement, incorporated herein by reference (See Attachment A to this Article).

Sec. 27.3 LOCATION AND SIZE OF STRUCTURES

The Zoning Administrator shall require a Special Use Permit Application and process in all Districts when structures or additions to structures are proposed within 39 feet of the center of the interior portion of a curve of the trail corridor of the Betsie Valley Trail Corridor. All regulations of the Crystal Lake Township Zoning Ordinance, its Overlay Districts, and underlying Zoning Districts will continue to apply.

Sec. 27.4 REASONABLE TRAIL DESIGN GUIDELINES

Reasonable Trail Design Guidelines shall apply to the location of all structures within the overlay district of the Betsie Valley Trail Corridor and not meeting these setback standards.

A. Structure Setback - Prior to approval of the proposed structure location the applicant will supply a letter or permit from the MDNR Trail Coordinator indicating the structure meets minimum "Reasonable" setback standards.

No Structure, proposed or existing, will be constructed or added so as to create unsafe conditions not meeting “Reasonable Trail Design Guidelines”. It is intended that these guidelines will attempt to prevent as many trail use conflicts as possible. Accidents may still occur, but these standards are an attempt to prevent as many as possible.

Sec. 27.5 SITE PLAN

The Site plan shall contain all those requirements as per Article XIV, Sec. 14.17 and Sec. 14.18, of the Crystal Lake Township Zoning Ordinance. In addition, within the Betsie Valley Trail Corridor, including the Crystal Lake Segment, the Trail, Trail easement, any crossings of the trail, and Future Rail/Utility Easement,

shall be located on the Site Plan.

Sec. 27.6 TRAIL CROSSINGS

Where vehicular access to a structure requires crossing the Trail, the applicant shall provide the following:

A. Documentation of ownership of the property in question where the structure is proposed.

B. Documentation that the owner is a party or within the Class of those bound and gaining access by the Settlement Agreement.

C. A letter or permit approving the access or crossing of the trail from the MDNR Trail Coordinator.

D. Property owners not a part of the Class bound by the Settlement Agreement or in the Crystal Lake Segment will require a letter or permit indicating approval of the access to and from the structure, where applicable.

Sec. 27.7 SPECIAL LAND USE PERMIT REQUIRED

Any portion of proposed structures or additions to structures which would lie within 15 feet of the center line of the Trail, or which would potentially either impede vision a distance of 125 feet down the Trail or impose a safety hazard to Trail users or pedestrians crossing the Trail, shall be required to acquire authorization or approval from the MDNR Trail Coordinator prior to review by the Crystal Lake Township Planning Commission.

Sec. 27.8 MDOT 30 FOOT FUTURE RAIL/UTILITY EASEMENT

Structures built on the MDOT Rail/Utility 30 foot Easement will be done so according to the Settlement Agreement and at the sole risk of the property owner(s) without a liability to any other party. Either the MDNR or MDOT may require removal of these structures with a new railroad or utility installation.

Sec. 27.9 TRAIL DESIGN GUIDELINES

A permit for any proposed Structure shall not be approved until the applicant has proven to the Planning Commission the structure meets Reasonable Trail Design Guidelines, incorporated herein by reference (see Attachment B to this Article).

4. Miscellaneous Provisions.

4.1 Obligations with respect to easement.

4.1.1 Use of trail easement.

MDNR will construct and the MDNR and Trail Management Council referred to in the Plan ("TMC") will manage the trail in a manner that will not cause harm, loss, damage, or unreasonable interference with the adjoining fee owners' peaceable use, enjoyment and possession of their property.

The Plaintiffs will allow MDNR to develop and construct a trail within the parameters set forth above in paragraph 3 and its subparts, and will not cause harm, loss, damage, or interfere with the use of the easement by the MDNR and the public. Plaintiffs agree to cooperate with MDNR and the Trail Management Council to eliminate objects, obstructions or visual barriers adjacent to the trail which pose a danger to lawful users of the trail and pedestrians crossing the trail.

Nothing may be placed, parked or stored on the trail easement, and violations of this provision may be enforced by the Trail Management Council, the MDNR or Benzie County and the expense shall be charged to the responsible party.

4.1.2 No duty of Adjoining Owners to maintain easements.

Neither the Trust, nor any subsequent owner of the fee to the right-of-way, shall have any obligation to build, repair or maintain the easements described in this Agreement, except to the extent required by paragraph 3.2 of this Agreement.

Grade

Grades on bicycle paths should be kept to a minimum, especially on long inclines. Grades greater than 5 percent are undesirable because the ascents are difficult for many bicyclists to climb and the descents cause some bicyclists to exceed the speeds at which they are competent. Where terrain dictates, grades over 5 percent and less than 500 feet (150 m) long are acceptable when a higher design speed is used and additional width is provided. Grades steeper than 3 percent may not be practical for bicycle paths with crushed stone surfaces.

Sight Distance

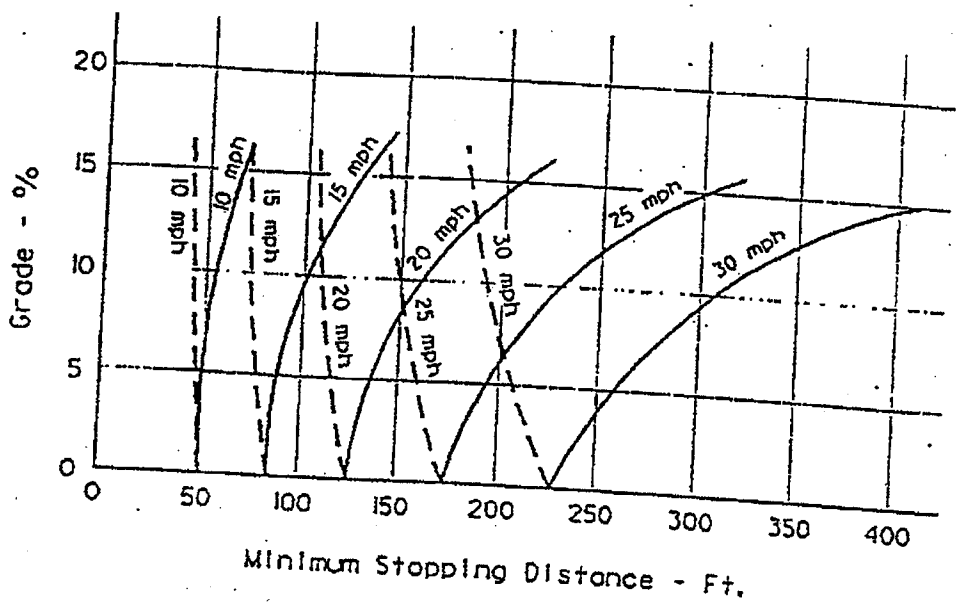
To provide bicyclists with an opportunity to see and react to the unexpected, a bicycle path should be designed with adequate stopping sight distances. The distance required to bring a bicycle to a full controlled stop is a function of the bicyclist's perception and brake reaction time, the initial speed of the bicycle, the coefficient of friction between the tires and the pavement, and the braking ability of the bicycle.

Figure 9 indicates the minimum stopping sight distance for various design speeds and grades based on a total perception and brake reaction time of 2.5 seconds and a coefficient of friction of 0.25 to account for the poor wet weather braking characteristics of many bicycles. For two-way bicycle paths, the sight distance in descending direction, that is, where "G" is negative, will control the design.

Figure 10 is used to select the minimum length of vertical curve necessary to provide minimum stopping sight distance at various speeds on crest vertical curves. The eye height of the bicyclist is assumed to be 4.5 feet (1.4 m) and the object height is assumed to be zero to recognize that impediments to bicycle travel exist at pavement level.

Figure 11 indicates the minimum clearance that should be used to line of sight obstructions for horizontal curves. The lateral clearance is obtained by entering Figure 11 with the stopping sight distance from Figure 9 and the proposed horizontal radius of curvature.

Bicyclists frequently ride abreast of each other on bicycle paths and, on narrow bicycle paths, bicyclists have a tendency to ride near the middle of the path. For these reasons, and because of the serious consequences of a head on bicycle accident, lateral clearances on horizontal curves should be calculated based on the sum of the stopping sight distances for bicyclists traveling in opposite directions around the curve. Where this is not possible or feasible, consideration should be given to widening the path through the curve, installing a yellow center stripe, installing a curve ahead warning sign in accordance with the *MUTCD*, or some combination of these alternatives.



$$S = \frac{V^2}{30(f \pm G)} + 3.67\ V$$

Where: S = Minimum Sight Distance, Ft.
V = Velocity, mph
f = Coefficient of Friction (use 0.25)
G = Grade Ft./Ft. (rise/run)

Decend (-G) ————
Ascend (+G) — — — —

(Metric Conversion: 1 Ft. = 0.3 m, 1 mph = 1.6 km/h)

Figure 9. *Minimum Stopping Sight Distances.*

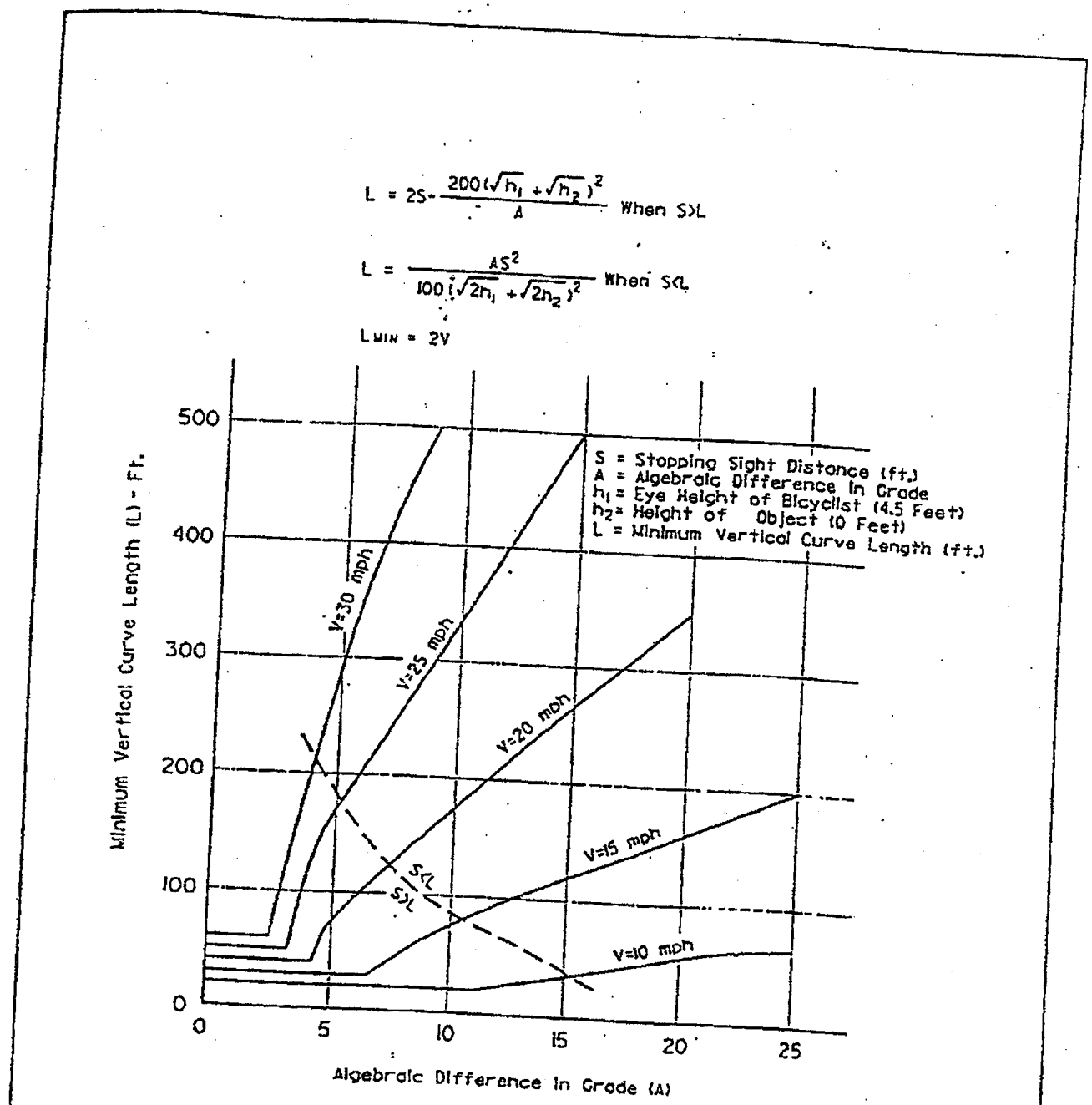
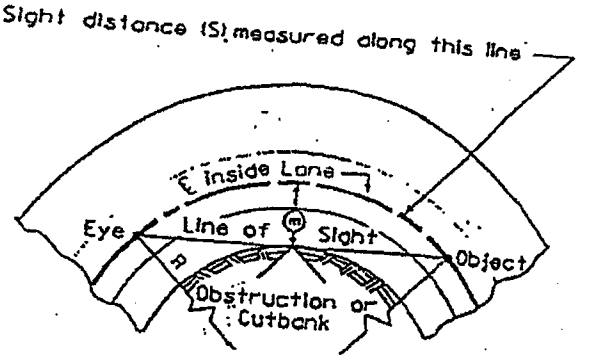


Figure 10. *Minimum Length of Vertical Curves.*



Line of sight is 2.0' above ℄ inside lane at point of obstruction.

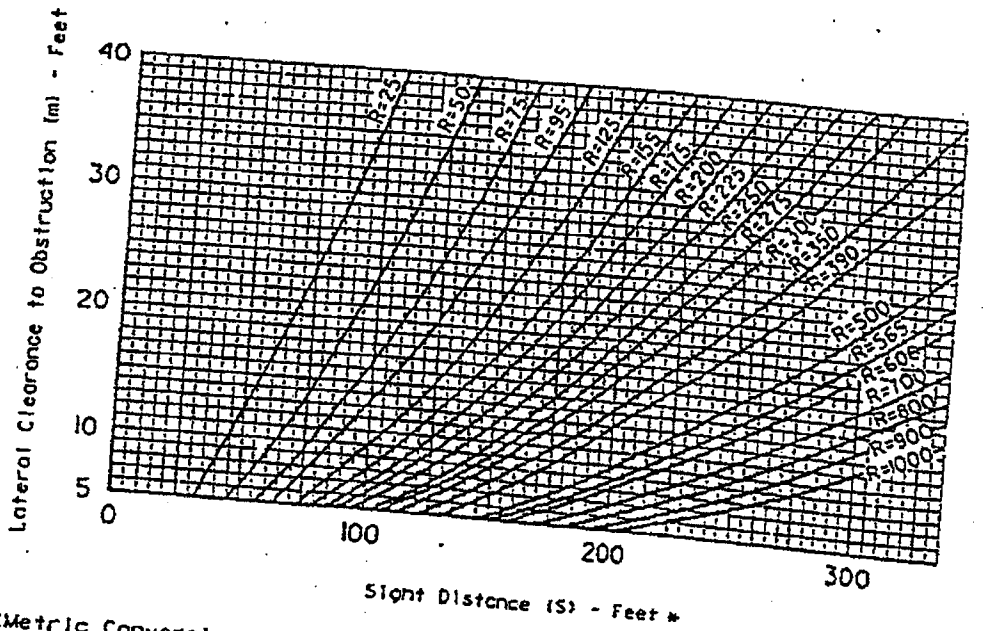
S = Sight distance in feet.
R = Radius of ℄ inside lane in feet.
m = Distance from ℄ inside lane in feet.
V = Design speed for S in mph

Angle is expressed in degrees

$$m = R\left[\text{vers}\left(\frac{28.65S}{R}\right)\right]$$

$$S = \frac{R}{28.65}\left[\cos^{-1}\left(\frac{R-m}{R}\right)\right]$$

Formula applies only when S is equal to or less than length of curve.



(Metric Conversion: 1 Ft. = 0.3 m.)

* Lateral clearances on horizontal curves should be calculated based on the sum of the stopping sight distances for bicyclists travelling in opposite directions around the curve. See text for additional discussion.

Figure 11. *Minimum Lateral Clearances on Horizontal Curves.*